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Editorial

Impact of ChatGPT on Interdisciplinary Nursing Education and Research

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Abstract

ChatGPT, a trending artificial intelligence tool developed by OpenAI, was launched in November 2022. The impact of ChatGPT on the nursing and interdisciplinary research ecosystem is profound.

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KEYWORDS

ChatGPT; nursing education; nursing research; artificial intelligence; OpenAI

ChatGPT (also known as Chat Generative Pretrained Transformer) is a trending artificial intelligence (AI) tool developed by OpenAI [1]. It was first launched in November 2022 based on OpenAI's GPT-3.5 [2], followed by the second release shortly in March 2023 based on GPT-4.0 [3]. Two months after its first release, the number of active users per month reached over 100 million, making ChatGPT the fastest-growing consumer application ever [4]. Technically, ChatGPT is a large language model-based chatbot that performs specific natural language processing tasks. For people who believe in deep learning technologies, they will immediately tell from the name of ChatGPT that the powerfulness of this tool is largely attributed to the attention model introduced by a group of Google researchers in 2017 [5]; however, even among users who are new to AI, ChatGPT is still well accepted as its user interface is straightforward with all the complex technical details hidden. More importantly, it is almost omnipotent in terms of answering a wide variety of questions like a knowledgeable human being most of the time.

Training ChatGPT for its versatility and powerfulness is not cheap. According to miscellaneous information sources, OpenAI originally used ~40 GB of text data to train the early GPT model with 8 NVIDIA V100 GPUs and 256 GB of RAM. To train GPT-3, which laid the foundation for ChatGPT, the 2016-2019 Common Crawl data set [6] of 45 TB of compressed plain text was used. Nowadays the data set used for training ChatGPT consists of more than 145 million dialogues scraped from various social media and online knowledge bases (eg, Twitter,

Reddit, and Wikipedia). Note that it is also expensive to clean up such text data as spam, offensive language, low-quality content, and so on need to be removed before they can be fed to ChatGPT. The typical hardware configuration for training ChatGPT may include 64 or more NVLink-connected NVIDIA V100 GPUs with 32 GB of memory each, and each round of training may take 2 weeks. The estimated cost of training ChatGPT is close to US \$5 million dollars, and for general large language models, the training cost falls between US \$2 million and US \$12 million [7]. OpenAI obviously found the right business model to *share* such costs via, for example, a monthly user subscription, so there are strong reasons to believe that ChatGPT will survive well into the foreseeable future. In addition, Microsoft, the big investor behind OpenAI, recently announced a series of Office products that will be deeply integrated with ChatGPT for AI-assisted productivity improvement. OpenAI also launched its own application store, and it allows connection to >5000 other applications via the Zapier ChatGPT plug-in. ChatGPT looks unstoppable.

There have been various concerns about AI since its concept was consolidated back in the 1950s. Many people deem ChatGPT as the first genuine and universal AI product; it is thus not surprising that a wide variety of concerns have been raised about ChatGPT, especially given its popularity and versatility. One such important question is what jobs will be replaced by ChatGPT soon. Interestingly, ChatGPT itself can answer this question, although this does not help to relieve the concern. According to the many such answers available online,

ChatGPT is likely to replace many jobs for which frequent human-to-human interactions are replaceable or not necessarily required, such as customer service representatives, translators, entry-level clerks, telemarketers, tutors, and virtual assistants. ChatGPT is also good at certain advanced tasks that are traditionally performed by domain experts. For instance, as this editorial is being written, several PhD students under our supervision are using ChatGPT for computer coding, data analysis, and even theoretical proof. It turns out that ChatGPT can build a pipeline for vital sign signal (eg, electrocardiogram, electroencephalogram) preprocessing in 3 seconds, which usually takes months to train a PhD student to accomplish. People are also experimenting with ChatGPT-assisted content development such as paint, video games, and movies. The impact of ChatGPT on our job market is real.

How is ChatGPT changing nursing and health care education? Trained on big data, ChatGPT is probably more knowledgeable than many human instructors in almost every discipline, especially on basic- to moderate-level topics. Additionally, remember that ChatGPT is an evolved form of a search engine: it can locate knowledge new to itself when necessary. ChatGPT is as competent and self-motivated as an omniscient human instructor in many senses; therefore, it is not surprising if ChatGPT becomes a component of the nursing education system in the near future, assuming health care policy makers and educators are not against such AI technologies. Even if this scenario does not happen soon, it is hard to believe that people will not use ChatGPT as a tutor or for self-teaching. In short, ChatGPT will play its role in education sooner or later. However, multiple institutions/divisions/departments/individuals have banned the use of ChatGPT by students in, for example,

article writing and homework assignments. While the underneath ethic concerns (eg, on plagiarism) are completely legitimate, the ban of ChatGPT may not last long for many reasons, one of which is that Microsoft is integrating ChatGPT into their prevailing Office products under the name brand Microsoft 365 Copilot. Our educators and policy makers may need to rethink and reshape our education system by allowing students to use ChatGPT as a learning assistant.

The impact of ChatGPT on the nursing and interdisciplinary research ecosystem is profound. For instance, a recent study presented AI-enhanced protein design and discovered proteins that never existed before [8]. We also witnessed the recent use of ChatGPT in various scientific questions like intelligent transportation [9]; drug discovery [10]; and nursing education, research, and practice [11]. Some interesting questions include whether researchers who know better about AI technologies and have more access to AI tools will be able to do better research in terms of, for example, productivity and quality. Additionally, if AI technology becomes the biggest determining factor in research, how should we evaluate human researchers' contributions? Will it become more difficult for junior researchers to establish their own independent research programs? How should we train the next generation of multidisciplinary researchers and scientists?

Finally, ChatGPT's competitors like Google Bard should be mentioned to avoid the impression that ChatGPT is the single AI tool dominating our world. It is of significant interest to observe whether OpenAI's and Google's AI products have different *personalities* and capacities, thus rendering more human diversity and creativity.

Conflicts of Interest

None declared.

References

1. Radford A, Narasimhan K, Salimans T, Sutskever I. Improving language understanding by generative pre-training. OpenAI posted online on June 11, 2018.
2. Bavarian M, Jiang A, Jun H, Pondé H. OpenAI. 2022 Mar 15. URL: <https://openai.com/blog/gpt-3-edit-insert> [accessed 2021-01-23]
3. OpenAI. GPT-4 technical report. arXiv Preprint posted online on March 15, 2023. [doi: [10.48550/arXiv.2303.08774](https://arxiv.org/abs/10.48550/arXiv.2303.08774)]
4. Gordon C. ChatGPT is the fastest growing app in the history of web applications. Forbes. 2023 Feb 02. URL: <https://tinyurl.com/yfmw8vk7> [accessed 2023-03-27]
5. Vaswani A, Shazeer N, Parmar N, Uszkoreit J, Jones L, Gomez AN, et al. Attention is all you need. 2017 Presented at: Advances in Neural Information Processing Systems 30; December 4-9, 2017; Long Beach, CA.
6. Patel JM. Introduction to common crawl datasets. In: Getting Structured Data from the Internet: Running Web Crawlers/Scrapers on a Big Data Production Scale. Berkeley, CA: Apress; 2020:277-324.
7. Li C. OpenAI's GPT-3 language model: a technical overview. Lambda. 2020 Jun 03. URL: <https://lambdalabs.com/blog/demystifying-gpt-3> [accessed 2023-04-17]
8. Eisenstein M. AI-enhanced protein design makes proteins that have never existed. Nat Biotechnol 2023 Mar;41(3):303-305 [FREE Full text] [doi: [10.1038/s41587-023-01705-y](https://doi.org/10.1038/s41587-023-01705-y)] [Medline: [36823357](https://pubmed.ncbi.nlm.nih.gov/36823357/)]
9. Zheng O, Abdel-Aty M, Wang D, Wang Z, Ding S. ChatGPT is on the horizon: could a large language model be all we need for intelligent transportation? arXiv Preprint posted online on March 6, 2023. [doi: [10.48550/arXiv.2303.05382](https://arxiv.org/abs/10.48550/arXiv.2303.05382)]
10. Sharma G, Thakur A. ChatGPT in drug discovery. ChemRxiv Preprint posted online on January 31, 2023. [doi: [10.26434/chemrxiv-2023-qgs3k](https://doi.org/10.26434/chemrxiv-2023-qgs3k)]

11. Sallam M. ChatGPT utility in healthcare education, research, and practice: systematic review on the promising perspectives and valid concerns. *Healthcare (Basel)* 2023 Mar 19;11(6):887 [FREE Full text] [doi: [10.3390/healthcare11060887](https://doi.org/10.3390/healthcare11060887)] [Medline: [36981544](https://pubmed.ncbi.nlm.nih.gov/36981544/)]

Abbreviations

AI: artificial intelligence

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Review

An Introduction to Faculty Diversity, Equity, and Inclusion for Excellence in Nurse Education: Literature Review

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Abstract

Background: The diversity of the world's population is increasing, along with the health inequities of underrepresented minority populations. To provide high-quality care to all patients, nurses require an understanding of diversity, equity, and inclusion (DEI) as well as how to implement best practices. Nurse educators are the ones to lead the way for DEI education for students.

Objective: This paper aims to describe the findings of a literature review that introduces DEI concepts for excellence in nurse education and their related benefits. Best practices for actions to address DEI in nursing education will be described.

Methods: After institutional review board approval, a literature search yielded 61 articles using 15 distinct keywords in 4 global, peer-reviewed literature databases. Melynk and Fineout-Overholt's (2023) Levels of Evidence guided the process of selecting 26 peer-reviewed articles and resources.

Results: Common themes for best practices in DEI were identified. These themes included recruiting underrepresented minority nursing faculty, incorporating DEI into an institution's mission statement, addressing DEI topics in curricula, providing leadership, having a DEI strategic plan, developing education, developing data-based interventions, instilling policy change, partnering in outreach, targeting impact on hiring committees, recognizing DEI work, and providing mentorship.

Conclusions: In summary, this literature review provides several strategies to address DEI for nurse educators. Committing to DEI efforts and improving diversity in the nurse educator workforce are integral steps in improving the quality and inclusivity of nursing education and ultimately improving the health of our communities.

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nursing education; diversity; equity; inclusion; inclusive; nursing; allied health; medical education; nurse; nurses; health care education; curriculum; DEI; teaching; educator; educators; hiring; recruiting; recruitment; teacher; teachers

Introduction

It is well known that the diversity of the world's population is increasing, along with the health inequities of underrepresented minority populations. To provide high-quality care to all patients, nurses need to understand diversity, equity, and inclusion (DEI) and implement best practices. The American Association of Colleges of Nursing (AACN) [1] declared the need for DEI in nursing academia to better prepare future nurses.

Nursing educators are in a prime role to lead education about DEI for the next generation of nurses.

In the United States, the proportion of full-time underrepresented minority nursing educators was 18% in 2019 [2,3]. In the state of Illinois, 20.1% of nurse educators identified as an underrepresented minority, which falls short in contrast to the 31.3% of underrepresented minority nursing students [2]. Efforts to increase the number of underrepresented minority nursing educators must be put into place to better match the needs of the student population. AACN [4] supports expanding the

diversity of nurse educators. To strengthen the quality of nursing education in DEI to promote the inclusion of underrepresented students, recruiting more diverse nursing educators is essential. Diverse nurse educators provide a diversity of perspectives and faculty to attract aspiring underrepresented minority students.

The objective of this paper is to provide the results of a literature review that introduces DEI concepts for excellence in nurse education and their related benefits. Evidence-based best practices for actions to address DEI in nursing education will be discussed.

Methods

Ethics Approval

The Lewis University Institutional Review Board approved this educational research on March 25, 2022.

Procedure

A literature review was done to investigate what is known about the attitudes, beliefs, and strategies related to building cultural competence among staff and faculty in a school setting. Primo, ProQuest, Google Scholar, and Mendeley were used to perform the literature review that yielded 61 articles and readings.

The following keywords were searched in variation for this literature review: *cultural competency, nurse educators, training, supporting diverse nursing faculty, diversity of nursing faculty, nursing faculty diversity, inclusivity for nursing faculty, holistic review, diversity, nursing workforce, holistic admissions, cultural competence, nursing, and influence on students and diversity.*

Melynk and Fineout-Overholt's Levels of Evidence [5] were used during the process of finding peer-reviewed articles for this literature review. All articles included were either primary or secondary sources and were written within the last 5 years.

Textbox 1. Definitions of diversity, equity, and inclusion.

Diversity

"A broad range of individual, population, and social characteristics, including but not limited to age; sex; race; ethnicity; sexual orientation; gender identity; family structures; geographic locations; national origin; immigrants and refugees; language; physical, functional, and learning abilities; religious beliefs; and socioeconomic status."

Equity

"The ability to recognize the differences in the resources or knowledge needed to allow individuals to fully participate in society, including access to higher education, with the goal of overcoming obstacles to ensure fairness."

Inclusion

"Environmental and organizational cultures in which faculty, students, staff, and administrators with diverse characteristics thrive."

Note: Definitions are taken from the American Association of Colleges of Nursing [1].

Benefits of Diversity in the Nurse Educator Workforce

One key benefit of diversity in the nurse educator workforce is a better representation of the diversity of the student population. An institution with diverse nursing faculty and staff attracts and inspires current and prospective students to identify with their educators. Students associating with faculty whom they identify with promotes a sense of belonging. Alsulami and Sherwood [7] note that underrepresented minority students are motivated

The search for DEI concepts was researched first through the AACN. Having a defined set of DEI concepts directed subsequent articles that sought the benefits of diversity in the nurse educator workforce.

Results

Overview

The following definitions and suggestions are the result of the literature review. Many resources in nursing education look to the AACN for how to define DEI. These definitions will be provided. "Benefits of diversity in the nursing workforce" was a common theme within each of the articles and resources examined. These benefits will also be provided.

After an examination of the literature, common themes for best practices in DEI were identified. These themes include recruiting underrepresented minority nursing faculty, incorporating DEI into an institution's mission statement, addressing DEI topics in curriculum, providing leadership, having a DEI strategic plan, developing education, developing data-based interventions, instilling policy change, partnering in outreach, targeting impact on hiring committees, recognizing DEI work, and providing mentorship.

Defining DEI

The AACN [1] provides important definitions (Textbox 1) for the terms diversity, equity, and inclusion. It is necessary to be knowledgeable of the many aspects that encompass DEI to fully grasp the importance of diversifying the nurse educator workforce. An institution that values and embraces DEI efforts, appreciates opposing opinions, inspires innovative problem-solving strategies, and boosts creativity within the academic institution is more likely to draw diverse applicants [6].

by seeing themselves represented by faculty who are successful in their careers. AACN [8] adds that underrepresented minority nursing faculty can inspire students looking to join the nursing profession. Increasing the diversity of underrepresented minority faculty members enriches the cultural climate of a teaching institution. The Center for American Progress emphasizes the importance of recruitment and retention of a diversity of faculty members to combat the imbalance of diversity between students and educators [9].

Guler [10] demonstrates that diverse students need diverse and inclusive teaching approaches. Educators with the best intentions verbalized frustration connecting with a diversity of students. For example, 65% of faculty members reported they did not have enough training to educate culturally and linguistically diverse students properly [10]. Volpe [11] added that underrepresented minority students attending schools with a lack of diversity reported feeling alone and unsupported. To solve this dilemma, Partelow et al [9] stated that recruiting faculty from underrepresented minority groups will help improve culturally responsive teaching. Diversity in language and culture is a positive experience for classroom learning allowing students to learn from both educators and peers. A diversity of nurse educators provides different outlooks, pedagogies, and experiences enriching the education of the students [7]. The ultimate goal would be to recruit a widely diverse faculty to support a diversity of students, increase inclusivity in the organization, and improve the cultural climate.

Discussion

Principal Findings

In the search for excellence in the recruitment of diverse nursing faculty, several common strategies were identified. The following practical strategies, created from a thorough literature review, can be applied to any school of nursing for the creation of a more culturally inclusive environment that supports a diversity of nurse educators.

Mission Statement

A mission statement conveys the purpose and intentions of the group and sets the tone for the group culture. A clear mission statement for nursing regarding DEI is critical for understanding the culture, holding leaders accountable, and directing the learning environment [4]. Therefore, the first step in creating a more diverse nursing faculty is a mission statement driven by DEI principles. By doing so, a mission statement dedicated to providing culturally competent education is indisputable. Moreover, Alsulami and Sherwood [7] found that faculty development offerings led to greater job satisfaction for underrepresented minority faculty when the mission and culture of the university were highlighted. The mission statement is the nucleus of an institution, guiding all actions.

A mission statement that describes values in DEI also helps support and sustain faculty work. Retention rates for underrepresented minority faculty were increased in institutions with mission statements embedding DEI values [7]. However, it is important to discern that simply rewording a mission statement to add popular DEI catchphrases will not be effective. Having core DEI values requires measurable initiatives for call-to-action stances on social justice to mean something [12]. This means that a mission statement driven by DEI principles is a first step, which then needs to be the anchor for a school's set of priorities, resources, and decisions, and in turn, be evident in the campus climate [13]. For example, the University of Pennsylvania School of Nursing exhibits its commitment to diversity through its mission statement, its Office of Diversity and Inclusivity's strategic goals to prioritize diversity in the social and cultural life of the campus, and its attentiveness to

adding cultural competence into the curriculum [14]. The mission statement of a school is a vital message to the community.

Curriculum

The incorporation of DEI concepts within the curriculum in nursing programs is a key component in attracting diverse faculty members. For example, a community health course can concentrate its clinical portion of the course on providing care to historically underserved populations, while continuing to practice their fundamental skills [13]. In another instance, in a nursing research course, a class assignment could incorporate the identification of DEI topics, retrieve related research articles, create in-class discussions, and participate in reflection activities about their given topic [15]. It was found through student course evaluations that incorporating DEI helped create a more inclusive learning environment and supported their personal growth. A more diverse group of nursing faculty and students cannot be accomplished without intentionally including DEI concepts in the curriculum and learning environment [16].

Syllabi within the nursing curriculum communicates class expectations. Among these expectations, the creation of an inclusive learning space is fundamental. The learning space includes the physical classroom, internet-based classroom, and experiential clinical setting. For example, Lewis University promotes a sanctified zone where learning spaces encourage diversity and oppose bias and prejudice [17]. Communicating a persistent and consistent inclusive message to the students and community in course syllabi is a practical way to support faculty diversity and recruit potentially underrepresented minority faculty. Prospective underrepresented minority faculty will find value in the addition of DEI concepts in the curriculum on which they base their work.

Loyola Marymount University's School of Education stands as an example to other universities for how they prepare their educators to serve a diverse student body. For example, a significant portion (40%) of their teaching competencies are specifically related to diversity [9]. Examples of diversity-specific teaching competencies incorporate advocacy for social justice and inclusion, respect for all individuals, and leadership that is moral and caring [9]. Having the next generation of educators meet these competencies demonstrates a commitment to diversity and ensures educators have the ability to teach in an inclusive way. A diversity of prospective faculty will see that the school of nursing values DEI, as stated in their mission, when the curriculum provides learning opportunities regarding DEI efforts.

Academic Leadership

Leaders in academia uphold the mission statement of the learning institution. In doing so, the cultural expectations of faculty are outlined. However, it is known that unconscious bias is a characteristic of being human. Everyone has their own biases. Unfortunately, biases from academic leaders or faculty members can unintentionally hinder the ability to recruit diverse nursing faculty members [1]. It is recommended that all leadership and faculty members increase their self-awareness of bias and reflect on how that bias could impact a nursing

school's endeavor to improve DEI efforts. More importantly, it is recommended to reflect on how bias can be overcome to promote DEI efforts.

Strategies to overcome bias include self-assessments on awareness and identification of individual biases. Subsequently, education and support to empower faculty with knowledge for personal and professional development is a responsibility of leadership. Resources, continuing education, and readings on inclusivity and bias are helpful for all faculty members to learn and grow. Byrd et al [18] highlight the importance of self-study on the topic of inclusivity and actively exposing oneself to diverse viewpoints. Inclusive leadership includes a diversity of perspectives for making decisions. Inclusive leaders promote diverse thinking while ensuring a respectful environment for discernment.

Along with biases, lack of support is another barrier in leadership for the recruitment and retention of diverse nursing faculty members. Iheduru-Anderson et al [19] found that many Black nurse leaders felt a lack of support from the institution's leadership. Actions such as the absence of academic leadership at important DEI events conveyed the message that these events are not significant [19]. AACN [4] highlights the importance of leadership participating in DEI activities and evidence-based training to ensure that the school can fulfill its commitment to advancing the quality of nursing education regarding DEI. An academic leadership team that is visible and campaigns for DEI initiatives will assist in recruiting diverse faculty members.

There are many other ways a leadership team can demonstrate a positive cultural climate for the promotion of diversity. Embracing differences, ensuring proper work-life balance, valuing a diversity of educators' voices through inclusion in decision-making procedures, and rewarding faculty members for DEI-related work are a few examples [7]. Leaders at the highest level of the institution must consistently convey the importance of diversity and inclusion to support underrepresented minority faculty to feel "that their presence on campus is part of the collective group, not a representation of the invisible few" [7,10]. In other words, the value of a diversity of underrepresented minority faculty members should be evident in all facets of the institution and continually reinforced by leadership.

DEI Strategic Plan

A DEI strategic plan is a document that communicates the strategies and goals regarding DEI efforts of the learning institution and provides ways to become a more inclusive and equitable environment. A DEI strategic action plan will identify stakeholders, set goals, create objectives, and develop outcomes and metrics that all align with the mission of the institution [4]. One of the first actions to include in a DEI strategic plan is the creation of a DEI committee to facilitate efforts [11]. The addition of a DEI leader can also assist with coordinating efforts between departments and the university, serving as a resource for mentorship and faculty advice, promoting a welcoming culture for a diversity of educators, and leading the nursing school's DEI committee [4]. The DEI strategic plan and DEI committee are a powerful duo. Prospective and current nursing

faculty will appreciate the guidance of a clear plan and feel supported by the DEI committee members.

The University of Pennsylvania School of Nursing proves to be a model for excellence in diversity and inclusion as demonstrated by the key performance indicator of faculty diversity. As of 2018, the University of Pennsylvania School of Nursing was one of 3 schools to have an Office of Equity and Inclusion [14]. This office focuses on the promotion of classroom strategies to ensure culturally sensitive and inclusive teaching-learning strategies and provides support to underrepresented minority faculty and students. As a result, the University of Pennsylvania School of Nursing has achieved a faculty diversity rate of 24.5% underrepresented minority faculty members [14]. This percentage is notably greater than the 2019 national average of 18% full-time diverse faculty members [3]. The University of Pennsylvania School of Nursing introduced a position called the Diversity Search Advisor to create hiring goals and strategies for promoting diversity. Some of these strategies include organizing implicit bias workshops for faculty search committees, improving university policies that relate to diversity and inclusion, and scheduling discussions about how to increase the pool of diverse applicants [14]. These strategies display the school of nursing's commitment to diversity, which has been successful in increasing faculty diversity.

Faculty Education

Although a DEI strategic plan is key for an organization dedicated to the promises of providing fair opportunities for all students, it is important to take it a step further and ensure that all faculty and staff are fully knowledgeable to implement these actions. AACN [4] prepared a DEI Tool Kit to guide and assist schools of nursing with implementing DEI strategies, expanding the capacity of nursing faculty to grow professionally and personally. Evidence-based resources and exemplar models are provided to give faculty the tools necessary to build an inclusive teaching and learning environment [4]. For example, the DEI Tool Kit contains an area called "Access and Success" that recommends developing a recruitment plan to expand the diversity pool for the next generation of nurses, creating a pipeline program for underrepresented minority high school students, and establishing articulation agreements from associate degree and baccalaureate degree programs through graduate studies to promote educational advancement. There are 3 additional areas in the DEI Tool Kit—Institutional Viability and Capacity, Climate and Intergroup Relations, and Education and Scholarship—providing a variety of strategies to advance DEI work. To support faculty education related to the DEI Tool Kit, AACN offers a series of free Inclusive Excellence webinars.

Research shows that many faculty members have a low sense of self-efficacy related to teaching DEI concepts [20]. One way to implement faculty education is to start with new faculty orientation that sets expectations for the faculty role in optimizing the learning space as inclusive and safe. Subsequent educational offerings can be expected on a regular basis as one way to meet the requirements for promotion and tenure. These offerings for DEI education should include current faculty members. Institutions that used educational interventions for DEI training saw more student success, increased faculty

involvement, and positive faculty feedback [7]. O'Connor et al [20] conducted an incentivized 3-day DEI institute to give faculty the knowledge and skills to embrace DEI concepts and create culturally competent teaching practices. The offering of the DEI institute found statistically significant increases in faculty and staff self-efficacy in teaching DEI-related topics [20]. Many of the participants felt that the training would improve their teaching and that DEI-based learning is valuable to consider in yearly faculty competencies.

Iheduru-Anderson et al [19] suggested that cultural competency education should cover topics such as racism, microaggressions, diversity, and inclusion. It is important that these sensitive topics are covered in separate interactive and introspective educational modules to promote self-awareness, empathy, and compassion for others. An institution that offers continuing education to faculty on DEI concepts is attractive to prospective and current underrepresented minority faculty to promote inclusion and enhance knowledge, thereby assisting in the recruitment and retention of faculty.

Data

Another key step for excellence in the recruitment of underrepresented minority nursing faculty is the use of data. Data are well known to drive institutional decision-making. Collecting data regarding faculty and student recruitment practices, acceptance rates, retention rates, and progression to measure and compare performance among groups will be informative for making decisions [11]. Metrics keep track of performance and assessments of the current climate. Some examples of metrics and data are the Center for Urban Education's Racial Equity Tools, climate surveys, and governance committees' feedback.

The University of Southern California's Center for Urban Education developed Racial Equity Tools, broken down into 4 phases, with the goal of improving racial justice in education [21]. The University of Southern California uses these tools to identify gaps in practices, policies, or individual beliefs to promote equity in the educational outcomes and opportunities for underrepresented minority students [21]. These tools are user-friendly and able to be used without a facilitator's assistance. Data results inform the institution's ability to learn about its areas of success and growth.

Another helpful metric for data on performance is an institutional climate survey. Climate surveys measure the perceptions of an institution's culture and provide a voice for participants to offer feedback as to what the institution is doing well, where there is room for improvement, and how the institution supports DEI efforts. To change the climate of academic nursing to value inclusion and diversity, the experiences of those impacted by these matters should be assessed through climate surveys. Climate surveys are deployed on a routine basis to provide a snapshot of the current climate and gather comparative data over time. Positive results from cultural climate surveys lead to greater retention of underrepresented minority faculty [22]. Similar to the Racial Equity Tools, a climate survey allows institutions to identify both areas of success and growth.

Viewpoints from current students, faculty, and staff members provide important details on the institutional culture and tips for addressing areas for growth. Byrd [13] found that nursing education programs successful at increasing DEI efforts obtain students' input often through governance committees and focus groups. This information is used to make changes, whether changes to outdated policies or enhancements in the classroom to promote effective teaching strategies. Data and feedback help to inform institutions about the need to create a diverse and inclusive academic environment.

Policy Change

Institutional, departmental, and programmatic policies need to reflect the commitment to DEI and support the DEI strategic plan. Policies and procedures regarding recruitment, acceptance, and progression of both faculty and students are of particular importance [11]. Taking action to address outdated policies and procedures speaks volumes to the perceived value and commitment to DEI work. According to AACN [4], there should be a continual review of current policies to remove barriers that prevent the advancement of DEI efforts. Examination of policy language is recommended for the reduction and elimination of any systemic bias or prejudice.

The gap in diversity between the educator workforce and the student population is wide. Policy changes regarding the improved recruitment and retention of underrepresented minority faculty members could help lessen this gap [7,9,11]. Institutional policies and key performance indicators need to involve inclusion and equitable work environments. For example, learning institutions could incorporate inclusive procedures to hire based on merit while also mitigating bias in search committees. Reducing bias includes addressing any prejudgments related to age, race, gender, or other characteristics that are not related to performance.

Outreach

The establishment of strategic partnerships throughout the community is a key step in increasing the pipeline of prospective underrepresented minority faculty members [11]. For example, the University of Pennsylvania School of Nursing uses the Diversity Search Advisor to represent the school of nursing at outreach events, internal and external meetings, and consultations with a diversity of community and educational leaders to attract a diversity of student and faculty applicants [14]. It is helpful for a leader who is knowledgeable and comfortable with DEI concepts to promote community partnerships. Along the same lines, Teach for America strategies for recruitment can be helpful [9]. The members of Teach for America have a role in expanding awareness of goals for diversity and advocacy of inclusion for prospective applicants. For example, campuses with a high percentage of a diverse student population, accredited historically black colleges and universities, and Hispanic-serving institutions are ideal places to form relationships with future students and educators [9].

The most effective nursing programs integrate outreach with recruitment. For example, in the United States, every public school district's data on student diversity are made available to the public. Nursing leaders and DEI experts can select to partner

with schools that serve a diverse student body. Increasing the number of underrepresented minority nursing students ultimately increases the number of potential future underrepresented minority nurse educators.

Hiring Committee

Displaying diversity in the search committee and using a holistic hiring process are two key steps to recruiting more diverse nurse educators. AACN recommends a guide provided by Columbia University as an exemplar for best practices in faculty search and hiring [4,23]. Columbia University [23] recommends that the recruitment and hiring of diverse candidates should be done in a space where the hiring committee is also diverse. In line with this, a web-based survey found that nurse educator applicants from underrepresented minority groups would prefer to see a more diverse hiring committee that is a better representation of themselves during the interview process to foster a sense of belonging [24].

Using a holistic hiring approach includes an examination of the applicant as a whole person. A holistic hiring approach considers more than a narrow view of the person's professional skill set. Rather, the holistic hiring approach will examine the applicant's values, how they interact with others, and their potential longevity with the institution. Incorporating a holistic hiring approach can prove beneficial for the overall culture of the workplace.

Recognition of Work

The role of faculty members includes not only teaching and scholarship but also university service, such as participating in DEI committees or mentoring programs. Service contributions, when speaking of promotion and tenure, are given less weight compared to research, teaching, or clinical practice [13]. DeWitty and Murray [22] report underrepresented minority faculty often serve on DEI committees and participate in DEI events, but this work is not as highly valued as research or scholarship. As a result, underrepresented minority faculty often feel unsupported and have less time for promotion, tenure, and professional development [7]. DEI work is important to driving the learning institution's mission and needs to be counted as valuable to career advancement. Giving credit to DEI work will support faculty retention, promotion, and tenure. It is recommended to give greater weight to activities that promote and influence diversity in an institution in the promotion and tenure process [13].

Iheduru-Anderson et al [19] report on the negative experiences of Black women in academic nursing and the increased responsibilities assumed of them. For example, it was reported that colleagues often expected the Black nurse educator to be the leader of diversity and inclusion committees or the planner of cultural competency training, without providing proper

resources. From the mission statement to the promotion and tenure process, a just and inclusive culture provides support and welcomes all to the role and shared responsibilities of being a faculty member within the nursing community.

Indiana University-Purdue University Indianapolis (IUPUI) is one of the first institutions to begin compensating employees, through tenure and promotion, for DEI-related work [25]. IUPUI's policy gives credit to accomplished work that strengthens the institution's efforts toward being inclusive and rewards those contributing to DEI. For example, an African American assistant professor at IUPUI described how she was asked to participate in many DEI-related roles, and because of the policy change, her research on DEI excellence in service counts for promotion [25]. It is well known that promotion and career advancement are key factors in attracting faculty. In the recruitment of diverse faculty members, the importance of recognition for DEI-related work should be highlighted, especially in terms of promotion and tenure.

Mentorship

Research shows that faculty members value the support of mentorship. There are data supporting the number of underrepresented minority faculty lost to tenure rejection or attrition [25]. Byrd [13] found that a significant factor in the retention of underrepresented minority faculty is offering a high-quality mentoring program. Mentorship has been shown to increase a sense of belonging, confidence, and support while fostering an environment of equity where equal pay and promotion occur fairly [26,27]. Mentorship would provide professional and personal support, in turn preventing attrition.

One exemplary organization for mentorship is Penn State, whose nursing program provides mentorship programs, faculty development opportunities, training, and workshops [14]. Another impactful factor for the retention and recruitment of faculty includes support from colleagues and leaders [7]. Forms of support include mentorship, quality new employee orientation, and continuing faculty development. Having a multitude of options for faculty to connect and learn with and from each other is invaluable.

Conclusions

Diversifying the nurse educator workforce is an essential strategy for creating a more equitable environment. The increasing diversity of nursing students and the next generation of nurse educators requires nursing education to evolve. Adopting best practices for the recruitment and retention of underrepresented minority faculty members will expand the pipeline of nurse educators. Committing to DEI efforts and improving diversity in the nurse educator workforce are integral steps in improving the quality and inclusivity of nursing education, ultimately improving the health of our communities.

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Conflicts of Interest

None declared.

References

1. Diversity, equity, and inclusion in academic nursing: AACN Position Statement. American Association of Colleges of Nursing. 2017. URL: <https://www.aacnnursing.org/Portals/0/PDFs/Position-Statements/Diversity-Inclusion.pdf> [accessed 2022-03-05]
2. Nursing faculty: a spotlight on diversity. American Association of Colleges of Nursing. 2017. URL: <https://www.aacnnursing.org/portals/0/PDFs/DEI/diversity-spotlight.pdf> [accessed 2022-02-05]
3. Distribution full-time nurse educators by race, 2019. National League for Nursing. 2019. URL: https://www.nln.org/docs/default-source/uploadedfiles/default-document-library/distribtion-of-full-time-nurse-educators-by-race-2019-pdf.pdf?sfvrsn=ca00d_0 [accessed 2022-02-05]
4. American Association of Colleges of Nursing. 2021. URL: <http://www.aacnnursing.org/Portals/42/Diversity/Diversity-Tool-Kit.pdf> [accessed 2022-02-15]
5. Melnyk BM. In: Fineout-Overholt E, editor. Evidence-Based Practice in Nursing & Healthcare : A Guide to Best Practice (Fifth Edition). Philadelphia, PA: Wolters Kluwer; 2023.
6. Khuntia J, Ning X, Cascio W, Stacey R. Valuing diversity and inclusion in health care to equip the workforce: survey study and pathway analysis. JMIR Form Res 2022 May 06;6(5):e34808 [FREE Full text] [doi: [10.2196/34808](https://doi.org/10.2196/34808)] [Medline: [35452404](https://pubmed.ncbi.nlm.nih.gov/35452404/)]
7. Alsulami SA, Sherwood G. The experience of culturally diverse faculty in academic environments: a multi-country scoping review. Nurse Educ Pract 2020 Mar;44:102777. [doi: [10.1016/j.nepr.2020.102777](https://doi.org/10.1016/j.nepr.2020.102777)] [Medline: [32252017](https://pubmed.ncbi.nlm.nih.gov/32252017/)]
8. Rosseter, Robert. Fact sheet: enhancing diversity in the nursing workforce. American Association of Colleges of Nursing. 2023 Apr. URL: <https://www.aacnnursing.org/Portals/0/PDFs/Fact-Sheets/Enhancing-Diversity-Factsheet.pdf> [accessed 2022-02-10]
9. Partelow L, Spong A, Brown C, Johnson S. America needs more teachers of color and a more selective teaching profession. CAP 20. 2017. URL: <https://www.americanprogress.org/article/america-needs-teachers-color-selective-teaching-profession/> [accessed 2022-03-12]
10. Guler N. Teaching culturally and linguistically diverse students: exploring the challenges and perceptions of nursing faculty. Nurs Educ Perspect 2022;43(1):11-13. [doi: [10.1097/01.NEP.0000000000000861](https://doi.org/10.1097/01.NEP.0000000000000861)] [Medline: [34405844](https://pubmed.ncbi.nlm.nih.gov/34405844/)]
11. Volpe KD. Strategies to promote a diverse nurse educator workforce. Gale Offline. 2021 Nov 02. URL: https://link.gale.com/apps/doc/A686274350/HRCA?u=uiuc_lewis&sid=bookmark-HRCA&xid=bbb4064e [accessed 2022-03-20]
12. Matthews AK, Fitz S, Wendler C, Lisea K, Vincent C, Kavukattu T. Developing a mission statement to reflect the diversity, equity, and inclusion values and priorities of a College of Nursing. J Prof Nurs 2023;48:40-46. [doi: [10.1016/j.profnurs.2023.05.010](https://doi.org/10.1016/j.profnurs.2023.05.010)] [Medline: [37775239](https://pubmed.ncbi.nlm.nih.gov/37775239/)]
13. Byrd DA. Best practices for diversifying nursing education: observations from a consultant's experience. J Nurs Educ 2022 Sep;61(9):542-544. [doi: [10.3928/01484834-20220412-02](https://doi.org/10.3928/01484834-20220412-02)] [Medline: [35533044](https://pubmed.ncbi.nlm.nih.gov/35533044/)]
14. School of nursing plan for faculty eminence through diversity: overview, goals, and strategies. University of Pennsylvania School of Nursing. 2018. URL: <https://www.nursing.upenn.edu/live/files/846-plan-for-faculty-eminence-through-> [accessed 2022-04-20]
15. O'Connor R. Integrating diversity, equity, and inclusion topics into an undergraduate nursing research course. J Nurs Educ 2019 Aug 01;58(8):494. [doi: [10.3928/01484834-20190719-13](https://doi.org/10.3928/01484834-20190719-13)] [Medline: [31373675](https://pubmed.ncbi.nlm.nih.gov/31373675/)]
16. Rhoten BA, Steed J, Johnson R, Schorn MN. Evaluating and addressing the diversity, equity, inclusion, and belonging climate in a school of nursing. Nurse Educ 2023 Oct 02. [doi: [10.1097/NNE.0000000000001529](https://doi.org/10.1097/NNE.0000000000001529)] [Medline: [37782939](https://pubmed.ncbi.nlm.nih.gov/37782939/)]
17. Overview. Lewis University. URL: <https://www.lewisu.edu/sanctifiedzone/index.htm> [accessed 2023-08-10]
18. Byrd D, DeWitty V, Morris J, Nadeau J, Rosenberg L, Sonke A. Promising practices in holistic admissions review: implementation in academic nursing. White paper. URL: <https://www.aacnnursing.org/Portals/42/News/White-Papers/AACN-White-Paper-Promising-Practices-in-Holistic-Admissions-Review-December-2020.pdf> [accessed 2022-03-15]
19. Iheduru-Anderson K, Okoro FO, Moore SS. Diversity and inclusion or tokens? a qualitative study of Black women academic nurse leaders in the United States. Glob Qual Nurs Res 2022;9:23333936211073116 [FREE Full text] [doi: [10.1177/23333936211073116](https://doi.org/10.1177/23333936211073116)] [Medline: [35097160](https://pubmed.ncbi.nlm.nih.gov/35097160/)]
20. O'Connor MR, Barrington WE, Buchanan DT, Bustillos D, Eagen-Torkko M, Kalkbrenner A, et al. Short-term outcomes of a diversity, equity, and inclusion institute for nursing faculty. J Nurs Educ 2019 Nov 01;58(11):633-640. [doi: [10.3928/01484834-20191021-04](https://doi.org/10.3928/01484834-20191021-04)] [Medline: [31665527](https://pubmed.ncbi.nlm.nih.gov/31665527/)]
21. CEU's racial equity tools. University of Southern California Center for Urban Education. URL: <https://www.cue-tools.usc.edu/> [accessed 2023-10-24]
22. DeWitty VP, Murray TA. Influence of climate and culture on minority faculty retention. J Nurs Educ 2020 Sep 01;59(9):483-484. [doi: [10.3928/01484834-20200817-01](https://doi.org/10.3928/01484834-20200817-01)] [Medline: [32865579](https://pubmed.ncbi.nlm.nih.gov/32865579/)]
23. Guide to best practices in faculty search and hiring. Columbia University. URL: <https://provost.columbia.edu/sites/default/files/content/BestPracticesFacultySearchHiring.pdf> [accessed 2022-03-22]

24. Salvucci C, Lawless CA. Nursing faculty diversity: barriers and perceptions on recruitment, hiring and retention. *J Cult Divers* 2016;23(2):65-75. [Medline: [27439233](#)]
25. Flaherty C. The DEI pathway to promotion. *Inside Higher Ed*. URL: <https://www.insidehighered.com/news/2021/05/14/iupui-creates-path-promotion-and-tenure-based-dei-work> [accessed 2022-03-22]
26. Mokel MJ, Behnke LM, Gatewood E, Mihaly LK, Newberry EB, Lovence K, et al. Mentoring and support for underrepresented nursing faculty: an integrative research review. *Nurse Educ* 2022;47(2):81-85. [doi: [10.1097/NNE.0000000000001089](https://doi.org/10.1097/NNE.0000000000001089)] [Medline: [34482345](#)]
27. Silver JK. Six practical strategies to mentor and sponsor women in academic medicine. *J Med Internet Res* 2023 May 25;25:e47799 [FREE Full text] [doi: [10.2196/47799](https://doi.org/10.2196/47799)] [Medline: [37227763](#)]

Abbreviations

AACN: American Association of Colleges of Nursing

DEI: diversity, equity, inclusion

IUPUI: Indiana University-Purdue University Indianapolis

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Original Paper

Perceived Risk of Diabetes Among Vietnamese Americans With Prediabetes: Mixed Methods Study

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Abstract

Background: Vietnamese Americans have a relatively high risk of developing diabetes at younger ages, yet there are no published studies exploring their risk perceptions.

Objective: This mixed methods study describes perceived diabetes risk in the context of an underserved population.

Methods: This study was guided by the Common-Sense Model of Self-Regulation. Snowball sampling was used to recruit 10 Vietnamese Americans with prediabetes and achieve data saturation. Qualitative and quantitative descriptive methodologies with data transformation were used to analyze data from semistructured interviews and questionnaires to explore the dimensions of perceived diabetes risk.

Results: Participants were between the ages of 30 and 75 years with diversity also noted in diabetes risk factors. The 3 risk perception domains from qualitative data were risk factors, disease severity, and preventing diabetes. The main perceived diabetes risk factors were eating habits (including cultural influences), sedentary lifestyle, and family history of diabetes. Quantitative data supported qualitative findings of a low-to-moderate level of perceived diabetes risk. Despite the lower levels of perceived diabetes risk, Vietnamese Americans do believe that the severity of diabetes is a “big concern.”

Conclusions: Vietnamese Americans with prediabetes have a low-to-moderate level of perceived diabetes risk. Understanding the perceived diabetes risk in this population provides a foundation for diabetes prevention interventions that consider cultural influences on diet and exercise.

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KEYWORDS

risk perception; perceived risk; diabetes; prediabetes; Vietnamese; Asian Americans

Introduction

Background

A diagnosis of prediabetes increases one's risk of developing type 2 diabetes mellitus (T2DM) [1]. Prediabetes has been associated with multiple other chronic conditions including cardiovascular disease, chronic kidney disease, cancer, and dementia [1]. Despite having a BMI within normal limits, Vietnamese Americans experience a disproportionate burden of diabetes with higher diabetes prevalence rates compared with non-Hispanic Whites, having 60% higher odds of diabetes

($P=.03$) [2]. The average age of initial T2DM diagnosis in Vietnamese Americans is more than 5 years younger than that in non-Hispanic Whites [3]. Despite these increased risk factors, there are no publications for diabetes prevention studies targeted at the Vietnamese American population.

Exploring perceived T2DM risk in Vietnamese Americans with prediabetes provides a foundation for developing effective culturally appropriate strategies to alter risk perception that facilitates adoption and sustainment of T2DM prevention behaviors. Risk perception includes the cognitive and affective dimensions related to perspectives of general and personal risk

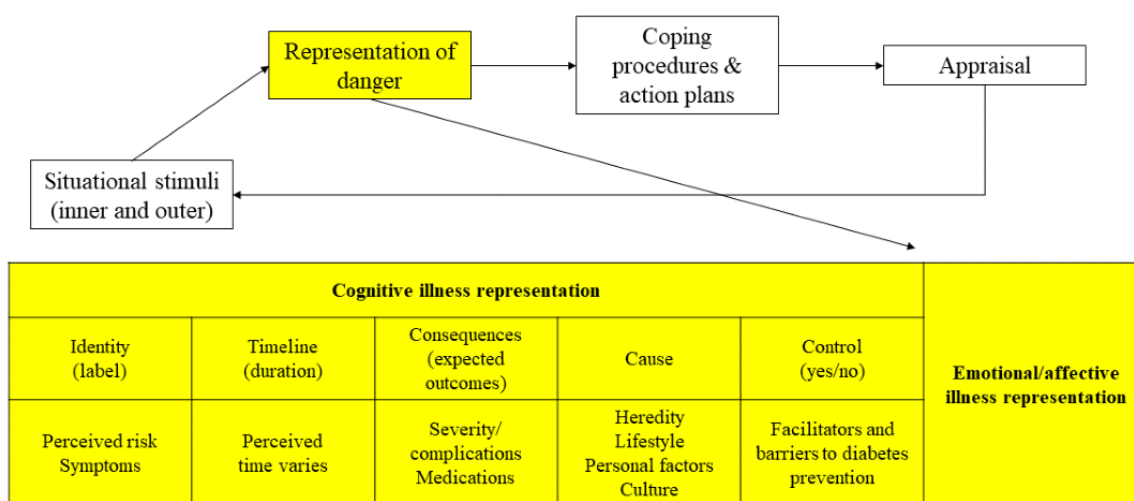
[4]. Perceived T2DM risk has been positively associated with behavioral intention and perceived behavioral control; behavioral intention is associated with the likelihood of adopting preventive behaviors [5]. The purpose of this study was to describe the perceived risk of developing T2DM among Vietnamese Americans adults with prediabetes using a mixed methods approach. The specific aims were to (1) explore the domains of perceived risk of developing T2DM; (2) measure the level of perceived risk; and (3) synthesize transformed qualitative and quantitative data to describe this population’s perceived risk of developing T2DM.

Conceptual Framework

The Common-Sense Model (CSM) of Self-Regulation (Figure 1) is a process-oriented model that begins with developing the

individual’s representations of illness in response to some sort of stimuli (internal or external), and followed by the development, implementation, and appraisal of action plans or coping methods [6]. The CSM has been used as a theoretical framework in this study to explore the perceived risk of developing T2DM in Vietnamese Americans. Illness representation is a central concept of the CSM, with emotional and cognitive dimensions. The cognitive dimension can be defined descriptively by its 5 constructs: identity (label) or symptoms and names of the threat, timeline (duration or age of onset) of the threat, consequences (expected outcomes) of the threat, cause of the threat, and control or cure for the threat [6].

Figure 1. The Common-Sense Model of type 2 diabetes in Vietnamese Americans.



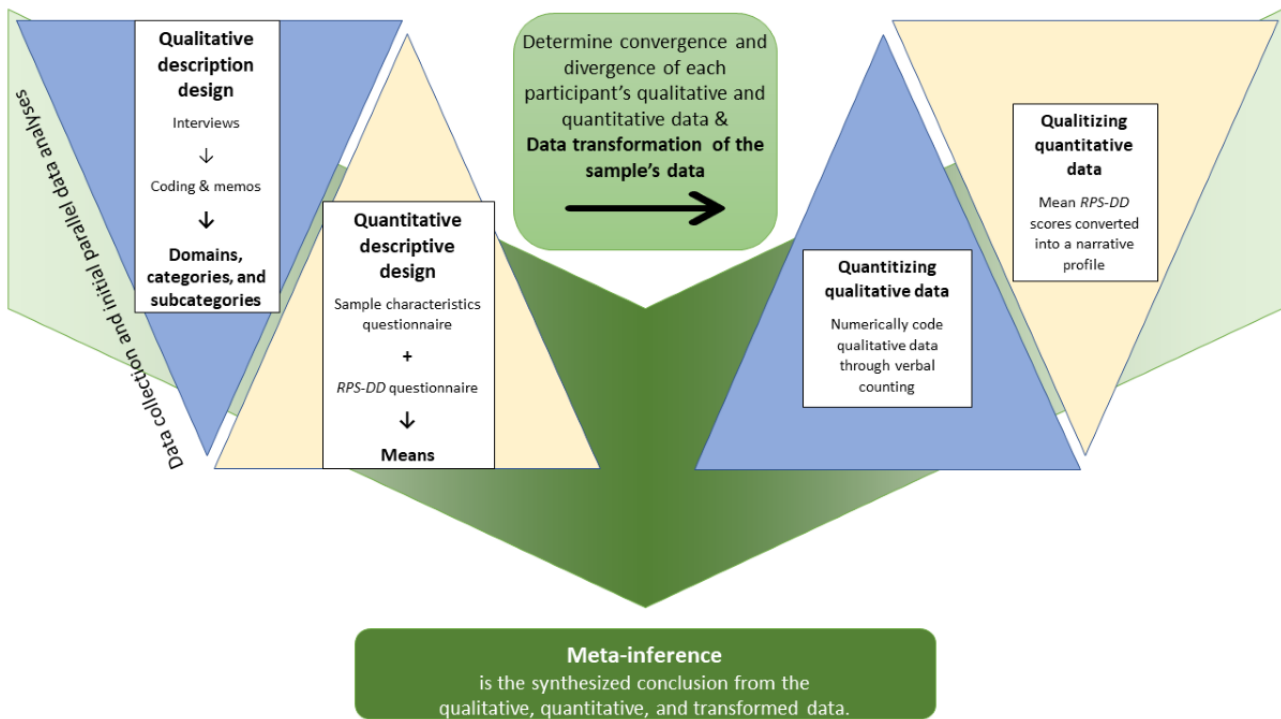
Methods

Study Design

A QUAL + quant mixed methods design (Figure 2) was used as follows: a qualitative description with semistructured interviews for aim 1, a quantitative descriptive design with

questionnaires for aim 2, and the mixed method design–enabled generation of a meta-inference (synthesized analyses) from both qualitative and quantitative data for aim 3. With the QUAL + quant mixed method design, the qualitative methodology was prioritized and both the qualitative and quantitative methods were conducted concurrently [7,8].

Figure 2. QUAL + quant mixed method research design and process. QUAL: qualitative; quant: quantitative; RPS-DD: Risk Perception Survey for Developing Diabetes.



Participants

Various religious and community gatekeepers (eg, a priest, a monk, and business owners) of the Vietnamese communities in the Southwestern United States distributed recruitment flyers. Inclusion criteria were self-reported and as follows: (1) Vietnamese ethnic descent, (2) prediabetes diagnosis, (3) age 18 years or older, and (4) English language proficiency. Reading and spoken English language proficiency was determined through conversation with the principal investigator (PI). Potential participants contacted the PI directly. Snowball sampling was used to reach this very specific population, where participants were asked to refer other potential participants [9]. The recommended sample size in this qualitative dominant study was dependent on the number of participants needed to achieve data saturation (ie, when no new categories emerge from the data) [9]. Guest et al [10] found that 6 interviews will typically reach 80% saturation. Participant compensation included a US \$10 gift card with the option to enter a raffle for 1 US \$50 gift card.

Data Collection and Analysis

Qualitative Data

The PI collected data using individual, semistructured face-to-face interviews in English between August and December 2018. Trustworthiness of qualitative findings was maintained by considering transferability, credibility, dependability, and confirmability. The CSM constructs were used to create the interview guide (Multimedia Appendix 1). While the interview questions with phrasing were planned, there was some flexibility warranted in the order that the questions were asked and clarifying questions as needed. Atlas.ti (ATLAS.ti Scientific Software Development GmbH) was used to organize the verbatim interview transcriptions, coding,

memos, and analyses. Other data sources included field notes recorded by the PI.

Qualitative content analysis involved an iterative process with ongoing, alternating, and simultaneous data collection and data analysis [11]. Qualitative content analysis involved deductive (based on the defined dimensions of risk perception) and inductive (open coding) approaches to code, analyze, and interpret the data [11]. Reading and rereading the interview transcripts with the use of in vivo (participants' own words) coding when possible maintained credibility of qualitative analysis. The PI (AN) and a coauthor (MMM) conducted open coding of 3 interviews independently, comparing codes and reaching consensus for congruency; all transcripts and analyses were further reviewed during weekly debriefing meetings. The PI created a codebook of codes with descriptions, as well as exemplary quotes from which the codes were derived. The codes were first classified into subcategories. Comparing the codes from all participants and generating subcategories and categories from like codes aided in the classification of domains, which was reviewed by the PI and a second coauthor (LJL) in additional debriefing meetings. Debriefing meetings held with the research team further enhanced credibility of findings. For assurance of dependability and confirmability, member checking was performed through shared interview transcript and final report with 2 participants. Member checking allowed for verification of accurate representation of risk perception and assurance that data saturation had been achieved. Finally, an audit trail was conducted by the coauthors to ensure the consensus of coding/meanings, consistency of the analyses processes, and the product of inquiry.

Quantitative Data

A total of 2 questionnaires in English were used to obtain sample characteristics and level of perceived diabetes risk. A

PI-developed questionnaire was used to obtain sample characteristics such as demographics (ie, age range, gender, educational level, income, insurance status, and marital status), acculturation level (ie, immigrant generational status), BMI (calculated from self-reported height and weight), and diabetes disease history (ie, length of time since first diagnosed with prediabetes, history of gestational diabetes, and family history of diabetes).

The 43-item *Risk Perception Survey for Developing Diabetes* (RPS-DD) was used to measure the level of perceived diabetes risk [12]. The RPS-DD is a reliable and valid measure of perceived diabetes risk (Cronbach $\alpha=.84$) and is the most widely used survey [4,13]. The composite RPS-DD score was calculated using the average of only 32 items (scored using a 4-point Likert scale, with 1=low attribute and 4=high attribute; reverse scoring was performed for some items to conform with the conceptual direction of the composite score) and does not include scoring for 11 items that only measure diabetes risk knowledge. The 5 subscales for the risk perception dimensions were Personal Control, Worry, Optimistic Bias, Personal Disease Risk, and Comparative Environment Risk (subscale Cronbach α values ranged from .50 to .81) [13]. An average of each risk perception subscale score was calculated by allowing an indicator of low versus high perception of each subscale concept (eg, high vs low perception of Personal Control). Descriptive statistics were used to analyze the data from the background information (ie, mean and frequencies) and the RPS-DD scores (ie, mean and internal consistency). SPSS 25.0 (IBM, Inc) was used to run all quantitative analyses.

Meta-Inference: Synthesis of Qualitative and Quantitative Data

Meta-inferences were derived from the syntheses of the qualitative, quantitative, and transformed results [7]. This process began with determining data convergence and

divergence. Convergence was determined if the qualitative and quantitative data for each participant were similar [8]. Divergence was determined if the qualitative and quantitative data for each participant were dissimilar [8].

Data transformation (ie, quantizing qualitative data and qualitzing RPS-DD data) was also performed. The procedure for transforming data from qualitative to quantitative (and vice versa) was to (1) numerically code (quantitize) qualitative data through verbal counting and (2) convert quantitative data into a narrative profile [7]. The use of verbal counting confirmed the description of the patterns that have been found in the data [11]. The mean RPS-DD scores were transformed into a qualitative narrative profile pulled from exemplars of qualitative data [11]. The narrative profile was the basis for the meta-inferences of this mixed methods study.

Ethics Approval

All study procedures were approved by the University of Arizona's institutional review board (protocol approval number: 1807760846). The University of Arizona maintains a Federal-wide Assurance with the Office for Human Research Protections (FWA #00004218).

Results

Sample Characteristics

A total of 10 participants were interviewed and completed questionnaires (Table 1). Half of the participants (n=5) were male. Most participants were married or had a domestic partner (n=6, 60%), had a household income greater than US \$75,000 (n=6, 60%), and were first-generation immigrants (n=8, 80%). Ninety percent were overweight/obese. Regarding disease history, 50% (n=5) of the participants had a family history of diabetes, none had a history of gestational diabetes, and 80% (n=8) were initially diagnosed with prediabetes over a year ago.

Table 1. Sample characteristics (N=10).

Sample characteristics	Values, n (%)
Male	5 (50)
First-generation immigrant	8 (80)
Family history of diabetes	5 (50)
Age (years)	
30-39	3 (30)
40-49	2 (20)
50-59	2 (20)
≥60	3 (30)
Initial prediabetes diagnosis (years)	
<1	2 (20)
1-5	7 (70)
>5	1 (10)
Marital status	
Married/domestic partner	6 (60)
Divorced/separated/widowed	2 (20)
Never married/no domestic partner	2 (20)
Household annual income (US \$)	
<25,000	1 (10)
25,000-49,999	1 (10)
50,000-74,999	2 (20)
>75,000	6 (60)
Education level	
Some college	5 (50)
Bachelor's degree	3 (30)
Postgraduate degree	2 (20)
BMI category^a	
Normal (<23 kg/m ²)	1 (10)
Overweight (23-24.9 kg/m ²)	4 (40)
Obese (≥25 kg/m ²)	5 (50)
Mean (SD)	27.70 (6.44)

^aThe BMI category was based on lowered BMI threshold (from 25 to 23 kg/m²) for T2DM screening in Asian Americans with overweight [14].

Qualitative Results: Risk Perception Domains and Verbal Counting

Overview

The 3 risk perception domains emerged from the qualitative data: (1) perceived risk factors of prediabetes and diabetes (with

categories for health behaviors and personal, health, and family history); (2) perceived disease severity with categories for prediabetes and diabetes; and (3) preventing T2DM with categories for behavior changes and the factors influencing those changes (Table 2). It should be noted that each of these domains are a component of the overall perceived diabetes risk. Participant names are pseudonyms to protect their identity.

Table 2. Domains, categories, and subcategories (including definitions) and related CSM^a constructs measured.

Domain, category, and subcategory	Definition of subcategory (CSM construct)
Risk factors for prediabetes or diabetes	
Health behaviors	
Sedentary lifestyle	Lack of exercise (cognitive dimension: cause)
Eating habits	Unhealthy eating habits (cognitive dimension: cause)
Stress management	Poor stress management (cognitive dimension: cause)
Personal, health, and family history	
Personal factors	Characteristics of the individual that increases diabetes risk (cognitive dimension: cause)
Comes from family	Family history of diabetes (cognitive dimension: cause)
Cultural influences	Cultural influences include geographic and ethnic influences (cognitive dimension: cause)
Disease severity	
Prediabetes diagnosis	
Initial reactions	Initial thoughts and feelings to being diagnosed with prediabetes (affective dimension)
Health concerns	Concerns regarding physical well-being (cognitive dimension: consequences)
I am at risk	Presence of perceived diabetes risk (cognitive dimension: identity)
Diabetes risk	Level of perceived diabetes risk (cognitive dimension: timeline)
Diabetes	
Medication	Taking diabetes medication(s) (cognitive dimension: identity and consequences)
Complications	Diabetes complications (cognitive dimension: identity and consequences)
Preventing T2DM^b	
Behavior changes	
Modifying behaviors	Examples of health-promoting behavior changes (cognitive dimension: control and affective dimension)
Results of behavior changes	Results from health-promoting behavior changes (cognitive dimension: control and affective dimension)
Factors influencing health behavior changes	
Become aware	Awareness of the need for health-promoting behavior changes (cognitive dimension: control and affective dimension)
I do the best I can	Personal efforts toward health promotion (cognitive dimension: control and affective dimension)
It hit home hard	Motivational influences on health promotion (cognitive dimension: control and affective dimension)
Barriers to preventing T2DM	Factors that impede health promotion (cognitive dimension: control and affective dimension)

^aCSM: Common-Sense Model.

^bT2DM: type 2 diabetes mellitus.

Perceived Risk Factors of Prediabetes and Diabetes

This domain consisted of 2 categories: health behaviors and personal, health, and family factors. The health behaviors perceived by participants as risk factors were sedentary lifestyle, eating habits, and stress management. Other risk factor subcategories included personal factors (eg, increased age, race, and obesity), “coming from family” (ie, hereditary linkage), and cultural influences (eg, geographical, Vietnamese, and American influences). The risk factors demonstrating the

greatest pattern were eating habits and cultural influences, supported by the higher frequency of these subcategories (n=9 for eating habits and n=8 from cultural influences) presented in the sample ([Multimedia Appendix 2](#)).

Most participants talked about eating large amounts of carbohydrates (including food and beverages high in sugar), sodium-rich foods and fish sauce, and fatty foods. Several participants mentioned that the main source of carbohydrates was rice and rice products. When considering influences on

dietary habits, participant John (male, 36 years old) talked about how overeating and unhealthy food choices were engrained early in life and these habits were difficult to break. Participants Chinh (male, 44 years old), Huy (male, 51 years old), and Lan (female, 67 years old) described the social influences on their eating. Chinh referred to how he now limits socializing with his friends because of the associated drinking of alcohol which he believes leads to excessive eating. Huy says that when “my friends coming to town, or my poor health father, or my mom, and we decide to go for *pho* [Vietnamese rice noodle soup]...I will eat that *pho*.” Lan talked about how she makes healthier food choices when she eats alone, but that most of her meals are with her family and her husband (who cooks the meals) will get upset if she does not eat those foods.

The main cultural influence discussed was the Vietnamese culture, with most of the discussion focused on those cultural influences for unhealthy diets. The participants reiterated how Vietnamese “eat a lot of rice-based dishes.” Participant Jane (female, 30 years old) mentioned how Vietnamese “love their tropical fruit and that’s probably packed with sugar like jackfruit and...lychee definitely.” Jane also talked about traditional foods served during holidays such as *banh chung* and *banh tet* (Vietnamese dishes made primarily of glutinous sweet rice and mung bean) which are “in your childhood and it comes up as tradition...and takes you back to that feel-good moment.” While participants Chinh, Mai (female, 39 years old), and Quan (male, 44 years old) all denied a cultural influence on their risk, Quan later recanted when he talked about how Vietnamese “get arguably the worst of both worlds [Vietnamese and American] because you get more holidays...[which means] more of the celebratory meals.”

Other than the Vietnamese cultural influence, participant Huy talked about the regional influence of living in Las Vegas. He described how “you get free coupon, two-for-one, five-for-one, for seniors [at the buffet].” He went on to say that many Vietnamese “are gamblers [or casino dealers], so they have tons of comps [free compensated meals given by the casinos]...so they bring their friends and their family...”

Disease Severity

This domain consisted of 2 categories: prediabetes diagnosis and diabetes. The prediabetes diagnosis category refers only to the severity of being prediabetic and their risk for developing diabetes. The 4 subcategories for prediabetes diagnosis were their initial reactions to their prediabetes diagnosis, health concerns related to prediabetes, “I am at risk,” and diabetes risk. The diabetes category for the disease severity domain refers to their perceived risk of having developed diabetes; the 2 subcategories were medication and complications.

The subcategory with the highest frequency of participant reporting (n=10, 100%; [Multimedia Appendix 2](#)) and depth of answers was the initial reactions to the prediabetes diagnosis, which ranged from “not worried,” questioning the diagnosis, “slightly surprised,” “caught me off-guard,” “frightened,” and “freaked out.” Participant Yen (female, 72 years old) was not worried by her diagnosis saying that she is “too old right now...and can live around 10 more years.” Participant Jane mentioned that she “was just glad that it was prediabetes and

not actual diabetes” as she notes not being very surprised by the diagnosis given her family history of diabetes. Participant Chinh instead reflected on his initial diagnosis of prediabetes by the health care provider stating how shocked he was, how he began questioning the diagnosis, and even stating that he may have overreacted to the diagnosis:

In my head, he’s givin’ me all this bad news, and I think I kinda tuned out a lot of things that he was saying. I was thinkin’, ‘how did I get this far?’ Because I was at that state. To me, it just sounded worse when I was sitting there.

Finally, participants Mai and Quan mentioned being “frightened” or “a little bit freaked out” as they considered their current experiences or knowledge regarding diabetes related to the need for medications (eg, insulin) or the complications of diabetes (eg, amputations and death). As participants continued to talk about the severity of diabetes (ie, the second category of disease severity), many noted that developing diabetes would be a “big concern” as evidenced by most participants reporting that medications will be needed (n=7) or complications may arise (n=6) if they develop T2DM.

While there was a wide range of how participants responded to their diagnosis of prediabetes, 9 participants further discussed either their perceptions of having risk for diabetes (n=8) or their level of diabetes risk (n=6). Overall, the participants who described their diabetes risk as low gave the following reasons: (1) they perceived that by developing a healthier lifestyle (ie, “eat better” and “exercise more”) they are almost eliminating their diabetes risk and (2) the risk is never nonexistent. They also perceived that they have a lower diabetes risk than the general population by citing the increased rates of obesity among Americans. Therefore, while participant Yen stated at one point in the interview that she did not think that she was at risk for developing diabetes, she does know that she cannot eliminate all risk.

Preventing T2DM

The final domain labeled “preventing T2DM” provided data regarding both the affective and cognitive dimensions of the CSM. This domain consisted of 2 categories: health behavior changes and factors influencing health behavior changes. The factors influencing health behavior changes were subcategorized to become aware, “I do the best I can,” “it hit home hard,” and barriers to preventing diabetes. Half of the participants noted the moment they were diagnosed with prediabetes by their health care provider that sparked the awareness needed to make the recommended lifestyle changes—whether it be the needed dietary modifications, increase in physical activity, or improvement of diabetes-related distress.

Quantitative Results: RPS-DD Scores

The mean composite RPS-DD score was 2.15, indicating an overall low-to-moderate perceived risk of developing diabetes ([Table 3](#)). Participants had moderate-to-high levels of perceived Personal Control (mean score 3.30), Worry (mean score 3.10), and Optimistic Bias (mean score 2.75; this lower score indicates a higher level of comparative personal risk). Participants had low-to-moderate levels of perceived comparative Personal

Disease Risk (mean score 2.06) and perceived Comparative Environmental Risk (mean score 2.27), relating to their perceptions of personal risk of diabetes, diabetes-related health complications, other diseases, and potential environmental hazards.

Table 3. RPS-DD^a results.

RPS-DD	Reliability (Cronbach α)	Range of scores	Mean scores (SD)
Composite RPS-DD ^b	.64	1.47-2.59	2.15 (0.31)
Personal Control Subscale ^c	.65	2.25-4.00	3.30 (0.59)
Worry Subscale ^c	.83	2.00-4.00	3.10 (0.81)
Optimistic Bias Subscale ^d	.70	1.50-4.00	2.75 (0.89)
Personal Disease Risk Subscale ^e	.52	1.53-2.80	2.06 (0.40)
Comparative Environmental Risk Subscale ^c	.86	1.00-3.44	2.27 (0.78)
Knowledge, %	N/A	36.4-81.8	60.9 (14.9)

^aRPS-DD: Risk Perception Survey for Developing Diabetes.

^bThe composite RPS-DD score is an average of the 5 subscales with reversed scoring of 4 items to conform with the conceptual direction of the composite score; composite scores range from 1 (low overall perceived diabetes risk) to 4.47 (high overall perceived diabetes risk) and the median score is 2.23, which indicates a moderate level of overall perceived diabetes risk.

^c1=low perceived Personal Control/Worry/Comparative Environmental Risk and 4=high perceived Personal Control/Worry/Comparative Environmental Risk and the median score is 2.5, which indicates a moderate level of the corresponding subscale construct.

^dSubscale is labeled as the measurement of Optimistic Bias but the 2 items of this subscale measure comparative risk with 1 (strongly agree that the perceived risk for T2DM and serious disease is decreased compared with other people with the same age and gender) and 4 (strongly disagree that the perceived risk for T2DM and serious disease is decreased compared with other people with the same age and gender). The median score is 2.5, which indicates a moderate level of Optimistic Bias.

^eSubscale score ranges from 1 (low perceived comparative Personal Disease Risk) to 5 (high perceived comparative Personal Disease Risk; ie, Likert scale scores of 1-4 indicate perceived risk of a disease or health problem, where 1=low perceived risk and 4=high perceived risk, and adding 1 if there is a personal or family history); the median score is 3, which indicates a moderate level of this subscale construct.

Meta-Inference: Narrative Profile

The meta-inference is best described via the narrative profile that was developed based on the 9 participants with a low-to-moderate mean RPS-DD composite score (Table 4). This profile presented an overall low-to-moderate level of

perceived diabetes risk. A closer look at various dimensions of perceived risk revealed moderate-to-high levels of Personal Control and Worry, but low-to-moderate levels of Comparative Risk, Personal Disease Risk, and Comparative Environmental Risk.

Table 4. Descriptive profile for low perceived diabetes risk scores on the RPS-DD^a (N=9).

Level of mean scores for the RPS-DD subscales	Mean scores (SD)	Exemplary qualitative data ^b
Moderate-to-high Personal Control	3.31 (0.62)	<i>I would say [there is a 0 to 10% chance of my developing diabetes] because I'm gonna try to definitely develop healthier lifestyle, and eat better, and exercise more. [Quan]</i>
Moderate-to-high level of Worry	3.06 (0.85)	<i>I know that there are people that are diabetic that have to be amputated, which [is]...a big concern. There's also people that I know that die early because of that. [John]</i>
Low-to-moderate level of Comparative Risk ^c	2.89 (0.82)	<i>[I think others have a higher risk of diabetes than me because I think of] Americans as just being obese, or overweight, or not having a healthy lifestyle. [Chinh]</i>
Low-to-moderate level of Personal Disease Risk	2.03 (0.41)	<i>Well, the reason why is I say my risk [for developing diabetes] is low is because I don't think anybody's risk is nonexistent. [Chinh]</i>
Low-to-moderate level of Comparative Environmental Risk	2.19 (0.78)	<i>Just like you driving here today on the freeway, knowing the risk [of getting into a car accident]. [Huy]</i>

^aRPS-DD: Risk Perception Survey for Developing Diabetes.

^bNames are pseudonyms.

^cSubscale is labeled as measurement of Optimistic Bias but the 2 items of this subscale actually measure comparative risk with a higher score indicating a decreased perceived risk for diabetes and serious disease compared with other people with the same age and gender.

The narrative profile was a summation of qualitative and quantitative data from 9 participants. The researchers determined that convergence resulted from similarities between the qualitative and quantitative data of the first participants (n=8). Pulling together all of the qualitative domains, categories, and subcategories, these participants were determined to have low levels of perceived diabetes risk based on statements fitting at least one of these 3 categories: (1) explicit statements that they believed they had a low diabetes risk, (2) they perceived high levels of control over their diabetes risk, or (3) they believed that they had lower diabetes risk compared with the general population.

The final participant included in the narrative profile had divergence noted between the qualitative and quantitative data. Huy's qualitative data indicated his awareness and perception of a high diabetes risk, but the quantitative data indicated a low perceived diabetes risk. Huy stated how much he hated the term "prediabetes" as he equated it to the idiosyncrasy of using a term such as pre-pregnant because "either you're pregnant or you're not pregnant." Huy also stated that having prediabetes indicates that "60 to 70 percent of your beta cells have already been gone...which means [that he is] at risk to be a frank diabetic." Possible explanations for divergence are detailed in the "Discussion" section.

Only 1 case was omitted from the narrative profile. For Anh's qualitative data, the level of perceived risk fluctuated throughout the interview due to his uncertainty with recent prediabetes diagnosis. The quantitative data indicated a higher level of perceived diabetes risk. This omission was not deemed to weaken the meta-inference.

Discussion

Principal Findings

There have been no prior publications that explored risk perceptions of developing diabetes in Vietnamese Americans. The key finding of this study is the meta-inference that Vietnamese Americans with prediabetes have an overall low perception of diabetes risk. This meta-inference was drawn from data categorized into the following qualitative domains: perceived risk factors, perceived disease severity, preventing T2DM, and mean RPS-DD scores of 9 participants. The participant with uncertain qualitative data was omitted from the narrative profile. This participant had just been diagnosed with prediabetes the week prior and her follow-up appointment was still pending at the time of the interview. She was very uncertain as to what this diagnosis meant and was not able to form much cognitive or affective representations of her diagnosis.

As for the case of divergence, participant Anh was unique because of his medical background. In his qualitative data, he is very clear regarding his high risk for developing diabetes. Yet, his quantitative data indicated that he had a low perceived diabetes risk. His composite RPS-DD score was 1.5. This is likely because he has a great understanding on how to control diabetes once it develops.

Perceived Diabetes Risk Compared With Actual Diabetes Risk

The participants from this study reported an overall perception of low diabetes risk, despite their diagnosis of prediabetes putting them at an increased risk for developing T2DM. Perceived personal risk is not always congruent with actual personal risk, and this was demonstrated in a study in which more than 78% of participants with elevated or high actual diabetes risk reported absent or slightly perceived diabetes risk [15]. The finding from our study was not surprising when compared with Heidemann et al's report [15] of incongruity between perceived and actual risk. It was, however, surprising when considering that another study has shown that increased diabetes risk perception is associated with the Asian race (odds ratio 1.475; $P < .001$) [16]. The finding from this study emphasizes the need for analysis of the different Asian ethnic subgroups.

Diabetes Risk Factors in Vietnamese Americans

The participants reported the following perceived risk factors: eating habits, sedentary lifestyle, stress management, personal factors (eg, being overweight or older), heredity, and various cultural influences. The perceived risk factors of prediabetes and diabetes that emerged from this study were similar to the top 3 perceived causes of T2DM (diet, heredity, and stress) identified in an ethnography of Vietnamese Americans diagnosed with diabetes [17]. The participants of this study reported risk factors according to the American Diabetes Association. The reported American Diabetes Association risk factors for T2DM are being overweight, increased age, having a family history of diabetes, and having had gestational diabetes [14]. Gestational diabetes was the only factor not reported in this study.

Overall, there was congruency regarding what the participants of this study perceived to be risk factors of developing diabetes with what is known to be a T2DM risk factor. That is, they did not report any perceptions regarding risk factors that differed from professional health knowledge. For example, "heat" was not mentioned as the cultural perceived cause of diabetes, as mentioned in an ethnographic study of Vietnamese Americans with diabetes ($P = .309$) [18]. The lack of this finding was surprising as the concepts of *am* and *duong* are part of a traditional belief that hot versus cold elements are metaphysical causes of illness [18] and the majority of participants in this study were first-generation immigrants. Perhaps a reason for this difference is that the participants of this study had high levels of education and all speak English, while more than half of the participants of the Mull et al's [19] study spoke little to no English.

Implications for Diabetes Prevention in Vietnamese Americans

Based on how many participants in this study noted their initial diagnosis as a motivator for adopting recommended lifestyle changes, there is a need for increased diabetes screening among Vietnamese Americans. Increased diabetes screening in this population is supported when considering that nearly one-half of Asian Americans with diabetes are undiagnosed [14]. The

screening recommendations by the American Diabetes Association also include using more stringent diabetes screening criteria in Asian Americans with a lowered BMI threshold (from 25 to 23 kg/m²) for T2DM screening in Asian Americans with overweight [14].

For participants in this study, being overweight was overshadowed by the perceived risk of having a sedentary lifestyle. For example, participant John reported that his problems with prediabetes started when his lifestyle changed, and he was no longer active. He goes on to say that this sedentary lifestyle led to his weight gain. Sedentary lifestyle was also mentioned in reference to the perceived cultural influences on diabetes risk (eg, participant Lan's perception that Vietnamese people simply do not exercise), clearly indicating the need to encourage physical activity in Vietnamese Americans.

Looking more closely at the perceived risk factors domain from this study, the most predominant subcategory was eating habits (n=9). The reported high carbohydrate and sodium-rich diet presents targets when developing interventions for Vietnamese Americans to improve their eating habits. Balanced diet and moderation may help to lower T2DM risk [20]. While the MyPlate nutrition guide by the US Department of Agriculture recommends that fruits comprise approximately 10% of the daily diet, there is no evidence that Vietnamese Americans who "love their tropical fruit" have an increased risk of T2DM due to the types of fruits that eat despite the higher glycemic indices of many tropical fruits [21]. So again, moderation is the key to avoid a higher total glycemic load associated with an increased risk of T2DM.

Sandelowski [11] stated that the use of verbal counting in qualitative research is useful for pattern recognition. Therefore, the increased frequency of data supporting the eating habits subcategory provides a focus for future diabetes prevention interventions with Vietnamese Americans. The cultural adaptation of diabetes prevention programs for Asian American populations is necessary to improve program relevance, satisfaction, and participation [22], as well as to promote healthy behavior changes to reduce T2DM risk. The need for emphasis on interventions focused on dietary control is supported by 1 study participant who stated that Vietnamese Americans "need someone to show us a diet to follow" (P 78) [23]. Furthermore, nutrition has been the main focus of diabetes self-management among Vietnamese [23]. The findings of eating habits combined with the awareness of the cultural influences on eating habits may inform future culturally tailored diabetes prevention efforts.

Stress management is a strategy used in diabetes prevention programs [22]. Stress was mentioned by participants Jane, Anh (female, 50 years old), and Yen. As Jane explained this, "stress breaks down a body...it could cause you to have diabetes...if you don't feel stressed, your heart feels lighter...and you don't reach out for those comfort foods." While the effects of stress on diabetes risk are not limited to eating behaviors, the emotion-oriented coping mechanism is certainly a consideration for interventions aimed at stress management in persons with or at risk for diabetes [21].

While there was an overall low perceived diabetes risk in this sample, they had a moderately high level of Personal Control. One previous study reported a positive correlation with a medium effect between the likelihood of adopting preventive behaviors and perceived behavioral control ($r=0.308$; $P\leq.001$) in a sample of African American participants [5]. Given the associated increase in the likelihood of adopting health-promoting behaviors to prevent diabetes in the African American population, this may translate to Vietnamese Americans who also have a high level of Personal Control and therefore may be more amenable to lifestyle intervention programs.

The findings from this study create several focal points for diabetes prevention efforts aimed at the Vietnamese American population. Specifically, clinicians and researchers need to promote screening, encourage physical activity, and promote healthy eating. They also need to consider the barriers to preventing diabetes as reported by the participants in this study that included "limited time and feeling tired"; "convenient foods are not healthy"; "eating healthy is expensive"; "difficulty breaking unhealthy habits or mindsets"; "resisting cravings/temptations or lack of self-discipline"; "measuring quality of life by nonphysical attributes" (eg, the perception that eating something that is known to be unhealthy is more important because it means they are spending quality time with friends and family); and "not recognizing the importance of needed changes due to increased age and life expectancy." Digital behavior change interventions should be used with (1) wider considerations around the user interface and design of content to promote accessibility and inclusivity and (2) novel automated approaches such as just-in-time approach to improve scalability [24,25].

Limitations

The mixed method design was needed to explore the perceived risk of developing diabetes in Vietnamese Americans, as the sole use of qualitative versus quantitative designs would not have sufficiently revealed the influences of the Vietnamese and American cultures on eating habits or the level of perceived diabetes risk. The analyses for convergence and divergence of data, the verbal counting of qualitative subcategories, and the rich descriptions added to quantitative data from the interviews in the narrative profile increased the current understanding of perceived diabetes risk in Vietnamese Americans through elaboration [7,8]. However, the quantitative data analysis should be regarded cautiously, given the small sample.

With the small sample and required inclusion criterion of English proficiency, there is a limitation to the transferability and generalizability of the findings. The small sample size, in which saturation was achieved, was appropriate for this qualitative dominant design. Overall, the sample was diverse in terms of age, gender, marital status, and family history for diabetes. All participants in this study had some form of health care coverage, which is similar to other studies in which more than 90% of the Vietnamese American participants were insured through Medicare, Medicaid, or both [26,27].

Conclusions

This study has important implications for nursing care and research as the Vietnamese American population experiences a disproportionate burden of diabetes, and there is a need to culturally tailor diabetes prevention programs to overcome this health disparity. This study provides culturally relevant data that inform future interventions targeted at modifiable risk factors. Based on the findings from this study, interventions that focus on healthy eating and the cultural influences for the adoption of this health-promoting behavior are essential. The use of the mixed methods research design allowed for greater understanding of risk perception than the sole use of either qualitative or quantitative methods, as well as greater capacity

to inform both theory and practice. The awareness of high levels of Personal Control and Worry, as found in this sample, will help identify optimal candidates for diabetes prevention. Diabetes prevention efforts in Vietnamese Americans should also focus on increased screening for prediabetes and diabetes, as many participants reported an overall perception of low diabetes risk. Finally, it will also be important for health care providers to consider cultural influences when incorporating exercise into daily routines and for effective coping strategies in this population. As the preventing T2DM domain emerged from this study while the purpose was to uncover diabetes risk perception, a future study aimed at the current health behaviors and factors that influence those health behaviors could be further performed.

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Main interview questions—basis for and resulting domains and categories.

[[DOCX File , 21 KB - apinj_v7i1e39195_app1.docx](#)]

Multimedia Appendix 2

Verbal counting for subcategories of qualitative data.

[[PNG File , 28 KB - apinj_v7i1e39195_app2.png](#)]

References

- Schlesinger S, Neuenschwander M, Barbaresko J, Lang A, Maalmi H, Rathmann W, et al. Prediabetes and risk of mortality, diabetes-related complications and comorbidities: umbrella review of meta-analyses of prospective studies. *Diabetologia* 2022 Feb;65(2):275-285 [FREE Full text] [doi: [10.1007/s00125-021-05592-3](https://doi.org/10.1007/s00125-021-05592-3)] [Medline: [34718834](https://pubmed.ncbi.nlm.nih.gov/34718834/)]
- De Souza LR, Chan KT, Kobayashi K, Karasiuk A, Fuller-Thomson E. The prevalence and management of diabetes among Vietnamese Americans: A population-based survey of an understudied ethnic group. *Chronic Illn* 2022 Jun;18(2):306-319. [doi: [10.1177/1742395320959422](https://doi.org/10.1177/1742395320959422)] [Medline: [33054356](https://pubmed.ncbi.nlm.nih.gov/33054356/)]
- Becerra MB, Becerra BJ. Disparities in Age at Diabetes Diagnosis Among Asian Americans: Implications for Early Preventive Measures. *Prev Chronic Dis* 2015 Sep 10;12:E146 [FREE Full text] [doi: [10.5888/pcd12.150006](https://doi.org/10.5888/pcd12.150006)] [Medline: [26355827](https://pubmed.ncbi.nlm.nih.gov/26355827/)]
- Nguyen AP, Loeschler LJ, McEwen MM. Perceived Risk of Developing Diabetes in the General Population and Asian Americans: Systematic Review. *J Transcult Nurs* 2020 Mar;31(2):188-201. [doi: [10.1177/1043659619876685](https://doi.org/10.1177/1043659619876685)] [Medline: [31540568](https://pubmed.ncbi.nlm.nih.gov/31540568/)]
- Seaborn C, Suther S, Lee T, Kiros G, Becker A, Campbell E, et al. Utilizing Genomics through Family Health History with the Theory of Planned Behavior: Prediction of Type 2 Diabetes Risk Factors and Preventive Behavior in an African American Population in Florida. *Public Health Genomics* 2016;19(2):69-80. [doi: [10.1159/000443471](https://doi.org/10.1159/000443471)] [Medline: [26845048](https://pubmed.ncbi.nlm.nih.gov/26845048/)]
- Leventhal H, Phillips LA, Burns E. The Common-Sense Model of Self-Regulation (CSM): a dynamic framework for understanding illness self-management. *J Behav Med* 2016 Dec;39(6):935-946. [doi: [10.1007/s10865-016-9782-2](https://doi.org/10.1007/s10865-016-9782-2)] [Medline: [27515801](https://pubmed.ncbi.nlm.nih.gov/27515801/)]
- Teddlie C, Tashakkori A. *Foundations of mixed methods research*. Thousand Oaks, CA: Sage Publications, Inc; 2009.
- Creswell JW, Plano Clark VL. *Designing and conducting mixed methods research* (3rd ed.). Thousand Oaks, CA: Sage Publications, Inc; 2018.
- Glesne C. *Becoming qualitative researchers: An introduction* (4th ed.). Boston, MA: Pearson Education, Inc; 2011.
- Guest G, Namey E, Chen M. A simple method to assess and report thematic saturation in qualitative research. *PLoS One* 2020;15(5):e0232076 [FREE Full text] [doi: [10.1371/journal.pone.0232076](https://doi.org/10.1371/journal.pone.0232076)] [Medline: [32369511](https://pubmed.ncbi.nlm.nih.gov/32369511/)]

11. Sandelowski M. Whatever happened to qualitative description? *Res Nurs Health* 2000 Aug;23(4):334-340. [doi: [10.1002/1098-240x\(200008\)23:4<334::aid-nur9>3.0.co;2-g](https://doi.org/10.1002/1098-240x(200008)23:4<334::aid-nur9>3.0.co;2-g)] [Medline: [10940958](#)]
12. Walker EA, Mertz CK, Kalten MR, Flynn J. Risk perception for developing diabetes: comparative risk judgments of physicians. *Diabetes Care* 2003 Sep;26(9):2543-2548. [doi: [10.2337/diacare.26.9.2543](https://doi.org/10.2337/diacare.26.9.2543)] [Medline: [12941716](#)]
13. Walker EA, Mertz CK, Kalten J. Risk Perception Survey-Developing Diabetes (RPS-DD). Albert Einstein College of Medicine. 2009. URL: http://www.einstein.yu.edu/docs/centers/diabetes-research/rpsdd_survey_english.pdf [accessed 2019-02-28]
14. American Diabetes Association. Classification and diagnosis of diabetes: standards of medical care in diabetes. *Diabetes Care* 2019 Jan 1;42(Supplement 1):S13-S28. [doi: [10.2337/dc19-s002](https://doi.org/10.2337/dc19-s002)]
15. Heidemann C, Paprott R, Stühmann LM, Baumert J, Mühlenbruch K, Hansen S, et al. Perceived diabetes risk and related determinants in individuals with high actual diabetes risk: results from a nationwide population-based survey. *BMJ Open Diabetes Res Care* 2019;7(1):e000680 [FREE Full text] [doi: [10.1136/bmjdr-2019-000680](https://doi.org/10.1136/bmjdr-2019-000680)] [Medline: [31297223](#)]
16. Hsueh L, Peña JM, Hirsh AT, de Groot M, Stewart JC. Diabetes Risk Perception Among Immigrant and Racial/Ethnic Minority Adults in the United States. *Diabetes Educ* 2019 Dec;45(6):642-651. [doi: [10.1177/0145721719873640](https://doi.org/10.1177/0145721719873640)] [Medline: [31725364](#)]
17. Nguyen AT. Self-management of type 2 diabetes: perspectives of Vietnamese Americans. *J Transcult Nurs* 2014 Oct;25(4):357-363. [doi: [10.1177/1043659614523470](https://doi.org/10.1177/1043659614523470)] [Medline: [24572150](#)]
18. Appel SJ. Vietnamese Americans. In: Giger J, Haddad LG, editors. *Transcultural nursing: Assessment & intervention*. 8th ed. St. Louis, MO: Elsevier Mosby; 2020:424-490.
19. Mull D, Nguyen N, Mull J. Vietnamese diabetic patients and their physicians: what ethnography can teach us. *West J Med* 2001 Nov;175(5):307-311 [FREE Full text] [doi: [10.1136/ewj.175.5.307](https://doi.org/10.1136/ewj.175.5.307)] [Medline: [11694472](#)]
20. Mohan V, Unnikrishnan R, Shobana S, Malavika M, Anjana R, Sudha V. *Indian J Med Res* 2018;148(5):531-538. [doi: [10.4103/ijmr.ijmr_1698_18](https://doi.org/10.4103/ijmr.ijmr_1698_18)]
21. Park M, Quinn L, Park C, Martyn-Nemeth P. Pathways of the relationships among eating behavior, stress, and coping in adults with type 2 diabetes: A cross-sectional study. *Appetite* 2018 Dec 01;131:84-93. [doi: [10.1016/j.appet.2018.09.008](https://doi.org/10.1016/j.appet.2018.09.008)] [Medline: [30213748](#)]
22. Joo JY. Effectiveness of culturally tailored diabetes interventions for Asian immigrants to the United States: a systematic review. *Diabetes Educ* 2014;40(5):605-615. [doi: [10.1177/0145721714534994](https://doi.org/10.1177/0145721714534994)] [Medline: [24829268](#)]
23. Nguyen AT, Jones EJ. Diabetes Beliefs, Culturally Influenced Self-Management Practices, and Interventions Among Vietnamese Adults: A Systematic Review. *J Transcult Nurs* 2021 May;32(3):266-275. [doi: [10.1177/1043659620988317](https://doi.org/10.1177/1043659620988317)] [Medline: [33472539](#)]
24. Goswami A, Poole L, Thorlu-Bangura Z, Khan N, Hanif W, Khunti K, et al. The Use of Digital Health Interventions for Cardiometabolic Diseases Among South Asian and Black Minority Ethnic Groups: Realist Review. *J Med Internet Res* 2023 Jan 06;25:e40630 [FREE Full text] [doi: [10.2196/40630](https://doi.org/10.2196/40630)] [Medline: [36607732](#)]
25. Keller R, Hartmann S, Teepe GW, Lohse K, Alattas A, Tudor Car L, et al. Digital Behavior Change Interventions for the Prevention and Management of Type 2 Diabetes: Systematic Market Analysis. *J Med Internet Res* 2022 Jan 07;24(1):e33348 [FREE Full text] [doi: [10.2196/33348](https://doi.org/10.2196/33348)] [Medline: [34994693](#)]
26. Kaplan SH, Billimek J, Sorkin DH, Ngo-Metzger Q, Greenfield S. Reducing racial/ethnic disparities in diabetes: the Coached Care (R2D2C2) project. *J Gen Intern Med* 2013 Oct;28(10):1340-1349 [FREE Full text] [doi: [10.1007/s11606-013-2452-y](https://doi.org/10.1007/s11606-013-2452-y)] [Medline: [23645452](#)]
27. Ngo-Metzger Q, Sorkin DH, Billimek J, Greenfield S, Kaplan SH. The effects of financial pressures on adherence and glucose control among racial/ethnically diverse patients with diabetes. *J Gen Intern Med* 2012 Apr;27(4):432-437 [FREE Full text] [doi: [10.1007/s11606-011-1910-7](https://doi.org/10.1007/s11606-011-1910-7)] [Medline: [22005941](#)]

Abbreviations

CSM: Common-Sense Model

RPS-DD: Risk Perception Survey for Developing Diabetes

T2DM: type 2 diabetes mellitus

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Original Paper

Using the Socioecological Model to Explore Barriers to Health Care Provision in Underserved Communities in the Philippines: Qualitative Study

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Abstract

Background: The Philippines' primary care is delivered via local health centers called barangay health centers (BHCs). Barangays are the most local government units in the Philippines. Designed to promote and prevent disease via basic health care, these BHCs are staffed mainly by barangay health workers (BHWs). However, there has been limited research on the social and environmental factors affecting underserved communities' access to health care in underserved areas of the Philippines. Given the importance of BHCs in disease prevention and health promotion, it is necessary to identify obstacles to providing their services and initiatives.

Objective: This study aimed to explore multilevel barriers to accessing and providing basic health care in BHCs.

Methods: We used a qualitative approach and the socioecological model as a framework to investigate the multilevel barriers affecting basic health care provision. A total of 18 BHWs from 6 BHCs nationwide participated in focus group interviews. Traditional thematic content analysis was used to analyze the focus group data. After that, we conducted individual semistructured interviews with 4 public health nurses who supervised the BHWs to confirm findings from focus groups as a data source triangulation. The final stage of thematic analysis was conducted using the socioecological model as the framework.

Results: Findings revealed various barriers at the individual (lack of staff motivation and misperceptions of health care needs), interpersonal (lack of training, unprofessional behaviors, and lack of communication), institutional (lack of human resources for health, lack of accountability of staff, unrealistic expectations, and lack of physical space or supplies), community (lack of community support, lack of availability of appropriate resources, and belief in traditional healers), and policy (lack of uniformity in policies and resources and lack of a functional infrastructure) levels.

Conclusions: Examining individual-, interpersonal-, institutional-, community-, and policy-level determinants that affect BHCs can inform community-based health promotion interventions for the country's underserved communities. Given the multidimensional barriers identified, a comprehensive program must be developed and implemented in collaboration with health care providers, community leaders, local and regional health care department representatives, and policy makers.

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KEYWORDS

health care delivery; health care access; socioecological model; Philippines; community; barriers; health care; Asian and Pacific Islander; focus group; Tagalog; thematic analysis; socioecological framework

Introduction

In the Philippines, women, older adults, low-income households, and people with disabilities face barriers to basic health care, particularly in underserved areas [1]. The Local Government Code of 1991 (Republic Act no. 7160) decentralized public health care, assets, liabilities, equipment, workers, and records to local governments in the country [2]. By decentralizing care to local government units (called *barangays*), the country aims to improve health care services by bringing them closer to consumers [3]. Decentralization allowed local governments to form organizations, improve and standardize services, and offer a platform for best practices and new laws [4]. The barangay's decentralized local government budget specifies the number of barangay health workers (BHWs), responsibilities, and salaries or allowances [3].

As a result of decentralization, health centers in barangays (the smallest administrative division in the Philippines) were tasked with providing basic health care (eg, vaccines, health and nutrition education, family planning services, treatment for minor illnesses and injuries) to the individuals residing in the communities they served [5]. These barangay health centers (BHCs) are the cornerstone of the country's public health system and were designed to promote health and prevent disease by providing basic health care [3]. Unfortunately, barely half of Filipinos can access a BHC within 30 minutes of travel time [6]. Also, previous research has demonstrated that decentralization does not always lead to greater equality, efficiency, and effectiveness in health care delivery. Instead, it can worsen inequality, erode local commitment to critical health issues, and reduce the efficiency and efficacy of health care delivery to underserved populations [2]. Decentralization has also decreased health care quality in some of the country's poorest local government units [6].

The Philippines' BHCs and their corresponding BHWs have been considered longer in operation as local government-trained health care providers than in other countries [7]. Therefore, exploring factors that facilitate and hinder the health care service delivery of BHWs may offer interesting insights into improving the health care services provided by local government-trained health care providers in countries that provide decentralized health care services. To enhance health outcomes on all fronts, BHWs are employed at the barangay level as a bridge between health care institutions and local communities to increase access to care [8]. Because most BHWs come from the communities they serve, they are well versed in the issues that the community members face and can tailor their care accordingly. In addition to taking vital signs, BHWs can advise on maintaining a healthy lifestyle, administering basic treatments, and making referrals when necessary [9]. However, there is a lack of knowledge of the motivational factors that make these primarily unpaid volunteers work and the challenges they face in providing access to basic health care to these vulnerable populations [10]. Recognizing these problems is crucial to the country's primary health care success and sustainability [11].

To address this gap in the literature, we used the socioecological model as a conceptual and organizing framework to investigate

barriers to basic health care from the perspectives of BHWs and public health nurses, as direct supervisors of BHWs, in several underserved communities in the Philippines. The socioecological model is well established and can investigate how social and environmental factors across ecological levels (ie, individual, interpersonal, institutional, community, and policy) influence basic health care provision or lack thereof in underserved communities [12]. This model assists in identifying context-specific factors, which are typically overlooked in research, that either reduce or promote access to basic health care.

This qualitative study is significant because many countries, particularly low- and middle-income countries, use decentralized health care services, and the grassroots level of health care accessed by the communities of these countries is those programs provided by community health workers (CHWs) [13], such as the Filipino BHWs in this study. An explorative study investigating factors that facilitate and hinder health care provision by CHWs at all levels (ie, individual, interpersonal, institutional, community, and policy) is imperative. Therefore, we conducted this qualitative study to explore factors affecting the health care provision of BHWs in the Philippines using a socioecological framework. The study's findings will provide nuanced evidence on the commonly identified challenges of community health care programs in low- and middle-income countries, such as inadequate government funding, lack of supervision and training of community health care providers, insufficient focus on health promotion and prevention, and fragmented programming [14-16]. The study's findings can also provide the basis for helping local, national, and international stakeholders maximize their support for various community health programs, particularly in countries that use decentralized health care services. The comprehensive approach (ie, socioecological framework) and the qualitative focus of the study will provide findings that can further clarify ambiguous and fragmented challenges that interface between broader health systems and point-of-care services; hence, the results of the study can provide a multilevel basis for overcoming challenges with decentralized health care services in order for community health programs to reach their full potential. Therefore, the purpose of the study is to explore the multilevel barriers to accessing and providing basic health care in community health centers in the Philippines called BHCs.

Methods

Study Design

The study team employed a qualitative descriptive approach using focus group sessions and individual interviews. We followed the COREQ (Consolidated Criteria for Reporting Qualitative Research) guidelines [17]. We used 2 sets of semistructured interview guides—one for focus groups and one for individual interviews—to explore our study topic; the conceptual underpinnings of both sets were derived from a literature review. **Textbox 1** outlines sample questions included in the semistructured interview guide. The interview guides were provided in Tagalog (the local language) and English. The focus group discussions focused on assessing the experiences

and perspectives of BHWs in delivering basic health care at their BHCs and the obstacles they faced in providing health care and using community resources for community members. The focus groups also explored how different levels of government-provided health care to the population. The

individual interviews had the same goals but focused on the public health nurses' perspectives of the BHWs' attitudes and work conditions and the community's response to the BHWs' roles in the BHCs they served.

Textbox 1. The semistructured interview guide.

Sample questions for focus groups and individual interviews

- In your opinion, what was the situation of basic health care in your community, or how accessible was basic health care in your community? Please explain.
- In your observation or experiences, how were you or people in your community using basic health care before the pandemic?
- Please share your experiences or efforts in delivering basic health care in your community. (Only ask health workers, female community health volunteers, and local elected authorities.)
- In your observation or experiences, how are the different levels of governments responding to providing health care to community people?
- Please feel free to share if you have any suggestions or anything you would like to say or think you missed during our conversation.

Study Setting and Participants

A total of 6 focus groups were interviewed. Each focus group comprised 3 BHWs from the Philippines' 6 regions, including the National Capital, Cordilleras, Ilocos Region, Central Luzon, Western Visayas, and Central Visayas (N=18). The BHCs of these regions of the Philippines served between 20,000 and 25,000 people [6]. The majority of BHWs (15/18, 83%) were older than 40 years (mean 50.8, SD 9.6 years), and 78% (14/18) had spent more than 6 years in their current occupation (mean 17.1, SD 10.3 years) and workplace (mean 12.9, SD 9.6 years). Additionally, 4 public health nurses (all female, average age 23.6, SD 5.6 years) assigned to supervise BHWs from 3 to 5 BHCs participated in the individual interviews to confirm preliminary findings from our focus group data analysis.

Sampling and Data Collection

Purposive sampling was used to interview BHWs through focus groups. After all 6 focus group interviews were completed, an initial thematic analysis was conducted to arrive at emerging categories and preliminary themes. After data source triangulation [18,19], these preliminary themes were forwarded to the public health nurses supervising the BHWs through in-person individual interviews. To protect the identity of the BHWs, personal identifying information was not disclosed during the individual interviews. Additionally, the individual interviews did not discuss information from the preliminary themes that could directly refer to the identity of the BHWs. For example, information was more expressed in general terms (eg, information related to the punctuality of a particular BHW was shared in general terms applicable to a larger group of BHWs, such as "Some BHWs in some clinics were often late in coming to work" as opposed to referring to a particular BHW).

A female master's-prepared nurse who was not part of the study team but was trained and skilled in qualitative research conducted all focus group discussions and individual interviews. The interviewer introduced herself and gave an overview of the research before each interview or group discussion. All individuals were allowed to ask questions and provided consent.

Interviews were in Tagalog or English based on the participants' request. All interviews were held at the BHCs. All individual interviews and focus groups, which lasted an average of 45 to 60 minutes, were recorded, transcribed, and translated into English. All data were deidentified before transcription and analyses. Two days after transcribing, the interviewer and research team convened to review the transcripts; they did not find any ambiguous questions or topics from the transcripts requiring follow-up interviews.

Data Analysis

We used a deductive thematic analysis to identify the service gaps, challenges, and constraints to providing health care in the barangays. The gathered data were structured and analyzed using a socioecological framework [12] frequently used as a foundational framework for research in health promotion behavior interventions.

ATLAS.ti (ATLAS.ti Scientific Software Development GmbH) [20] was used to analyze transcripts for themes and patterns. Two bilingual researchers (EWAL and LSE) trained in qualitative research compared transcriptions with original recordings to verify accuracy. Subsequently, these 2 researchers coded the first few transcripts and met with a senior researcher to discuss discrepancies and new topics. After comparing and contrasting the coding, we obtained consensus on the emerging codes and categories and implemented these as a template for coding on the remaining transcripts.

The female master's-prepared nurse who originally conducted the interviews reviewed the emerging code and categories with the 2 bilingual researchers to organize the themes for the individual follow-up interviews with the nurses (data source triangulation). Statements that could have direct reference to a BHW or could reveal the personal identifying information of the BHW were highlighted to omit them from the discussions in the individual interviews. After all individual interviews were conducted, the final stage of thematic analysis was conducted to include insights from the individual interviews. In the final analysis stage, all identified themes were grouped and categorized into a socioecological model level with no emerging themes outside the socioecological framework.

Ethics Approval

The University of California Irvine Institutional Review Board and the University of the Philippines Ethics Review Board (IRB approval number: UPMRED #2016-496-01) approved this study. Before conducting any interviews, each participant was informed of the purpose of the study, and we ensured that all participants provided written informed consent.

Results

Levels of the Socioecological Model

This study aimed to examine barriers to basic health care from the viewpoints of BHWs and public health nurses in several

underserved communities in the Philippines. Using the socioecological model framework, we organized the concepts we found into five broad categories: (1) individual, (2) interpersonal, (3) institutional, (4) community, and (5) policy (Figure 1). The socioecological model is a system model based on the notion that social contexts determine the actions and reactions of individuals and that multiple factors influence and are influenced by the behavior of individuals [12]. It highlights the importance of addressing the interaction between individuals and their sociocultural environment at all system levels and the interdependence of influencing factors within and across all health problems and behaviors. Themes are presented according to the 5 levels of the socioecological model and augmented with illustrative quotes (see Table 1).

Figure 1. Barriers to health care provision in barangay health centers.



Table 1. Themes with representative quotes.

Levels and themes	Sample quotes
Individual-level barriers	
Lack of staff motivation	“Sometimes, we don’t want to go to the center because there aren’t any people to see or because we can’t do anything about their health problems.” (Christina, BHW ^a)
Misperceptions of health needs	“People in our community don’t go to the center because they don’t think it’s necessary to be seen for their high blood pressure. Instead, they go to the city or provincial hospital when they are really sick.” (Lolita, BHW)
Interpersonal-level barriers	
Lack of training	“Because not everyone got the same training to become a BHW, some of us are less skilled than others. Then there is experience. For example, some of us have worked with local midwives, while others have not.” (Melinda, BHW)
Unprofessional behaviors	“One of the BHWs working at our center was rude to the patients and their families. Because of this, the center had to close because the people it served went to a nearby BHC for basic care.” (Josephine, BHW)
Lack of communication	“We never see the nurses, so if we aren’t sure what to do, we have to send them a text message, which they may not answer for several days. So, we send patients home without taking care of them.” (Luninging, BHW)
Institutional-level barriers	
Lack of human resources for health	“There are just days when it is busy, and I can’t take care of all the people coming in. We just need more manpower.” (Magnolia, BHW)
Lack of accountability of staff	“No one is held responsible for being at work, so no one sticks to the schedule, which slows things down. At the centers, we sometimes work alone, which is frustrating because we can’t get everything done.” (Gwendolyn, BHW)
Unrealistic expectations	“What we do as BHWs changes from day to day. If community leaders need us, sometimes for personal reasons, we have to leave the center. The nurses who watch over us don’t know what we can do, and some let us do what we feel comfortable with. However, some nurses will ask us to do things we shouldn’t, clean wounds.” (Delia, BHW)
Lack of physical space or supplies	“The space in our BHC is so small that only the BHW, the patient, and one family member can be there at once. Because of this, more people who need healthcare must wait outside, often for long periods. We also don’t have electric fans, so it gets very hot. Our mayor promised to build a bigger and better facility to replace the one we have, but that has been a plan for several years.” (Carmelita, BHW)
Community-level barriers	
Lack of community support	“With the help of our community leaders, we have done projects to reach out to the community. But this is not consistent, and we often feel unsupported.” (Marilou, BHW)
Lack of availability of appropriate resources	“Our wealthier members will go to hospitals in the city, while those with less money will go to an herbalist or a quack doctor. Most say that the centers don’t have enough resources or supplies for their needs.” (Tomasa, BHW)
Belief in traditional healers	“Our herbalists and quack doctors have everything they need to treat common illnesses and can give them to sick people for free. Therefore, they are more trusted than we (BHWs) are.” (Amelia, BHW)
Policy-level barriers	
Lack of uniformity in policies and resources	“Depending on how much money the local government spends on healthcare, some BHCs may have more supplies and resources than others. Also, they have more space and supplies. But we can’t be like them if we do not have funds.” (Jocelyn, BHW)
Lack of a functional infrastructure	“Donors sometimes make donations, but they are very infrequent and local leaders will make promises but not carry them out.” (Marilyn, BHW)

^aBHW: barangay health worker.

Individual-Level Factors

Participants shared several individual-level factors that they deemed were barriers to providing basic health care at the BHCs. These individual characteristics were BHW’s self-motivation and community members’ misperceptions of their health care needs. In addition, individual-level characteristics reported by participants were influenced by determinants at all other socioecological model levels, particularly those linked to interpersonal and institutional factors.

Interpersonal-Level Factors

Participants frequently brought up interpersonal concerns such as a lack of training, unprofessional behavior among peers, and poor communication. BHWs, for instance, have reported feeling unprepared for their roles because of a lack of formal training. The nurses confirmed this BHW’s concern that they could not support the BHWs as much as possible because of their scope of responsibilities of managing more than one BHC. During the confirmatory interviews, nurses also expressed their need to provide closer supervision of the BHWs to help the BHWs develop more confidence in performing basic health care services. Other BHWs reported the opposite, citing informal

training with more seasoned peers (BHWs) in their BHCs as the source of a better understanding of their roles and a renewed sense of motivation to perform at their best within the limits of their job. However, BHWs voiced concerns that not all nurses (considered as their supervisors) could be contacted for advice when necessary. As a result, the nurses' lack of access to supervise and mentor the BHWs contributed to the BHWs' ongoing frustration and decreased job satisfaction. Lastly, the BHWs rarely had someone check in on their progress because the nurses were often unavailable to supervise them and oversee their performance at the clinics. During the confirmatory individual interviews with the nurses, it was evident that there were differences in perceived priorities between the nurses and the BHWs. For example, BHWs prioritized improving their ability to provide basic health care services. At the same time, the nurses wanted to expand the BHWs' scope of responsibilities so they could function even without the presence of the nurses in the clinics. Nurses often found resistance from BHWs in their attempts to expand BHW's scope of practice; this perceived resistance often resulted in more distant communication between the BHWs and the nurses. Therefore, this poor (often nonexistent) communication was detrimental to their functions as primary health care providers.

Institutional-Level Factors

Participants said that a BHC's ability to provide basic health care primarily depends on the availability of health workers and the quality of care delivered by staff. Despite this, there was a lack of accountability among BHWs such as only a handful of dedicated BHWs working at the BHCs, with some employees regularly missing work and others complaining about how much they had to do and how little help they got. In addition, basic health care was difficult to deliver for various reasons, such as conflicting and unrealistic expectations from community leaders and members, supervisors, and local government entities. For example, BHCs were promised by community leaders (eg, city mayors and barangay leaders) more funding, but BHWs continued to wait for these plans to be realized; therefore, basic medical supplies were limited, resulting in challenges with delivering basic health care services. In another example, nurses and BHWs were expected to deliver more community outreach programs by local government entities; however, they expressed frustration with the incongruence between the lack of public funding and the increasing expectation to deliver more outreach programs. BHWs voiced that they largely depended on volunteers from private organizations for their outreach programs, and they also articulated that the support they received from these private volunteers was inconsistent and infrequent.

During the group sessions, accessibility to the BHCs (ie, the physical distance between the center and the people it serves) and transportation costs determined whether community members would come for basic health care. It was also emphasized that the infrastructure and resources varied from center to center. Patients frequently had to wait outside the center in the heat and occasionally rainy weather due to a lack of physical space within the BHCs. Individuals were less inclined to seek preventative treatment at the BHCs because of the absence of functioning fans and air conditioning. When the patients obtained the help they needed, there was a limited

selection of services and items they could avail themselves of during their visit to the BHC. Free access to essential medical items such as medication, contraception, and water was only offered at a select number of BHCs.

Community-Level Factors

At the community level, thematic clusters emerged with environmental elements such as the lack of community support, usually demonstrated by informal networks like community leaders influencing basic health care delivery. For example, some BHCs benefited from donations from wealthier community members, but this was uncommon. Another environmental consideration was the availability of community resources. Furthermore, despite efforts to encourage community members to seek basic treatment at BHCs, affluent members would go to city or provincial hospitals related to the lack of appropriate health resources available at the BHC level. On the other hand, the poorer members sought treatment from traditional healers such as an herbalist or quack doctors.

Policy-Level Factors

Policy topics that emerged were a lack of uniformity in policies governing the provision of essential health care by individual local government bodies. Different towns have varied requirements for providing citizens with basic medical care. Another theme evident among the participants' interviews was the lack of functional health infrastructure. The health care resources made accessible by each jurisdiction influence the accessibility of basic health care services (such as personnel, supplies or equipment, and medications). Consequently, there was an inadequate understanding of the benefits and expected health care coverage offered by the public and private health care sectors.

Discussion

Principal Findings

The provision of primary health care in low- and middle-income countries has been the subject of prior research that used the socioecological model [21-24]. However, no study has examined the perspectives of BHWs and public health nurses who work in BHCs to provide basic health care in underserved regions in the Philippines using the socioecological model as a framework [12]. Our research indicates that basic health care provision in BHCs across the Philippines is influenced by factors at all levels of the socioecological model. The premise of the socioecological model is that health policy decisions and practices affect not only individuals but also the social networks in which they participate and the institutions and communities in which they reside [25].

There are several similarities between this study's findings and other studies on primary health care services provided by CHWs in low- and middle-income countries. Findings from our study that are consistent with previous research include the influence of the lack of physical space and adequate ventilation on the quality of health care services provided by the CHWs [26], the impact of the quality of the partnership between the local health system and the CHWs on the community perceptions of the quality of services provided by the health centers [27], the

relationship between the community's pervasive traditional beliefs of non-Western medical care and the lack of trust of CHWs [9,28], lack of consistent funding from local health systems [29,30], variability of basic and supplementary training of CHWs among health centers [8], and inconsistent and infrequent funding from private and nongovernmental organizations [8].

However, the area in which our findings are distinct from previous studies on primary health care services provided by CHWs in low- and middle-income countries is the interactional processes between the BHWs and the public health nurses who oversee the work of the BHWs. Although previous studies highlighted the importance of a collaborative working relationship between CHWs and higher-level health workers [15,31-33], these studies did not specifically explore the supervisory role of public health nurses in the work of the CHWs. Our findings specifically demonstrate that the collaboration between the public health nurses and the BHWs is crucial in providing health care services to the BHWs. Because the scope of responsibilities of BHWs is mostly based on nursing functions, supervision, training, and mentoring of BHWs by public health nurses are imperative. Nursing perspectives in the partnership between public health nurses and BHWs are incumbently necessary. The lack of confidence and competence of BHWs in performing their assigned nursing tasks in the clinics was attributed to the lack of formal training, supervision, and mentoring by their nursing supervisors (ie, the public health nurses).

Additionally, our study's findings show that community members were not maximizing the use of the services offered by the clinics because the services provided by the BHWs were limited. The limited scope of practice of BHWs was mainly related to the lack of availability and limited accessibility of public health nurses to train, supervise, and monitor the progress of their performance. The BHWs required the supervision of the public health nurses to carry out their nursing tasks to expand their scope of responsibilities and be able to perform nursing functions more independently, especially when the nurses are not able to promptly respond to the needs of the clinics (eg, the public health nurses were responsible for overseeing several clinics or health centers). Our findings provide the basis for developing nursing-specific standards and policies in monitoring the progress of BHWs' performance and expanding their scope of responsibilities to perform more independent functions and respond to rapidly changing and complex clinical situations. Our findings also demonstrate the need to integrate nursing perspectives in training CHWs to deliver point-of-care health care programs to the communities. For example, the type of services and coordination provided by the BHWs are mainly based on nursing; therefore, public health nurses are the most appropriate supervisors, mentors, and coaches for the BHWs. More importantly, the limited resources provided to the BHCs and the increasing scope of responsibilities of public health nurses in managing multiple health centers require BHWs to expand their scope of practice; the public health nurses are the main drivers in the professional development of BHWs to provide timely and safe health care services to the populations they serve.

Our research reveals that poor working conditions and limited resources significantly hinder providing high-quality basic health care in underserved areas. These findings are consistent with earlier research examining health care delivery in underserved areas in the country [1,5,9,11,25]. Given the magnitude of the problems afflicting the health care system in the Philippines, an interdisciplinary and cross-sectoral approach is required to improve the quality of health care provided in BHCs by enhancing their staffing, clinical resources, and access to life-saving drugs [33,34]. The vital role of BHWs within the larger health system should be reflected in resource allocation as the Philippines and other contexts make strides toward universal health coverage.

The absence of supervision and proper training for BHWs prevented them from playing their full role in providing primary care to their communities. BHWs are employed and trained by local government units to support various health programs. Unfortunately, not all BHWs get the training they need. Some BHWs claim that they were not provided with a formal training program and were educated by experienced BHWs on how to perform their duties; if the training was provided at all, its scope, depth, and duration varied across different local communities. Given the disparity in training, BHWs may have difficulty understanding and consistently carrying out their tasks. Moreover, lack of adequate training may lead to the communities' lack of trust and hesitancy to seek care from BHWs, as revealed in our findings. Our results are consistent with other studies performed in the Philippines [1,9] and elsewhere [35] on BHW initiatives in low- and middle-income countries. For this reason, the Philippine Department of Health must attempt to standardize the training of BHWs throughout the country. The effectiveness of BHC programs and safe, quality health care in the communities depend on BHWs receiving high-quality initial and continuous training.

In addition to standardizing the initial and ongoing training of BHWs, another widely discussed option in the country is to accredit BHW programs that can significantly improve the usefulness of BHC programs, both for their communities and BHWs. The Philippines' BHW Act (1995) demanded BHW accreditation as a viable tool to increase BHWs' morale, job security, career chances, legitimacy, and social standing [8]. Accreditation for BHW programs has been shown to protect them from acquiescing to the agenda of local political leaders, ensuring their continued existence [8]. Furthermore, accreditation can increase reliability in executing BHW programs in various settings by improving oversight and standardizing BHW performance [8]. However, previous initiatives to support the accreditation of BHW programs were unsuccessful at the local level in the Philippines.

More research is needed to explore the governance challenges and opportunities of BHW programs in various decentralized health systems to realize the full role BHW programs can play in achieving universal health care. This includes the ability of programs to extend the reach of formal health care providers, enhance access and equity of health care, and improve individual- and community-level health outcomes. In the decentralized Philippines, BHWs could be "local" health experts in multistakeholder talks on planning, financing, implementing,

managing, and monitoring community health care. Our research indicates that BHC programs and BHWs can be more effectively leveraged in efforts to achieve universal health care by increasing the capacity of local governments to provide sufficient resources to BHC programs and BHWs [8]. Providing BHWs a voice in policy decisions that pertain to their work might increase transparency and accountability by involving more government agencies (ie, local communities and regional or national health authorities) [36].

Our study has some limitations. Using a convenience sample, for example, increases the possibility of selection bias. In addition, the findings represent the viewpoints of numerous BHWs and nurses working in underserved areas in the Philippines. However, they were mainly from Luzon and Visayas (the northern and mid-regions of the country), making generalization difficult. Moreover, our participants were female, highlighting a crucial gendered aspect of BHWs in the Philippines. In societies where care is feminized, it is crucial to recognize and address gender inequalities to ensure that the work and time of BHWs are adequately appreciated [8]. Nevertheless, the study has numerous merits, such as the iterative process of developing a framework of barriers that hamper the delivery of basic health care to BHCs in the Philippines. Furthermore, this is the first known and documented study to use the socioecological model to investigate how social and environmental factors at different ecological levels (individual, interpersonal, institutional, community, and policy) influence the provision or lack thereof of basic health care in

underserved communities in the Philippines. Our findings can be used to develop comprehensive and effective interventions to address the various barriers to health care access and provision and to inform “task shifting” programs and policies in the Philippines and other low- and middle-income countries that aim to encourage and empower communities to take a more active role in health management with the help of BHWs.

Conclusions

Health professionals, communities, and stakeholders must think outside conventional medicine to improve health [8]. This comprehensive approach must encourage multisectoral cooperation to improve public policy and long-term health care delivery [10]. National, state, and local institutions must coordinate health policy making [4]. In the decentralized Philippines, BHWs could be “local” health experts in multistakeholder dialogues on planning, financing, implementing, managing, and monitoring community health care [9]. Underserved areas need better health education so community members can adopt healthier lifestyles. BHWs need superior training and supervision to provide basic services, health education, and patient referrals. The Philippine Department of Health must provide greater resources to reduce local health promotion barriers [6]. These elements are crucial to health promotion, which creates personal accountability to improve people’s health. Individual and community efforts must modify people’s ideas and habits to enhance health outcomes [9].

Conflicts of Interest

None declared.

References

1. Siongco KLL, Nakamura K, Seino K, Moncatar TJRT, Tejero LMS, De La Vega SAF, et al. Improving community health workers' attitudes toward collaborative practice in the care of older adults: an in-service training intervention trial in the Philippines. *Int J Environ Res Public Health* 2021;18(19):9986 [FREE Full text] [doi: [10.3390/ijerph18199986](https://doi.org/10.3390/ijerph18199986)] [Medline: [34639285](https://pubmed.ncbi.nlm.nih.gov/34639285/)]
2. Lakshminarayanan R. Decentralisation and its implications for reproductive health: the Philippines experience. *Reprod Health Matters* 2003;11(21):96-107 [FREE Full text] [doi: [10.1016/s0968-8080\(03\)02168-2](https://doi.org/10.1016/s0968-8080(03)02168-2)] [Medline: [12800707](https://pubmed.ncbi.nlm.nih.gov/12800707/)]
3. Banaag MS, Dayrit MM, Mendoza RU. Health inequity in the Philippines. In: Batabyal AA, Nijkamp P, Higano Y, editors. *Disease, Human Health, and Regional Growth and Development in Asia*. Singapore: Springer; 2019:163-174.
4. Siongco KLL, Nakamura K, Seino K. Reduction in inequalities in health insurance coverage and healthcare utilization among older adults in the Philippines after mandatory national health insurance coverage: trend analysis for 2003-2017. *Environ Health Prev Med* 2020;25(1):17 [FREE Full text] [doi: [10.1186/s12199-020-00854-9](https://doi.org/10.1186/s12199-020-00854-9)] [Medline: [32517677](https://pubmed.ncbi.nlm.nih.gov/32517677/)]
5. Dela Rosa JGL, Ornos EDB, Sianoya AC, Tantengco OAG, Guinanan RC. Social determinants of health inequities in indigenous children in the Philippines. *J Paediatr Child Health* 2022;58(8):1493-1494 [FREE Full text] [doi: [10.1111/jpc.16103](https://doi.org/10.1111/jpc.16103)] [Medline: [35770475](https://pubmed.ncbi.nlm.nih.gov/35770475/)]
6. Philippine health facility development plan 2020-2040: investing in resilient and sustainable health facilities towards universal health care. Philippine Department of Health. URL: <https://drive.google.com/file/d/1eahmozW6PYADnBfm57ccM0XhKN19HXp7/view?ths=true> [accessed 2022-08-01]
7. Matsumoto-Takahashi ELA, Kano S. Evaluating active roles of community health workers in accelerating universal access to health services for malaria in Palawan, the Philippines. *Trop Med Health* 2016;44:10 [FREE Full text] [doi: [10.1186/s41182-016-0008-7](https://doi.org/10.1186/s41182-016-0008-7)] [Medline: [27433129](https://pubmed.ncbi.nlm.nih.gov/27433129/)]
8. Dodd W, Kipp A, Nicholson B, Lau LL, Little M, Walley J, et al. Governance of community health worker programs in a decentralized health system: a qualitative study in the Philippines. *BMC Health Serv Res* 2021;21(1):451 [FREE Full text] [doi: [10.1186/s12913-021-06452-x](https://doi.org/10.1186/s12913-021-06452-x)] [Medline: [33980209](https://pubmed.ncbi.nlm.nih.gov/33980209/)]

9. Mallari E, Lasco G, Sayman DJ, Amit AML, Balabanova D, McKee M, et al. Connecting communities to primary care: a qualitative study on the roles, motivations and lived experiences of community health workers in the Philippines. *BMC Health Serv Res* 2020;20(1):860 [FREE Full text] [doi: [10.1186/s12913-020-05699-0](https://doi.org/10.1186/s12913-020-05699-0)] [Medline: [32917203](https://pubmed.ncbi.nlm.nih.gov/32917203/)]
10. Katigbak C, Van Devanter N, Islam N, Trinh-Shevrin C. Partners in health: a conceptual framework for the role of community health workers in facilitating patients' adoption of healthy behaviors. *Am J Public Health* 2015;105(5):872-880. [doi: [10.2105/AJPH.2014.302411](https://doi.org/10.2105/AJPH.2014.302411)] [Medline: [25790405](https://pubmed.ncbi.nlm.nih.gov/25790405/)]
11. Dodd W, Brubacher LJ, Kipp A, Wyngaarden S, Haldane V, Ferrolino H, et al. Navigating fear and care: the lived experiences of community-based health actors in the Philippines during the COVID-19 pandemic. *Soc Sci Med* 2022;308:115222 [FREE Full text] [doi: [10.1016/j.socscimed.2022.115222](https://doi.org/10.1016/j.socscimed.2022.115222)] [Medline: [35930848](https://pubmed.ncbi.nlm.nih.gov/35930848/)]
12. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Q* 1988;15(4):351-377. [doi: [10.1177/109019818801500401](https://doi.org/10.1177/109019818801500401)] [Medline: [3068205](https://pubmed.ncbi.nlm.nih.gov/3068205/)]
13. Zulu JM, Perry HB. Community health workers at the dawn of a new era. *Health Res Policy Syst* 2021;19(Suppl 3):130 [FREE Full text] [doi: [10.1186/s12961-021-00761-7](https://doi.org/10.1186/s12961-021-00761-7)] [Medline: [34641904](https://pubmed.ncbi.nlm.nih.gov/34641904/)]
14. Angwenyi V, Aantjes C, Kondowe K, Mutchiyeni JZ, Kajumi M, Criel B, et al. Moving to a strong(er) community health system: analysing the role of community health volunteers in the new national community health strategy in Malawi. *BMJ Glob Health* 2018;3(Suppl 3):e000996 [FREE Full text] [doi: [10.1136/bmjgh-2018-000996](https://doi.org/10.1136/bmjgh-2018-000996)] [Medline: [30498595](https://pubmed.ncbi.nlm.nih.gov/30498595/)]
15. Kok MC, Dieleman M, Taegtmeier M, Broerse JEW, Kane SS, Ormel H, et al. Which intervention design factors influence performance of community health workers in low- and middle-income countries? A systematic review. *Health Policy Plan* 2015;30(9):1207-1227 [FREE Full text] [doi: [10.1093/heapol/czu126](https://doi.org/10.1093/heapol/czu126)] [Medline: [25500559](https://pubmed.ncbi.nlm.nih.gov/25500559/)]
16. Zulu JM, Kinsman J, Michelo C, Hurtig AK. Integrating national community-based health worker programmes into health systems: a systematic review identifying lessons learned from low- and middle-income countries. *BMC Public Health* 2014;14:987 [FREE Full text] [doi: [10.1186/1471-2458-14-987](https://doi.org/10.1186/1471-2458-14-987)] [Medline: [25245825](https://pubmed.ncbi.nlm.nih.gov/25245825/)]
17. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19(6):349-357 [FREE Full text] [doi: [10.1093/intqhc/mzm042](https://doi.org/10.1093/intqhc/mzm042)] [Medline: [17872937](https://pubmed.ncbi.nlm.nih.gov/17872937/)]
18. Carter N, Bryant-Lukosius D, DiCenso A, Blythe J, Neville AJ. The use of triangulation in qualitative research. *Oncol Nurs Forum* 2014;41(5):545-547. [doi: [10.1188/14.ONF.545-547](https://doi.org/10.1188/14.ONF.545-547)] [Medline: [25158659](https://pubmed.ncbi.nlm.nih.gov/25158659/)]
19. Patton MQ. Enhancing the quality and credibility of qualitative analysis. *Health Serv Res* 1999;34(5 Pt 2):1189-1208 [FREE Full text] [Medline: [10591279](https://pubmed.ncbi.nlm.nih.gov/10591279/)]
20. Soratto J, de Pires DEP, Friese S. Thematic content analysis using ATLAS.ti software: potentialities for research in health. *Rev Bras Enferm* 2020;73(3):e20190250 [FREE Full text] [doi: [10.1590/0034-7167-2019-0250](https://doi.org/10.1590/0034-7167-2019-0250)] [Medline: [32321144](https://pubmed.ncbi.nlm.nih.gov/32321144/)]
21. Soola AH, Davari M, Moghaddam HR. Determining the predictors of self-management behaviors in patients with type 2 diabetes: an application of socio-ecological approach. *Front Public Health* 2022;10:820238 [FREE Full text] [doi: [10.3389/fpubh.2022.820238](https://doi.org/10.3389/fpubh.2022.820238)] [Medline: [35462803](https://pubmed.ncbi.nlm.nih.gov/35462803/)]
22. Khuzwayo N, Taylor M. Exploring the socio-ecological levels for prevention of sexual risk behaviours of the youth in uMgungundlovu district municipality, KwaZulu-Natal. *Afr J Prim Health Care Fam Med* 2018;10(1):e1-e8 [FREE Full text] [doi: [10.4102/phcfm.v10i1.1590](https://doi.org/10.4102/phcfm.v10i1.1590)] [Medline: [29781679](https://pubmed.ncbi.nlm.nih.gov/29781679/)]
23. Uchendu C, Windle R, Blake H. Perceived facilitators and barriers to Nigerian nurses' engagement in health promoting behaviors: a socio-ecological model approach. *Int J Environ Res Public Health* 2020;17(4):1314 [FREE Full text] [doi: [10.3390/ijerph17041314](https://doi.org/10.3390/ijerph17041314)] [Medline: [32085607](https://pubmed.ncbi.nlm.nih.gov/32085607/)]
24. Zulkipli SH, Rosliza AM. Application of socio-ecological model in developing preventive strategies against suicidal ideation and suicidal attempt among youth in low and middle-income countries: a scoping review. *Med J Malaysia* 2022;77(6):755-763 [FREE Full text] [Medline: [36448396](https://pubmed.ncbi.nlm.nih.gov/36448396/)]
25. Duante CA, Austria REG, Ducay AJD, Acuin CCS, Capanzana MV. Nutrition and health status of Indigenous Peoples (IPs) in the Philippines: results of the 2013 national nutrition survey and 2015 updating survey. *Philipp J Sci* 2022;151(1):513-531. [doi: [10.56899/151.01.39](https://doi.org/10.56899/151.01.39)]
26. Olaniyan A, Isiguzo C, Hawk M. The socioecological model as a framework for exploring factors influencing childhood immunization uptake in Lagos state, Nigeria. *BMC Public Health* 2021;21(1):867 [FREE Full text] [doi: [10.1186/s12889-021-10922-6](https://doi.org/10.1186/s12889-021-10922-6)] [Medline: [33952252](https://pubmed.ncbi.nlm.nih.gov/33952252/)]
27. Kowitt SD, Emmerling D, Fisher EB, Tanasugarn C. Community health workers as agents of health promotion: analyzing Thailand's village health volunteer program. *J Community Health* 2015;40(4):780-788. [doi: [10.1007/s10900-015-9999-y](https://doi.org/10.1007/s10900-015-9999-y)] [Medline: [25744815](https://pubmed.ncbi.nlm.nih.gov/25744815/)]
28. Sacks E, Morrow M, Story WT, Shelley KD, Shanklin D, Rahimtoola M, et al. Beyond the building blocks: integrating community roles into health systems frameworks to achieve health for all. *BMJ Glob Health* 2018;3(Suppl 3):e001384 [FREE Full text] [doi: [10.1136/bmjgh-2018-001384](https://doi.org/10.1136/bmjgh-2018-001384)] [Medline: [31297243](https://pubmed.ncbi.nlm.nih.gov/31297243/)]
29. Burnett-Zieman B, Abuya T, Mwanga D, Wanyugu J, Warren CE, Sripad P. Community-based postnatal care services for women and newborns in Kenya: an opportunity to improve quality and access? *J Glob Health* 2021;11:07006 [FREE Full text] [doi: [10.7189/jogh.11.07006](https://doi.org/10.7189/jogh.11.07006)] [Medline: [33763220](https://pubmed.ncbi.nlm.nih.gov/33763220/)]

30. Chipokosa S, Pattnaik A, NEP Malawi Technical Task Team, Misomali A, Mohan D, Peters M, et al. How strong are Malawi's family planning programs for adolescent and adult women? Results of a national assessment of implementation strength conducted by Malawi's National Evaluation Platform. *J Glob Health* 2019;9(2):020901 [FREE Full text] [doi: [10.7189/jogh.09.020901](https://doi.org/10.7189/jogh.09.020901)] [Medline: [33282227](https://pubmed.ncbi.nlm.nih.gov/33282227/)]
31. Kok MC, Ormel H, Broerse JEW, Kane S, Namakhoma I, Otiso L, et al. Optimising the benefits of community health workers' unique position between communities and the health sector: a comparative analysis of factors shaping relationships in four countries. *Glob Public Health* 2017;12(11):1404-1432 [FREE Full text] [doi: [10.1080/17441692.2016.1174722](https://doi.org/10.1080/17441692.2016.1174722)] [Medline: [27133127](https://pubmed.ncbi.nlm.nih.gov/27133127/)]
32. Mundeve H, Snyder J, Ngilangwa DP, Kaida A. Ethics of task shifting in the health workforce: exploring the role of community health workers in HIV service delivery in low- and middle-income countries. *BMC Med Ethics* 2018 04;19(1):71 [FREE Full text] [doi: [10.1186/s12910-018-0312-3](https://doi.org/10.1186/s12910-018-0312-3)] [Medline: [29973217](https://pubmed.ncbi.nlm.nih.gov/29973217/)]
33. LeBan K, Kok M, Perry HB. Community health workers at the dawn of a new era: 9. CHWs' relationships with the health system and communities. *Health Res Policy Syst* 2021;19(Suppl 3):116 [FREE Full text] [doi: [10.1186/s12961-021-00756-4](https://doi.org/10.1186/s12961-021-00756-4)] [Medline: [34641902](https://pubmed.ncbi.nlm.nih.gov/34641902/)]
34. Vaughan C, Gill-Atkinson L, Devine A, Zayas J, Ignacio R, Garcia J, et al. Enabling action: reflections upon inclusive participatory research on health with women with disabilities in the Philippines. *Am J Community Psychol* 2020;66(3-4):370-380 [FREE Full text] [doi: [10.1002/ajcp.12468](https://doi.org/10.1002/ajcp.12468)] [Medline: [33078846](https://pubmed.ncbi.nlm.nih.gov/33078846/)]
35. Plowright A, Taylor C, Davies D, Sartori J, Hundt GL, Lilford RJ. Formative evaluation of a training intervention for community health workers in South Africa: a before and after study. *PLoS One* 2018;13(9):e0202817 [FREE Full text] [doi: [10.1371/journal.pone.0202817](https://doi.org/10.1371/journal.pone.0202817)] [Medline: [30248100](https://pubmed.ncbi.nlm.nih.gov/30248100/)]
36. Abimbola S, Baatiema L, Bigdeli M. The impacts of decentralization on health system equity, efficiency and resilience: a realist synthesis of the evidence. *Health Policy Plan* 2019;34(8):605-617 [FREE Full text] [doi: [10.1093/heapol/czz055](https://doi.org/10.1093/heapol/czz055)] [Medline: [31378811](https://pubmed.ncbi.nlm.nih.gov/31378811/)]

Abbreviations

BHC: barangay health center

BHW: barangay health worker

CHW: community health worker

COREQ: Consolidated Criteria for Reporting Qualitative Research

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Review

Family-Based, Culturally Responsive Intervention for Chinese Americans With Diabetes: Lessons Learned From a Literature Review to Inform Study Design and Implementation

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Abstract

Background: The prevalence of diabetes in the United States is very high, and Chinese peoples with diabetes are estimated to comprise 50% of the total cases. Rates of diabetes continue to rise among Chinese and Chinese American people; however, research regarding effective diabetes interventions for this minority group is sparse.

Objective: A literature review was conducted to determine a study design and interventions for future studies investigating the efficacy of a family-based intervention to improve diabetes care for Chinese Americans.

Methods: The review was conducted from January 2023 to April 2023. The PubMed, CINAHL, ScienceDirect, ProQuest, Google Scholar, Scopus, and Cochrane Central Register of Controlled Trials databases were searched. The key search terms were “diabetes type 2,” “Chinese patients,” “minority patients,” “interventions for diabetes,” “diabetes and family,” “culturally responsive interventions for diabetic patients,” “family education for diabetes,” and “diabetes in China.”

Results: The initial search retrieved 2335 articles, and 10 articles met the selection criteria to examine the efficacy of family-based interventions for Chinese American people. The review showed that providing multiple sessions of education and counseling for both patients and family members is promising for improving diabetes care. Recruitment of 20 to 60 dyads consisting of a patient and a family member can help assess family dynamics in the process of diabetes care, such as food shopping and preparation, and of diabetes management to further evaluate the efficacy of an intervention. Glycated hemoglobin (HbA_{1c}) was the most often used primary outcome. Other secondary outcomes included knowledge and efficacy in diabetes management and self-care activities related to diabetes care.

Conclusions: A family-based intervention is essential for optimizing diabetes care for Chinese Americans. Thus, recruitment of a dyad consisting of a patient and a family member is important to investigate the efficacy of a family-based intervention for improving diabetes care in this population. Strategies for improving recruitment and retention of dyads were identified. In addition, technology can be used to promote the delivery of interventions to patients, which in turn increases efficacy. This review can help researchers investigate the efficacy of family-based interventions for promoting diabetes management by designing culturally appropriate study protocols and interventions.

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KEYWORDS

family-based intervention; diabetes; HbA_{1c}; Chinese; implementation; prevalence; systematic review; patient; intervention; diabetes care; effectiveness; diabetes management; cultural intervention; patient education; Chinese Americans

Introduction

Overview

Despite advances in health care knowledge and science, diabetes and its complications remain a significant issue in the United States, causing premature deaths and a huge financial burden on the society [1]. It is estimated that the prevalence of diabetes will increase to more than 54.9 million Americans in 2030; this is an increase of 54% from 2015 to 2030 [1]. In addition, the total annual medical costs related to diabetes will be more than \$622 billion by 2030 [1]. Thus, diabetes management and self-management are essential areas for research. When examining the demographics of people with diabetes in the United States, it is clear that type 2 diabetes is a significant issue for minority groups such as Chinese and Chinese American adults [1]. The care of adult patients with type 2 diabetes is a complex process, particularly for minority populations in the United States.

Problem Statement

The population of Chinese immigrants in the United States is rapidly increasing and has grown by over 2 million from 2000 to 2015 [2]. As stated, the prevalence of diabetes in the United States is projected to be 54.9 million cases in 2030, and Chinese patients with diabetes are estimated to comprise 50% of the total cases [1,3]. Rates of diabetes continue to rise among Chinese and Chinese American people; however, research regarding effective interventions for this minority group is sparse [3-5]. Current yet limited research demonstrates the potential efficacy of family support and involvement for improving diabetes management for patients among certain cultures, such as for Chinese people [3,4]. However, the findings are not robust enough to make significant clinical implications, as this area of research is rarely implemented with Chinese Americans [3,4,6]. Chinese patients usually place high value on family; thus, family structure and support can significantly impact their disease management [3]. Therefore, involving family in disease management is culturally responsive with potential effectiveness for optimizing diabetes management for Chinese Americans. Family members are defined as relatives living with the patients or in regular contact with patients at least once a week [7].

In the general US population, family support interventions showed more robust efficacy for diabetes management when compared with traditional approaches such as individual patient education on diet control and medication compliance [3]. Family-based interventions cover a broad range of activities, such as preparation of a culturally and medically appropriate diet and collective decision-making on crucial issues such as limb amputation. However, limited literature could be found on the efficacy of family support for diabetes management for Chinese Americans.

Regarding study populations, our search was expanded to include research conducted with Chinese Americans as well as other ethnic minorities, such as Hispanic and Korean Americans, who also have similar cultural values of viewing family as their important support system.

The goal of this literature review was to provide a comprehensive review of the existing literature to inform future researchers about details and specifics for study design, components of an effective family-based intervention, outcome measures, and how to efficiently recruit and retain participants within dyads of patients and family members.

Methods

Literature Review

The literature review was conducted between January 2023 and April 2023, and we searched the PubMed, CINAHL, ScienceDirect, ProQuest, Google Scholar, Scopus, and Cochrane Central Register of Controlled Trials databases. Keywords were “diabetes mellitus type 2,” “type 2 diabetes mellitus,” “Chinese patients,” “Chinese Americans,” “Chinese immigrants,” “minority patients,” “interventions for diabetes,” “diabetes and family,” “culturally responsive interventions for diabetic patients,” “family education for diabetes,” and “diabetes in China.” The literature search was performed by 2 reviewers using various keywords from the aforementioned list. For instance, we used a combination of “type 2 diabetes mellitus” and “Chinese Americans” and “family education” as the initial approach to search articles in PubMed. The first reviewer used various combinations of keywords for the search and documented the entire search history. The second reviewer used the same combinations of various keywords from the first reviewer and documented the search results. The number of articles for each search was compared by the 2 researchers. If there was discrepancy in terms of the numbers of articles, the 2 reviewers performed the search again and discussed the results to reach consensus (the same number of articles). This process was conducted with all databases, and the number of articles were summed to establish the first pool of papers (for the exact number, review the “Study Quality” section).

The inclusion criteria were developed by our research team members, including 2 clinicians who had been working with Chinese Americans for more than 20 years and 2 researchers who had 10 years to 15 years of research experience with Chinese Americans. The inclusion criteria included report of glycated hemoglobin (HbA_{1c}) levels (a gold standard for diabetes management); recruitment of patients older than 18 years of age; patients who identified as Chinese, Chinese American, or other minority ethnicity such as Hispanic or Korean who share similar family support systems; use of a continuous family-based, culturally responsive intervention as a primary approach; or investigation of how family support helped or was associated with diabetes management. Studies were retrieved from peer-reviewed journals published in various countries and written in English. Study types ranged from quasiexperimental and qualitative to randomized control trials (RCTs).

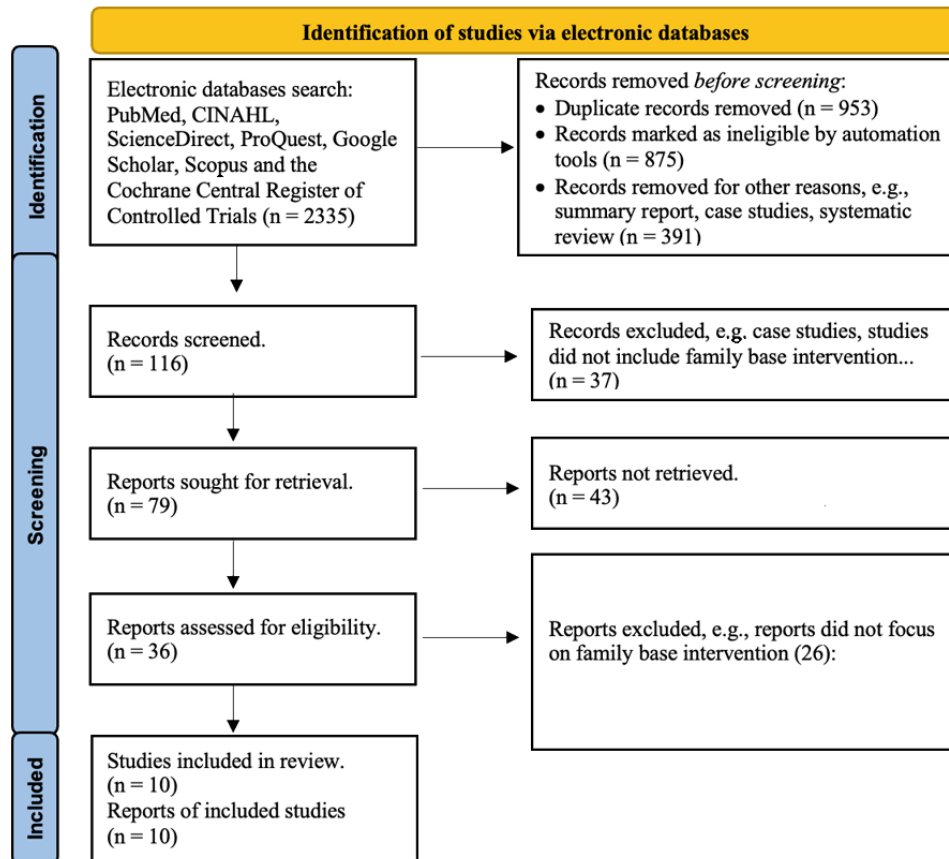
Study Quality

Assessment of study quality was developed by the research team. The articles had to meet the following requirements (the standard for good quality studies) to be eligible for our final review: (1) meeting all inclusion criteria; (2) providing the full text; (3) not a summary report, case study, nor systematic

review; (4) focus on family-based interventions or providing important information related to family-based interventions. Figure 1 shows the flow chart describing how the articles were screened and selected. The screening algorithm was developed by the research team by modifying the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow chart [8]. The entire screening process was conducted by 2 reviewers together.

The initial search retrieved 2335 articles, and 10 articles met the selection criteria and were included in this review. These studies were conducted in various countries, such as the United States and China, and were written in English. In terms of the review process, 2 reviewers conducted their literature review independently, then met to discuss their review results and the review tables they generated. The consensus of the review results from the 2 reviewers is described in the “Results” section.

Figure 1. PRISMA flow chart for selected studies on family-based diabetes management.



Results

Study Design

Regarding study design, there were 2 RCTs, 2 quasiexperimental studies, 3 cross-sectional studies, and 3 qualitative studies.

Study Duration

Studies were conducted for a duration of time ranging from 2 months to 19 months, depending on the resources and availability of study participants. Although significant results were identified for shorter studies of around 6 months, studies lasting longer than 12 months were more reliable due to the chronic nature of diabetes and that effective management requires repeated tests throughout the patient’s lifetime.

Study Bias

Loss of follow-up may lead to study bias as it limits generalizability of the study findings to Chinese or Chinese American patients with type 2 diabetes at large [6]. For instance, 1 study cited a loss of follow-up [6]; up to 20% of participants were unable to complete the study. The participants who

withdrew from the study might have had more serious health conditions that prevented them from continuing to participate in the study. This is particularly challenging for the studies that involved both a participant and a family member who had to commit to several months of educational or interview sessions with little incentive to complete the required number of sessions. The possible solutions to promote recruitment and retention of a dyad will be discussed under in the “Incentives” section.

Another potential bias may be associated with recruitment of only specific patient populations. For example, some studies focused exclusively on elderly patients who were hospitalized [4,6], while others involved participants who had a low income or were from rural areas in China [9,10]. Thus, the generalizability of the study findings was limited. For future studies, a broader population base, such as from young to older adults and across different settings, should be included to generate more generalizable findings. This is especially true when a large sample size is available and appropriate (eg, in a more advanced stage of investigating the effectiveness of a well-established intervention instead of a newly developed, untested intervention).

Sample Size

Sample size was reported based on the study design. For the intervention studies, the sample size ranged from 29 dyads to 225 dyads.

Two RCTs

The study by Feng et al [6] used a rigorous RCT design with 2 groups (225 dyads; intervention vs control): 113 patients in the intervention group and 112 patients in the control group. McEwen et al [9] also used an RCT design with 2 groups (157 dyads; intervention vs control): 83 dyads in the intervention group and 74 dyads in the control group. Feng and colleagues [6] have not published their data. McEwen et al [9] reported significant improvement of diabetes management outcomes, such as diabetes management activities, but not of HbA_{1c}.

Two Quasiexperimental Studies

Cai and Hu [11] conducted a 2-group quasiexperimental study (without randomization of participants): 29 dyads in the intervention group and 28 dyads in the control group. Hu et al [12] conducted a 2-group quasiexperimental study (92 dyads): 51 dyads in the intervention group and 41 dyads in the control group. Both studies showed a significant reduction in HbA_{1c}.

Three Cross-Sectional Studies

Recruitment in the cross-sectional studies resulted in the following samples: 70 dyads in the study by Zhao et al [7]; 532 participants (patients with type 2 diabetes) in the study by Shao et al [10]; 83 participants (baseline survey data from an original RCT) in the study by Song et al [13]. All 3 studies reported that family support was positively associated with diabetes control (eg, a better HbA_{1c} outcome).

Three Qualitative Studies

Recruitment in the qualitative studies resulted in the following samples: 229 participants in the study by Chen et al [4]; 20 dyads in the study by Chesla et al [3]; 20 participants in the study by Yue et al [5]. All 3 qualitative studies described in detail how and why family support was associated with diabetes management.

Inclusion Criteria and Recruitment

The inclusion criteria commonly used across most studies involved a current diagnosis of type 2 diabetes, age older than 18 years, recent HbA_{1c} value $\geq 7\%$, and presence of an adult family member willing to participate in the study with the patient. Shao et al [10] also stipulated that patients had no concurrent malignant tumor, type 1 diabetes, gestational diabetes, nor acute complications of type 2 diabetes to avoid incidence of further complications that may have biased the study findings. For future studies, these inclusion criteria were recommended to obtain more unbiased and reliable outcomes for diabetes management.

In terms of sources for recruiting participants, the review showed that the majority of the studies recruited their participants through the community [3,4,6,7,9,11-13] and referrals from

health care providers [4,5,11,12]. The literature also showed that the best strategies to recruit and retain Chinese Americans are through outreach to communities and via referral by health care providers [14].

Incentives

As discussed earlier, incentives improved health care outcomes for patients with type 2 diabetes and reduced the number of participants lost to follow-up, especially for older Chinese adults without an income or who were living with a compromised financial situation [4,15]. Cai and Hu [11] provided incentives of free physical examinations and finger stick blood glucose tests at the end of their intervention period, which led to a low attrition rate. In addition, they instructed participants to communicate within their assigned smaller groups to remind each other about upcoming education sessions and follow-up events. Offering incentives and peer support for participation in the study also significantly reduced the attrition rate. For example, Cai and Hu [11] had an attrition rate of 5% using their peer support.

Intervention

Feng et al [6] aimed to examine the effects of a family-based intervention utilizing the Chinese social media application WeChat. WeChat is a messaging system that includes news and other information that is periodically distributed to participants. This was a 2-armed RCT following 225 dyads of Chinese patients and their family members. Their intervention provided educational articles via WeChat over a period of 12 months. The control group continued to receive regular medical care. The educational articles were divided into 2 themes: (1) optimal diets for patients with diabetes and (2) exercise recommendations [6]. Compared with those in the control group, the patients in the intervention group achieved significant changes in HbA_{1c}, self-care activities, and risk perception of diabetes.

McEwen et al [9] also implemented a 2-armed RCT to examine the efficacy of a 12-week educational intervention for Hispanic patients and their families. The research team conducted a group session intervention for the participant-family member dyads that focused on materials from the National Standards for Diabetes Self-Management Education [12]. Group sessions were held to discuss tips and challenges with diabetes management and how to overcome challenges. McEwen et al [9] implemented an extensive intervention protocol, including 3 weekly home visits, 3 weekly follow-up phone calls from a health care practitioner, and 6 group sessions over 12 weeks for the intervention group. The comparison consisted of wait list control groups. Compared with other studies, McEwen et al [9] used a greater variety of interventions, including patient education, family support, and telephone calls to follow up on home visits. However, their intervention was very labor-intensive. Compared with the control group, the intervention group achieved better diabetes management, except HbA_{1c} levels (Table 1).

Table 1. Description of studies included in the systematic review.

Author(s), year	Study purpose	Study design and sample size	Intervention	Participants and inclusion criteria	Recruitment	Outcomes
Zhao et al, 2022 [7]	To examine the effects of the patients' and family members' perceived family support on diabetes management	Cross-sectional; 70 dyads	N/A ^a	Chinese people in China 1. DM ^b ≥6 months 2. Aged 50-79 years 3. HbA _{1c} ^c between 7.0% and 10.0%	Recruitment took place in 26 residential communities; no other details were provided.	Patients' perceived family support, such as actively helping patients adjust their lifestyles (healthy diet and regular exercise), was positively associated with diabetes management.
Feng et al, 2023 [6]	To examine the effectiveness of a family-based intervention with WeChat	RCT ^d with 2 groups; 225 dyads (intervention: 111; control: 111)	12-week interventions, including distribution of educational articles, quizzes, and more via WeChat (social media) to patients and family members of patients	Chinese people in China 1. Registered in 1 of the 2 community health service centers in the urban area in Jiading District 2. Had been diagnosed with T2DM ^e by a doctor at least 6 months before study enrollment 3. Aged 18 to 79 years 4. HbA _{1c} level ≥7% 5. Had no plans to leave their place of residence in the following 12 months 6. Had a family member who could use WeChat and lived with the patient or visited them at least once a week	Recruited from family doctors in 2 community health centers; patients and family interviewed by the research team member	HbA _{1c} significantly decreased by 0.60% ($P<.001$); other secondary outcomes included decrease in nonsupportive behavior ($P=.03$) and improved scores for general diet ($P<.001$), specific diet ($P<.001$), exercise ($P=.002$), blood sugar testing ($P=.02$), foot care ($P<.001$), risk knowledge ($P<.001$), personal control ($P<.001$), worry ($P=.02$), optimism bias ($P=.03$), and supportive behaviors ($P<.001$).
Cai and Hu, 2016 [11]	To examine the effects of a family-based self-management education intervention for adults	Quasiexperimental design with 2 groups; 57 dyads (intervention: 29 dyads; control: 28 dyads)	7 educational sessions with patients and their family members	Chinese people in China 1. Self-reported diagnosis of T2DM 2. >18 years old 3. HbA _{1c} >7.0%	Recruited via flyers posted in health community centers and via referral from physicians	Significant average 1% reduction in HbA _{1c} (intervention group vs control group); significant reduction in average BMI (23.27, SD 2.13 for the intervention group vs 24.96, SD 3.07 for the control group; $F=18.11$; $P<.001$); significant increase in average diabetes knowledge (22.97, SD 2.03 for the intervention group vs 14.11, SD 4.57 for the control group; $F=92.77$; $P<.001$).
Shao et al, 2017 [10]	To determine if better social support perceived or received by patients could reinforce self-efficacy, medical regimen, and glycemic control	Cross-sectional study; n=532	N/A	Chinese people in China 1. Diagnosis of T2DM at least 1 year prior 2. >18 years old 3. No concurrent serious health conditions, such as advanced renal failure 4. Chinese inhabitants of Guangzhou, China 5. Able to complete a questionnaire	Recruited from outpatients and inpatient units in 2 hospitals	Social support was significantly associated with diabetes control. Social support was measured in 3 dimensions: (1) objective support (ie, visible support, such as social network), (2) subjective support (ie, an individual's sense of being supported or understood by family), (3) support utilization (ie, the extent of accepting help and actively looking for support from family).

Author(s), year	Study purpose	Study design and sample size	Intervention	Participants and inclusion criteria	Recruitment	Outcomes
Chen et al, 2018 [4]	To identify common factors affecting diabetes management	Qualitative study using thematic analysis (TCA); n=229	Cross-sectional study (no intervention)	Chinese people in China 1. Patients with T2DM 2. >18 years old 3. Permanent residents of Tianjin, China	Referred by physicians	Major factors (themes) related to family support for diabetes management included a higher level of family support to promote diabetes management and more social integration (eg, patients felt less lonely and more willing to optimize their diabetes control).
Hu et al, 2014 [12]	To test the efficacy of a family-based, culturally tailored intervention (8 weeks) for Hispanics with T2DM and their families	Quasiexperimental long-term study; 92 dyads (51 in the intervention group; 41 in the control group)	8-week educational sessions taught in Spanish to patients and their family members	Hispanic Americans 1. Hispanic patients with T2DM and their family members 2. Community-dwelling 3. Self-identification as Hispanic 4. Aged 18 years or older 5. Self-identification as having a medical diagnosis of T2DM 6. An adult family member willing to participate in the study Inclusion criteria for family members: 1. Residence in the same household as the participant with diabetes 2. Aged 18 years or older	Recruited from community clinics, physician offices, and churches	Mean HbA _{1c} significantly decreased by 1%, BMI significantly decreased (mean difference=-0.25 kg/m ² ; P=.02), and diabetes knowledge significantly improved (mean difference=5.89; P<.001).
McEwen et al, 2017 [9]	To investigate the effects of a family-based self-management support intervention (12 weeks) for T2DM	RCT with 2 groups; 157 dyads (83 dyads in the intervention group; 74 dyads in the control group)	Participants randomly assigned to an intervention	Mexican Americans 1. Mexican American patient 2. Diagnosed with T2DM at least 1 year prior 3. 35-74 years old 4. Spoke and read Spanish or English 5. HbA _{1c} ≥8.0% 6. Had not participated in a diabetes education program in the prior year 7. Able to walk at least 1 mile (determined by self-report) 8. Access to and ability to talk on the telephone 9. Had 1 adult family member willing to participate	Recruited via outreach activities to various communities by the research team	HbA _{1c} did not change significantly over time, but other outcomes, including diabetes management activities and diabetes self-efficacy, were improved.
Yue et al, 2018 [5]	To explore factors affecting patients with diabetes and develop family-based interventions	Qualitative descriptive approach; 20 participants	Qualitative data collection through interviews (no intervention)	Chinese people in China 1. HbA _{1c} target <7% 2. T2DM diagnosis 3. >18 years old 4. Living in the target community	Referred by a community health care nurse to the research team	Six major themes or patient concerns were identified through data analysis that included family experiences about starvation (starvation experience in early life led to overeating, which was associated with poor diabetes management), seeking family harmony in eating, and family financial burden.

Author(s), year	Study purpose	Study design and sample size	Intervention	Participants and inclusion criteria	Recruitment	Outcomes
Chesla et al, 2009 [3]	To describe cultural and family challenges with illness management	Qualitative, interpretive, comparative study; 20 dyads	Qualitative data collection through interviews (no intervention)	Chinese Americans 1. T2DM for at least 1 year 2. Aged 35-75 years 3. Married for a minimum of 1 year 4. Self-identified as Chinese American or Chinese having immigrated to the United States from mainland China or Hong Kong 5. Spouse agreed to participate	Recruitment from community clinics, community service organizations, and public notices	The results showed that Chinese families were involved in diabetes management activities, such as food preparation.
Song et al, 2012 [13]	Determine primary sources of social support for Korean Americans with T2DM and examine the effect of unmet needs in diabetes management	Baseline data from an RCT; 83 patients with DM	Survey/cross-sectional data from an RCT (no intervention)	Korean Americans 1. Self-identified as Korean American 2. Aged ≥30 years 3. Uncontrolled diabetes (HbA _{1c} ≥7.5% within the past 6 months) 4. Resided in the Baltimore, WA area 5. Able to give written consent to participate in the study	Recruitment via social media, Korean churches, and grocery stores	The primary source of social support was their spouse (family support) for both genders; social support (mainly family support) was significantly associated with diabetes management. Diabetes management was measured by self-care activities, including diet, exercise, blood glucose testing, foot care, and medication adherence.

^aN/A: not applicable.

^bDM: diabetes mellitus.

^cHbA_{1c}: glycated hemoglobin.

^dRCT: randomized controlled trial.

^eT2DM: type 2 diabetes mellitus.

Cai and Hu [11] recruited 57 dyads and utilized a quasiexperimental 2-group design with no randomization of participants. Participants were placed in the intervention or control group based on geographic location. The intervention group required both participants and family members to undergo 7 educational sessions, including 2 one-on-one home visits and 5 group sessions. Each session focused on a particular theme, such as general knowledge, diet, physical activities, medication management, blood glucose checks, and complication prevention [11]. The control group received usual care, which included a 10-minute to 15-minute quarterly home visit for family health promotion. At the end of the study (3-month follow-up), patients in the intervention group achieved significantly better results than the control group in improving HbA_{1c}, BMI, and diabetes self-care knowledge (Table 1).

Hu et al [12] recruited 92 dyads and utilized a quasiexperimental 2-group design with no randomization of participants. The intervention group participated in 8 weekly interactive modules on diabetes management including the topics of general knowledge about diabetes, facilitation of family support, identification of barriers to diabetes self-management, discussion of how to adjust lifestyle and medication to enhance diabetes control, and goal setting for healthy behaviors. The control group received 8 weeks of regular care, such as a physical exam and education about general health (eg, weight control and smoking cessation). At the end of the study (6-month follow-up), patients in the intervention group achieved significantly better

results than the control group in improving HbA_{1c}, lowering BMI, and increasing diabetes knowledge (Table 1).

Although the 3 cross-sectional studies, including those by Zhao et al [7], Shao et al [10], and Song et al [13], did not include any family-based interventions, their study findings highlighted important factors that were associated with diabetes management and should be considered for future family-based interventions. Zhao et al [7] reported that perceived family support by the patient, such as actively helping them adjust their lifestyles (healthy diet and regular exercise), was positively associated with diabetes management. Song et al [13] reported that family support was positively related to self-efficacy in diabetes management, including diet, exercise, and general self-management skills. They defined family support as the support that patients wanted and received from family: the more family support patients received, the better self-efficacy the patients had. Shao et al [10] also had similar findings. They further quantified family support in 3 dimensions: (1) objective support (ie, visible direct assistance, such as food preparation); (2) subjective support (ie, an individual’s sense of being supported or understood by family); (3) support utilization (ie, the extent of accepting help and actively looking for support from family). Above all, having family work with the patient to support them the way they needed and being perceived or accepted by the patient is important to develop an effective intervention in diabetes management. This also further validates

our hypothesis that recruitment of dyads of a patient and a family member is crucial.

Similarly, the 3 qualitative studies by Chen et al [4], Chesla et al [3], and Yue et al [5] did not include any family-based interventions, but their study findings validated the importance of family assistance in supporting diabetes management. The examples of family support included food prepared by family, family harmony in eating, and social integration when making decisions, such as planning a diabetes management regimen together.

Outcomes and Measurements

The most used gold standard outcome was HbA_{1c} [6,9-12]. Other outcomes related to diabetes management, such as BMI, waist circumference, diabetes knowledge, diabetes management activities, self-efficacy in diabetes management [6,9-12], and qualitative outcomes addressing how and why family factors supported diabetes management [3,4], were also included. The following studies described the efficacy of a family-based intervention for improving diabetes outcomes.

The RCT by Feng et al [6] provided educational articles via WeChat over a period of 12 months and showed a 0.6% improvement in HbA_{1c}. Other outcomes were also improved, including decreased nonsupportive behavior and improvement in diet, exercise, blood glucose testing, foot care, risk knowledge, personal control, and supportive behaviors [6].

The 12-week RCT by McEwen et al [9] used a variety of interventions and did not show improvement in HbA_{1c} for Hispanic participants [9]. However, other outcomes, such as diabetes management activities and diabetes self-efficacy, were significantly improved.

The quasiexperimental study by Cai and Hu [11] showed that a family-based intervention (7 weeks) reduced patient HbA_{1c} levels by an average of 1%. This 1% reduction in HbA_{1c} has clinically significant benefits, which will prevent severe complications, such as renal failure [11]. Other outcomes, including reduced BMI, waist circumference, and improvements in diabetes knowledge, were also noted.

The quasiexperimental study by Hu et al [12] also showed significant effects of their family support intervention (ie, HbA_{1c} decreased 1%) for Hispanic participants. Other outcomes, such as BMI and diabetes knowledge, were also improved.

In terms of data driven from cross-sectional studies [7,10,13] and qualitative projects [3-5], as aforementioned, family support was highly valued by patients; thus, a healthy family dynamic should be incorporated into diabetes management to promote efficacy. For example, seeking family harmony in eating by shopping for healthy food and preparing food and eating meals together (eg, Chinese culture focuses on communal eating) can significantly optimize diabetes control. Other benefits are that patients feel less socially isolated and achieve greater efficacy at managing their diabetes.

Discussion

This literature review attempted to provide analysis and observation of appropriate study designs to investigate the efficacy of a family-based intervention for improving diabetes management for Chinese American adults with type 2 diabetes. This discussion includes conclusions and recommendations for specific elements to design future projects, including sampling and recruitment, incentives for promoting recruitment and retention, interventions, outcomes and measurement, and study duration.

Best Diabetes Intervention in Review

The most efficacious intervention was by Cai and Hu [11] who used a quasiexperimental 2-group design (57 dyads). The 7-week intervention resulted in a significant 1% reduction in HbA_{1c}, which can lead to a 40% decreased risk of complications such as eye and kidney diseases [1]. Participants also increased their diabetes knowledge and reported improved physical and mental health. Patients felt more cared for by their family and an increased sense of community. Hu et al [12], also using a quasiexperimental 2-group design (92 dyads), had a similar intervention of an 8-week educational session provided to patients and family members in their chosen language. Patients in the intervention group had an average 0.41% decrease in HbA_{1c} at 1 month from the initial intervention. BMI and diabetes knowledge were also significantly improved. Both studies used either one-on-one or interactive modules with patients and family to facilitate family support for diabetes management. They also used various approaches, such as video games, illustrations, and educational flip charts, to facilitate understanding and implementation of the strategies that were taught for managing diabetes.

It is worth noting that the use of technology to deliver an intervention is a current trend due to its contact-free nature and good efficacy. If participants are prepared or familiar with using technology, positive outcomes are anticipated. For instance, the 12-week delivery of diabetes educational materials by Feng et al [6] achieved significant improvement of HbA_{1c} and other outcomes (eg, healthy diet). Thus, besides the strategies provided by Cai and Hu [11] and Hu et al [12], use of technology, such as WeChat (social media) as proposed by Feng et al [6], should also be considered when designing an intervention to deliver the educational information more effectively without the limit of physical distance or the impact of a pandemic. To facilitate use of technology-based interventions to further enhance optimal management of diabetes for Chinese American patients, including a younger adult family member who is savvy at using technology is especially important, as many patients are older and uncomfortable using technology to manage their disease [14,16].

Qualitative study findings also provided important information to design a family-based intervention. For instance, family support for diet and food was highly valued by patients. Thus, an intervention should contain discussion with patients and their families about food shopping and preparation provided by family, eating meals with the family in a harmonious

environment, helping patients and their families find resources to resolve financial burdens in preparing healthy food or seeking medical treatment for diabetes, and facilitating healthy interactions and communication between patients and their families. Future studies should develop interventions focusing on dynamics and interactions between patients and their families instead of approaching each one separately. It is also important to understand both patient and family concerns in dealing with diabetes and help resolve those issues.

Recruitment of Chinese Americans, Sample Size, and Incentives

In terms of sources for recruiting participants, a dyad set of a patient with diabetes and their family member was most feasible through community settings, such as a local church or community center, instead of other approaches, such as hospitals or online recruitment, due to better social connections and attachments in those settings [4,5,7,10,11]. In addition, our review demonstrated that recruitment via personal contact, such as a referral from a participant's health care provider, will be more successful, with increased rates of participation and retention [4-6,10,11]. Other methods including public flyers or phone calls made by a research team member were not as efficient as community settings or personal referrals [4-6,10,11].

Regarding sample size, 20 to 60 dyads should be sufficient, as demonstrated by Cai and Hu [11] and Hu et al [12], in an under-studied research field, such as investigation of efficacy of family-based diabetes interventions for Chinese Americans. It is also worth noting that it is more feasible to recruit and retain a smaller number of dyads when both a patient and a family member are needed in the early stage of developing a new family-based intervention. Recruitment of dyads requires commitment. A larger sample size (eg, more than 60 dyads) is recommended for future studies with a clearer research direction (eg, a well-developed intervention) supported by robust literature to examine the effectiveness of family-based interventions that will help inform clinical practice or policy.

Incentives are important to recruit and retain study participants. Besides offering a physical examination, laboratory tests, and peer support, as mentioned in the Results section, the first author's previous study also showed that frequent, smaller incentives, such as a gift card (in a smaller amount), throughout the study instead of one incentive at the end of the study can reduce attrition [15]. This is especially true for studies recruiting both patients and their family members as dyads [12,15].

Outcomes

For future studies focusing on family support for Chinese Americans managing diabetes, HbA_{1c} should be used as a primary outcome accompanied by other secondary outcomes. Other measures could also include BMI, diabetes knowledge, self-efficacy in diabetes management, and self-care activities, including diet, exercise, blood glucose testing, foot care, and medication adherence.

Conclusion

Overall, this review focused on emerging literature supporting interventions for Chinese American patients with type 2 diabetes and involving a family-based intervention.

According to the literature, the interventions involving at least one family member for diabetes care showed efficacy in improving diabetes management for Chinese Americans. However, these studies were still very limited in terms of establishing robust findings. Thus, more studies are needed in this research area.

Our review detailed information about the potential elements that should be considered when designing a family-based intervention, such as an in-person consultation with both patients and their families at the same time followed by periodic follow-up visits or phone calls. In addition, focusing on family dynamics and family support for lifestyle modifications, such as shopping for food together, is very important to promote diabetes management for Chinese Americans, as this population highly values support from family. Any family-related issues, such as no time for self-care due to spending extensive time baby-sitting grandchildren or other family members, should also be discussed for possible solutions.

Since family is highly valued by the Chinese, it is essential to recruit dyads of both a patient and an adult family member to study diabetes management instead of solely recruiting patients. Although recruiting dyads takes more time and can be challenging, strategies such as frequent incentives can promote recruitment and retention of participant dyads.

Finally, technology can be incorporated due to its advantages of saving time and no physical limitations (eg, participants do not need to commute long distances for study participation). An additional benefit of using technology is the use of a social media platform to facilitate 3-way communications among a researcher, a patient, and a family member, which can also facilitate participation by family members. However, studies using technology to help Chinese Americans manage their diabetes are very limited. Thus, this could be a future study direction for Chinese Americans with diabetes.

Conflicts of Interest

None declared.

References

1. Rowley WR, Bezold C, Arikan Y, Byrne E, Krohe S. Diabetes 2030: Insights from yesterday, today, and future trends. *Popul Health Manag* 2017 Feb;20(1):6-12 [FREE Full text] [doi: [10.1089/pop.2015.0181](https://doi.org/10.1089/pop.2015.0181)] [Medline: [27124621](https://pubmed.ncbi.nlm.nih.gov/27124621/)]

2. Budiman A. Chinese in the U.S. Fact Sheet. Pew Research Center. 2021 Apr 29. URL: <https://www.pewresearch.org/social-trends/fact-sheet/asian-americans-chinese-in-the-u-s/> [accessed 2023-10-27]
3. Chesla CA, Chun KM, Kwan CML. Cultural and family challenges to managing type 2 diabetes in immigrant Chinese Americans. *Diabetes Care* 2009 Oct;32(10):1812-1816 [FREE Full text] [doi: [10.2337/dc09-0278](https://doi.org/10.2337/dc09-0278)] [Medline: [19628812](https://pubmed.ncbi.nlm.nih.gov/19628812/)]
4. Chen J, Jing X, Liu X, Volkmann A, Chen Y, Liu Y, et al. Assessment of factors affecting diabetes management in the City Changing Diabetes (CCD) study in Tianjin. *PLoS One* 2019 Feb 12;14(2):e0209222 [FREE Full text] [doi: [10.1371/journal.pone.0209222](https://doi.org/10.1371/journal.pone.0209222)] [Medline: [30753195](https://pubmed.ncbi.nlm.nih.gov/30753195/)]
5. Yue P, Lamb KV, Chen X, Wang Y, Xiao S, Feng X, et al. Identification of family factors that affect self-management behaviors among patients with type 2 diabetes: a qualitative descriptive study in Chinese communities. *J Transcult Nurs* 2019 May 22;30(3):250-259. [doi: [10.1177/1043659618793713](https://doi.org/10.1177/1043659618793713)] [Medline: [30132743](https://pubmed.ncbi.nlm.nih.gov/30132743/)]
6. Feng Y, Zhao Y, Mao L, Gu M, Yuan H, Lu J, et al. The effectiveness of an eHealth family-based intervention program in patients with uncontrolled type 2 diabetes mellitus (T2DM) in the community via WeChat: randomized controlled trial. *JMIR Mhealth Uhealth* 2023 Mar 20;11:e40420 [FREE Full text] [doi: [10.2196/40420](https://doi.org/10.2196/40420)] [Medline: [36939825](https://pubmed.ncbi.nlm.nih.gov/36939825/)]
7. Zhao Q, Yu X, Feng Y, Zhao Y, Lu J, Guo Y, et al. Patients' and family members' knowledge, attitudes and perceived family support for SMBG in type 2 diabetes: a fuzzy-set qualitative comparative analysis. *BMJ Open* 2022 Dec 09;12(12):e063587 [FREE Full text] [doi: [10.1136/bmjopen-2022-063587](https://doi.org/10.1136/bmjopen-2022-063587)] [Medline: [36600335](https://pubmed.ncbi.nlm.nih.gov/36600335/)]
8. Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021 Mar 29;372:n71 [FREE Full text] [doi: [10.1136/bmj.n71](https://doi.org/10.1136/bmj.n71)] [Medline: [33782057](https://pubmed.ncbi.nlm.nih.gov/33782057/)]
9. McEwen MM, Pasvogel A, Murdaugh C, Hepworth J. Effects of a family-based diabetes intervention on behavioral and biological outcomes for Mexican American adults. *Diabetes Educ* 2017 Jun 27;43(3):272-285 [FREE Full text] [doi: [10.1177/0145721717706031](https://doi.org/10.1177/0145721717706031)] [Medline: [28447545](https://pubmed.ncbi.nlm.nih.gov/28447545/)]
10. Shao Y, Liang L, Shi L, Wan C, Yu S. The effect of social support on glycemic control in patients with type 2 diabetes mellitus: the mediating roles of self-efficacy and adherence. *J Diabetes Res* 2017;2017:2804178-2804178 [FREE Full text] [doi: [10.1155/2017/2804178](https://doi.org/10.1155/2017/2804178)] [Medline: [28626769](https://pubmed.ncbi.nlm.nih.gov/28626769/)]
11. Cai C, Hu J. Effectiveness of a family-based diabetes self-management educational intervention for Chinese adults with type 2 diabetes in Wuhan, China. *Diabetes Educ* 2016 Dec 09;42(6):697-711. [doi: [10.1177/0145721716674325](https://doi.org/10.1177/0145721716674325)] [Medline: [27831523](https://pubmed.ncbi.nlm.nih.gov/27831523/)]
12. Hu J, Wallace DC, McCoy TP, Amirehsani KA. A family-based diabetes intervention for Hispanic adults and their family members. *Diabetes Educ* 2014 Nov 18;40(1):48-59 [FREE Full text] [doi: [10.1177/0145721713512682](https://doi.org/10.1177/0145721713512682)] [Medline: [24248832](https://pubmed.ncbi.nlm.nih.gov/24248832/)]
13. Song Y, Song H, Han H, Park S, Nam S, Kim MT. Unmet needs for social support and effects on diabetes self-care activities in Korean Americans with type 2 diabetes. *Diabetes Educ* 2012 Jan 05;38(1):77-85 [FREE Full text] [doi: [10.1177/0145721711432456](https://doi.org/10.1177/0145721711432456)] [Medline: [22222514](https://pubmed.ncbi.nlm.nih.gov/22222514/)]
14. Li W, Zhong J. A review of technology-based interventions in improving type 2 diabetes management in Chinese Americans. *Asian Pac Isl Nurs J* 2019 Apr 11;4(1):20-33. [doi: [10.31372/20190401.1018](https://doi.org/10.31372/20190401.1018)] [Medline: [31037270](https://pubmed.ncbi.nlm.nih.gov/31037270/)]
15. Li WW, Wu Y, Chen ACC. A systematic review of recruitment for older Chinese immigrants into clinical trials. *Asian/Pacific Island Nursing Journal* 2016;1(2):35-45 [FREE Full text] [doi: [10.9741/23736658.1019](https://doi.org/10.9741/23736658.1019)]
16. Liu L, Wu F, Tong H, Hao C, Xie T. The digital divide and active aging in China. *Int J Environ Res Public Health* 2021 Dec 01;18(23):12675 [FREE Full text] [doi: [10.3390/ijerph182312675](https://doi.org/10.3390/ijerph182312675)] [Medline: [34886400](https://pubmed.ncbi.nlm.nih.gov/34886400/)]

Abbreviations

HbA_{1c}: glycated hemoglobin

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

RCT: randomized clinical trial

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Original Paper

An Antiracism Community-Based Participatory Research With Organizations Serving Immigrant and Marginalized Communities, Including Asian Americans and Native Hawaiians/Pacific Islanders in the United States Pacific Northwest: Qualitative Description Study With Key Informants

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Abstract

Background: Asian American (AA) community leaders, Native Hawaiian/Pacific Islander (NH/PI) community leaders, and allies in the United States Pacific Northwest expressed concern that there are families and children from AA communities and NH/PI communities who experience and witness acts of xenophobia and racism. This can cause racial trauma. The long-time practice of aggregating AA and NH/PI data contributes to erasure and makes it challenging to advance health equity, such as allocating resources. According to AAPI Data's long-awaited report in June 2022, there are over 24 million AAs and 1.6 million NHs/Pis in the United States, growing by 40% and 30%, respectively, between 2010 and 2020. Philanthropic investments have not kept up with this substantive increase. The National Academies of Sciences, Engineering, and Medicine emphasized the need for effective partnerships to advance the health and well-being of individuals and communities in antiracism and system-level research.

Objective: The aim of this community-based participatory research qualitative description study was to identify perceptions and experiences regarding racial discrimination, race-based stress, and racial trauma; intergenerational healing and resiliency; and sharing the body with science from key informants of an academic and community partnership to inform antiracism coalition work. This partnership includes academic researchers and community leaders from community-based organizations and a health care organization serving immigrant and marginalized communities, including AAs and NHs/Pis in the United States Pacific Northwest.

Methods: In total, 10 key informants joined 1 of 2 participatory group discussions via videoconference for 2 hours in 2022. We used a semistructured and open-ended group interview guide. A qualitative participatory group-level assessment was conducted with the key informants and transcribed. Interpretations and meanings of the main points and the main themes were reflected

upon, clarified, and verified with the key informants in real time. The field note–based data transcripts were manually coded using conventional content analysis. Reflexivity was used.

Results: There were 6 main themes: prejudice plus power in racism definition and working in solidarity to counter lateral oppression/false sense of security, microaggression as multilayers, “not assimilationist by nature” and responding differently to white superiority, intergenerational- and identity-related trauma, what is healing among People of Color and through a lens of resiliency and intergenerational connection and knowledge, and mistrust and fear in the research and health care systems surrounding intentions of the body.

Conclusions: The themes highlight the importance of internal and intergenerational healing from racial trauma and the need for solidarity among communities of color to combat white supremacy and colonization. This work was foundational in an ongoing effort to dismantle racism and uplift the community voice through a cross-sector academic and community partnership to inform antiracism coalition work.

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KEYWORDS

Asian Americans; Native Hawaiians/Pacific Islanders; community-based participatory research; qualitative description; coalition; antiracism; racial discrimination; race-based stress; racial trauma; COVID-19

Introduction

Background

Asian American (AA) community leaders, Native Hawaiian/Pacific Islander (NH/PI) community leaders, and allies in Oregon and Washington States in the United States Pacific Northwest expressed concern that there are families and children from AA communities and NH/PI communities who experience and witness acts of xenophobia and racism. The power of science needs to focus on social issues and at a system level [1]. There is an ongoing need to mobilize, engage, and partner across sectors with health care organizations and community-based organizations in community organizing to inform antiracism coalition work. The National Academies of Sciences, Engineering, and Medicine emphasized the need for effective partnerships between health care organizations and community-based organizations to advance the health and well-being of individuals and communities [1]. Cross-sector partnership collaboration is important, and there must be recognition and navigation consideration of the contextual differences in power dynamics between sectors, such as funding resources and capacity of workforces [1,2], while collaborating on determining priority issues and actionable steps. Authentic intentionality is essential in being fully inclusive in the use of language and in-depth conversations on the diversity of perspectives and experiences and be driven by community and grassroots organizations regarding said inclusive language [1]. Research evidence points to the importance of relationship building within a culturally safe context for long-term sustainability between community and academic partners as meaningful engagement, especially working with immigrants and marginalized communities, including AA communities and NH/PI communities that have experienced historical trauma, including diaspora [3-13]. Earning and sustaining trust through mobilizing, engaging, partnering, and discussing difficult areas, priority issues, and actionable steps with community-based and health care organizations serving immigrants and marginalized communities, including AA communities and NH/PI communities, in research and honoring cultures are vitally important. Sustainable authentic relationships to inform

antiracism coalition work in support of effective prevention and health programs are crucial.

Contextual Considerations in Performing Antiracism Work: Erasure, Impacts of Racism, Race-Based Stress, Racial Trauma, and Protective Factors

There are multiple contexts to consider and recognize in performing antiracism work and a pathway forward for a post–COVID-19 pandemic time.

Erasure

Although AAs and NHs/PIs are diverse racial-ethnic populations, these populations are often aggregated as a monolithic group in health and human services data. The negative impact of the long-time practice of aggregating AAs and NHs/PIs must be recognized—*erasure of communities*. This long-time aggregation practice contributes to erasure and makes it challenging to advance health equity. Although data are used in decision-making on priorities regarding allocating resources, for example, during public health emergencies, and informing public health officials and policies aimed at reducing health inequities [14,15], there has been minimal policy attention on the burden of COVID-19 among AAs and NHs/PIs [16].

AAPI Data is a nationally recognized publisher of demographic data and policy research on AAs and PIs [17]. In June 2022 of the second year of the COVID-19 pandemic, AAPI Data reported on the long-awaited disaggregated data for AAs and NHs/PIs [17]. AAs and NHs/PIs are among the fastest-growing population groups in the United States based on the 2020 Census data [17]. There are over 24 million AAs and 1.6 million NHs/PIs in the United States, and the AA and NH/PI populations grew by about 40% and 30%, respectively, between the 2010 and the 2020 Census [17]. Over 1.7 million AAs are undocumented immigrants [17]. AAPI Data asserted there is economic devastation of the COVID-19 pandemic among AAs and NHs/PIs, including individuals, families, communities, and nonprofit community-based organizations [17]. According to AAPI Data, philanthropic investments have not kept up with this substantial increase in demand [18].

Impacts of Racism

Although racism is defined in the literature in different ways that illustrate, in part, mechanisms (see [Multimedia Appendix 1 \[1,19-22\]](#)), an underpinning is that racism affects health and wellness [23,24] and is entrenched in culture [23,25]. According to the National Academy of Medicine, there is a need to have intention in the use of language regarding racism that is inclusive of Black, Indigenous, and People of Color, including AAs and NHs/PIs, while acknowledging and doing work toward or in addressing structural racism and unequal allocation of power and resources as root causes of health inequities [26]. Racism can include prejudice, discrimination, or antagonism toward a race or ethnic group [25] and bias [22]. Discrimination is the most studied aspect of racism [23].

Race-Based Stress

Prior to the COVID-19 pandemic, AAs' experiences of racial discrimination were rarely brought to public attention due, in part, to the model minority myth that erroneously posits that AAs do not experience the negative consequences of racism in this country as evidenced by their upward mobility and educational attainment [27]. This phenomenon, wherein the higher socioeconomic status some AAs have is used to deny or erase their experiences of racism, is a specific feature of anti-Asian racism, but in general, Black, Indigenous, and People of Color face significant race-based stressors due to the institutional, systemic, and interpersonal racism present in White-dominant US society [28,29]. Race-based stressors are threats of harm or injury, humiliating or shaming events, and witnessing harm to People of Color [30,31]. These race-based experiences have short-term and long-term impacts on mental health and physical health among socially disadvantaged racial and ethnic populations, including among children as adverse childhood experiences that can negatively impact well into adulthood as chronic health conditions [23,31-35]. Although the field has focused primarily on the experiences and consequences of race-based stress among African American people [36], AAs and NHs/PIs, along with minoritized groups, also suffer significantly from race-based stress [31,37].

Racial Trauma

During the COVID-19 pandemic, the escalating anti-AA hate and anti-NH/PI hate incidents were brought to public attention: 10,905 incidents between March 2020 and December 2021 in the United States, of which 4632 (42.48%) occurred in 2020 and 6273 (57.52%) occurred in 2021 [38]. Between January 2020 and March 2020, evidence of anti-AA sentiments was prevalent internationally on Twitter as well [39]. These direct and indirect racialized attacks have impacted mental and physical health [40-42]. Xenophobia is the fear of strangers—someone who is different from self or dislike of or prejudice against people from other countries [43,44]. Experiencing or witnessing acts of xenophobia and racism can cause racial trauma [31,37]. Similar to posttraumatic stress disorder, racial trauma involves injuries. Racial trauma is real or perceived experiences of discrimination in danger-related events [37]. Racial trauma differs from posttraumatic stress disorder in that there are ongoing injuries where there is exposure and re-exposure to race-based stress [37]. “Cumulative

racial trauma can leave scars for those who are dehumanized” [37]. Scars can be psychological wounds or physiological effects or both [37]. Prolonged psychological and physiological stress resulting from discrimination and antagonistic interactions can result in health consequences due to dysregulation or chronic hypercortisolemia, such as suppressing immunity and increasing the risk of chronic diseases [45].

Protective Factors

The following are examples of protective factors. Cultural humility and inclusion are essential to address the increased xenophobia and racial trauma that has intensified as a result of the COVID-19 pandemic [40]. The National Academies of Sciences, Engineering, and Medicine underscored research evidence that the feeling of belonging is also essential [22]. Researchers found higher levels of social support, including caregiver emotional and instrumental support and peer support, decrease the negative effect of discrimination on allostatic load that is the cumulative stress—*wear and tear*—the body experiences [32,46]. Racism is an everyday risk factor [47]. Movement from a deficit lens to an asset-based one is crucial in antiracism work regarding healing.

An Organized Academic and Community Partnership to Inform Antiracism Coalition Work

An academic and community partnership was created among academic researchers and community leaders from the public Washington State University College of Nursing; the College of Agricultural, Human, and Natural Resource Sciences; and the School of Biological Sciences; the nonprofit Immigrant & Refugee Community Organization (IRCO) and its Pacific Islander & Asian Family Center (PI&AFC); the nonprofit Pacific Islander Community Association of Washington (PICA-WA); and PeaceHealth not-for-profit health care system in the United States Pacific Northwest. IRCO unites newcomers and long-time community members from around the world and serves the holistic needs of immigrants, refugees, and mainstream community members in Oregon, with reach to Southwest Washington [48]. IRCO provides culturally and linguistically specific social services, including health, to build new lives and become self-sufficient [48]. PICA-WA serves as a cultural home, centers community power, and advocates to further the wellness of Pacific Islander communities in Washington [49]. PeaceHealth serves Oregon, Washington, and Alaska and promotes healing through personal and community health, relieving pain and suffering, and treating each person in a loving and caring way [50]. Culturally responsive community-based participatory research has been shown to center community voices and actionable leadership for changes [3,4,10,11,29].

We are mindful that prior researchers have reported ethical issues regarding collaboration, such as needing additional time, financial issues, the extent of comfort to discomfort regarding sharing power, and disempowerment among ethnic minoritized groups [3]. We have a foundational diverse cross-sector partnership to inform antiracism coalition work.

This Study

Cohen et al's [51] developing an effective coalition guided this study, and they describe effective coalition building can achieve

more widespread reach within communities, sharing information, providing a range of perspectives, and accomplishing more together. The antiracism coalition includes AAs, NHs/PIs, and allies collaborating alongside. Due to the substantive breadth of community needs in an antiracism context, conducting a community-based participatory research qualitative description study is necessary to explore the in-depth diversity of perspectives and experiences to inform antiracism coalition work. Thus, the aim of this community-based participatory research qualitative description study was to identify perceptions and experiences regarding racial discrimination, race-based stress, and racial trauma; intergenerational healing and resiliency; and sharing the body with science from the key informants of a cross-sector academic and community partnership to inform antiracism coalition work. This work was foundational on findings related to priority issues and actionable steps to inform antiracism coalition work for accountability, growth, and sustainability.

Methods

Study Design and Key Informant Participants

In this community-based participatory research, we used qualitative description. Findings are closer to the data, as given by participants, in qualitative description, as Sandelowski described it [52,53]. Qualitative description is still interpretative [53]. Qualitative description aligns well in this study and the use of the scientific qualitative participatory group-level assessment method (described later).

We describe the background of academic researchers and community leaders from the organizational partnership who are from the antiracism coalition because this contributed to in-depth participatory group discussions. There were academic multiple principal investigators (MPIs), of which one was an academic nurse PI and identified as Vietnamese American with a Guamanian Micronesian Islander background and a community-based participatory research background and another was an academic human development PI and identified as White with a psychology background. On behalf of the academic MPIs, the academic human development PI emailed key informant participants with written instructions and a secure password-protected Qualtrics online link to the combined research study consent and sociodemographic and background form and obtained electronic consent. This study was held virtually via videoconference during the COVID-19 pandemic. Key informants from an academic and community partnership of an antiracism coalition joined 1 of 2 participatory group discussions for about 2 hours in January or February 2022. The academic MPIs were facilitators, and an academic prevention science researcher with a Native American and Asian Indian background was a cofacilitator and recorded field note–based data transcripts in both participatory group discussions. We determined the participation size was sufficient to achieve codebook stability and for understanding the main themes with a scope of this study to inform antiracism coalition work, the high quality of data from participants, and the methodological study on data saturation by Hennink et al [54]. We spoke with community organizational leadership regarding a compensation

amount based on a mutual understanding of seed funding availability. From a social justice and equity lens, we compensated to commensurate the needed time for each key informant community leader at US \$50 per hour for 2 hours for a total of a US \$100 Visa gift card at the end of a participatory group discussion.

Ethical Considerations

This study was determined exempt by the Washington State University Human Research Protection Program (#19080-001).

Concurrent Data Collection and Data Analysis: Qualitative Participatory Group-Level Assessment Method

We adapted the scientific qualitative participatory group-level assessment method [55]. The group-level assessment method is from a social justice lens, where there is active involvement of participants in generating data, analyzing data, and reflecting on interpretations and meanings, clarifying, and verifying in real time with academic researcher facilitators. Group-level assessment steps include climate setting, generating data, appreciating perspectives, reflecting, understanding the data, selecting themes, and taking action.

Vaughn and Lohmueller [55] developed the qualitative participatory group-level assessment method to provide timely and valid data. The academic nurse PI previously modified the group-level assessment method in innovative community-based participatory research work with AAs and Micronesian Islanders to be inclusive of a storytelling communication style [6,8]. We provided an overview of how we adapted the qualitative group-level assessment steps used in the participatory group discussions in this study ([Multimedia Appendix 2](#)).

We obtained a rich texture of perceptions and experiences with the qualitative group-level assessment method. The academic MPIs and cofacilitator engaged in discussions through reflection and clarification and verified the interpretations and meanings of the main points and identified the main themes with key informants in real time during the participatory group discussions to ensure trust in meaningful data interpretation [56]. Consensus was sought and achieved among key informants and academic researcher facilitators. We referred to the co-constructed grounding agreements for a collaborative space from the climate setting step (see [Multimedia Appendix 2](#)), and this helped in working through discrepancies and disagreements. For example, there was a difference in interpretation and meaning regarding “hypervisibilized” versus “hypervigilance,” and this was clarified and verified with participants. In another example, there were different understandings that were discussed through reflection, clarified, and verified on the intended interpretations and meanings regarding assimilation and white supremacy. We identified the main themes using nonspecific quantification, including direct and nuances in findings related to the purpose of the study. The academic MPIs and cofacilitator debriefed immediately after each participatory group discussion and reviewed the impressions of group processes and interactions that provided an additional depth of understanding. The academic MPIs provided participants with access to the field note–based data transcripts, and there was no mention of

major concerns about discrepancies or disagreements. The academic MPIs discussed with key informants and mutually agreed for academic researchers do the lifting work in additional conventional content analysis, selecting example quotes for the identified main themes, naming the themes, and then sharing for review. The academic MPIs, cofacilitator, and 2 academic nurse researcher collaborators met 2 times for 1.5-2 hours to further examine the recorded field note-based data transcripts and reviewed the main points and identified the main themes generated with key informants during the participatory group discussions. Next, the field note-based data transcripts were manually coded using conventional content analysis and reviewed for example quotes that represented the identified main themes with supported original text [57]. Interpretation variances enhanced credibility. The academic MPIs provided participants with access to the coded field note-based data transcripts. The academic nurse PI read the transcripts and selected example quotes that seemed to be the most representative for the identified main themes, performed an initial round of naming the main themes, and then discussed with the academic human development PI. The initial names of the main themes were longer in length, and the academic nurse PI shortened the names of the main themes for clarity as a round. Next, the academic nurse PI shared the names of the main themes and example quotes with the academic human development PI, cofacilitator, and the participants. There was

no mention of major concerns about discrepancies or disagreements. Reflexivity was used throughout the process as a technique to address the influence of personal biases on results.

Results

Background of Key Informants

There was a total of 10 key informants who work with immigrants and marginalized communities, including AAs and NHs/PIs. Of the 10 key informants, 5 (50%) are community leaders from the AA communities and NH/PI communities and 5 (50%) identify as allies collaborating alongside. The key informants were invited to report in their own terms. Of the 10 key informants, 2 (20%) were academic nurse researchers and identified as Black. Of the 8 (80%) key informant community leaders, 3 (38%) are immigrant and refugee community leaders, 1 (12%) is an immigrant and refugee community leader for Pacific Islanders, 2 (25%) are NH/PI community leaders, and 2 (25%) are health caregiver leaders. The 8 (80%) key informant community leaders reported race and ethnicities as follows: Pacific Islander; Black/Hispanic; Finnish; White Hispanic; Vietnamese and Mexican; Polynesian/Tongan; Southeast Asian and Bhutanese-Nepali; and Samoan, Korean/Chinese, and White. All key informants spoke English. In addition, Samoan, Spanish, Finnish, and Heritage/elementary Vietnamese were also spoken. Additional sociodemographic information is shown in [Table 1](#).

Table 1. Sociodemographics of key informant community leaders (N=8).

Sociodemographic variables	Participants ^a
Race and ethnicity background, n (%)	
Pacific Islander	1 (13)
Polynesian/Tonga	1 (13)
Samoan, Korean/Chinese, and White	1 (13)
Southeast Asian and Bhutanese-Nepali	1 (13)
Vietnamese and Mexican	1 (13)
Black/Hispanic	1 (13)
White Hispanic	1 (13)
Finnish	1 (13)
Immigrant status, n (%)	
Immigrated to the United States	4 (50)
Born in the United States	3 (38)
Unsure of status	1 (13)
Lived in United States (years), mean (SD)	29 (14)
Gender, n (%)	
Female	5 (63)
Male	2 (25)
Nonbinary	1 (13)
Age (years), mean (SD)	39 (13)
Education level, n (%)	
Undergraduate degree	5 (38)
Graduate degree	3 (38)
Type of work, n (%)	
Community and social service	6 (75)
Management	1 (13)
Health care practice	1 (13)
Organizational leadership, n (%)	
NH/PI ^b community leaders	2 (25)
Immigrant and refugee community leader for Pacific Islanders	1 (13)
Immigrant and refugee community leaders	3 (38)
Health caregiver leaders	2 (25)
State of residence, n (%)	
Washington	5 (63)
Oregon	3 (38)

^aThe sum of percentages could be more than 100 because of rounding.

^bNH/PI: Native Hawaiian/Pacific Islander.

Themes

There were 6 identified main themes across participatory groups, main points, and example quotes. There were 3 identified main themes in participatory group 1: (1) prejudice plus power in racism definition and working in solidarity to counter lateral oppression/false sense of security, (2) microaggression as

multilayers, and (3) “not assimilationist by nature” and responding differently to white superiority. There were 3 identified main themes in participatory group 2: (1) intergenerational- and identity-related trauma, (2) what is healing among People of Color and through a lens of resiliency and intergenerational connection and knowledge, and (3) mistrust and fear in the research and health care systems

surrounding intentions of the body. We provided descriptive interpretations for each theme. The diversity of perspectives and experiences in this cross-sector organizing movement is crucial in naming together what is happening and collectively as an antiracism coalition set forth priority issues and actionable steps.

Participatory Group 1

Prejudice Plus Power in Racism Definition and Working in Solidarity to Counter Lateral Oppression/False Sense of Security

There were some participants who referred to “your definition of racism” as coming from the lens of an institutional definition rather than from that of what must be recognized in a racism definition. A racism definition needs to include power, in addition to prejudice thoughts, in the context of who has the power to make decisions of impact and whether they can recognize the extent of the impact of those decisions on People of Color. This racism working definition makes prejudice plus power explicit. An NH/PI community leader commented on prejudice plus power and how that upholds individual and structural racism:

...there should be a focus on individual prejudice—and need to clarify with the People’s Institute is prejudice plus power and have to mention the addition of power...have to be clear that racism is set up with how this country is made and the way it is run. [NH/PI community leader J, Pacific Islander background]

Most participants talked about the issue of lateral oppression between communities of color and must work in solidarity against white supremacy and how lateral oppression and internalized oppression show up. Working in solidarity is the coming together to unite, including community leaders and members, such as mobilizing and community organizing within and across diverse communities of color. The positionality of the lens through which racism is viewed and from which context are necessary to clearly identify and name racism. An immigrant and refugee community leader for Pacific Islanders described lateral oppression through a territorialism lens as an internal conflict:

...lateral oppression between communities of color...viewed as racism, but I see it as territorial, as it is less and to be categorized in that form...to address that internal conflict and territorial impact of People of Color—prejudice within or between. [Immigrant and refugee community leader for Pacific Islanders, K, Polynesian/Tongan background]

Two NH/PI community leaders described white superiority/oppression of People of Color where lateral oppression is a manifestation of internalized oppression. Proximity to whiteness is colorism and is a false sense of security. Most participants expressed concern about tension between different communities of color, and this is a challenge in coming together. Working alongside as allies is a movement forward. Internalized oppression can show up through imposter

syndrome. Not being able to view self as leaders is an example of internalized oppression.

When we clearly identify racism...we have to be committed that we are working in solidarity with each other against white supremacy. We have to get away from the lateral oppression but using the term “racist” to describe tension between Black and Brown communities [referring to how the term “racist” is being used], we have to understand racism within the context of white supremacy and how to dismantle it...dynamic as internalized racial oppression—white superiority and minority inferiority—the mentality of People of Color of anti-Black sentiments or at least I’m not them mentality; this is a false sense of security. [referring to People of Color] are...targets of white supremacy...do not want to be the target. [NH/PI community leader J, Pacific Islander background]

What came up for me is that internalized oppression shows up through imposter syndrome [how there are community members who are leaders within but not viewing self as leaders] and seems to be through manifestation. [NH/PI community leader K, Samoan, Korean/Chinese, and White background]

Microaggression as Multilayers

Some participants talked about how coloring would be perceived by people within the same community to be more accepted. A Black academic nurse researcher described colorism within cultures and internal community as a lived experience example. There is an emphasis on complexion or perfect skin color.

My family is from Central America—I am told that I am not Black enough in America...colorism really does play in within cultures...light skin is in or light skin is out...how it reflects on myself and others—when the eyes are on me and when they are not on me...much emphasis on complexion or perfect skin color to be more accepted plays into that internal community and how those different complexions are feeling and experiencing different things. [Academic nurse researcher N, Black background]

In another example, a Black academic nurse researcher described that taking care of children who are struggling and feeling inferior due to the color of their skin is constant despite being successful in academia. The parenting lifting support is ongoing.

Our kids have to deal with this too [referring to colorism]. Have a daughter who is a senior in college and see her struggle in high school and college and now just with the color of her skin and feeling inferior. She is winning awards and excelling academically, but she could never believe that she was that or feel that she is anything...As adults we try to deal, but as kids it is disheartening. I have to reassure her don’t worry about the color of your skin; you are intelligent, you are beautiful. They have to believe that the color of their skin doesn’t matter...they can accomplish so much—constantly we have to remind them [referring

to her children] that they can accomplish much. After a while I get numb—maybe I'm just dealing with it.
[Academic nurse researcher D, Black background]

A health caregiver leader commented on the feeling of not belonging due to the color of their skin and what have seen in their home country and in the United States in taking care of clients:

[Referring to home country] Strata based on money and...neighborhood and what kind of house you have in Columbia...just your color and stop you from joining a group or being a part of a different group of people even if you have the economic means, you can still feel that you do not belong, and I see this in my practice in America [United States]. [Health caregiver leader A, White Hispanic background]

An immigrant and refugee community leader for Pacific Islanders described interaction experiences about how “look like belong where” or “do not belong where” were based on physical appearance and assumptions despite being capable, having an education, or having a high income. The perceived appearance of being a perpetual foreigner is ongoing and how those perceptions inform decisions and lifting efforts to belong.

Talking about education and economics for Pacific Islander needs...to make up credit, but the school automatically throws in a PE [referring to physical education]—related class or course even when the child is capable and bright. When I walk into a building, I intentionally turn to a white employee so that they can see my badge, and it is my responsibility to show them that I belong in this building. [I] was told there's this big Mexican seen in the building. Even if you climb up the ladder income-wise or education-wise, there are still barriers and they'll [referring to White people] always question you—like, how did you get there? Or they ask so “what position did you play?”, assuming that I had a football scholarship—and I am not athletic...I am referring [they]...White people or around a White audience; this is how they respond to me, that has been the experience. [Immigrant and refugee community leader for Pacific Islanders, K, Polynesian/Tongan background]

“Not Assimilationist by Nature” and Responding Differently to White Superiority

An NH/PI community leader voiced that Indigenous People have not consented to the ways of governance, and the dignity of Pacific Peoples must be maintained in the process and what colonialism white supremacy at work means:

We are not assimilationists by nature. We are Indigenous People, and we have never consented to these ways of governance... We are not going to go along with the system aside from all the prizes; this idea that we can get rich by stepping on your neighbor—this endless consumerist wealth-holding culture...not going to be a culture that we can continue to be a part of. Being human that we should

assimilate by nature is not true...The dignity of my peoples, of Pacific Peoples is maintained in this process, and in some ways how do we continue to foster this sense of sovereignty and strength that can only be actualized in community. Others we are all going to be killed off. Can be genetically PI [referring to Pacific Islander], but if you don't have your culture, language, way of being then they are not PI, then white colonialism white supremacy worked. Live out human values and not assimilate to another people's values. [NH/PI community leader J, Pacific Islander background]

Participants discussed the use of a social justice lens. A health caregiver leader described being surrounded by white supremacy and how members are responding differently to the white supremacy culture and to different radicalized trauma, and the importance of supporting social justice warriors:

...[referring to Asian Americans and Native Hawaiians/Pacific Islanders] members are responding differently to the white supremacy culture and different to radicalized trauma...how community members are responding differently that we all swim in it—surrounding white supremacy...we have an opportunity to explore this further...this has been studied within the context of Black and White and not many studies that are looking into white supremacy culture among the AA, PI/NH communities, so this is a huge contribution and helps us [referring to health care system] to understand better how we can be of service of those who are suffering and how we can support and apply those social justice warriors. [Health caregiver leader R, Finnish background]

Participatory Group 2

Intergenerational- and Identity-Related Trauma

All participants talked about how impactful discrimination and trauma are and how this causes intergenerational trauma, where their own cultural way of living and being that may not be perceived or experienced as protective is not passed down from generation to generation. An immigrant and refugee community leader stated examples:

The impacts of discrimination and trauma lead to the shed of identities and pushing away from their [referring in general to working with immigrant and refugee clients] cultures and causing intergenerational trauma. [Examples of losses] Community connections, language, food sovereignty, ways of knowing, spirituality. [Immigrant and refugee community leader B, Vietnamese and Mexican background]

Participants discussed experiences and expressed not feeling like belonging and that connection with immigrant and refugee clients is needed. An immigrant and refugee community leader described a personal experience of having faced racism at a young age but not having the term at that time to name it as racism. Walking alongside clients in their journey is crucial so

that they know what it is they are experiencing and that they are not experiencing this alone.

For me...identify with experience. I grew up in a refugee camp, and I never felt that I belonged there. It was clear at a young age that my identity, and how I face racism, but I didn't have the definition of what it is. I knew that I was not treated equally...I didn't have the "right" terms to describe what I was experiencing. This leads to the need to talk about experiences, how and why? Focusing on empowerment and liberation—navigating new systems and cultures and naming racism, I connected the dots as I learned more about American [US] society and culture. When working with people [referring to clients in general] in similar situations, I encourage them to see, feel, and speak to their experiences. Reflecting on experiences from a bigger context of society. [Immigrant and refugee community leader N, Southeast Asian and Bhutanese-Nepali background]

Participants talked about in their working with immigrants and refugees that there are many people who do not have the words or full understanding to name what might be happening to them, and this can be an added stressor. An immigrant and refugee community leader voiced examples of internalization and hypervisibilization due to physical appearance and identities perceived/shaped by others and being pushed away from or out of the community:

...these interactions accumulate and create a barrier causing internalization where people [referring to working with immigrant and refugee clients] continue to feel pushed away. Internalizations—that all these interactions may be a trend due to how you look leading to feeling pushed away from community. Terminology or full concepts may not be fully understood via trends—an incident happens, and they only have their own assumptions as to why the event might be happening. [Immigrant and refugee community leader B, Vietnamese and Mexican background]

It can create this internalization of feeling that it is about them [referring to working with immigrant and refugee clients] or what might be common stereotypes and multifacets of their identity. When there are no words or understandings of the full concept, then sometimes it can translate to some incident, and they only have their own assumptions as to why something is happening. This causes an additional stressor, feeling pushed out of community or where they become common and hypervisibilized. Hypervisibilization to me is realizing that people are overattentive to you for whatever reason, or the reverse. A similar response when you think—oh I need to watch out for this, so I don't experience this again. [Immigrant and refugee community leader B, Vietnamese and Mexican background]

In another example, an immigrant and refugee community leader voiced an inclusion concern—intersectional identities and further trauma experiences following immigration with fear of not being accepted:

...racial discrimination...the trauma that occurs after immigration and integration makes me think about how queer, and other folks with intersectional identities, are further discriminated against, even intercommunity, because of fear around further trauma from not being accepted on individual, structural, and institutional basis. [Immigrant and refugee community leader K, Black/Hispanic background]

What Is Healing Among People of Color and Through a Lens of Resiliency and Intergenerational Connection and Knowledge

Participants talked about healing and resiliency together as healing from trauma, although participants raised the question about how truly one can heal since trauma keeps occurring. An immigrant and refugee community leader voiced the strength and fluidity of intergenerational connection and knowledge exchange as a form of healing, how holding the trauma in or deciding not to share it with other people is a concern, trying to deeply understand the trauma or not want to be judged by other people, and needing to name what is happening and the impacts before one can truly heal.

The resilience part is coming out...talking about mental wellness training and the content... thinking of trauma as an injury. I see healing and resiliency as a healing for trauma, since the wounds are still opened and injured repeatedly...I focus on resiliency as they [referring to immigrant and refugee clients in general] turn inward with social cohesion and finding support and within communities. Broader understanding of certain phrases or terminology, as entities do not want to name it as what it is. Notion that racism and systemic oppression is historical or in the past, although it is happening today and in what ways. Gentrification and the impacts of this on communities of color—how can we truly heal if we do not learn the impacts, healing can't happen when you don't know why you're impacted or what you are trying to heal from. [Immigrant and refugee community leader K, Black/Hispanic background]

Intergenerational connection has been a method community [referring in general to what is known in working with immigrants and refugees] has used to come together to both learn and come to terms with their history. Even if this does not include learning from an elder, but just spending time with them and being okay with what comes and doesn't come out of it. People don't talk about their traumas. There are harmful forms of "integration" and "assimilation" (shedding language, identity, culture) that can leave people to struggle in accepting themselves and their stories, which does not allow for healing/resilience.

[Immigrant and refugee community leader K, Black/Hispanic; background]

Participants raised questions about what is healing and in what ways People of Color heal. This can have emotional and mental health impacts, where being resilient is already a must. Another immigrant and refugee community leader commented on experiences working in general with People of Color who do not know where to go for rest and play:

...the community [referring in general to People of Color] is often trying to continue to be resilient and there is guilt when one seeks means of rest. And spaces of rest/play can lack [minimal] representation...so community is unsure where to go for rest/play options. [Immigrant and refugee community leader B, Vietnamese and Mexican background]

Mistrust and Fear in the Research and Health Care Systems Surrounding Intentions Regarding the Body

Participants talked about fear and concern surrounding the body and not knowing what exactly the intentions for science are. Mistrust and trauma from immigration and refugee experience must be recognized. An immigrant and refugee community leader raised questions that could be stemming from mistrust and trauma from immigration or refugee camp experience:

Fear and concern surrounding the body and not knowing what intentions are and the mistrust of institutions and science, this idea of who is it and who is behind science? What are they doing with my information and my body? It is intimidating not knowing what is being asked of you and the next steps. Although we do care about future generations and our health, but initially there is fear...there's mistrust and trauma from refugees and immigrants around incidents that might have occurred to them/their family when immigrating/in refugee camps. [Immigrant and refugee community leader B, Vietnamese and Mexican background]

Mistrust in the United States regarding treatment of People of Color in medical institutions is part of past and current history. Another immigrant and refugee community leader described this from the context of whether there is authentic intention in supporting communities and healing or the concern whether is just a datapoint—seeing the humanity in scientific work and meaning for healing in communities.

We cannot ignore the mistrust in the America [referring to United States] context how medical institutions have treated People of Color and how their bodies have been used, as well as not having access to health care. Medical institutions have used People of Color as commodities. What does access and the process look like?...I've been through experiences with family or my mother, and the doctors think that she knows the terminology or know what medications she needs to take and what they all entail...become a datapoint instead of their [referring in general to working with immigrant and refugee

clients] own experiences and their feelings...is it about supporting communities and healing or is it just a datapoint? [Immigrant and refugee community leader N, Southeast Asian and Bhutanese-Nepali background]

Participants talked about mistrust in research and health care systems in the context of positions of power. An immigrant and refugee community leader voiced about the power gap and dynamic in research and health care and recommendations to view as a social contract between providers, researchers, and scientists and patients/communities of color/People of Color to gain trust and to use a historical trauma lens:

...There is a valid reason why communities of color do not trust the system. The researchers are providers have to build up the trust and how can we lessen the gap of that power dynamic? [Examples] Providers, researchers, and scientists have power/knowledge versus patients/communities of color/People of Color, in relationship with each other. What should the social contract be between these two? Those in power need to come to enter relationships and gain trust, acknowledged the historical trauma done to People of Color and interact with this lens... [Immigrant and refugee community leader K, Black/Hispanic background]

Discussion

Principal Findings

In this community-based participatory research qualitative description study, we identified 6 main themes: prejudice plus power in racism definition and working in solidarity to counter lateral oppression/false sense of security; microaggression as multilayers; “not assimilationist by nature” and responding differently to white superiority; intergenerational- and identity-related trauma; what is healing among People of Color and through a lens of resiliency and intergenerational connection and knowledge; and mistrust and fear in the research and health care systems surrounding intentions of the body.

Participants highlighted the importance of solidarity among communities of color and the need to recognize and combat lateral oppression. Lateral oppression or violence is rooted, in part, in the deliberate efforts of the settler-colonial project to erase the existence of Indigenous Peoples. The oppressive regulation of access to resources and land, blood quantum laws, and US hegemony feed the competition and aggression within Indigenous communities [58]. Participants' assertion of the need to recognize and combat internalized racial oppression and the ways it manifests as lateral violence or oppression echoes calls to action from scholars who see the minimal awareness of and empirical attention to these phenomena as critical barriers to antiracist progress [59]. A refusal to engage in lateral oppression connects to the theme of “not assimilationist by nature” and the rejection of settler-colonialism by Indigenous Pacific Peoples. Participants also shared concerns regarding cultural assets that are lost to assimilation and the resilience and strengths inherent in traditional practices and knowledge sharing, including intergenerational relationships. Resistance to assimilation aligns

with efforts to decolonize AAs' and NHs'/PIs' understandings of self and community. One recent study fostered resilience by using online forums as safe(r) spaces for collective identity work among AAs and NHs'/PIs [60]. The virtual videoconference-based participatory groups in our study were similar, in that they served as spaces for community members to process and explore collective pathways forward for coalition building and decolonization.

Understanding the ongoing impacts of colonization for Indigenous Peoples also grounds the theme of intergenerational trauma in the concept of historical trauma or the "cumulative emotional and psychological wounding across generations including one's own lifespan" [61]. The role of historical trauma in the healthy inequities experienced by American Indians and Alaska Natives is well documented [62]. Comparable awareness is needed of the impact of historical trauma among Indigenous Pacific Peoples as well. Antiracism coalition work must involve an appreciation for the oppression perpetrated and perpetuated by settler-colonialism and a commitment to decolonization. As described by scholars of decolonization, this work must involve true and authentic honoring of Indigenous sovereignty and cannot be reduced to symbolic gestures that ultimately uphold white supremacist structures [63].

The stories shared by participants also communicated the far-reaching impacts of white supremacy and white superiority in people's lives and communities, including through experiences of microaggressions. Sue et al [64] defined microaggressions as "brief and commonplace" racialized attacks that can include microassault, microinsult, and microinvalidation. Some evidence suggests that AAs experience microaggression more than other marginalized and minoritized groups [65]. For AAs, microaggressions include the racist trope of the "perpetual foreigner"—the treatment of AAs as though they do not belong in their own country. This treatment has been linked to lower levels of social belonging and life satisfaction [66]. The long-standing practices of erasure of AAs and NHs'/PIs in health data and the dismissal or downplaying of experiences of racism in these communities can be viewed through the lens of microaggression as well. Along with addressing larger systems of oppression, antiracism work must address the daily, perhaps unintentional, racialized acts that perpetuate harm and undermine the well-being of AAs and NHs'/PIs. For instance, People of Color and White allies who witness racial microaggressions can perform microinterventions that acknowledge and disarm the microaggressions and validate the experiences of the targets of those attacks [67].

The second participatory group discussed topics related to mistrust and fear among their families and community members when interfacing with health care systems. The absence of or

minimal cultural understanding and sensitivity results in racialized discomfort that can discourage community members from seeking medical care or participating in health research [68]. The long practice of health data aggregation contributes to erasure of rich and distinct cultural communities and makes it challenging to advance health equity. Koholokula et al [14] reported that NH/PI communities have been calling for better data collection and analysis via disaggregation of NH/PI data apart from AA data and for accuracy in public health reports and data surveillance systems, even prior to the COVID-19 pandemic. The extent of reach and addressing the needs of communities are often limited by inadequate data disaggregation [69-72]. The perspectives shared by participants in this study inform the continuing work of our research team partnership, and this uplifts voices and center stories regarding racialized experiences in accessing health care among multigenerational families within AA communities and NH/PI communities. Collective conversations about sharing the body with science or medicine are also taking place with an understanding of parents and relatives as Family Leaders. This approach is consistent with both community-based participatory research and citizen science [73] to leverage community knowledge and leadership to address and dismantle racialized barriers to health and well-being.

Limitations

This study has some limitations to consider. The qualitative study design prioritized uplifting participants' unique voices, and the community-based participatory research approach involved deep engagement and relationship building with specific community partners. As such, the results of this work are not necessarily generalizable beyond the people involved or the communities served. The key informant community leaders drew on their experiences working with diverse groups of AAs and NHs'/PIs. We recognize that their perspectives cannot represent all AAs and NHs'/PIs, however, and we resist understanding these groups as monoliths with singular identities or experiences. There is still much research to be done to dismantle racism against and reverse the erasure of AAs and NHs'/PIs.

Conclusion

The identified themes from our community-based participatory research qualitative description study highlight the importance of internal and intergenerational healing from racial trauma and the need for solidarity among communities of color to combat white supremacy and colonization. This work was a foundational step in an ongoing effort to dismantle racism and uplift the community voice through a cross-sector academic and community partnership to inform antiracism coalition work.

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Authors' Contributions

The following are individual contributions from authors who contributed substantially to the work reported: conceptualization by CKYN-T, SFW, JS, and KFR; methodology, CKYN-T; validation, CKYN-T, SFW, MR, NB, JS, DUE, and KFR; formal analysis, CKYN-T, SFW, MR, NB, DUE, JS, and KFR; investigation, CKYN-T, SFW, MR, NB, JS, DUE, and KFR; resources, CKYN-T and SFW; data curation, CKYN-T, SFW, and MR; writing—original draft, CKYN-T, SFW, and MR; writing—review and editing, CKYN-T, SFW, MR, NB, JS, DUE, and KFR; visualization, CKYN-T and SFW; supervision, CKYN-T and SFW; project administration, CKYN-T and SFW; and funding acquisition, CKYN-T and SFW.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Examples of racism definitions that illustrate, in part, mechanisms.

[[PDF File \(Adobe PDF File\), 131 KB - apinj_v7i1e43150_app1.pdf](#)]

Multimedia Appendix 2

Qualitative participatory group-level assessment: overview of adapted steps. We provided an overview of how we adapted the qualitative participatory group-level assessment steps in the participatory group discussions in this community-based participatory research qualitative description study.

[[PDF File \(Adobe PDF File\), 159 KB - apinj_v7i1e43150_app2.pdf](#)]

References

1. National Academies of Sciences, Engineering, and Medicine. The Science of Implicit Bias: Implications for Law and Policy. Proceedings of a Workshop—in Brief. Washington, DC: National Academies Press; 2021. [doi: [10.17226/26191](#)]
2. Trent M, Dooley DG, Dougé J, Section on Adolescent Health, Council on Community Pediatrics, Committee on Adolescence. The impact of racism on child and adolescent health. *Pediatrics* 2019 Aug;144(2):e20191765. [doi: [10.1542/peds.2019-1765](#)] [Medline: [31358665](#)]
3. Hoekstra F, Mrklas KJ, Khan M, McKay RC, Vis-Dunbar M, Sibley KM, SCI Guiding Principles Consensus Panel, et al. A review of reviews on principles, strategies, outcomes and impacts of research partnerships approaches: a first step in synthesising the research partnership literature. *Health Res Policy Syst* 2020 May 25;18(1):51 [FREE Full text] [doi: [10.1186/s12961-020-0544-9](#)] [Medline: [32450919](#)]
4. Nguyen-Truong CK, Tang J, Hsiao C. Community interactive research workshop series: community members engaged as team teachers to conduct research. *Prog Community Health Partnersh* 2017;11(2):215-221. [doi: [10.1353/cpr.2017.0026](#)] [Medline: [28736414](#)]
5. Nguyen-Truong CKY, Fritz RL, Lee J, Lau C, Le C, Kim J, et al. Interactive co-learning for research engagement and education (I-COREE) curriculum to build capacity between community partners and academic researchers. *Asian Pac Isl Nurs J* 2018;3(4):126-138 [FREE Full text] [Medline: [31037261](#)]
6. Fritz RL, Nguyen-Truong CKY, Leung J, Lee J, Lau C, Le C, et al. Older Asian immigrants' perceptions of a health-assistive smart home. *Gerontechnology* 2020 Dec 31;19(4):1-11. [doi: [10.4017/gt.2020.19.04.385](#)]
7. McElfish PA, Yearly K, Sinclair IA, Steelman S, Esquivel MK, Aitaoto N, et al. Best practices for community-engaged research with Pacific Islander communities in the US and USAPI: a scoping review. *J Health Care Poor Underserved* 2019;30(4):1302-1330 [FREE Full text] [doi: [10.1353/hpu.2019.0101](#)] [Medline: [31680100](#)]
8. Nguyen-Truong CKY, Leung J, Micky K. Cultural narratives of Micronesian Islander parent leaders: maternal and children's health, the school system, and the role of culture. *Asian Pac Isl Nurs J* 2020;4(4):173-182 [FREE Full text] [Medline: [32055685](#)]
9. Nguyen-Truong CKY, Leung J, Micky K, Nevers JI. Building safe didactic dialogues for action model: mobilizing community with Micronesian Islanders. *Asian Pac Isl Nurs J* 2020;5(1):1-11 [FREE Full text] [Medline: [32704525](#)]
10. Nguyen-Truong CKY, Leung J, Micky K. Development of a culturally specific leadership curriculum through community-based participatory research and popular education. *Asian Pac Isl Nurs J* 2020;5(2):73-88 [FREE Full text] [Medline: [33043136](#)]
11. Spence SR, Leung J, Geil S, Nguyen-Truong CKY. Gaining entrée into a Micronesian Islander-based community organization through culturally responsive team building and reflection. *Asian Pac Isl Nurs J* 2020;5(3):177-180 [FREE Full text] [Medline: [33324737](#)]
12. Kaholokula JK, AuYoung M, Chau M, Sambamoorthi U, Carson S, Thao C, et al. Unified in our diversity to address health disparities among Asian Americans, Native Hawaiians and Pacific Islanders. *Health Equity* 2022 Jul 01;6(1):540-545 [FREE Full text] [doi: [10.1089/heq.2022.0034](#)] [Medline: [36186617](#)]
13. Wallerstein N, Duran B, Oetzel J, Minkler M. Community-Based Participatory Research for Health: Advancing Social and Health Equity. 3rd edition. San Francisco, CA: Jossey-Bass; 2018.

14. Kaholokula JK, Samoa RA, Miyamoto RES, Palafox N, Daniels S. COVID-19 special column: COVID-19 hits Native Hawaiian and Pacific Islander communities the hardest. *Hawaii J Health Soc Welf* 2020 May 01;79(5):144-146 [FREE Full text] [Medline: [32432218](#)]
15. Kaholokula JK, Okamoto SK, Yee BWK. Special issue introduction: advancing Native Hawaiian and other Pacific Islander health. *Asian Am J Psychol* 2019 Sep;10(3):197-205. [doi: [10.1037/aap0000167](#)]
16. Chu JN, Tsoh JY, Ong E, Ponce NA. The hidden colors of coronavirus: the burden of attributable COVID-19 deaths. *J Gen Intern Med* 2021 May;36(5):1463-1465 [FREE Full text] [doi: [10.1007/s11606-020-06497-4](#)] [Medline: [33483829](#)]
17. AAPI Data. State of Asian Americans, Native Hawaiians, and Pacific Islanders in the United States. URL: <https://aapidata.com/blog/2022-national-demographics/> [accessed 2022-12-29]
18. AAPI Data, Center for Social Innovation. State of Philanthropy Among Asian Americans and Pacific Islanders. Findings and Recommendations to Strengthen Visibility and Impact. URL: <https://aapidata.com/blog/2022-national-demographics/> [accessed 2022-07-29]
19. Defining Racism. National Commission to Address Racism in Nursing. URL: <https://www.nursingworld.org/~4a0e54/globalassets/practiceandpolicy/workforce/commission-to-address-racism/final-defining-racism.pdf> [accessed 2022-07-02]
20. Shiao J, Woody A. The Meaning of “Racism”. *Sociological Perspectives* 2020 Oct 16;64(4):495-517. [doi: [10.1177/0731121420964239](#)]
21. 11 Terms You Should Know to Better Understand Structural Racism. The Aspen Institute. URL: <https://www.aspeninstitute.org/blog-posts/structural-racism-definition/> [accessed 2022-02-01]
22. National Academies of Sciences, Engineering, and Medicine. Addressing Diversity, Equity, Inclusion, and Anti-Racism in 21st Century STEMM Organizations: Proceedings of a Workshop—in Brief. Washington, DC: National Academies Press; 2021. [doi: [10.17226/26294](#)]
23. Williams DR. Stress and the mental health of populations of color: advancing our understanding of race-related stressors. *J Health Soc Behav* 2018 Dec 28;59(4):466-485 [FREE Full text] [doi: [10.1177/0022146518814251](#)] [Medline: [30484715](#)]
24. American Academy of Nursing. Racism Affects Health and Wellness and It Must Be Addressed. URL: <https://www.aannet.org/news/press-releases/position-statement-on-racism> [accessed 2022-08-01]
25. Baptiste D, Josiah NA, Alexander KA, Commodore-Mensah Y, Wilson PR, Jacques K, et al. Racial discrimination in health care: an “us” problem. *J Clin Nurs* 2020 Dec;29(23-24):4415-4417. [doi: [10.1111/jocn.15449](#)] [Medline: [33448551](#)]
26. National Academy of Medicine. Culture of Health Program. URL: <https://nam.edu/programs/culture-of-health/> [accessed 2022-09-19]
27. Yi V, Museus SD. Model minority myth. In: *The Wiley Blackwell Encyclopedia of Race, Ethnicity, and Nationalism*. New York, NY: John Wiley & Sons; 2015:1-2.
28. Thames AD, Irwin MR, Breen EC, Cole SW. Experienced discrimination and racial differences in leukocyte gene expression. *Psychoneuroendocrinology* 2019 Aug;106:277-283 [FREE Full text] [doi: [10.1016/j.psyneuen.2019.04.016](#)] [Medline: [31029930](#)]
29. National Academy of Medicine. Acknowledging Structural Racism’s Direct and Negative Impact on Health. URL: <https://nam.edu/programs/culture-of-health/structural-racism-impact-on-health/> [accessed 2022-07-01]
30. Carter RT. Racism and psychological and emotional injury: recognizing and assessing race-based traumatic stress. *Counsel Psychol* 2016 Jun 30;35(1):13-105 [FREE Full text] [doi: [10.1177/0011000006292033](#)]
31. Nguyen-Truong CKY, Rakha S, Eti DU, Angelesco L. Deconstructing racialized experiences in healthcare: what a missed opportunity for healing looks like and healthcare resources for children and their families. *Asian Pac Isl Nurs J* 2021;5(4):227-235 [FREE Full text] [doi: [10.31372/20200504.1109](#)] [Medline: [33791410](#)]
32. Brody GH, Lei M, Chae DH, Yu T, Kogan SM, Beach SRH. Perceived discrimination among African American adolescents and allostatic load: a longitudinal analysis with buffering effects. *Child Dev* 2014;85(3):989-1002 [FREE Full text] [doi: [10.1111/cdev.12213](#)] [Medline: [24673162](#)]
33. Zare M, Narayan M, Lasway A, Kitsantas P, Wojtusiak J, Oetjen CA. Influence of adverse childhood experiences on anxiety and depression in children aged 6 to 11 years. *Pediatr Nurs* 2018;44(6):267-274,287 [FREE Full text]
34. Anderson AT, Luartz L, Heard-Garris N, Widaman K, Chung PJ. The detrimental influence of racial discrimination on child health in the United States. *J Natl Med Assoc* 2020 Aug;112(4):411-422. [doi: [10.1016/j.jnma.2020.04.012](#)] [Medline: [32532525](#)]
35. Conn A, Szilagyi M, Forkey H. Adverse childhood experience and social risk: pediatric practice and potential. *Acad Pediatr* 2020 Jul;20(5):573-574. [doi: [10.1016/j.acap.2020.03.013](#)] [Medline: [32272231](#)]
36. Chou T, Asnaani A, Hofmann SG. Perception of racial discrimination and psychopathology across three U.S. ethnic minority groups. *Cultur Divers Ethnic Minor Psychol* 2012 Jan;18(1):74-81 [FREE Full text] [doi: [10.1037/a0025432](#)] [Medline: [21967527](#)]
37. Comas-Díaz L, Hall GN, Neville HA. Racial trauma: theory, research, and healing: introduction to the special issue. *Am Psychol* 2019 Jan;74(1):1-5 [FREE Full text] [doi: [10.1037/amp0000442](#)] [Medline: [30652895](#)]
38. Stop AAPI Hate. National Report (Through December 31, 2021). URL: <https://stopaapihate.org/national-report-through-december-31-2021/> [accessed 2022-07-14]

39. Lloret-Pineda A, He Y, Haro JM, Cristóbal-Narváez P. Types of racism and twitter users' responses amid the COVID-19 Outbreak: content analysis. *JMIR Form Res* 2022 May 19;6(5):e29183 [FREE Full text] [doi: [10.2196/29183](https://doi.org/10.2196/29183)] [Medline: [35446780](https://pubmed.ncbi.nlm.nih.gov/35446780/)]
40. Lee S, Waters SF. Asians and Asian Americans' experiences of racial discrimination during the COVID-19 pandemic: impacts on health outcomes and the buffering role of social support. *Stigma Health* 2021 Feb;6(1):70-78. [doi: [10.1037/sah0000275](https://doi.org/10.1037/sah0000275)]
41. Pan S, Yang C, Tsai J, Dong C. Experience of and worry about discrimination, social media use, and depression among Asians in the United States during the COVID-19 pandemic: cross-sectional survey study. *J Med Internet Res* 2021 Sep 01;23(9):e29024 [FREE Full text] [doi: [10.2196/29024](https://doi.org/10.2196/29024)] [Medline: [34351304](https://pubmed.ncbi.nlm.nih.gov/34351304/)]
42. Tiwari BB, Zhang DS. Differences in mental health status among Asian Americans during the COVID-19 pandemic: findings from the Health, Ethnicity, and Pandemic Study. *Health Equity* 2022;6(1):448-453 [FREE Full text] [doi: [10.1089/heap.2022.0029](https://doi.org/10.1089/heap.2022.0029)] [Medline: [35801151](https://pubmed.ncbi.nlm.nih.gov/35801151/)]
43. Beers LS, Szilagyi M, Seigel WM, Davis WS, Fukuda Y, Joseph M, American Academy of Pediatrics Board of Directors Executive Committee, Board Committee on Equity. Immunizing against hate: overcoming Asian American and Pacific Islander racism. *Pediatrics* 2021 Jul;148(1):e2021051836. [doi: [10.1542/peds.2021-051836](https://doi.org/10.1542/peds.2021-051836)] [Medline: [33941584](https://pubmed.ncbi.nlm.nih.gov/33941584/)]
44. Chou SW, Gaysynsky A. Racism and xenophobia in a pandemic: interactions of online and offline worlds. *Am J Public Health* 2021 May;111(5):773-775. [doi: [10.2105/AJPH.2021.306230](https://doi.org/10.2105/AJPH.2021.306230)] [Medline: [33826388](https://pubmed.ncbi.nlm.nih.gov/33826388/)]
45. Oh DL, Jerman P, Silvério Marques S, Koita K, Purewal Boparai SK, Burke Harris N, et al. Systematic review of pediatric health outcomes associated with childhood adversity. *BMC Pediatr* 2018 Feb 23;18(1):83 [FREE Full text] [doi: [10.1186/s12887-018-1037-7](https://doi.org/10.1186/s12887-018-1037-7)] [Medline: [29475430](https://pubmed.ncbi.nlm.nih.gov/29475430/)]
46. Juster R, McEwen BS, Lupien SJ. Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neurosci Biobehav Rev* 2010 Sep;35(1):2-16. [doi: [10.1016/j.neubiorev.2009.10.002](https://doi.org/10.1016/j.neubiorev.2009.10.002)] [Medline: [19822172](https://pubmed.ncbi.nlm.nih.gov/19822172/)]
47. Acevedo N, Solorzano DG. An overview of community cultural wealth: toward a protective factor against racism. *Urban Educ* 2021 May 20:1-19. [doi: [10.1177/00420859211016531](https://doi.org/10.1177/00420859211016531)]
48. Immigrant & Refugee Community Organization. Who We Are. 2001-2022. URL: <https://irco.org/who-we-are/> [accessed 2022-02-01]
49. Pacific Islander Community Association of Washington. Who We Are. URL: <https://www.picawa.org/who-we-are/> [accessed 2022-02-01]
50. PeaceHealth. Our Mission, Vision, and Values. URL: <https://www.peacehealth.org/about-peacehealth/mission-values> [accessed 2022-02-01]
51. Cohen L, Baer N, Satterwhite P. Developing effective coalitions: an eight step guide. In: Wurzbach ME, editor. *Community Health Education & Promotion: A Guide to Program Design and Evaluation*. 2nd edition. Gaithersburg, MD: Aspen; 2002.
52. Sandelowski M. Whatever happened to qualitative description? *Res Nurs Health* 2000 Aug;23(4):334-340. [doi: [10.1002/1098-240x\(200008\)23:4<334::aid-nur9>3.0.co;2-g](https://doi.org/10.1002/1098-240x(200008)23:4<334::aid-nur9>3.0.co;2-g)] [Medline: [10940958](https://pubmed.ncbi.nlm.nih.gov/10940958/)]
53. Sandelowski M. What's in a name? Qualitative description revisited. *Res Nurs Health* 2010 Feb;33(1):77-84. [doi: [10.1002/nur.20362](https://doi.org/10.1002/nur.20362)] [Medline: [20014004](https://pubmed.ncbi.nlm.nih.gov/20014004/)]
54. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: how many interviews are enough? *Qual Health Res* 2017 Mar;27(4):591-608 [FREE Full text] [doi: [10.1177/1049732316665344](https://doi.org/10.1177/1049732316665344)] [Medline: [27670770](https://pubmed.ncbi.nlm.nih.gov/27670770/)]
55. Vaughn LM, Lohmueller M. Calling all stakeholders: group-level assessment (GLA)-a qualitative and participatory method for large groups. *Eval Rev* 2014 Aug;38(4):336-355. [doi: [10.1177/0193841X14544903](https://doi.org/10.1177/0193841X14544903)] [Medline: [25147354](https://pubmed.ncbi.nlm.nih.gov/25147354/)]
56. Lincoln YS, Guba EG. Establishing trustworthiness. In: *Naturalistic Inquiry*. Beverly Hills, CA: Sage; 1985.
57. Hsieh H, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005 Nov;15(9):1277-1288. [doi: [10.1177/1049732305276687](https://doi.org/10.1177/1049732305276687)] [Medline: [16204405](https://pubmed.ncbi.nlm.nih.gov/16204405/)]
58. Whyman T, Murrup-Stewart C, Young M, Carter A, Jobson L. 'Lateral violence stems from the colonial system': settler-colonialism and lateral violence in Aboriginal Australians. *Postcolon Stud* 2021 Dec 16:1-19. [doi: [10.1080/13688790.2021.2009213](https://doi.org/10.1080/13688790.2021.2009213)]
59. Pyke KD. What is internalized racial oppression and why don't we study it? Acknowledging racism's hidden injuries. *Sociol Perspect* 2010 Dec 01;53(4):551-572. [doi: [10.1525/sop.2010.53.4.551](https://doi.org/10.1525/sop.2010.53.4.551)]
60. Dosono B, Semaan B. Decolonizing tactics as collective resilience: identity work of APPI communities on Reddit. *Proc ACM Hum-Comput Interact* 2020 May 28;4:1-20. [doi: [10.1145/3392881](https://doi.org/10.1145/3392881)]
61. Brave Heart MY, DeBruyn LM. The American Indian holocaust: healing historical unresolved grief. *Am Indian Alsk Nativ Ment Health Res* 1998;8(2):56-78. [Medline: [9842066](https://pubmed.ncbi.nlm.nih.gov/9842066/)]
62. Evans-Campbell T. Historical trauma in American Indian/Native Alaska communities: a multilevel framework for exploring impacts on individuals, families, and communities. *J Interpers Violence* 2008 Mar 01;23(3):316-338. [doi: [10.1177/0886260507312290](https://doi.org/10.1177/0886260507312290)] [Medline: [18245571](https://pubmed.ncbi.nlm.nih.gov/18245571/)]
63. Tuck E, Yang K. Decolonization is not a metaphor. *Decoloniz Indigeneity Edu Soc* 2012;1(1):1-40 [FREE Full text]
64. Sue DW, Bucceri J, Lin AI, Nadal KL, Torino GC. Racial microaggressions and the Asian American experience. *Cultur Divers Ethnic Minor Psychol* 2007 Jan;13(1):72-81. [doi: [10.1037/1099-9809.13.1.72](https://doi.org/10.1037/1099-9809.13.1.72)] [Medline: [17227179](https://pubmed.ncbi.nlm.nih.gov/17227179/)]

65. Hwang W, Goto S. The impact of perceived racial discrimination on the mental health of Asian American and Latino college students. *Cultur Divers Ethnic Minor Psychol* 2008 Oct;14(4):326-335. [doi: [10.1037/1099-9809.14.4.326](https://doi.org/10.1037/1099-9809.14.4.326)] [Medline: [18954168](https://pubmed.ncbi.nlm.nih.gov/18954168/)]
66. Huynh Q, Devos T, Smalarz L. Perpetual foreigner in one's own land: potential implications for identify and psychological adjustment. *J Soc Clin Psychol* 2011;30(2):133-162 [FREE Full text] [doi: [10.1521/jscp.2011.30.2.133](https://doi.org/10.1521/jscp.2011.30.2.133)] [Medline: [21572896](https://pubmed.ncbi.nlm.nih.gov/21572896/)]
67. Sue DW, Alsaidi S, Awad MN, Glaeser E, Calle CZ, Mendez N. Disarming racial microaggressions: microintervention strategies for targets, white allies, and bystanders. *Am Psychol* 2019 Jan;74(1):128-142. [doi: [10.1037/amp0000296](https://doi.org/10.1037/amp0000296)] [Medline: [30652905](https://pubmed.ncbi.nlm.nih.gov/30652905/)]
68. George S, Duran N, Norris K. A systematic review of barriers and facilitators to minority research participation among African Americans, Latinos, Asian Americans, and Pacific Islanders. *Am J Public Health* 2014 Feb;104(2):e16-e31. [doi: [10.2105/AJPH.2013.301706](https://doi.org/10.2105/AJPH.2013.301706)] [Medline: [24328648](https://pubmed.ncbi.nlm.nih.gov/24328648/)]
69. Ka'ai K, Lee R, Chau V, Xu L. Advancing health equity for Asian Americans, Native Hawaiians, and Pacific Islanders. *Health Equity* 2022 Jun 01;6(1):399-401 [FREE Full text] [doi: [10.1089/heq.2022.0075](https://doi.org/10.1089/heq.2022.0075)] [Medline: [35801149](https://pubmed.ncbi.nlm.nih.gov/35801149/)]
70. Samoa R, Kaholokula J, Penaia C, Tupai-Firestone R, Fa'amoe-Timoteo LM, Aitaoto N. COVID-19 and the state of health of Pacific Islanders in the United States. *AAPI Nexus* 2020;17(1&2):1-7 [FREE Full text]
71. Wang D, Gee GC, Bahiru E, Yang EH, Hsu JJ. Asian-Americans and Pacific Islanders in COVID-19: emerging disparities amid discrimination. *J Gen Intern Med* 2020 Dec;35(12):3685-3688 [FREE Full text] [doi: [10.1007/s11606-020-06264-5](https://doi.org/10.1007/s11606-020-06264-5)] [Medline: [33009656](https://pubmed.ncbi.nlm.nih.gov/33009656/)]
72. Wang Kong C, Green J, Hamity C, Jackson A. Health disparity measurement among Asian American, Native Hawaiian, and Pacific Islander populations across the United States. *Health Equity* 2022 Jul 01;6(1):533-539 [FREE Full text] [doi: [10.1089/heq.2022.0051](https://doi.org/10.1089/heq.2022.0051)] [Medline: [36186616](https://pubmed.ncbi.nlm.nih.gov/36186616/)]
73. Katapally TR. The SMART Framework: integration of citizen science, community-based participatory research, and systems science for population health science in the digital age. *JMIR Mhealth Uhealth* 2019 Aug 30;7(8):e14056 [FREE Full text] [doi: [10.2196/14056](https://doi.org/10.2196/14056)] [Medline: [31471963](https://pubmed.ncbi.nlm.nih.gov/31471963/)]

Abbreviations

AA: Asian American

IRCO: Immigrant & Refugee Community Organization

MPI: multiple principal investigator

NH/PI: Native Hawaiian/Pacific Islander

PICA-WA: Pacific Islander Community Association of Washington

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Original Paper

Facilitators and Barriers of Tai Chi Practice in Community-Dwelling Older Adults: Qualitative Study

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Abstract

Background: Numerous studies have documented the beneficial effects of Tai Chi on a variety of health outcomes, especially in older adults. However, only few studies have examined how to improve the practice and adherence of this Asian-originated exercise among older adults in Western countries.

Objective: This study aimed to identify facilitators and barriers to Tai Chi practice and adherence in community-dwelling older adults.

Methods: This study analyzed the qualitative data collected from 13 participants (mean age 62.0, SD 10.3) at the end of a 15-week randomized controlled trial conducted at a day activity senior center. Semistructured interviews were conducted, recorded, and transcribed; and the data were analyzed using inductive thematic analysis.

Results: Four themes emerged: perceived benefit, threats, facilitators, and barriers. Perceived threats (eg, aging and side effects of medications) and perceived benefits of Tai Chi (eg, balance) inspired participants' engagement in Tai Chi exercise. On the other hand, barriers to Tai Chi practice and adherence included instructor's teaching style, the complexity of Tai Chi postures and movements, and existing health conditions (eg, hip problems). In essence, factors like Tai Chi class availability, family and peer support, as well as practicing Tai Chi with music may facilitate Tai Chi exercise adherence.

Conclusions: The study findings could provide valuable information to health professionals, such as nurses and physical therapists, in developing and implementing effective Tai Chi programs in care plans. Considering health conditions, tailoring Tai Chi exercise instruction styles, encouraging social and peer support, and incorporating music may promote Tai Chi practice and adherence.

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KEYWORDS

facilitators; barriers; older adults; practice; adherence; Tai Chi; qualitative study; health outcomes; martial arts; exercise; gerontology; muscle strengthening

Introduction

Background

The population worldwide is rapidly aging, and the global percentage of adults aged 65 years and older is projected to double by the year 2050 [1]. Aging is frequently accompanied with increased chronic health conditions, including but not

limited to osteoporosis, sarcopenia, cancer, heart disease, stroke, diabetes, and Alzheimer disease [2-4]. It is widely evidenced that chronic conditions significantly increase the risk of falls and physical disability, resulting in poor quality of life and premature death [5-8].

Tai Chi, a body-mind practice originating in China, has generated increasing attention from health professionals,

including nurses, due to evidence that suggests Tai Chi's ability to enhance health and well-being indices. A growing body of studies have documented the beneficial effects of Tai Chi on a variety of health outcomes, especially in the older population. The number of Tai Chi studies that are indexed in MEDLINE or PubMed increased from 9 before 1990 to 105 between 1990 and 2003, then rising to 234 between 2004 and 2008, and even higher between 2009 and 2013 to 362 [9]; this number increased to 2336 between 2014 and 2021. The health benefits of Tai Chi practice include but are not limited to physical function [10-13], cardiovascular diseases [14], mental health [15,16], the musculoskeletal system [17,18], balance and fall prevention [13,19], and cognitive function [20,21]. One of the implications of practicing Tai Chi consistently is relative to improved health benefits. For example, a systematic review reports that the frequency of Tai Chi practice is important for fall prevention in older adults [19]. However, like most types of exercise programs, barriers exist that limits adherence to Tai Chi exercise. Understanding these barriers and facilitators becomes essential for health professionals to develop effective Tai Chi interventions that promotes mind-body exercise for optimal health benefits.

Objective

In spite of the fact that there have been many studies demonstrating numerous health benefits associated with Tai Chi practice, only a small number of studies have looked at the barriers and facilitators involved in the practice. Gryffin et al [22] suggest that inadequate information and teaching style may serve as an obstacle for Tai Chi practice. However, this study did not address the facilitators of engaging in and adhering to Tai Chi practice. Another study found that encouragement from social supports is a factor that motivates older people to start practicing Tai Chi, and subsequent positive health outcomes from the exercise program can help motivate people to continue practicing Tai Chi [23]. This study was conducted in Taiwan [23]; therefore, the results may not be generalized to individuals living in the Western countries. In addition, even though Tai Chi has been proven to provide health benefit to certain patient populations, we are not aware of any examples of facilitators and barriers in the African American community as it relates to Tai Chi. The objective of this study was to explore the facilitators and barriers of Tai Chi practice and adherence in both White and African American older adults.

Methods

Study Participants

Our study reports the findings of the qualitative data collected at the end of a 15-week randomized controlled trial, which assessed the effects of practicing Tai Chi with music on fall-related factors. The trial was conducted in the fall of 2014 at a day center in the Southern United States, offering a variety of creative arts and activity programs for adults aged 50 and older. A total of 13 women were enrolled, and block randomly assigned into a Tai Chi practice with music group or Tai Chi practice without music group. A detailed study design of the randomized controlled trial was documented in early reports [24].

Ethics Approval

This study was approved by the Tulane University Institute Review Board (#630231). Written consents were obtained from all participants.

Data Collection

At the end of the 15-week Tai Chi exercise intervention, a semistructured interview was conducted with each of the 13 study participants. An interview guide was developed based on the Health Belief Model, which consists of the following 6 concepts: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Multimedia Appendix 1) [25].

Health Belief Model is a theory designed to predict health behaviors to promote good health outcomes [26]. This has been used frequently in nursing to identify factors relative to positive behavior changes [27]. This model suggests that an individual's perception about health problems, perceived benefits of intervention and barriers to intervention, self-efficacy, and cues to action explains engagement (or lack of engagement) in health-promoting behaviors [25].

The semistructured interview questions were organized in the following segments: (1) perceived susceptibility and severity of health issues occurring with aging, (2) motivations of Tai Chi practice, (3) perceived benefits of Tai Chi practice, and (4) perceived facilitators and barriers for Tai Chi practice. Open ended questions such as "What made you sign up for Tai Chi class?" and "Was there anything that stopped you from practicing Tai Chi?" were included in the interview. Probe questions were further asked when appropriate or deemed necessary to explore participants' experience and perceptions of Tai Chi practice. Two trained graduate students conducted the semistructured interviews, and each interview lasted about 15-30 minutes. All interviews were audio-recorded and transcribed.

Data Analysis

Data were analyzed using NVivo (version 8.0; QSR International). Although the Health Belief Model was used to develop the interview guide, the data were analyzed using inductive thematic analysis—a method of identifying, analyzing, and reporting patterns (ie, themes, topics, and ideas) within data without predetermined themes to guide coding processes [28,29]. First, 2 researchers immersed themselves in the qualitative data to become acquainted with the content; throughout, they made notes, comments, and ideas of coding the data. Second, the two researchers independently coded the 13 interviews using open coding, and then the researchers gathered together to reconcile code differences in their respective analyses. Coding discrepancies were discussed between the two researchers until a consensus was reached. Third, one researcher grouped the codes into themes based on the similarities and differences of the codes and cited relevant quotes for each theme, while the other researcher reviewed the themes created, and then both discussed to reach an agreement as different opinions arose.

Trustworthiness

The trustworthiness related to credibility, transferability, dependability, and confirmability was enhanced through various approaches starting at the study design stage [30,31]. For instance, prolonged engagement at the study site, member checking, and team meetings were used to improve credibility. Even though the study was conducted at a single senior site, it included both White and African American participants, which might improve the transferability, given that little is known about African Americans regarding this topic. Audio recordings of all conducted interviews were adopted to increase dependability. Confirmability was enhanced through approaches such as coding the data independently with 2 researchers.

Results

Sample Characteristics

Table 1 shows characteristics of the study participants. Participants in the study were female, aged 50 to 84 years, with

an average age of 69.2 (SD 8.5) years. Half of the participants were African American. This was a group of relatively high educated adults, with 82% (11/13) having higher than high school education. Only 23% (3/13) still worked full- or part-time. Around 46% (6/13) of the participants either were married or lived with a partner. The average reported exercise hours per week was 4.5 (SD 2.1) hours, including walking, yoga, ballet, and strength training (not shown in Table 1). In total, 61% (9/13) of the participants had practiced Tai Chi before this study, mostly for one semester and at the same facility as in this study, with a different volunteer instructor. The average class attendance rate for the clinical trial was 71%.

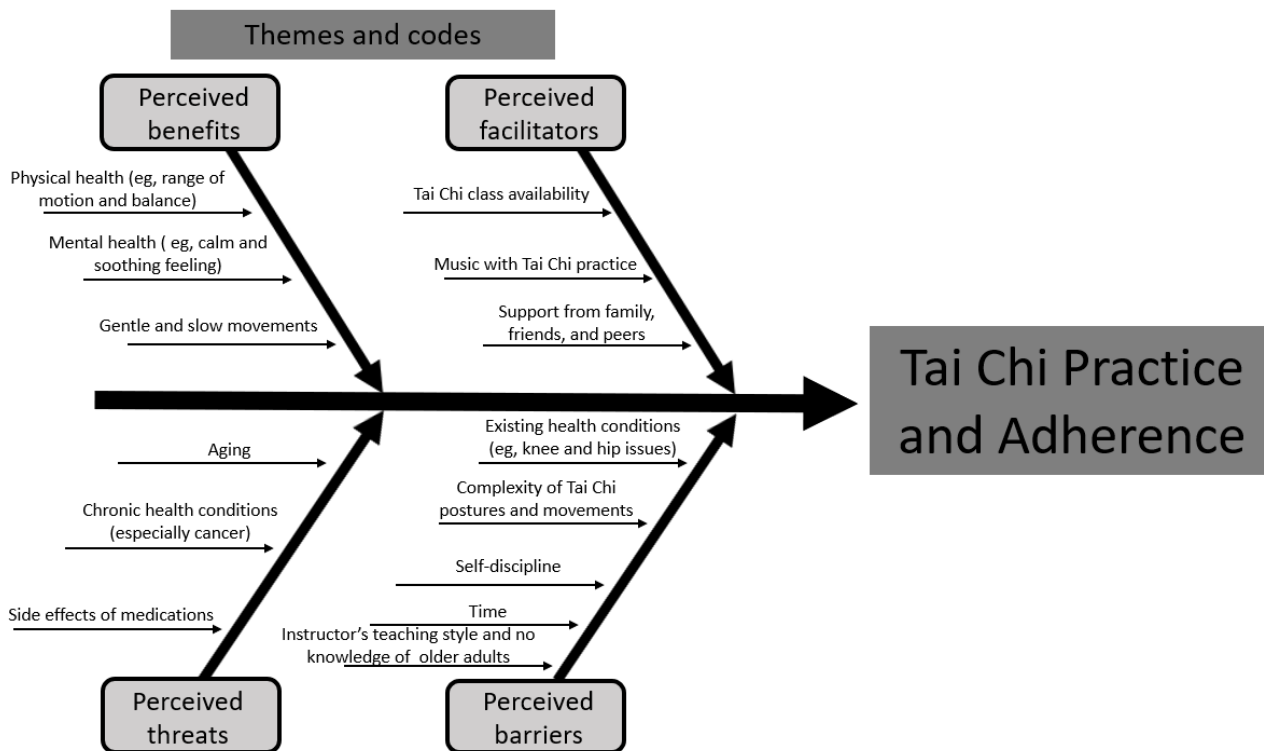
Four major themes related to this study topic emerged from the qualitative interviews, as follows: perceived threats, perceived benefits, perceived facilitators, and perceived barriers for Tai Chi practice and adherence. The corresponding codes for each theme are displayed in Figure 1.

Table 1. Characteristics of participants (N=13).

Variables	Values
Age (years), mean (SD)	69.2 (8.5)
Race, n (%)	
White	6 (46)
African American	7 (54)
Education, n (%)	
High school (yes)	2 (18)
>High school (yes)	11 (82)
Work status, n (%)	
Not working	10 (77)
Part- or full-time	3 (23)
Marital status^a, n (%)	
Married	6 (46)
Other	7 (54)
Previous Tai Chi (yes), n (%)	9 (61)
Exercise hours/week, mean (SD)	4.5 (2.1)
Compliance rate, mean (SD)	0.71 (0.23)

^aMarital status: married=married with spouse alive; other=widow, single, or divorced.

Figure 1. Themes and codes for Tai Chi practice and adherence.



Perceived Threats

The perceived threats due to aging were typical reasons that inspired participants to engage in exercise, including Tai Chi. One of the oldest participants in the study stated the following:

You have to keep at it [exercise- including Tai Chi]. That’s how I feel. At my age, if I don’t, you lost a lot.

When talking about what drives Tai Chi practice, some participants responded with a combination of reasons related to aging and chronic health conditions, like one participant said:

I suffer with blood pressure and I’m getting up in age.

In particular, cancer was frequently repeated as a health threat in this study population. One cancer survivor said the following:

One of the reasons why I’m so conscientious about trying to do different forms of exercise and keep myself really healthy is because I do not want a recurrence.

Relatedly, the side effect of drugs was also motivation for these reasons. For example, another cancer survivor responded:

Yeah so you know, really, the cancer is, that’s the primary, that’s my primary health challenge. Everything else is pretty good shape but because of the drugs that I take there are these rippling effects, it’s one of the reasons why I try to stay active.

Perceived Benefits

Perceived health benefits consist mainly of two aspects: the benefits they learned from scientific report or other sources; and the benefits they experienced themselves. Perceived benefits from other sources were usually stated as the motivation to start Tai Chi practice. Participants described appreciation of Tai Chi

in a variety of ways. Most participants stated that they had prior first- or second-hand knowledge of Tai Chi. Many were aware of the reported health benefits of Tai Chi, particularly balance improvement. For example, one participant in response to being asked about reasons for wanting to take part in Tai Chi, said the following:

Undoubtedly the benefits. As I said in class yesterday, range of motion issues, balance issues, um, focus, concentration.

Additionally, as they started to practice Tai Chi exercises, experienced benefits were stated as factors that facilitate the continuity to practice and adhere to Tai Chi. In addition to frequently perceived balance improvement, participants also mentioned the psychological aspect they gained from the movements, such as the following statement by a participant:

Um, I don’t only like the movements; I also like the soothing aspect.

Likewise, characteristics of Tai Chi movements were perceived positively by participants. The gracefulness of the movements was especially attractive; In that regard, a participant said the following:

I have seen Tai Chi through the years, and it just looked so beautiful; the movements looked so beautiful that to get some degree of grace would be wonderful for me.

The slowness of the movements was also acknowledged; one participant, after stating that she had some health issues and considered her age, mentioned,

I wanted to do something that wasn’t like being out running or something strenuous, so I decide to [do Tai Chi]

Perceived Barriers

Similar to participating in other exercises, self-discipline and time management are among the most common barriers for engaging in Tai Chi practice, with several participants mentioning self-discipline as the most challenging barrier that kept them from adhering to Tai Chi class schedules. For instance, one participant said the following:

I think, personally, I just need to discipline myself. It's more about disciplining myself...That's why I tried to be as faithful as I can to come to the classes here.

Time was another factor several individuals talked about, as one participant said:

One thing is to make the time to do it. See, I took two other exercise classes, and I am supposed to not have to work anymore, but I do, and so I have to fill in different things.

The complexity of Tai Chi postures and movements were likewise identified as barriers by the participants. Several participants stated it was difficult for them to master movements. For example, one participant said the following:

For me, right now, that's what's throwing me off. I'm not getting the hand movements. She [the instructor] is doing this [movement] and I'm doing that [other movement]

Furthermore, finding the right instructor with an appropriate teaching style for the older population was also a barrier. One participant stated the following:

Now I have to say that the first experience I had with taking Tai Chi, it was this really young girl, she must've been like 19 or 20 and I think she didn't realize that we were senior citizens and she needed to not be as intense with it as she was. We kept saying, she forgets that we are not young like she is, we can't really do all this.

Some subjects perceived multiple barriers at the same time. A participant stated:

Need an instructor in front of me. Just discipline to do it, and sometimes, time was strained.

Lastly, some existing health conditions also restricted participants from practicing, such as hip and knee issues. One participant said the following in this regard:

[B]ecause my hip does give me problems, so you know, with the walk, that's why I never did Tai Chi. I have to balance on one foot so that hip really is not; the hip and the toe on that one foot doesn't allow me to balance as good on that left foot.

Perceived Facilitators

Facilitators included class availability, music with Tai Chi practice, and support from family, friends, and peers. Availability of classes can also promote Tai Chi practice or adherence. One person stated, "I would commit to the class if I had a class (available to me)." In this study, music was added as another component to increase motivation with Tai Chi

practice, and participants in the Tai Chi group with music component indicated that music helped them focus and enjoy more of the practice:

I have enjoyed having the music in class. I think it helps me focus. I think that the music has that same ability, so you hear the music and all of the sudden, it's focused, certainly, but it's also sets up a criterion for what you're going to be doing. It brings about kind of an automatic response in the body.

Similarly, all participants enrolled in the Tai Chi without music group wanted to add music in the future when practicing Tai Chi.

In addition, peers, friends, and family members were among the most common facilitators for adhering to Tai Chi exercise, with one participant commenting the following:

And because I feel like I'm getting older my brain is, you know, really getting jelly-like. So, it took me a while to catch up on to Tai Chi....And I would tell XX (a participant in Tai Chi class), 'XX, I think I'm going to drop this class, and she would say, 'No, don't drop it, you're not doing any worse than the rest of us!'

One member of the Tai Chi classes reported:

My daughter wants me to do this, because it's good for me.

Discussion

Perceived Facilitators and Barriers

This qualitative study identified several facilitators (eg, practicing with music and class availability) and barriers (eg, lack of quality instructors and complexity of Tai Chi movements) of Tai Chi practice and adherence perceived by community-dwelling older adults. These findings are important for nurses and other health care professionals to develop and recommend effective Tai Chi programs and interventions for older adults' optimal health benefits.

Perceived health conditions and aging were the two major motivators for Tai Chi practice, and perceived health benefit of Tai Chi was another motivator for Tai Chi practice. This is consistent with the literature suggesting that perceived threats of health could be a motivator for engaging in healthy lifestyle behaviors [32] and Tai Chi practice [33]. Previous studies have widely documented the health benefits of Tai Chi practice in the older population [11,19,34,35], especially because of its gentle and slow movements [22]. Meanwhile, certain health problems, such as major physical disability, might be an obstacle for engaging in Tai Chi exercise. Fortunately, Tai Chi exercise can be modified and tailored to individuals with physical limitations. For example, the wheelchair Tai Chi includes modified exercises for participants in wheelchairs and has been proven effective for people with disabilities [36]. Therefore, providing tailored instructions and recommendations to target populations is warranted to improve Tai Chi practice and adherence.

In addition to similar barriers to participating in other exercises, such as time restriction and self-discipline [37], participants

perceived some unique challenges when practicing this Eastern exercise. First, unlike other exercise, Tai Chi classes are not always available in the community. Even though learning from videos is possible, it is very different from learning on site, especially considering that Tai Chi movements have a substation stretching and turning of the body, which may be difficult to perceive over video and easier to learn with the assistance of an instructor. This could be one of the reasons for retaining participants in Tai Chi practice and Tai Chi studies [38].

Second, Tai Chi was considered both physically and cognitively challenging by the participants. Tai Chi's origin is from martial arts, and it is an intricate combination of individual head, hand, arm, leg, ankle, upper body, and lower body movements. Tai Chi involves continuous, slow, and rhythmic dynamic loading and unloading with the ability to gradually modify the difficulty of the task, all of which is needed for joint health. Current Tai Chi research can be divided into those analyzing the practice and those that introduce Tai Chi movements, further analyzing their therapeutic effects on particular maladies. Tai Chi, whether performed as an exercise or woven into daily life for fall prevention, is beneficial to the body without causing secondary problems, especially to the joints. Tai Chi has several different styles, including but not limited to the Chen, Yang, Sun, and Wu styles [39]; some of these styles are more physically and cognitively challenging than others. If instructors do not consider older adults' physical and cognitive changes, Tai Chi exercise may be unnecessarily taxing for this population and deter them from practicing it. In addition, the selection of Tai Chi forms is critical to the success of Tai Chi as a therapeutic intervention; thus, it is crucial that a more precise estimate of joint movement within Tai Chi forms be incorporated into future studies to understand how Tai Chi can optimize joint kinematics and kinetics, then identify the biomechanical mechanisms and their association with different Tai Chi forms. Therefore, instructors who teach Tai Chi to older adults could select the most optimal forms and movements to maximize Tai Chi's benefits and minimize its harms. It would also be beneficial to standardize the training process for Tai Chi instructors in both future research studies and general practice in the community.

In addition to instructor's teaching style, music may also play a critical role in influencing Tai Chi learning and adherence. Studies have documented improved learning occurring when music is paired with movements in the music therapy technique of entrainment. Entrainment occurs when music is paired with an activity, further described as "a temporal locking process in which one system's motion or signal frequency entrains the frequency of another system" [40]. Via this principle, linking movement to rhythm may establish a kinetic pattern that is easier and faster, increases confidence, and therefore, promptly leads to increased compliance in attendance. Although teaching long and complicated movement patterns is traditionally taught with "chunking" (ie, grouping together chunks of information and focusing on one chunk at a time), compound cues may actually improve acquisition [41]; and the addition of music, therefore, encodes basic movements and facilitate progression to difficult patterns.

Lastly, this is one of the first studies to include African American participants in the study of Tai Chi practice. Perceived

facilitators and barriers of Tai Chi practice among African American participants were similar to those of their counterparts. Even though the longevity of African Americans is increasing, they generally undergo more chronic conditions and have a higher risk of disability [42,43], which may be improved with Tai Chi. Literature supports the health benefits of Tai Chi practice [9]; therefore, it is important to conduct further studies with larger samples and thoughtful research designs to examine Tai Chi practice in African American population and other minority groups.

Limitations

There were a few limitations to this study. One of the limitations was that all study participants were from a single senior center and were previously enrolled in a Tai Chi class. In addition, all our participants reported having at least high school education or a higher level of education. Therefore, the generalizability of the study findings to other populations is limited, and studies that include a diverse population are still needed.

Data from this study were collected in 2014, and despite there being a few other studies examining similar topics since 2014 [22,44], our study population included White and African American participants, which resulted in some unique findings. For example, we found that using music may promote Tai Chi learning experience and Tai Chi practice adherence among this racial diversity, which would be very helpful in implementing Tai Chi in the community settings, particularly; in the face of increasing evidence that reveals the health benefits of Tai Chi exercise in older adults, little is known regarding how to disseminate Tai Chi to diverse older populations. Thus, these results are worthy of being reported and publicized, as this would help guide the development of Tai Chi programs, and it will benefit the aging community.

Nurses play an essential role in health promotion, educating the public and patients on the prevention and management of health conditions, providing evidence-based care and support, advocating for health-related programs and policies, as well as advancing nursing care through research. Tai Chi, as a mind-body exercise, can be practiced in various community settings, including but not limited to hospitals, senior communities, clinics, and nursing homes. The study findings provide valuable information for nurses to develop or identify effective Tai Chi programs to improve health outcomes in older adults. In addition, research exploring strategies to tailor Tai Chi programs to promote Tai Chi practice in populations with different health conditions and background is needed.

Conclusions

This study found that perceived aging, health issues, and health benefits were common reasons for choosing to practice Tai Chi. Importantly, the barriers to its practice and adherence (eg, lack of quality instructors) need to be addressed; and facilitators, such as practicing with music and class availability, need to be promoted. Although studies have been trending upward about the health benefits of Tai Chi constantly, most of them are very limited in terms of translational forethought. Therefore, research in exploring the dissemination and promotion of Tai Chi exercise is warranted. For instance, strategies must be explored to address

the shortage of qualified instructors and train them to meet specific health needs, especially for older adults. Additionally, incorporating music into Tai Chi may reduce anxiety and promote adherence to Tai Chi practices.

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Interview guide.

[DOCX File . 27 KB - [apinj_v7i1e42195_app1.docx](#)]

References

1. He W, Goodkind D, Kowal P. An aging world: 2015 International population reports. United States Census Bureau. 2016. URL: <https://www.census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf> [accessed 2022-01-06]
2. Jaul E, Barron J. Age-related diseases and clinical and public health implications for the 85 years old and over population. *Front Public Health* 2017 Dec 11;5:335 [FREE Full text] [doi: [10.3389/fpubh.2017.00335](https://doi.org/10.3389/fpubh.2017.00335)] [Medline: [29312916](https://pubmed.ncbi.nlm.nih.gov/29312916/)]
3. Dao T, Green AE, Kim YA, Bae S, Ha K, Gariani K, et al. Sarcopenia and muscle aging: a brief overview. *Endocrinol Metab* 2020 Dec;35(4):716-732. [doi: [10.3803/enm.2020.405](https://doi.org/10.3803/enm.2020.405)]
4. Johnston CB, Dagar M. Osteoporosis in older adults. *Med Clin North Am* 2020 Sep;104(5):873-884. [doi: [10.1016/j.mcna.2020.06.004](https://doi.org/10.1016/j.mcna.2020.06.004)] [Medline: [32773051](https://pubmed.ncbi.nlm.nih.gov/32773051/)]
5. Ning H, Du Y, Zhao Y, Liu Q, Li X, Zhang H, et al. Longitudinal impact of metabolic syndrome and depressive symptoms on subsequent functional disability among middle-aged and older adults in China. *J Affect Disord* 2022 Jan 01;296:216-223. [doi: [10.1016/j.jad.2021.09.061](https://doi.org/10.1016/j.jad.2021.09.061)] [Medline: [34614438](https://pubmed.ncbi.nlm.nih.gov/34614438/)]
6. Gandham A, Mesinovic J, Jansons P, Zengin A, Bonham MP, Ebeling PR, et al. Falls, fractures, and areal bone mineral density in older adults with sarcopenic obesity: a systematic review and meta-analysis. *Obes Rev* 2021 May 24;22(5):e13187. [doi: [10.1111/obr.13187](https://doi.org/10.1111/obr.13187)] [Medline: [33491333](https://pubmed.ncbi.nlm.nih.gov/33491333/)]
7. Vaishya R, Vaish A. Falls in older adults are serious. *Indian J Orthop* 2020 Feb 24;54(1):69-74 [FREE Full text] [doi: [10.1007/s43465-019-00037-x](https://doi.org/10.1007/s43465-019-00037-x)] [Medline: [32257019](https://pubmed.ncbi.nlm.nih.gov/32257019/)]
8. Zhang X, Huang P, Dou Q, Wang C, Zhang W, Yang Y, et al. Falls among older adults with sarcopenia dwelling in nursing home or community: a meta-analysis. *Clin Nutr* 2020 Jan;39(1):33-39 [FREE Full text] [doi: [10.1016/j.clnu.2019.01.002](https://doi.org/10.1016/j.clnu.2019.01.002)] [Medline: [30665817](https://pubmed.ncbi.nlm.nih.gov/30665817/)]
9. Harmer PA. So much research, so little application: barriers to dissemination and practical implementation of Tai Ji Quan. *J Sport Health Sci* 2014 Mar 01;3(1):16-20 [FREE Full text] [doi: [10.1016/j.jshs.2013.10.005](https://doi.org/10.1016/j.jshs.2013.10.005)] [Medline: [25089214](https://pubmed.ncbi.nlm.nih.gov/25089214/)]
10. Tai H, Chou Y, Tzeng I, Wei C, Su C, Liu W, et al. Effect of Tai Chi synergy T1 exercise on autonomic function, metabolism, and physical fitness of healthy individuals. *Evid Based Complement Alternat Med* 2018 Jun 27;2018:6351938-6351937 [FREE Full text] [doi: [10.1155/2018/6351938](https://doi.org/10.1155/2018/6351938)] [Medline: [30050592](https://pubmed.ncbi.nlm.nih.gov/30050592/)]
11. Choo YT, Jiang Y, Hong J, Wang W. Effectiveness of Tai Chi on quality of life, depressive symptoms and physical function among community-dwelling older adults with chronic disease: A systematic review and meta-analysis. *Int J Nurs Stud* 2020 Nov;111:103737. [doi: [10.1016/j.ijnurstu.2020.103737](https://doi.org/10.1016/j.ijnurstu.2020.103737)] [Medline: [32891966](https://pubmed.ncbi.nlm.nih.gov/32891966/)]
12. Gu R, Gao Y, Zhang C, Liu X, Sun Z. Effect of Tai Chi on cognitive function among older adults with cognitive impairment: a systematic review and meta-analysis. *Evid Based Complement Alternat Med* 2021 Aug 5;2021:6679153-6679159 [FREE Full text] [doi: [10.1155/2021/6679153](https://doi.org/10.1155/2021/6679153)] [Medline: [34394392](https://pubmed.ncbi.nlm.nih.gov/34394392/)]
13. Nyman S. Tai Chi for the prevention of falls among older adults: a critical analysis of the evidence. *J Aging Phys Act* 2021 Apr 01;29(2):343-352 [FREE Full text] [doi: [10.1123/japa.2020-0155](https://doi.org/10.1123/japa.2020-0155)] [Medline: [32839351](https://pubmed.ncbi.nlm.nih.gov/32839351/)]
14. Liu T, Chan AW, Liu YH, Taylor-Piliae RE. Effects of Tai Chi-based cardiac rehabilitation on aerobic endurance, psychosocial well-being, and cardiovascular risk reduction among patients with coronary heart disease: a systematic review and meta-analysis. *Eur J Cardiovasc Nurs* 2018 Apr 19;17(4):368-383. [doi: [10.1177/1474515117749592](https://doi.org/10.1177/1474515117749592)] [Medline: [29256626](https://pubmed.ncbi.nlm.nih.gov/29256626/)]
15. Hu L, Wang Y, Liu X, Ji X, Ma Y, Man S, et al. Tai Chi exercise can ameliorate physical and mental health of patients with knee osteoarthritis: systematic review and meta-analysis. *Clin Rehabil* 2021 Jan 21;35(1):64-79. [doi: [10.1177/0269215520954343](https://doi.org/10.1177/0269215520954343)] [Medline: [32954819](https://pubmed.ncbi.nlm.nih.gov/32954819/)]

16. Wang F, Lee EO, Wu T, Benson H, Fricchione G, Wang W, et al. The effects of tai chi on depression, anxiety, and psychological well-being: a systematic review and meta-analysis. *Int J Behav Med* 2014 Aug 28;21(4):605-617. [doi: [10.1007/s12529-013-9351-9](https://doi.org/10.1007/s12529-013-9351-9)] [Medline: [24078491](https://pubmed.ncbi.nlm.nih.gov/24078491/)]
17. Woo J, Hong A, Lau E, Lynn H. A randomised controlled trial of Tai Chi and resistance exercise on bone health, muscle strength and balance in community-living elderly people. *Age Ageing* 2007 May 13;36(3):262-268. [doi: [10.1093/ageing/afm005](https://doi.org/10.1093/ageing/afm005)] [Medline: [17356003](https://pubmed.ncbi.nlm.nih.gov/17356003/)]
18. Chang T, Ting YT, Sheu SL, Chang HY. [Effects of tai chi in postmenopausal women with osteoporosis: a systematic review]. *Hu Li Za Zhi* 2014 Oct;61(5):75-84. [doi: [10.6224/JN.61.5.75](https://doi.org/10.6224/JN.61.5.75)] [Medline: [25271035](https://pubmed.ncbi.nlm.nih.gov/25271035/)]
19. Huang Z, Feng Y, Li Y, Lv C. Systematic review and meta-analysis: Tai Chi for preventing falls in older adults. *BMJ Open* 2017 Feb 06;7(2):e013661 [FREE Full text] [doi: [10.1136/bmjopen-2016-013661](https://doi.org/10.1136/bmjopen-2016-013661)] [Medline: [28167744](https://pubmed.ncbi.nlm.nih.gov/28167744/)]
20. Wayne PM, Walsh JN, Taylor-Piliae RE, Wells RE, Papp KV, Donovan NJ, et al. Effect of tai chi on cognitive performance in older adults: systematic review and meta-analysis. *J Am Geriatr Soc* 2014 Jan 02;62(1):25-39 [FREE Full text] [doi: [10.1111/jgs.12611](https://doi.org/10.1111/jgs.12611)] [Medline: [24383523](https://pubmed.ncbi.nlm.nih.gov/24383523/)]
21. Liu F, Chen X, Nie P, Lin S, Guo J, Chen J, et al. Can Tai Chi improve cognitive function? A systematic review and meta-analysis of randomized controlled trials. *J Altern Complement Med* 2021 Dec 01;27(12):1070-1083. [doi: [10.1089/acm.2021.0084](https://doi.org/10.1089/acm.2021.0084)] [Medline: [34314596](https://pubmed.ncbi.nlm.nih.gov/34314596/)]
22. Gryffin PA, Chen WC, Chaney BH, Dodd VJ, Roberts B. Facilitators and barriers to tai chi in an older adult community: a theory-driven approach. *Am J Health Educ* 2015 Mar 04;46(2):109-118. [doi: [10.1080/19325037.2014.999964](https://doi.org/10.1080/19325037.2014.999964)]
23. Chen K, Snyder M, Krichbaum K. Facilitators and barriers to elders' practice of t'ai chi. A mind-body, low-intensity exercise. *J Holist Nurs* 2001 Sep 23;19(3):238-255. [doi: [10.1177/089801010101900305](https://doi.org/10.1177/089801010101900305)] [Medline: [11847870](https://pubmed.ncbi.nlm.nih.gov/11847870/)]
24. Du Y, Roberts P, Xu Q. The effects of Tai Chi practice with asynchronous music on compliance and fall-related risk factors in middle-aged and older women: a pilot study. *J Holist Nurs* 2017 Jun 31;35(2):142-150 [FREE Full text] [doi: [10.1177/0898010116636972](https://doi.org/10.1177/0898010116636972)] [Medline: [26951578](https://pubmed.ncbi.nlm.nih.gov/26951578/)]
25. Jones CL, Jensen JD, Scherr CL, Brown NR, Christy K, Weaver J. The Health Belief Model as an explanatory framework in communication research: exploring parallel, serial, and moderated mediation. *Health Commun* 2015 Jul 10;30(6):566-576 [FREE Full text] [doi: [10.1080/10410236.2013.873363](https://doi.org/10.1080/10410236.2013.873363)] [Medline: [25010519](https://pubmed.ncbi.nlm.nih.gov/25010519/)]
26. Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the Health Belief Model. *Health Educ Q* 1988 Sep 04;15(2):175-183. [doi: [10.1177/109019818801500203](https://doi.org/10.1177/109019818801500203)] [Medline: [3378902](https://pubmed.ncbi.nlm.nih.gov/3378902/)]
27. Cengiz B, Bahar Z, Canda AE. The effects of patient care results of applied nursing intervention to individuals with stoma according to the health belief model. *Cancer Nurs* 2018 Dec 13;43(2):E87-E96. [doi: [10.1097/ncc.0000000000000678](https://doi.org/10.1097/ncc.0000000000000678)]
28. Castleberry A, Nolen A. Thematic analysis of qualitative research data: Is it as easy as it sounds? *Curr Pharm Teach Learn* 2018 Jun;10(6):807-815. [doi: [10.1016/j.cptl.2018.03.019](https://doi.org/10.1016/j.cptl.2018.03.019)] [Medline: [30025784](https://pubmed.ncbi.nlm.nih.gov/30025784/)]
29. Chapman AL, Hadfield M, Chapman CJ. Qualitative research in healthcare: an introduction to grounded theory using thematic analysis. *J R Coll Physicians Edinb* 2015;45(3):201-205. [doi: [10.4997/JRCPE.2015.305](https://doi.org/10.4997/JRCPE.2015.305)] [Medline: [26517098](https://pubmed.ncbi.nlm.nih.gov/26517098/)]
30. Guba EG. Criteria for assessing the trustworthiness of naturalistic inquiries. *ECTJ* 1981 Jun;29(2):75-91. [doi: [10.1007/bf02766777](https://doi.org/10.1007/bf02766777)]
31. Roberts P, Du Y, Xu Q. The effects of T'ai Chi with asynchronous music on the health of older women: a pilot study. *Altern Complement Ther* 2017 Feb;23(1):14-19. [doi: [10.1089/act.2016.29093.per](https://doi.org/10.1089/act.2016.29093.per)]
32. Villar OAE, Montañez-Alvarado P, Gutiérrez-Vega M, Carrillo-Saucedo IC, Gurrola-Peña GM, Ruvalcaba-Romero NA, et al. Factor structure and internal reliability of an exercise health belief model scale in a Mexican population. *BMC Public Health* 2017 Mar 01;17(1):229 [FREE Full text] [doi: [10.1186/s12889-017-4150-x](https://doi.org/10.1186/s12889-017-4150-x)] [Medline: [28249597](https://pubmed.ncbi.nlm.nih.gov/28249597/)]
33. Yang G, Li X, Peel N, Klupp N, Liu J, Bensoussan A, et al. Perceptions of participants on trial participation and adherence to Tai Chi: a qualitative study. *PPA* 2022 Sep; Volume 16:2695-2707. [doi: [10.2147/ppa.s380780](https://doi.org/10.2147/ppa.s380780)]
34. Huston P, McFarlane B. Health benefits of tai chi: what is the evidence? *Can Fam Physician* 2016 Nov;62(11):881-890 [FREE Full text] [Medline: [28661865](https://pubmed.ncbi.nlm.nih.gov/28661865/)]
35. Wayne PM, Walsh JN, Taylor-Piliae RE, Wells RE, Papp KV, Donovan NJ, et al. Effect of tai chi on cognitive performance in older adults: systematic review and meta-analysis. *J Am Geriatr Soc* 2014 Jan 02;62(1):25-39 [FREE Full text] [doi: [10.1111/jgs.12611](https://doi.org/10.1111/jgs.12611)] [Medline: [24383523](https://pubmed.ncbi.nlm.nih.gov/24383523/)]
36. Wang YT, Li Z, Yang Y, Zhong Y, Lee S, Chen S, et al. Effects of wheelchair Tai Chi on physical and mental health among elderly with disability. *Res Sports Med* 2016 Jun 30;24(3):157-170. [doi: [10.1080/15438627.2016.1191487](https://doi.org/10.1080/15438627.2016.1191487)] [Medline: [27248716](https://pubmed.ncbi.nlm.nih.gov/27248716/)]
37. Picorelli AMA, Pereira LSM, Pereira DS, Felício D, Sherrington C. Adherence to exercise programs for older people is influenced by program characteristics and personal factors: a systematic review. *J Physiother* 2014 Sep;60(3):151-156 [FREE Full text] [doi: [10.1016/j.jphys.2014.06.012](https://doi.org/10.1016/j.jphys.2014.06.012)] [Medline: [25092418](https://pubmed.ncbi.nlm.nih.gov/25092418/)]
38. Wayne PM, Kaptchuk TJ. Challenges inherent to t'ai chi research: part I--t'ai chi as a complex multicomponent intervention. *J Altern Complement Med* 2008 Jan;14(1):95-102. [doi: [10.1089/acm.2007.7170a](https://doi.org/10.1089/acm.2007.7170a)] [Medline: [18199021](https://pubmed.ncbi.nlm.nih.gov/18199021/)]
39. Wolf SL, Coogler C, Xu T. Exploring the basis for Tai Chi Chuan as a therapeutic exercise approach. *Arch Phys Med Rehabil* 1997 Aug;78(8):886-892. [doi: [10.1016/s0003-9993\(97\)90206-9](https://doi.org/10.1016/s0003-9993(97)90206-9)]

40. Thaut MH, McIntosh GC, Hoemberg V. Neurobiological foundations of neurologic music therapy: rhythmic entrainment and the motor system. *Front Psychol* 2014 Feb 18;5:1185 [FREE Full text] [doi: [10.3389/fpsyg.2014.01185](https://doi.org/10.3389/fpsyg.2014.01185)] [Medline: [25774137](https://pubmed.ncbi.nlm.nih.gov/25774137/)]
41. Cohen NR, Sekuler R. Chunking and compound cueing of movement sequences: learning, retention, and transfer. *Percept Mot Skills* 2010 Jun 01;110(3):736-750. [doi: [10.2466/pms.110.3.736-750](https://doi.org/10.2466/pms.110.3.736-750)]
42. Ellis KR, Hecht HK, Young TL, Oh S, Thomas S, Hoggard LS, et al. Chronic disease among African American fFamilies: a systematic scoping review. *Prev Chronic Dis* 2020 Dec 31;17(1):E167-E168 [FREE Full text] [doi: [10.5888/pcd17.190431](https://doi.org/10.5888/pcd17.190431)] [Medline: [33416471](https://pubmed.ncbi.nlm.nih.gov/33416471/)]
43. Thorpe RJ, Wynn AJ, Walker JL, Smolen JR, Cary MP, Szanton SL, et al. Relationship between chronic conditions and disability in African American men and women. *J Natl Med Assoc* 2016 Feb;108(1):90-98 [FREE Full text] [doi: [10.1016/j.jnma.2015.12.012](https://doi.org/10.1016/j.jnma.2015.12.012)] [Medline: [26928493](https://pubmed.ncbi.nlm.nih.gov/26928493/)]
44. Jones DL, Starcher RW, Eicher JL, Wilcox S. Adoption of a Tai Chi intervention, Tai Ji Quan: moving for better balance, for fall prevention by rural faith-based organizations, 2013-2014. *Prev Chronic Dis* 2016 Jul 14;13:E92 [FREE Full text] [doi: [10.5888/pcd13.160083](https://doi.org/10.5888/pcd13.160083)] [Medline: [27418214](https://pubmed.ncbi.nlm.nih.gov/27418214/)]

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Original Paper

The Association of Sociodemographic Variables and Unhealthy Behaviors With Limitations in Activities of Daily Living Among Thai Older Adults: Cross-sectional Study and Projected Trends Over the Next 20 Years

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Abstract

Background: Extended life spans have led to an increase in the number of older people and an increase in the prevalence of disability among people older than 60 years of age.

Objective: This study aims to investigate the association of sociodemographic variables and unhealthy behaviors with limitations in activities of daily living (ADL) among Thai older adults. The study also projects the number of older individuals likely to experience ADL limitations in the next 20 years.

Methods: We performed sex-specific multinomial logistic regression analysis based on the 5th Thai National Health Examination Survey in 2014 to investigate the association between sociodemographic variables and health behaviors with ADL limitations among Thai older adults. Age- and sex-specific prevalence estimates of ADL limitations were obtained by applying the same models. These estimates were combined with population projections up to 2040 from the Office of the National Economic and Social Development Board, Thailand, to generate projections of older individuals with ADL limitations.

Results: Age and physical activity were significant factors for both sexes, with age positively associated with the level of ADL limitations and low physical activity associated with an increased relative probability of mild or moderate to severe ADL limitations compared to individuals with no ADL limitation (1.2-2.2 times). Other variables such as education, marital status, diabetes, hypertension, smoking, alcohol consumption, and having a fruit- and vegetable-based diet showed significant associations, but the results varied regarding sex and levels of ADL limitations. This study also projected the number of older adults with mild and moderate to severe ADL limitations over the next 20 years from 2020 to 2040, revealing an increase of 3.2 and 3.1 times, respectively, along with a significant increase in men compared to that in women.

Conclusions: This study identified age and physical activity as significant factors associated with ADL limitations in older adults, while other factors showed varying associations. Over the next 2 decades, projections suggest a significant increase in the number of older adults with ADL limitations, particularly men. Our findings emphasize the importance of interventions to reduce ADL limitations, and health care providers should consider various factors impacting them.

KEYWORDS

ADL limitation; National Health Examination Survey; older adults; activities of daily living; physical activity; disability

Introduction

An aging society is characterized by a state where individuals aged 60 years and older constitute over 10% of the total population [1]. By 2022, Thailand will have a complete aging society, and by 2030, it may become a superaged society. In just 9 years, Thailand is projected to become a hyperaged society, with an aging population approaching 20% of the nationwide population [2]. The increasing number of older people with longer life expectancies raises questions about whether they live longer lives with good health and how unhealthy behaviors affect their future lives. Furthermore, longer life expectancies and the concomitant increase in the incidence of noncommunicable diseases, such as hypertension, diabetes, stroke, and coronary artery disease, have led to questions about the well-being of older individuals [3,4]. These healthy states lead to a disabled state and to complete dependency throughout life. The dependence of older individuals is one of the major challenges faced by the Thai health care system. The National Health Examination Survey (NHES) also found that the prevalence of at least one functional limitation in activities of daily living (ADL) slightly increased from 11.1% in 2015 to 11.4% in 2019 [5]. The prevalence of at least one limitation increased with age, accounting for 11.1% in those aged 60 years to 17.6% among those aged 80 years [5].

Unhealthy behaviors such as low physical activity and having a high BMI, high cholesterol, and high blood sugar are known to increase the likelihood of disability among older adults [6-8]. Handgrip strength and a usual walking speed are objective measures of muscle strength and physical function and are useful in identifying people at risk of functional limitations, particularly ADL disabilities [9,10]. Physical activity is one of the most significant parameters for predicting functional limitations and is associated with physical performance [11]. Encouraging policy makers to promote a healthy lifestyle among older people could help reduce the incidence of functional limitations in this population.

Governments require precise and prompt demographic information that is categorized by age, gender, and other pertinent factors to prepare for demographic changes and effectively implement policies and initiatives to address the effects and possibilities of an aging population. The United Nations suggests that governments be devoted to gathering, sharing, and evaluating demographic statistics, such as those pertaining to aging populations and older individuals. In Thailand, the studies on the correlation of social determinants of health and unhealthy behaviors with ADL limitations among older people are limited. Moreover, predictive values of personal health behavior and social determinants of health have seldom been applied to project the volume of older individuals with different ADL limitation levels. These estimates are crucial for driving health policy and addressing interventions that could decrease the number of disabilities among older individuals in

the future [12,13]. Therefore, this study aimed to investigate the association of sociodemographic variables and unhealthy behaviors with ADL limitations among older people in Thailand and project the number of individuals likely to experience ADL limitations in the next 20 years (2020-2040).

Methods

Data and Management

Our study was based on two data sources: (1) the Thai NHES in 2014, and (2) population projections by 5-year age group and sex in Thailand.

The Thai NHES

Data from the Thai NHES in 2014 were obtained [14]. This survey constitutes a large cross-sectional study using stratified 4-stage sampling to provide nationally and regionally representative samples of the Thai population, conducted every 5 years. The sampling method has been described elsewhere [14,15]. Briefly, stratified random sampling was applied. The first stage of sampling was systematic selection from 5 provinces in each of the 4 regions, including Bangkok. In total, 3-5 districts were randomly selected for each chosen province. Next, 13 to 14 electoral units in municipality areas or villages in a municipality area for each district were randomly selected. Finally, individuals aged ≥ 1 year by selected electoral units and villages, sex, and age group were randomly chosen. A total of 19,468 participants were sampled in 2014. This study recruited 7366 individuals aged 60 years and older. Demographic information of the participants was collected using face-to-face interviews, physical examinations, and laboratory tests with assured data quality and data management.

Dependent Variable

ADL limitations were assessed using the Barthel index [16]—an ordinal scale used to measure performance in ADL. ADL limitations were defined as the inability to perform basic self-care activities without assistance, including feeding, dressing, bathing, using the toilet, and transferring from beds or chairs. Each item was rated on a 3-item ordinal rating scale (0=unable, 1=needs help, and 2=independent). The final score was obtained by summing up the scores of all items, resulting in a 100-point score, in accordance with the guidelines for interpreting Barthel scores of Shah et al [17]. ADL scores were categorized into 3 levels: moderate to severe limitations (0 to 90 points), mild limitations (91 to 99 points), and no limitation (100 points).

Health Status Variables

Hypertension was defined as a diagnosis based on a systolic blood pressure of ≥ 140 mm Hg, diastolic blood pressure of ≥ 90 mm Hg from physical examinations, or self-reports of using antihypertensive medication.

Diabetes mellitus was defined as a diagnosis based on a fasting plasma glucose level of ≥ 126 mg/dL from laboratory blood testing or self-reports of diagnosis from physicians, and currently receiving medical treatment.

BMI was categorized as follows: underweight (< 18.5 kg/m²), normal weight ($18.5 \leq \text{BMI} < 25$ kg/m²), and overweight (≥ 25 kg/m²).

Smoking status was categorized as follows: never smoked, current smokers (people who have smoked in the past 12 months), and former smokers (people who have smoked previously and not in the past 12 months).

Alcohol consumption was defined as consuming at least 1 alcoholic drink (12.5 g/day) in the past 12 months.

Physical activity level was categorized as high (≥ 150 minutes/week of combined intensity) and low (< 150 minutes/week of combined intensity) in accordance with the global physical activity questionnaire of the World Health Organization [18].

Fruit and vegetable consumption was categorized as high (≥ 5 portions/day) and low (< 5 portions/day) [19].

Population Projection

To project the number of older adults with ADL limitations in the future, we required population projections by age and sex. We used population projections from the National Economic and Social Development Board, which were based on population registration data from 2010 to 2015, collected by the Ministry of Interior and were generated using the cohort-component method. We selected the medium fertility assumption, which assumes that the fertility rate will decline from 1.62 in 2010 to 1.30 in 2040. The mortality assumption was based on life expectancy, which is projected to increase from 70.5 years to 76.8 years for men and from 77.8 years to 83.2 years for women between 2010 and 2040. The mortality pattern was created using a relational logit model. Lastly, a migration rate of 0 was used in the population projections.

Statistical Analyses

Descriptive statistics, including prevalence, proportion, mean, and SD, were used. All analyses were weighted to account for this, and statistical significance was set at $P < .05$. To predict prevalence, we first selected potential covariate variables associated with ADL limitations. The results showed that age, sex, residential area, education, employment status, behavior risks, and health status were associated with ADL limitations (details are included in Table S1 in [Multimedia Appendix 1](#)). All analyses in this study were performed using STATA (version 11; StataCorp).

Multinomial logistic regression was used to predict the prevalence of ADL limitations by sex while controlling for potential covariates. This type of model characterizes the probability of a participant's decision for a discrete choice [20]. Once the multinomial regression model was generated, estimated marginal standardization [21,22] was used to predict prevalence rates of ADL limitations among Thai older individuals based on fixed values of potential covariates. The prevalence rates of

ADL limitations were presented by age group (60-64, 65-69, 70-74, 75-79, and 80 years and older) and sex (female and male).

Our projection of older adults with ADL limitations from 2020 to 2040 involved a deterministic model. This type of model does not include elements of randomness, so the same initial conditions will present the same results of the output model. The estimated age-specific prevalence rates of ADL limitations were multiplied by the population projection described in the data section and the rate of change in the prevalence of ADL limitations. This allowed us to assess the effect of changes in the demographic structure of the older population on the total number of people with ADL limitations. Direct age standardization was applied to calculate the prevalence rate of ADL limitations in 2014 and 2019. Based on this, we assumed that the prevalence rate of ADL limitations increased by 23% in men and 8% in women every 5 years. The applied standard population constituted the population structure in 2014 by sex, using sample weights.

Ethical Considerations

This study was approved by the Human Research Ethics Committee of the Faculty of Public Health, Mahidol University (REC.MUPH 96/2022). The NHES study was approved by the Ethical Review Committee for Research in Human Subjects, Ministry of Public Health, and all participants provided written informed consent.

Results

Sample Characteristics

Overall, among 7306 respondents, the mean age in 2015 was 69.7 (SD 7.6) years, and the highest proportion of individuals ($n=2493$) were 34.1% in the age group of 60-64 years. Nearly equal proportions of men and women were observed (44.1% vs 55.9%, respectively). The prevalence rates of ADL limitations were 9.2% ($n=672$) for the mild level and 19.3% ($n=1410$) for the moderate to severe level.

As shown in [Table 1](#), Thai older men and women without ADL limitations were generally younger than those with mild and moderate to severe ADL limitations. In total, 3343 of 5224 (64%) Thai older men and women without ADL limitations, 336 of 672 (50%) individuals with mild ADL limitations, and 635 of 1410 (45%) individuals with moderate to severe ADL limitations were aged between 60 and 69 years. Women comprised 52.6% (2748/5224) of Thai older adults without ADL limitations, while 62.3% (419/672) and 65.1% (918/1410) of those with mild and moderate to severe ADL limitations, respectively, were female. Older adults without and those with mild ADL limitations were more likely to live in urban areas (2737/5224, 52.4% and 368/672, 54.8%) than those with moderate to severe ADL limitations (682/1410, 48.4%).

Furthermore, the proportion of individuals with no education attainment increased with the level of ADL limitation (no limitation: 4378/5224, 83.8%; mild limitation: 587/672, 87.3%; moderate to severe limitation: 1282/1410, 90.9%). The proportion of individuals with an abnormal BMI increased with the level of ADL limitation (no limitation: 2304/5224, 44.1%; mild limitation: 317/672, 47.2%; moderate to severe limitation:

681/1410, 48.3%), particularly among underweight individuals. Additionally, one-third of older adults without ADL limitations were single, while the proportion of single individuals among those with ADL limitations was higher (mild limitations: 291/672, 43.3%; moderate to severe limitations: 575/1410, 40.8%).

Table 1. Description of sample characteristics by level of limitations in activities of daily living (ADL; N=7306).

Characteristics	No ADL limitation (n=5224), n (%)	Mild ADL limitations (n=672), n (%)	Moderate to severe ADL limitations (n=1410), n (%)
Age group (years)			
60-64	1985 (38.0)	180 (26.8)	328 (23.2)
65-69	1358 (26.0)	156 (23.2)	307 (21.8)
70-74	904 (17.3)	140 (20.8)	276 (19.6)
75-79	575 (11.0)	98 (14.6)	264 (18.7)
≥80	402 (7.7)	98 (14.6)	235 (16.7)
Sex			
Female	2748 (52.6)	419 (62.3)	918 (65.1)
Male	2476 (47.4)	253 (37.7)	492 (34.9)
Residential area			
Urban	2737 (52.4)	368 (54.8)	682 (48.4)
Rural	2487 (47.6)	304 (45.2)	728 (51.6)
Education			
No education	4378 (83.8)	587 (87.3)	1282 (90.9)
Having an education	846 (16.2)	85 (12.7)	128 (9.1)
Marital status			
Single	1740 (33.3)	291 (43.3)	575 (40.8)
Married	3484 (66.7)	381 (56.7)	835 (59.2)
BMI			
Normal	2920 (55.9)	355 (52.9)	729 (51.7)
Underweight	319 (6.1)	46 (6.8)	130 (9.2)
Overweight	1985 (38.0)	271 (40.4)	551 (39.1)
Having diabetes mellitus	946 (18.1)	159 (23.7)	278 (19.7)
Having hypertension	2837 (54.3)	423 (62.9)	888 (63.0)
Smoking			
Never smoked	3380 (64.7)	461 (68.6)	1007 (71.4)
Former smoker	1013 (19.4)	130 (19.3)	238 (16.9)
Current smoker	831 (15.9)	81 (12.1)	165 (11.7)
Alcohol consumption			
Nondrinker	4414 (84.5)	608 (90.5)	1270 (90.1)
Drinker	810 (15.5)	64 (9.5)	140 (9.9)
Fruit and vegetable intake			
<5 portions	1306 (25.0)	173 (25.8)	275 (19.5)
>5 portions	3918 (75.0)	499 (74.2)	1135 (80.5)
Physical activity level			
Low	1097 (21.0)	214 (31.9)	578 (41.0)
High	4127 (79.0)	458 (68.1)	832 (59.0)

The prevalence of hypertension tended to increase with the level of ADL limitation, but that of diabetes mellitus did not, the latter having been the highest in older adults with mild ADL limitations (159/672, 23.7%). The proportion of individuals with prior and current smoking experience decreased with an increase in the level of ADL limitation (no limitation: 1844/5224, 35.5%; mild limitation: 211/672, 31.4%; moderate to severe limitation: 403/1410, 28.6%). The proportion of alcohol drinkers was higher among individuals with no ADL limitation (810/5224, 15.5%) than among those with mild limitations (64/672, 9.5%) and those with moderate to severe limitations (140/1410, 9.9%). Furthermore, the proportion of individuals with insufficient fruit and vegetable consumption was higher among those with mild ADL limitations (173/672, 25.8%) than in those with no limitation (1306/5224, 25%) and those with moderate to severe limitations (275/1410, 19.5%), while that of individuals with low physical activity levels increased with the level of ADL limitations (no limitation: 1097/5224, 21%; mild limitations: 214/672, 31.9%; moderate to severe limitations: 578/1410, 41%).

Association Between ADL Limitation Level Across Sociodemographic Variables and Health Status

Table 2 shows the adjusted odds ratios for the association between ADL limitation level and various sociodemographic

variables. The baseline group had no ADL limitation. After adjusting for other variables, we observed that among women, the associations between mild limitations and sociodemographic variables were significant among older adults (ie, those aged ≥ 70 years), those with an education, those with diabetes mellitus, those who drink alcohol, and those with low physical activity levels. Among men, the adjusted odds ratio for the association between mild limitations and sociodemographic variables was significant with respect to age (ie, ≥ 70 years), having hypertension, current smoking, current drinking alcohol, having inadequate fruit- and vegetable-based diets, having low physical activity levels, and having a BMI in the overweight range.

Moderate to severe ADL limitations were significantly associated with all age groups among women and significantly associated with age groups of ≥ 70 years among men. Having hypertension had a significant association with moderate to severe ADL limitations among men but not among women. Having low physical activity levels exhibited a stronger significant association with having moderate to severe ADL limitations than with having high physical activity levels. Furthermore, the association between moderate to severe limitations and having a BMI in the underweight range was significant in both men and women.

Table 2. Multinomial logistic regression for levels of limitation in activities of daily living (ADL) and sociodemographic variables.

	Mild ADL limitations				Moderate to severe ADL limitations			
	Women		Men		Women		Men	
	AOR ^a	P values	AOR	P values	AOR	P values	AOR	P values
Age group (years; reference: 60-64 years)								
65-69	1.250	.10	1.018	.91	1.462	<.001	1.007	.95
70-74	1.642	.003	1.704	.001	2.110	<.001	1.319	.03
75-79	1.894	<.001	1.565	.009	2.914	<.001	1.788	<.001
≥80	2.021	<.001	3.497	<.001	3.154	<.001	1.593	.001
Residential area (reference: urban)								
Rural	0.933	.33	0.905	.36	1.378	<.001	0.964	.62
Education level (reference: no education)								
Having education	0.634	.001	1.009	.94	0.496	<.001	0.700	<.001
Marital status (reference: single)								
Married	0.648	<.001	1.278	.07	0.949	.40	1.650	<.001
Having diabetes mellitus	1.363	.02	1.254	.08	1.185	.02	0.934	.52
Having hypertension	1.015	.86	1.38	.006	0.998	.98	1.777	<.001
BMI category (reference: normal)								
Underweight (BMI<18.5)	1.35	.06	0.916	.70	1.401	.01	1.683	.005
Overweight (BMI≥25)	0.98	.83	1.49	<.001	1.295	<.001	0.947	.58
Smoking status (reference: not smoking)								
Former smoking	0.954	.76	1.527	.002	1.007	.96	1.099	.27
Current smoking	0.678	.12	1.546	.001	1.070	.57	1.047	.67
Drinkers	0.679	.04	0.704	.004	0.682	.03	1.001	.99
Insufficient fruit- and vegetable-based diet	1.016	.86	1.704	<.001	0.676	.001	1.078	.41
Low physical activity	1.223	.02	2.173	<.001	1.814	<.001	1.571	<.001

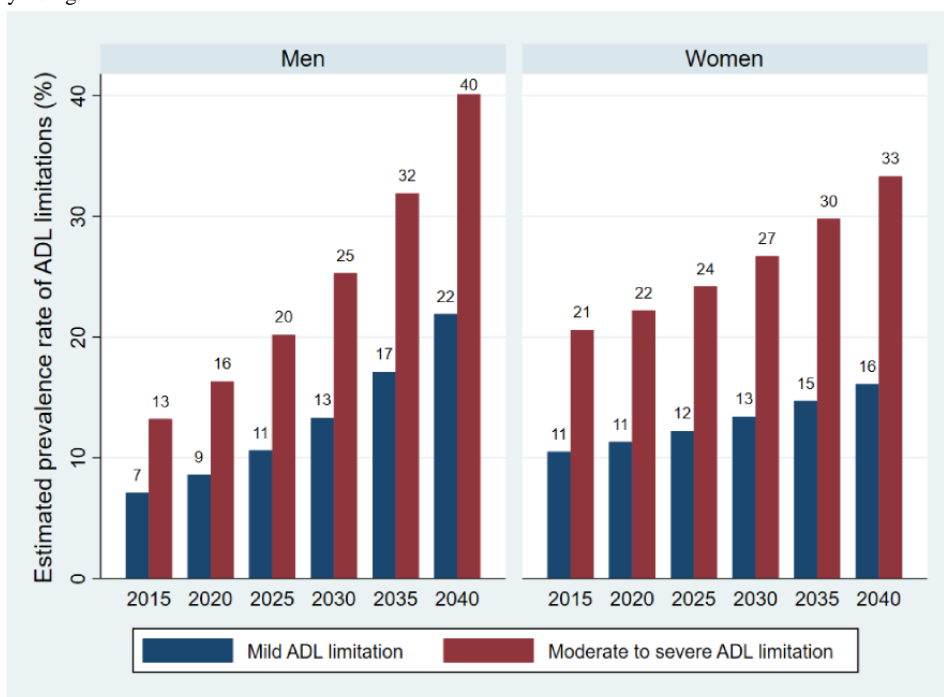
^aAOR: adjusted odd ratio.

Starting Population and Probability Prediction of the Prevalence of ADL Limitations by Level

The overall population volume in 2015 was 4,304,000 for older men and 5,676,000 for older women. After adjusting for other variables in the model, the probability prediction of prevalence from postestimation regression was divided by age group and sex. The prevalence of mild functional ADL limitations was 7.1% (n=306,225) among older men and 10.5% (n=593,333)

among older women, and for moderate to severe ADL limitations, it was 13.2% (n=569,730) among men and 20.6% (n=1,171,028) among women at the base year. The prevalence rates of functional ADL limitations increased by 23% among men and 8% among women every 5 years, in accordance with the rate of change in the prevalence of ADL limitations from the NHES from 2014 to 2019. Figure 1 presents the estimated prevalence rate of ADL limitations among older individuals by level of ADL limitation and gender.

Figure 1. Estimated prevalence rate of ADL limitations among older individuals by level of ADL limitation and gender in Thailand in 2015-2040. ADL: activities of daily living.

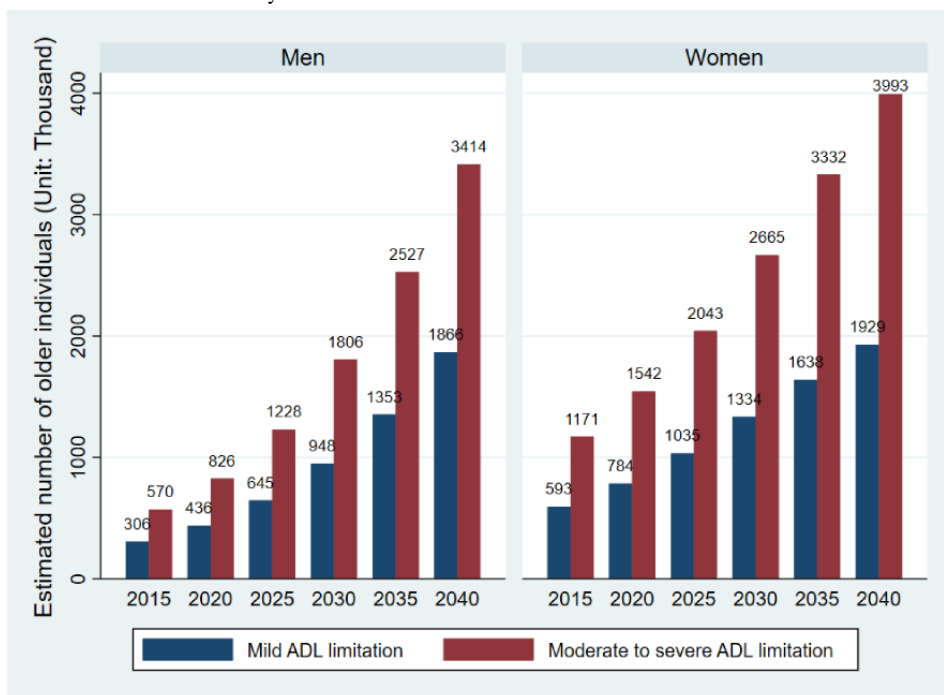


Estimated Number of Older Individuals by the Level of ADL Limitations

Over 20 years, an increase in the predicted number of older individuals with ADL limitations was more likely among women than among men (20.3 million vs 15.1 million, respectively). Among men, the predicted number of people with mild ADL limitations in the population increased from 436,000 in 2020

to 1,866,000 in 2040. The number in the moderate to severe group also increased, from 826,000 to 3,414,000. Among women, the number of older people with mild ADL limitations showed a linear increasing pattern from 784,000 in 2020 to 2,040,000 in 2040, while that in the moderate to severe ADL limitations group increased from 1,542,000 to 3,993,000. The population estimates for both groups are presented in Figure 2.

Figure 2. Estimated number of older Individuals by the level of ADL limitations in Thailand in 2015-2040. ADL: activities of daily living.



Discussion

Main Findings, Interpretations, and Comparisons With Related Studies

This study used data from a nationwide health survey among older individuals to investigate the association of sociodemographic variables and unhealthy behaviors with ADL limitations, and to estimate the predicted number of people living with ADL limitations from this association. The study identified age and physical activity as factors significantly associated with ADL limitations in older adults, while other factors showed varying associations. Over the next 2 decades, our projections suggest a significant increase in the number of older adults with ADL limitations, particularly men.

This study found that ADL limitations remarkably increased with age among men and women. In addition, the estimated number of Thai older people with ADL limitations continuously increased over 20 years, and women accounted for a higher number of older people with ADL limitations than men. Consistent with several studies, our study found a significant association between ADL limitations and sociodemographic factors such as age, having chronic health conditions, and having unhealthy behaviors. It confirmed the profound effect of increasing age and chronic diseases on leading ADL limitations in older individuals [6,9,10,12,23].

Our findings indicate that the prevalence of ADL limitations increased with age. Similarly, a previous study [24] reported that the prevalence of disability increased with older age. Older people presented a higher prevalence of functional limitations than younger people. Regarding chronic health conditions, the study revealed that having diabetes or hypertension was related to ADL limitations, which was consistent with previous studies. Older adults with major chronic illnesses exhibited higher prevalence rates of disability across all forms of ADL including bathing, dressing, walking, eating, using the toilet, and transferring in and out of bed [25,26]. Another longitudinal aging study in India found that among older individuals, having preexisting chronic conditions, such as hypertension, diabetes, psychiatric disorders, or stroke, was strongly associated with at least one ADL limitation [27]. Unhealthy behaviors also showed associations with disability among older adults. Similar to previous studies [23,28,29], an increased likelihood of incident disability is relevant to unhealthy lifestyles and health-related behaviors, and the risk increases with an increase in the number of unhealthy behaviors. Therefore, our predictive model strongly aligns with those of related studies.

Our study used estimated marginal standardization from predictions of a fitted model [21,22] at fixed values of potential covariates to forecast the number of ADL limitations among older Thai individuals. The model was controlled for any potential covariates, such as health conditions, low physical activity, insufficient fruit and vegetable intake, and sociodemographic status. The average number of ADL limitations was indicated by age, sex, and level of ADL limitations. The adjusted predictions refer to predictive values that are evaluated at fixed values for all covariates influencing functional limitations. Thus, this study endeavors to fill the gaps

of other studies encountering limitations in terms of demographic variables such as health conditions, educational background, and unhealthy behaviors, among others [30]. The assumption of our model was that the measurement of ADL limitations, associated health conditions and other sociodemographic variables, was taken only at baseline in 2014; changes over time were not accounted for, and the risk associated with ADL limitations was assumed to be constant over time. The proportion of changes in ADL limitations over the study period increased by 23% among men and 8% among women, which was estimated by the differential between the prevalence of ADL limitations in 2014 and 2019. This change might reflect the real situation of ADL limitations in Thailand.

Our estimation of the average number of ADL limitations per year was 752,530 among men and 1,014,710 among women. Women were approximately 1-fold less likely to live with any ADL limitation than men. One explanation is that men exhibited a poorer health status and lifestyle and were more likely to be current alcohol consumers and smokers [31]. Furthermore, a study on the number of years lived with mobility limitations in older populations in Thailand found that women spent significantly more years with any limitation than men, and the number of years lived with severe limitations was notably constant across ages [32]. Our findings confirmed those of other studies that longer life spans do not necessarily indicate a good health status. At the age of 65 years, women were more likely to have a higher chance of experiencing mild ADL limitations (28.8%) and moderate to severe ADL limitations (46.5%) than those with no ADL limitation. However, our results do not provide supportive evidence of an association among men aged 65 years but rather indicate that increasing age is related to having any ADL limitation in both sexes. Regarding chronic diseases, older people with diabetes mellitus or hypertensive disorder were more likely to have any ADL limitation.

Overall, the number of older Thai individuals will gradually increase over the next 20 years. This study found that the number of moderate to severe ADL limitations would reach 7.4 million in 2040, which is approximately 3-fold the current volume of individuals with moderate to severe ADL limitations. Our results project a larger number of individuals with mild ADL limitations than that suggested by Tantirak et al [30], who estimated that the number of individuals needing assistance would total to 318,980. However, the difference might be due to the various methods used in the studies, including the definition of ADL limitation levels. Accordingly, a comparison of the number of older adults by ADL limitation level in this and other studies must be considered with caution because of these different definitions. In addition, the predicted number of older adults is sensitive to different calculation methods. However, the trends in limitations with other studies could be compared when using relatively similar definitions.

Our findings suggest improvements in creating a friendly environment for older individuals, such as improving sidewalks and stairs to prevent falls, along with an increased number of health promotion and prevention programs to enhance overall physical activity, prevent chronic diseases and other limitations, and improve the quality of life of older Thai individuals. Longer

healthy life expectancy would also reduce health care expenditure in older populations.

Study Strengths and Limitations

The strength of this study lies in the use of a large cross-sectional national health survey that represents the general nationwide population. Furthermore, potential confounding factors were considered in the analyses. However, this study has limitations, as encountered in cross-sectional studies. First, this type of epidemiological study cannot establish causal relationships. Moreover, the direction of causality is indeterminate; ADL limitations and the presence of chronic disease could be reciprocally related to each other. Second, older individuals with severe disabilities or bedridden conditions might not have been included in the survey due to the data collection process, where respondents were invited to health care centers. Therefore, the prevalence of ADL limitations from these surveys might have been underestimated.

In terms of methodology, this study encountered several limitations. We used a multinomial regression model to estimate the predicted probability of our outcome of interest. While certain demographic variables, such as marital status, residential area, and educational background, were considered in this model, it comprised a deterministic model that might not reflect the real situation [33]. Further studies should carry out multistage modeling to estimate the actual health state of older individuals in Thailand. Furthermore, additional empirical research on health status in the population, in terms of a longitudinal study, should be conducted to estimate several modeling parameters such as transit probability.

The findings of this study highlight the vast number of older Thai individuals who will potentially experience ADL limitations in the next 20 years. This information could be used in policy making, particularly in health promotion planning. Consequently, relevant factors can be modified to reduce the number of people with disabilities in the future.

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Conflicts of Interest

None declared.

Multimedia Appendix 1

Results of univariate logistic regression for ADL limitation level and socio-demographic variables.

[DOCX File, 15 KB - [apinj_v7i1e42205_app1.docx](#)]

References

1. Situation of The Thai Elderly 2017. Thai Gerontology Research and Development Institute. Bangkok: Institute for Population and Social Research, Mahidol University and Foundation of Thai Gerontology Research and Development institute (TGRD); 2019 Jan. URL: <https://thaitgri.org/?wpdmpro=situation-of-the-thai-elderly-2017#> [accessed 2023-05-15]
2. United Nations Department of Economic and Social Affairs. World Population Prospects. Data Booklet - 2015 Revision. New York, NY: United Nations; 2016.
3. Einarson TR, Acs A, Ludwig C, Pantou UH. Prevalence of cardiovascular disease in type 2 diabetes: a systematic literature review of scientific evidence from across the world in 2007-2017. *Cardiovasc Diabetol* 2018 Jun 08;17(1):83 [FREE Full text] [doi: [10.1186/s12933-018-0728-6](https://doi.org/10.1186/s12933-018-0728-6)] [Medline: [29884191](https://pubmed.ncbi.nlm.nih.gov/29884191/)]
4. Mensah GA, Roth GA, Fuster V. The global burden of cardiovascular diseases and risk factors: 2020 and beyond. *J Am Coll Cardiol* 2019 Nov 19;74(20):2529-2532 [FREE Full text] [doi: [10.1016/j.jacc.2019.10.009](https://doi.org/10.1016/j.jacc.2019.10.009)] [Medline: [31727292](https://pubmed.ncbi.nlm.nih.gov/31727292/)]
5. Aekplakorn W. The 6th national health examination survey 2020. 2020. URL: <https://online.fliphtml5.com/bcbgj/znee/#p=5> [accessed 2023-05-20]
6. Booth F, Roberts C, Laye M. Lack of exercise is a major cause of chronic diseases. *Compr Physiol* 2012 Apr;2(2):1143-1211 [FREE Full text] [doi: [10.1002/cphy.c110025](https://doi.org/10.1002/cphy.c110025)] [Medline: [23798298](https://pubmed.ncbi.nlm.nih.gov/23798298/)]
7. Lehtisalo J, Rusanen M, Solomon A, Antikainen R, Laatikainen T, Peltonen M, et al. Effect of a multi-domain lifestyle intervention on cardiovascular risk in older people: the FINGER trial. *Eur Heart J* 2022 Jun 01;43(21):2054-2061 [FREE Full text] [doi: [10.1093/eurheartj/ehab922](https://doi.org/10.1093/eurheartj/ehab922)] [Medline: [35051281](https://pubmed.ncbi.nlm.nih.gov/35051281/)]
8. Buttar H, Li T, Ravi N. Prevention of cardiovascular diseases: role of exercise, dietary interventions, obesity and smoking cessation. *Exp Clin Cardiol* 2005;10(4):229-249 [FREE Full text] [Medline: [19641674](https://pubmed.ncbi.nlm.nih.gov/19641674/)]

9. Prasitsiriphon O, Weber D. Objective physical measures and their association with subjective functional limitations in a representative study population of older Thais. *BMC Geriatr* 2019 Mar 05;19(1):73 [FREE Full text] [doi: [10.1186/s12877-019-1093-3](https://doi.org/10.1186/s12877-019-1093-3)] [Medline: [30836934](https://pubmed.ncbi.nlm.nih.gov/30836934/)]
10. Zhang L, Guo L, Wu H, Gong X, Lv J, Yang Y. Role of physical performance measures for identifying functional disability among Chinese older adults: data from the China Health and Retirement Longitudinal Study. *PLoS One* 2019 Apr 18;14(4):e0215693 [FREE Full text] [doi: [10.1371/journal.pone.0215693](https://doi.org/10.1371/journal.pone.0215693)] [Medline: [30998757](https://pubmed.ncbi.nlm.nih.gov/30998757/)]
11. Wennie Huang WN, Perera S, VanSwearingen J, Studenski S. Performance measures predict onset of activity of daily living difficulty in community-dwelling older adults. *J Am Geriatr Soc* 2010 May;58(5):844-852 [FREE Full text] [doi: [10.1111/j.1532-5415.2010.02820.x](https://doi.org/10.1111/j.1532-5415.2010.02820.x)] [Medline: [20406319](https://pubmed.ncbi.nlm.nih.gov/20406319/)]
12. Chen C, Lim JT, Chia NC, Wang L, Tysinger B, Zissimopoulos J, et al. The long-term impact of functional disability on hospitalization spending in Singapore. *J Econ Ageing* 2019;14:100193 [FREE Full text] [doi: [10.1016/j.jeoa.2019.02.002](https://doi.org/10.1016/j.jeoa.2019.02.002)] [Medline: [31857943](https://pubmed.ncbi.nlm.nih.gov/31857943/)]
13. Freedman V, Spillman B, Andreski P, Cornman J, Crimmins E, Kramarow E, et al. Trends in late-life activity limitations in the United States: an update from five national surveys. *Demography* 2013 Apr;50(2):661-671 [FREE Full text] [doi: [10.1007/s13524-012-0167-z](https://doi.org/10.1007/s13524-012-0167-z)] [Medline: [23104207](https://pubmed.ncbi.nlm.nih.gov/23104207/)]
14. Aekplakorn W, Chariyalertsak S, Kessomboon P, Assanangkornchai S, Taneepanichkul S, Putwatana P. Prevalence of diabetes and relationship with socioeconomic status in the Thai population: National Health Examination Survey, 2004-2014. *J Diabetes Res* 2018;2018:1654530 [FREE Full text] [doi: [10.1155/2018/1654530](https://doi.org/10.1155/2018/1654530)] [Medline: [29687009](https://pubmed.ncbi.nlm.nih.gov/29687009/)]
15. Siwarom S, Aekplakorn W, Pirojsakul K, Paksi W, Kessomboon P, Neelapaichit N, et al. Metabolic syndrome in Thai adolescents and associated factors: the Thai National Health Examination Survey V (NHES V). *BMC Public Health* 2021 Apr 07;21(1):678 [FREE Full text] [doi: [10.1186/s12889-021-10728-6](https://doi.org/10.1186/s12889-021-10728-6)] [Medline: [33827482](https://pubmed.ncbi.nlm.nih.gov/33827482/)]
16. Mahoney F, Barthel D. Functional evaluation: The Barthel index. *Md State Med J* 1965;14:61-65. [doi: [10.1037/t02366-000](https://doi.org/10.1037/t02366-000)]
17. Shah S, Vanclay F, Cooper B. Improving the sensitivity of the Barthel index for stroke rehabilitation. *J Clin Epidemiol* 1989 Jan;42(8):703-709. [doi: [10.1016/0895-4356\(89\)90065-6](https://doi.org/10.1016/0895-4356(89)90065-6)] [Medline: [2760661](https://pubmed.ncbi.nlm.nih.gov/2760661/)]
18. Global physical activity questionnaire (GPAQ). World Health Organization. 2021. URL: <https://www.who.int/publications/m/item/global-physical-activity-questionnaire> [accessed 2023-05-15]
19. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. World Health Organization. 2002. URL: <https://www.who.int/publications/i/item/924120916X> [accessed 2023-05-15]
20. Umaña-Hermosilla B, de la Fuente-Mella H, Elórtégui-Gómez C, Fonseca-Fuentes M. Multinomial logistic regression to estimate and predict the perceptions of individuals and companies in the face of the COVID-19 pandemic in the Ñuble Region, Chile. *Sustainability* 2020 Nov 17;12(22):9553. [doi: [10.3390/su12229553](https://doi.org/10.3390/su12229553)]
21. Williams R. Using the Margins Command to estimate and interpret adjusted predictions and marginal effects. *Stata J* 2012 Jun 01;12(2):308-331. [doi: [10.1177/1536867x1201200209](https://doi.org/10.1177/1536867x1201200209)]
22. Muller C, MacLehose R. Estimating predicted probabilities from logistic regression: different methods correspond to different target populations. *Int J Epidemiol* 2014 Jun;43(3):962-970 [FREE Full text] [doi: [10.1093/ije/dyu029](https://doi.org/10.1093/ije/dyu029)] [Medline: [24603316](https://pubmed.ncbi.nlm.nih.gov/24603316/)]
23. Artaud F, Dugravot A, Sabia S, Singh-Manoux A, Tzourio C, Elbaz A. Unhealthy behaviours and disability in older adults: three-City Dijon cohort study. *BMJ* 2013 Jul 23;347(jul23 1):f4240-f4240 [FREE Full text] [doi: [10.1136/bmj.f4240](https://doi.org/10.1136/bmj.f4240)] [Medline: [23881930](https://pubmed.ncbi.nlm.nih.gov/23881930/)]
24. Jiawiwatkul U, Aekplakorn W, Vapattanawong P, Prasartkul P, Porapakkhom Y. Changes in active life expectancy among older thais: results from the 1997 and 2004 national health examination surveys. *Asia Pac J Public Health* 2012 Nov 26;24(6):915-922. [doi: [10.1177/1010539511409923](https://doi.org/10.1177/1010539511409923)] [Medline: [21622481](https://pubmed.ncbi.nlm.nih.gov/21622481/)]
25. Fong JH. Disability incidence and functional decline among older adults with major chronic diseases. *BMC Geriatr* 2019 Nov 21;19(1):323 [FREE Full text] [doi: [10.1186/s12877-019-1348-z](https://doi.org/10.1186/s12877-019-1348-z)] [Medline: [31752701](https://pubmed.ncbi.nlm.nih.gov/31752701/)]
26. Ralph NL, Mielenz TJ, Parton H, Flatley A, Thorpe LE. Multiple chronic conditions and limitations in activities of daily living in a community-based sample of older adults in New York City, 2009. *Prev Chronic Dis* 2013 Nov 27;10:E199 [FREE Full text] [doi: [10.5888/pcd10.130159](https://doi.org/10.5888/pcd10.130159)] [Medline: [24286273](https://pubmed.ncbi.nlm.nih.gov/24286273/)]
27. Sharma P, Maurya P, Muhammad T. Number of chronic conditions and associated functional limitations among older adults: cross-sectional findings from the longitudinal aging study in India. *BMC Geriatr* 2021 Nov 23;21(1):664 [FREE Full text] [doi: [10.1186/s12877-021-02620-0](https://doi.org/10.1186/s12877-021-02620-0)] [Medline: [34814856](https://pubmed.ncbi.nlm.nih.gov/34814856/)]
28. Artaud F, Sabia S, Dugravot A, Kivimaki M, Singh-Manoux A, Elbaz A. Trajectories of unhealthy behaviors in midlife and risk of disability at older ages in the Whitehall II cohort study. *J Gerontol A Biol Sci Med Sci* 2016 Nov 30;71(11):1500-1506 [FREE Full text] [doi: [10.1093/gerona/glw060](https://doi.org/10.1093/gerona/glw060)] [Medline: [27034508](https://pubmed.ncbi.nlm.nih.gov/27034508/)]
29. Sulander T, Martelin T, Rahkonen O, Nissinen A, Uutela A. Associations of functional ability with health-related behavior and body mass index among the elderly. *Arch Gerontol Geriatr* 2005 Mar;40(2):185-199. [doi: [10.1016/j.archger.2004.08.003](https://doi.org/10.1016/j.archger.2004.08.003)] [Medline: [15680501](https://pubmed.ncbi.nlm.nih.gov/15680501/)]
30. Tantirat P, Suphanchaimat R, Rattanathumsakul T, Noree T. Projection of the number of elderly in different health states in Thailand in the next ten years, 2020-2030. *Int J Environ Res Public Health* 2020 Nov 23;17(22):8703 [FREE Full text] [doi: [10.3390/ijerph17228703](https://doi.org/10.3390/ijerph17228703)] [Medline: [33238588](https://pubmed.ncbi.nlm.nih.gov/33238588/)]

31. Rogers RG, Krueger PM, Miech R, Lawrence EM, Kemp R. Nondrinker mortality risk in the United States. *Popul Res Policy Rev* 2013 Jun;32(3):325-352 [[FREE Full text](#)] [doi: [10.1007/s11113-013-9268-7](https://doi.org/10.1007/s11113-013-9268-7)] [Medline: [25045194](#)]
32. Apinonkul B, Soonthornhadha K, Vapattanawong P, Jagger C, Aekplakorn W. Regional and gender differences in years with and without mobility limitation in the older population of Thailand. *PLoS One* 2016;11(5):e0153763 [[FREE Full text](#)] [doi: [10.1371/journal.pone.0153763](https://doi.org/10.1371/journal.pone.0153763)] [Medline: [27138811](#)]
33. Meira-Machado L, de Uña-Alvarez J, Cadarso-Suárez C, Andersen PK. Multi-state models for the analysis of time-to-event data. *Stat Methods Med Res* 2009 Apr 29;18(2):195-222 [[FREE Full text](#)] [doi: [10.1177/0962280208092301](https://doi.org/10.1177/0962280208092301)] [Medline: [18562394](#)]

Abbreviations

ADL: activities of daily living

NHES: National Health Examination Survey

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Original Paper

Factors and Challenges in Increasing the Utilization Rate of a New Long-term Care Service (Kantaki) in a Superaging Society: Cross-sectional Study

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Abstract

Background: Japan is a superaging society unparalleled in the world. Elderly people who need medical care do not receive adequate support in the community. As a new service to address this issue, a small-scale multifunctional in-home care nursing service called Kantaki was created in 2012. Kantaki, in collaboration with a primary physician, operates 24 hours a day and provides various nursing services (home visits, home care, day care, and overnight stays) to older people living in the community. The Japanese Nursing Association is working hard to promote this system; however, its low utilization rate is an issue.

Objective: This study aimed to determine factors influencing the utilization rate of Kantaki facilities.

Methods: This was a cross-sectional study. A questionnaire on the operation of Kantaki was sent to all administrators of Kantaki facilities operating in Japan from October 1 to December 31, 2020. A multiple regression analysis was used to determine factors associated with a high utilization rate.

Results: Responses from 154 of the 593 facilities were analyzed. The average utilization rate for all valid responding facilities was 79.4%. The average number of actual users and the break-even point were almost equal, resulting in little surplus profit from facility operations. A multiple regression analysis showed that factors that had a significant impact on the utilization rate included the break-even point, a surplus of users relative to the break-even point (ie, the margin of revenues), the number of months in office of the administrator, the type of corporation (ie, nonprofit), and Kantaki's profit from operating home-visit nursing offices. The break-even point, a surplus of users relative to the break-even point, and the number of months in office of the administrator were robust. In addition, support for reducing the burden on family helpers, a service sought by the system, significantly and negatively affected the utilization rate. In the analysis that removed the most influential factors, the cooperation of the home-visit nursing office, Kantaki's profit from operating the home-visit nursing office, and the number of full-time care workers were significantly related.

Conclusions: To improve the utilization rate, managers need to stabilize their organization and increase profitability. However, a positive relationship was found between the break-even point and utilization rate, suggesting that simply increasing users did not contribute to cost reduction. Moreover, providing services that meet the needs of individual clients may result in lower utilization rates. These results, which are inconsistent with common sense, reflect the divergence between the assumptions underlying the system's design and actual conditions. To solve these issues, institutional reforms, such as an increase in nursing care fee points, may be necessary.

KEYWORDS

aging; independent living; community health services; Kantaki; long-term care; terminal care; utilization rate; utilization; Japan; aging society; nursing; nursing services; home care; questionnaire; users

Introduction

Background

Japan is the most aging society in the world, with 27% of the population aged >65 years in 2015; this figure is expected to increase to 40% by 2050 [1]. As the population ages, Japan's mortality setting has changed dramatically. In 1952, 9.7% of deaths occurred in hospitals and 81.3% at home; however, in 2006, 79.7% occurred in hospitals and 12.2% at home [2].

The Japanese government launched a long-term care (LTC) insurance scheme in 2000, with the aim of enabling older people to live independently in the community. Under this system, individuals or their family apply for coverage with an insurer, usually the municipal government; individuals deemed to require long-term care are classified into 1 of 5 levels based on their level of dependence and their eligibility to receive services [3]. In this system, many home-care services provide support to older people in their home life. However, many of the staff providing these services are not qualified nurses, and older peoples' medical care needs are not being met [4]. Visiting nurse services, which can provide medical care under LTC insurance, also face difficulties in providing continuous and sufficient medical support, as their activities focus on routine care with regular visits within a time limit [5]. As a result, older people who need medical care cannot receive adequate support in their communities and must be readmitted to the hospital. Rehospitalization attributed to the inability to continue care at home is due to a limited number of caregivers with an ability to care for older people with a deteriorating condition [6]. Many primary caregivers who live with older individuals requiring a high level of care are forced to leave their jobs and are involved in caregiving throughout nearly the entire day. In addition, most of those involved in such care are women [4]. This problem of maintaining life support for older people in need of medical care will become a global challenge in the future.

Prior Work

In 2012, a service called Kantaki (the full name in Japanese is Kango Syokibo Takinou Kyotakugata Kaigo, which means "small-scale multifunctional in-home nursing care"), was established in Japan to provide community-based comprehensive care that allows the older population to live in the community [7]. The Ministry of Health, Labour and Welfare describes the service as small scale because it limits the number of users a facility can serve to 29 [8]. As a community-based service, Kantaki combines home-visit, day-care, and short-stay services to provide integrated services over a 24-hour period to older people who require nursing care while living at home [8]. By providing all these services from a single office in collaboration with a primary care physician, integrated and detailed care is possible. Kantaki is a groundbreaking service that leverages nursing expertise to improve residents' quality of life.

Kantaki is expected to include end-of-life care support, medical support for patients with intractable diseases and dementia, support for reducing the burden on family caregivers, and utilization of community resources [8-10]. The Japanese Nursing Association [11] is promoting this service as a priority policy. Although there are 12,000 home-visit nursing offices nationwide, only 500 Kantaki facilities are available [12]; they are thus not sufficiently widespread. According to the results of interviews conducted by Mitsubishi UFJ Research and Consulting [9], the reasons for the lack of widespread use include the operational and staffing systems required to provide complex new services and challenges for users to understand and use the services offered. Consequently, many Kantaki facilities operate at loss, as they cannot secure the number of users [9]. Generally, facilities with financial challenges would either reduce their level of care to the poor and uninsured or face closure, bankruptcy, or merger [13]. In particular, smaller-sized facilities are less well managed than larger-sized facilities, making it difficult for them to provide services [4].

Fukui et al [14] conducted a study on the profitability of home-visit nursing offices in Japan using a questionnaire with 7 categories: operating structure, management by a nurse manager, employment, patient use, quality control, regional cooperation, and financial condition. The number of nursing staff, the number of users, being owned by a hospital, control of staff goals by nursing managers, and income compensation were reported as factors that increased profitability. Several studies of hospitals and nursing homes have reported that a higher utilization rate is related to better financial performance [15,16]. Lower occupancy has been found to be a significant predictor of financial problems [13]. A low utilization rate results in high operating expenses per client, which hinders efficient operations [13,17]. To stabilize operations, increasing the utilization rate is important. However, it is unclear to what extent specific facility, staff, and service characteristics impact utilization rates.

Goal of This Study

The purpose of this study is to determine specific factors involved in facility, staff, and service characteristics that affect Kantaki's utilization rates.

Methods

Study Design and Participants

This was a cross-sectional study conducted with a mailed questionnaire. Participants were administrators at Kantaki facilities (n=593) licensed to operate by local governments as of March 31, 2020.

Survey Items

Based on the results of previous studies [8-10,14,18], the following variables were selected as independent factors that

may affect the utilization rate of Kantaki: (1) facility characteristics, such as corporation type, cooperation of the home-visit nursing office, Kantaki's profit from operating home-visit nursing offices, the actual number of users, maximum user capacity, number of months in business, number of months in office of the administrator, ratio of users with needs at each level of care (1-5), maximum distance to a user's residence, break-even point of users, and the surplus of users relative to the break-even point (ie, the margin of revenues); (2) staff characteristics, such as the number of full-time nurses and care workers, turnover rate of nurses and care workers, and training participation rate of nurses and care workers; and (3) service characteristics, such as support for end-of-life care at home, support for patients with intractable diseases, functional training to reduce care needs, support for patients with dementia, support for reducing the burden on family helpers, support for medically dependent users, and interaction with local residents and participation in local activities (evaluated on a 5-point Likert scale).

The break-even point in facility characteristics is the point at which the revenue generated by facility operations equals the cost of the resources consumed to generate it [19]. Additionally, the surplus of users relative to the break-even point is regarded as the surplus width of revenue.

Utilization Rate Calculation

Kantaki's maximum capacity is set at a maximum of 29 persons according to the requirements of the personnel standards of the Ministry of Health, Labour and Welfare. As for the opening requirements, at least one staff member must be assigned to every 3 users for daytime services and at least two staff members for home-visiting services. The maximum capacity varies depending on the number of staff members employed at the facility [7].

The utilization rate was the dependent factor and was calculated based on the number of actual users and maximum user capacity using the following formula: (number of actual users / maximum user capacity) \times 100 (%).

Data Collection

At the end of March 2020, we collected public information on all Kantaki facilities registered with the Ministry of Health, Labour and Welfare. Questionnaires were mailed to each facility. The collection period was October 1 to December 31, 2020. A database was created from the response forms returned during this period.

Statistical Analysis

Missing data from the survey responses were eliminated from the database, and other valid responses were included in the analysis. Statistical analysis was conducted with SPSS (version 26; IBM Corp). For descriptive statistics, we calculated the median (range) and mean (SD) for each item, and then examined the relationship between the utilization rate and each factor using the Spearman rank-order correlation coefficient.

Subsequently, a multiple regression analysis was conducted to determine the relationship between the utilization rate and each factor. Dummy variables were created for corporation type, cooperation of home-visit nursing offices, and Kantaki's profit from operating the home-visit nursing offices. The variance inflation factor (VIF) was used to avoid multicollinearity. We judged VIFs greater than 10 as representing multicollinearity and excluded them from the items. VIFs greater than 4 also raised the suspicion of multicollinearity; however, we retained those with high *P* values in the results to avoid the possibility of increasing the arbitrariness of the model [20]. All the variables were first established in the model and analyzed using the backward selection method. Regarding the size of the adjusted R^2 value and VIF, high *P* value variables were removed sequentially. The α level was set to .05 for statistical tests. In model 1, the goal was to maximize the size of the adjusted R^2 value. In model 2, we excluded items with a VIF greater than 4. Finally, in model 3, the high impact variables in model 1 were excluded, retaining those with *P* values below .05.

Ethical Considerations

This study was approved by the Research Ethics Committee of the Research Institute of Nursing Care for People and Community, College of Nursing Art and Science, University of Hyogo (2019F25). We asked the administrators of the Kantaki facilities to participate in our research project and obtained their consent.

Results

Characteristics of the Data

We received responses from 193 of 593 facilities (for a collection rate of 32.5%). Of these 193 facilities, 154 (79.8%) provided the data required for calculating the utilization rate (ie, the actual number of users and facility capacity) and were thus included in the analysis.

Descriptive statistics and correlations between each item and utilization rate are shown in Tables 1 and 2. Some items had missing data. The average utilization rate for all valid responding facilities was 79.4%. The average number of actual users was 21.1, whereas the average break-even point was 20.9, resulting in little surplus profit from facility operations.

The tenure of administrators was shorter than the number of months the facility was in operation, with a maximum of 84 months. The percentage of users at each level of care was approximately 20%, and there was no bias. The number of full-time care workers was approximately twice as large as that of full-time nurses. Among the service characteristics, support for reducing the burden on family helpers was addressed with the greatest emphasis. The correlations between each independent factor and utilization rate were all $P < .6$, except for the number of actual users.

Table 1. Descriptive statistics and correlation with utilization rate of each item at the facilities (n=154).

Variables	Median (range)	Mean (SD)	Correlation coefficient with utilization rate ^a	P value
Utilization rate, %	81.4 (20.8 to 100)	79.4 (18.9)	1.000	
Actual users, n	22 (5 to 29)	21.1 (5.5)	0.774	<.001
Maximum user capacity, n	29 (8 to 29)	26.7 (3.8)	-0.224	.005
Months in business, n	42 (7 to 96)	46.7 (24.0)	0.086	.16
Months in office of the administrator, n	36 (0 to 84)	35.7 (21.2)	0.109	.18
Ratio of users with level 1 needs, %	13.7 (0 to 60)	17.0 (14.1)	-0.005	.95
Ratio of users with level 2 needs, %	18.8 (0 to 47.1)	19.5 (10.5)	0.033	.69
Ratio of users with level 3 needs, %	18.6 (0 to 72.2)	19.8 (10.8)	0.049	.55
Ratio of users with level 4 needs, %	18.9 (0 to 56.3)	20.5 (11.5)	-0.020	.81
Ratio of users with level 5 needs, %	18.9 (0 to 78.9)	23.2 (16.3)	-0.001	.99
Maximum distance to a user's residence ^b , km	8.0 (0 to 45)	8.9 (6.4)	-0.150	.37
Break-even point of users ^c , n	20.5 (4 to 29)	20.9 (4.7)	0.419	<.001
Surplus of users relative to the break-even point ^d , n	0 (-13 to 11)	-0.1 (4.1)	0.513	<.001
Number of full-time nurses, n	3 (0 to 10)	3.9 (2.1)	-0.014	.86
Number of full-time care workers, n	7 (1 to 14)	7.5 (3.1)	0.243	.002
Turnover rate of nurses ^e , %	0 (0 to 100)	12.6 (19.0)	0.035	.67
Turnover rate of care workers ^f , %	0 (0 to 133.3)	14.3 (22.5)	-0.105	.20
Training participation rate of nurses ^g , %	44.4 (0 to 237.5)	54.0 (43.1)	0.031	.73
Training participation rate of care workers ^h , %	33.3 (0 to 153.8)	41.8 (33.6)	-0.015	.86
Support for end-of-life care at home, score	5 (1 to 5)	4.3 (0.9)	0.138	.09
Support for patients with intractable diseases ^f , score	4 (1 to 5)	3.8 (1.0)	0.117	.15
Functional training to reduce the care need, score	4 (1 to 5)	3.9 (0.9)	0.012	.88
Support for dementia patients, score	4 (2 to 5)	4.3 (0.7)	0.082	.31
Support for reducing the burden of family helper, score	5 (3 to 5)	4.6 (0.6)	0.019	.81
Support for medically dependent users, score	5 (2 to 5)	4.4 (0.7)	-0.010	.91
Participation in local activities, score	4 (1 to 5)	3.5 (0.9)	0.145	.07

^aSpearman rank test.

^b143 facilities.

^c138 facilities.

^d137 facilities.

^e152 facilities.

^f153 facilities.

^g123 facilities.

^h133 facilities.

Table 2. Descriptive statistics and correlation with utilization rate of dummy variables at the facilities (n=154).

Dummy variables	Dummy variable=yes (facilities), n	Average utilization rate, %	Dummy variable=no (facilities), n	Average utilization rate, %	P value ^a	Correlation coefficient with utilization rate ^b
Type of corporation						
For profit	53	79.9	101	78.4	.81	-0.020
Medical	43	80.1	111	77.5	.35	-0.076
Social welfare	35	78.2	119	83.2	.14	0.122
Nonprofit	5	79.3	149	82.8	.56	0.045
Other	18	79.5	136	78.2	.55	-0.049
Cooperation of home-visit nursing office	36	80.0	118	77.5	.78	-0.023
Kantaki's profit from operating home-visit nursing offices	31	79.0	123	80.8	.51	0.053

^aMann-Whitney *U* test.

^bSpearman rank test.

Impact of Each Factor on the Utilization Rate

The results of a multiple regression analysis with the utilization rate as the dependent variable are shown in [Table 3](#).

Table 3. Factors related to the utilization rate.

Variable	β	Standardized β coefficient (95% CI)	t^a	P value	VIF ^b
Model 1 (n=109 facilities, adjusted $R^2=0.776$)					
Constant	36.914	— ^c (6.917 to 56.911)	3.875	<.001	
Break-even point of users	2.807	0.687 (2.40 to 3.214)	13.715	<.001	1.212
Surplus of users relative to the break-even point	3.286	0.664 (2.807 to 3.765)	13.627	<.001	1.145
Number of months in office of the administrator	0.126	0.132 (0.037 to 0.214)	2.814	.006	1.059
Type of corporation (nonprofit)	17.930	0.151 (6.481 to 29.377)	3.108	.002	1.141
Cooperation of home-visit nursing office	-6.646	-0.150 (-16.013 to 2.721)	-1.408	.16	5.448
Kantaki's profit from operating home-visit nursing offices	10.503	0.221 (0.443 to 20.564)	2.072	.04	5.481
Ratio of patients requiring level 3 care	0.107	0.062 (-0.0636 to 0.278)	1.246	.22	1.190
Turnover rate of care workers	-0.067	-0.069 (-0.166 to 0.031)	-1.360	.18	1.239
Training participation rate of nurses	0.008	0.020 (-0.034 to 0.052)	0.413	.68	1.164
Support for reducing the burden of family helpers	-3.988	-0.113 (-7.782 to -0.195)	-2.087	.04	1.406
Support for medically dependent users	-1.308	-0.049 (-4.362 to 1.747)	-0.850	.40	1.616
Model 2 (n=137 facilities, adjusted $R^2=0.661$)					
Constant	16.824	— ^c (6.467 to 27.182)	3.213	.002	
Break-even point of users	2.591	0.634 (2.171 to 3.012)	12.19	<.001	1.083
Surplus of users relative to the break-even point	3.147	0.678 (2.671 to 3.623)	13.08	<.001	1.077
Number of months in office of the administrator	0.092	0.102 (0.001 to 0.183)	1.990	.049	1.047
Type of corporation (nonprofit)	8.738	0.087 (-1.412 to 18.888)	1.703	.09	1.040
Ratio of patients requiring level 3 care	0.221	0.129 (0.050 to 0.393)	2.554	.01	1.018
Model 3 (n=154 facilities, adjusted $R^2=0.091$)					
Constant	68.425	— ^c (60.451 to 76.398)	16.955	<.001	
Cooperation of home-visit nursing office	-21.524	-0.484 (-37.809 to -5.238)	-2.611	.01	5.783
Kantaki's profit from operating home-visit nursing offices	23.577	0.502 (6.429 to 40.274)	2.717	.007	5.755
Number of full-time care workers	1.500	0.244 (0.555 to 2.445)	3.137	.002	1.015

^aThe t test was 2-tailed.

^bVIF: variance inflation factor.

^cStandardized β coefficient not calculated for constant.

Analysis Including All Factors (Models 1 and 2)

Among the facility characteristics, nonprofit corporation type, number of months the administrator was in office, Kantaki's profit from operating home-visit nursing offices, the ratio of patients requiring level 3 care, the break-even point, and the surplus of users relative to the break-even point affected the utilization rate. Among these characteristics, the break-even point of users, the surplus of users relative to the break-even point, and the number of months in office had a common influence in models 1 and 2 and were highly robust. In particular, the break-even point and surplus of users relative to the break-even point both had a standardized coefficient above 0.6 and had a high impact on the utilization rate. No significant factors were observed among the staff characteristics related to

the utilization rate. Among the service characteristics, support for reducing the burden on family helpers had a negative impact on the utilization rate.

Analysis Excluding High-Impact Factors (Model 3)

After excluding high-impact variables, the cooperation of home-visit nursing offices had a significantly negative impact and the profit from operating a home-visit nursing office and number of full-time care workers had a significantly positive impact on the utilization rate.

Discussion

Factors Influencing Kantaki's Utilization Rate

While the surplus of users relative to the break-even point increased Kantaki's utilization rate, the break-even point also had a very large impact on the utilization rate. Theoretically, the break-even point would be lower if services could be efficiently provided to a large number of users. However, this relationship was not observed in this study. A large break-even point indicates a high cost per user and low profit margin. Therefore, in order to sustain management, the facility administrators attempted to eliminate the deficit by increasing the number of users. Kantaki's average labor cost accounted for approximately 75% of the total cost; the relative proportion of labor costs was high [9]. We presume that the large relative share of labor costs resulted in an increase in cost per user, leading to a positive correlation between the break-even point and the utilization rate.

Regarding staff characteristics, a greater number of full-time care workers contributed to a higher utilization rate. In general, turnover among care workers is high [21]. Reasons for this include low wages, increased work stress, and decreased job satisfaction [22]. In Japan, low wages for men and old age for women have been reported as the main reasons for leaving care worker jobs [23]. If the organization can increase its profit margins and improve the working environment, the utilization rates could improve. This is consistent with the finding that additional profit from operating a home-visit nursing office and the number of full-time care workers had an impact on utilization rates in model 3. Kantaki's maximum capacity is based on the number of employed staff members. Improving the financial situation without lowering the cost to maintain staff is important for the expansion of Kantaki services.

Home-visit nursing offices cooperated in 23.4% (36/154) of the participating facilities but negatively impacted the utilization rate. This coincides with the results of a survey conducted by the Tokyo Metropolitan Government [24]. One of the advantages of running 2 facilities together is that nurses can work in both facilities at the same time [25]. However, nurses may not be exclusively involved in Kantaki, which requires integrated services and continuous support. It is important not only to have enough nurses to meet staffing standard requirements but also to make a sufficient contribution to Kantaki services.

Challenges to Ensure the Stable Operation of Kantaki Facilities

In this study, the number of months in the office of the administrator affected the utilization rate. Nursing home administrators in the LTC sector are under great stress due to high work complexity and administrative responsibilities resulting from public policies and high-level specialization and competitiveness [26]. Administrator turnover is associated with poor quality of care and high turnover of care workers [21,27,28]. Therefore, reducing the turnover rate of administrators in the Kantaki facilities is essential to expand this service.

The surplus of users relative to the break-even point and Kantaki's profit from operating the home-visit nursing offices contributed to the utilization rate. This highlights the importance of proper revenue generation in expanding services. However, although the average utilization rate was 80%, the average break-even point was not positive. We believe that poor profitability in the current system is one of the main issues that must be addressed.

The analysis of the service characteristics indicated that fulfilling the role required by the system did not improve the utilization rate. In addition, support for reducing the burden on family helpers had a negative impact on utilization rates, although it was the most important type of service for the administrators. This suggests that they might no longer be able to serve many individuals owing to the increased effort per user. Normally, facilities that provide better services to users should attract customers and thereby increase the utilization rate. With the aim of providing support to older people with medical needs to continue living at home, many nursing activities are conducted in Kantaki, including health management, determining the need for medical consultations, and emergency management [10]. Watanabe et al [18] reported that the average number of full-time equivalent staff was 13.4 for an average of 20.7 users. This number is much higher than the standard staffing requirement for a Kantaki facility. This indicates that labor costs are higher than the government assumed when the system was designed. Ensuring sufficient staff is important to maintain the quality of services [29]. However, under the current system, hiring staff beyond the standard staffing level does not result in an increase in facility revenue. In the future, it will be necessary to conduct a survey on the number of staff and the content and quality of services that can actually be provided, calculate compensation based on evidence, and reform the system to appropriately improve the utilization rate.

Government support in terms of funding and legislation is critical to the success of aging in place [30]. Supporting the lives of older people with medical needs requires a large number of staff and financial support to ensure that income is sufficient to meet necessary staff costs. Life support for older people who need medical care will become a global issue in the future. As the Kantaki system was established to support the people's lives in the community, institutional improvements must be made to expand this small-scale, multifunctional in-home care service. The establishment and wide recognition of this service may be an effective strategy to provide end-of-life care support to older people in the community.

Limitations

In this survey, complete data from only 154 of 593 (26%) facilities were included in the analysis. This inevitably resulted in bias. However, compared to the results of the study by Watanabe et al [18], which reported complete data on all facilities, no deviations in the ratio of corporation type or the required care level were observed. In addition, because this was a cross-sectional study, the data for each facility may reflect a temporary situation. A longitudinal study is required for a more detailed analysis.

Conclusions

The break-even point of users and the surplus of users relative to the break-even point strongly impacted the utilization rate of the Kantaki facilities. The utilization rate was higher with a higher break-even point and an increase in the surplus of users relative to the break-even point. Long-term and stable efforts by administrators were also influences on a higher utilization

rate. In contrast, providing services that could improve the quality of life of Kantaki users reduced the utilization rate.

To increase Kantaki's utilization rate, facilities should increase profitability while maintaining employment levels. However, in reality, the break-even point can only be exceeded by increasing the occupancy rate to 80%. To expand this service, revising the system will be necessary to improve the profitability of facilities, such as by raising nursing care fee points.

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Conflicts of Interest

None declared.

References

1. Vogelsang E, Raymo J, Liang J, Kobayashi E, Fukaya T. Population aging and health trajectories at older ages. *J Gerontol B Psychol Sci Soc Sci* 2019 Sep 15;74(7):1245-1255 [FREE Full text] [doi: [10.1093/geronb/gbx071](https://doi.org/10.1093/geronb/gbx071)] [Medline: [28575472](https://pubmed.ncbi.nlm.nih.gov/31441285/)]
2. Anezaki H. Transition of the place of death and total number of death in Japan. *Asian Pac J Dis Manag* 2008;2(4):97-101 [FREE Full text] [doi: [10.7223/apjdm.2.97](https://doi.org/10.7223/apjdm.2.97)]
3. Matsuda S, Muramatsu K, Hayashida K. Eligibility classification logic of the Japanese long term care insurance. *Asian Pac J Dis Manag* 2011;5(3):65-74 [FREE Full text] [doi: [10.7223/APJDM.5.65](https://doi.org/10.7223/APJDM.5.65)]
4. Japanese NA. Nursing for the older people: current situation and challenges. 2013. URL: <https://www.nurse.or.jp/assets/pdf/info-02.pdf> [accessed 2023-04-25]
5. Ikegami N. Financing long-term care: lessons from Japan. *Int J Health Policy Manag* 2019 Aug 01;8(8):462-466 [FREE Full text] [doi: [10.15171/ijhpm.2019.35](https://doi.org/10.15171/ijhpm.2019.35)] [Medline: [31441285](https://pubmed.ncbi.nlm.nih.gov/31441285/)]
6. Akazawa H, Iwamori K, Harada Y. The factors and affects on the continuation long-term and interruption of home care in caregiving's of elderly people with dementia [in Japanese]. *Journal of Japan Academy of Community Health Nursing* 2002;4(1):76-82 [FREE Full text] [doi: [10.20746/JACHN.4.1_76](https://doi.org/10.20746/JACHN.4.1_76)]
7. Japanese NA. Promotion of multifunctional long-term care in a small group home based on visiting nursing. JNA news release. 2012. URL: https://www.nurse.or.jp/english/assets/pdf/2012nr_8.pdf [accessed 2023-04-25]
8. Kango Syokibo Takinou Kyotakugata Kaigo. Ministry of Health, Labour and Welfare. 2020. URL: <https://www.mhlw.go.jp/content/12300000/000666434.pdf> [accessed 2023-04-21]
9. FY2015 Subsidy for Promotion of Health Services for the Elderly, Health Promotion Project for the Elderly, Survey and Research Project on the Actual Management Conditions of Nursing Small-Scale Multi-Functional In-Home Care Facilities Report. Mitsubishi UFJ Research and Consulting. 2017. URL: https://www.mhlw.go.jp/file/06-Seisakujouhou-12300000-Roukenkyoku/118_UFJ.pdf [accessed 2023-04-21]
10. Katahira N, Tsukasaki K. Nursing care in multifunctional small group homes providing day, visiting and overnight services for older people living at home. *Int J Nurs Pract* 2016 Dec;22(6):605-615. [doi: [10.1111/ijn.12482](https://doi.org/10.1111/ijn.12482)] [Medline: [27653637](https://pubmed.ncbi.nlm.nih.gov/27653637/)]
11. JNA Activities. Japanese Nursing Association. 2021. URL: <https://www.nurse.or.jp/jna/english/activities/index.html> [accessed 2023-04-21]
12. Watanabe R, Ono H, Haga K. A study on the nationwide distribution of Japanese long-term care Kantaki. *Phenomena in Nursing* 2020;4:11-19 [FREE Full text] [doi: [10.24640/PURS.4.1_O11](https://doi.org/10.24640/PURS.4.1_O11)]
13. Younis M. A comparison study of urban and small rural hospitals financial and economic performance. *Online J Rural Nurs Health Care* 2003;3(1):38-48 [FREE Full text] [doi: [10.14574/OJRNHC.V3I1.247](https://doi.org/10.14574/OJRNHC.V3I1.247)]
14. Fukui S, Yoshiuchi K, Fujita J, Ikezaki S. Determinants of financial performance of home-visit nursing agencies in Japan. *BMC Health Serv Res* 2014 Jan 09;14:11 [FREE Full text] [doi: [10.1186/1472-6963-14-11](https://doi.org/10.1186/1472-6963-14-11)] [Medline: [24400964](https://pubmed.ncbi.nlm.nih.gov/24400964/)]
15. Weech-Maldonado R, Laberge A, Pradhan R, Johnson C, Yang Z, Hyer K. Nursing home financial performance: the role of ownership and chain affiliation. *Health Care Manage Rev* 2012;37(3):235-245. [doi: [10.1097/HMR.0b013e31823dfe13](https://doi.org/10.1097/HMR.0b013e31823dfe13)] [Medline: [22261667](https://pubmed.ncbi.nlm.nih.gov/22261667/)]
16. Weech-Maldonado R, Lord J, Pradhan R, Davlyatov G, Dayama N, Gupta S, et al. High Medicaid nursing homes: organizational and market factors associated with financial performance. *Inquiry* 2019;56:46958018825061 [FREE Full text] [doi: [10.1177/0046958018825061](https://doi.org/10.1177/0046958018825061)] [Medline: [30739512](https://pubmed.ncbi.nlm.nih.gov/30739512/)]

17. Kim TH. Factors associated with financial distress of nonprofit hospitals. *Health Care Manag (Frederick)* 2010;29(1):52-62. [doi: [10.1097/HCM.0b013e3181cca2c5](https://doi.org/10.1097/HCM.0b013e3181cca2c5)] [Medline: [20145468](https://pubmed.ncbi.nlm.nih.gov/20145468/)]
18. Watanabe R, Nakanishi E, Haga K, Ono H, Muya M, Awamura K, et al. Factors that affect the estimated revenue of Kantaki services: multifunctional in-home long-term care in Japan. *Asian J Hum Serv* 2021;20:34-47 [FREE Full text] [doi: [10.14391/ajhs.20.34](https://doi.org/10.14391/ajhs.20.34)]
19. Lesure JD. Break-even analysis — a useful management tool in the lodging industry. *Int J Hosp Manag* 1983 Jan;2(3):115-120. [doi: [10.1016/0278-4319\(83\)90031-2](https://doi.org/10.1016/0278-4319(83)90031-2)]
20. O'Brien R. A Caution Regarding Rules of Thumb for Variance Inflation Factors. *Qual Quant* 2007 Mar 13;41(5):673-690. [doi: [10.1007/s11135-006-9018-6](https://doi.org/10.1007/s11135-006-9018-6)]
21. Karantzas GC, Mellor D, McCabe MP, Davison TE, Beaton P, Mrkic D. Intentions to quit work among care staff working in the aged care sector. *Gerontologist* 2012 Aug;52(4):506-516. [doi: [10.1093/geront/gnr161](https://doi.org/10.1093/geront/gnr161)] [Medline: [22399580](https://pubmed.ncbi.nlm.nih.gov/22399580/)]
22. Suzumura M, Fushiki Y, Kobayashi K, Oura A, Suzumura S, Yamashita M, et al. A prospective study of factors associated with risk of turnover among care workers in group homes for elderly individuals with dementia. *J Occup Health* 2013 Mar 19;55(6):487-494 [FREE Full text] [doi: [10.1539/joh.12-0265-oa](https://doi.org/10.1539/joh.12-0265-oa)] [Medline: [24162146](https://pubmed.ncbi.nlm.nih.gov/24162146/)]
23. Yamada A, Ishii K. Aging and wages of long-term care workers: a case study of Japan, 2002–2017. *Keizai Bunseki*. URL: <https://www.esri.cao.go.jp/jp/esri/archive/bun/bun202/bun202d.pdf> [accessed 2023-04-21]
24. Kango Syoukibo Takinougata Kyotaku Kaigo Jigyousyo No Unei Joukyou Tou Ni Kansuru Tyousa Kekka. Tokyo Metropolitan Government. 2018. URL: https://www.fukushihoken.metro.tokyo.lg.jp/kourei/hoken/kantakichousa.files/kantaki_chousakekka20181106.pdf [accessed 2023-04-21]
25. Japanese Nursing Association. 2021. URL: https://www.nurse.or.jp/nursing/zaitaku/kantaki/pdf/faq_management0509.pdf?ver=2 [accessed 2023-04-21]
26. Angelelli J, Gifford D, Shah A, Mor V. External threats and nursing home administrator turnover. *Health Care Manage Rev* 2001;26(3):52-62. [doi: [10.1097/00004010-200107000-00006](https://doi.org/10.1097/00004010-200107000-00006)] [Medline: [11482176](https://pubmed.ncbi.nlm.nih.gov/11482176/)]
27. Castle N. Administrator turnover and quality of care in nursing homes. *Gerontologist* 2001 Dec;41(6):757-767. [doi: [10.1093/geront/41.6.757](https://doi.org/10.1093/geront/41.6.757)] [Medline: [11723344](https://pubmed.ncbi.nlm.nih.gov/11723344/)]
28. Castle N, Lin M. Top management turnover and quality in nursing homes. *Health Care Manage Rev* 2010;35(2):161-174. [doi: [10.1097/HMR.0b013e3181c22bcb](https://doi.org/10.1097/HMR.0b013e3181c22bcb)] [Medline: [20234222](https://pubmed.ncbi.nlm.nih.gov/20234222/)]
29. Dong GN. Performing well in financial management and quality of care: evidence from hospital process measures for treatment of cardiovascular disease. *BMC Health Serv Res* 2015 Feb 01;15:45 [FREE Full text] [doi: [10.1186/s12913-015-0690-x](https://doi.org/10.1186/s12913-015-0690-x)] [Medline: [25638252](https://pubmed.ncbi.nlm.nih.gov/25638252/)]
30. Ahn M, Kwon HJ, Kang J. Supporting aging-in-place well: Findings from a cluster analysis of the reasons for aging-in-place and perceptions of well-being. *J Appl Gerontol* 2020 Jan;39(1):3-15. [doi: [10.1177/0733464817748779](https://doi.org/10.1177/0733464817748779)] [Medline: [29277156](https://pubmed.ncbi.nlm.nih.gov/29277156/)]

Abbreviations

LTC: long-term care

VIF: variance inflation factor

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Original Paper

WeChat-Based Intervention for Chinese Immigrants With Hypertension: Development and Evaluation Study

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Abstract

Background: Despite Chinese immigrants having a higher or comparable proportion of hypertension (HTN) compared to non-Hispanic White and Hispanic individuals, there are no effective technology-based intervention studies that target HTN management in Chinese immigrants in the United States.

Objective: The aim of this study was to develop and pilot-test the efficacy of a culturally and linguistically sensitive social media-based intervention (WeChat) for Chinese immigrants to improve blood pressure (BP) control, antihypertensive medication adherence, and self-efficacy.

Methods: The study was conducted in 2020 with a pre- and posttest design (N=20). A WeChat-based intervention was implemented using one 20-minute video presentation plus one 20-minute nurse counseling session via WeChat at the baseline, followed by 4 biweekly 20-minute nurse counseling sessions via WeChat calls. The primary outcome (BP control) and secondary outcomes, including medication adherence and self-efficacy in HTN management, were measured at baseline and at 6 months.

Results: The participants' mean age was 68.9 (SD 10.2; range: 51-86) years. The majority of the participants were female (n=13, 65%), had a high school degree or less (n=15, 75%), were married (n=16, 80%), not religious (n=13, 65%), and not employed (n=12, 60%). The results showed that the mean baseline systolic BP was 131.43 (SD 9.61) mmHg, and the mean diastolic BP was 79.79 (SD 9.62) mmHg. The 6-month outcome showed a reduction of systolic BP (-0.74, SD 9.18 mmHg; $P=.05$) and diastolic BP (-0.96, SD 6.92 mmHg; $P=.001$). The mean score for medication adherence at baseline was 4.50 (SD 1.70), and it significantly improved to 3.65 (SD 1.18) at 6 months (reversely scored; possible range was 1-5, with 1 being the best score; $P=.001$). Self-efficacy in HTN management had a trend in reduction from a baseline score of 8.28 (SD 1.25) decreasing to 7.93 (SD 1.48) at 6 months, with a mean difference of 0.34 (SD 2.02), with a score of 0 indicating the lowest self-efficacy and a score of 10 indicating the highest self-efficacy.

Conclusions: Our WeChat-based HTN management program showed a significant improvement in diastolic BP and medication adherence as well as a trend of reduction for systolic BP and self-efficacy in managing HTN in Chinese immigrants. Compared to the traditional health care system, the proposed WeChat-based HTN management program has a low cost and is easy to implement. Thus, further investigation is recommended to generate further results. This intervention should be tested across different regions and clinical settings to verify the findings. The long-term goal is to implement the intervention in clinical settings to help Chinese immigrants at large achieve better HTN management.

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KEYWORDS

social media; hypertension; medication adherence; Chinese immigrants; WeChat; blood pressure; BP

Introduction

Overview

The number one cause of premature morbidity and mortality in the United States is hypertension (HTN) [1,2]. Despite Chinese immigrants having a higher or comparable proportion of HTN (40%) compared to non-Hispanic White (38%) and Hispanic (40%) individuals [3-5] and being at high risk for HTN-related health complications, they are underrepresented in health-related research [6]. A recent study has found that technology-based HTN interventions, such as video presentations or home monitors, showed efficacy, were accepted, and had positive behavioral outcomes among Black and Hispanic populations [7,8]. However, despite being a part of the fastest-growing Asian ethnic population, there are no effective intervention studies that target HTN management in Chinese immigrants in the United States [7,8]. Furthermore, the existing technology-based HTN interventions lack culturally sensitive educational materials [7]. For example, due to dietary differences, the usual methods for restricting sodium intake and eating heart-healthy diets do not work well in Chinese immigrants. Instead, studies have found that substituting Chinese herbs or spices to reduce sodium intake may be a more effective intervention [9]. To address the gap in current HTN management interventions, which includes a lack of using technology and culturally sensitive approaches, this study implemented Chinese Medicine as Longevity Modality (CALM); CALM combined both methods, that is, technology-based and culturally sensitive components. The CALM intervention was initially developed by the first author (WWL) in 2015 [9]. In the first stage, an educational video on culturally sensitive management of HTN (eg, the use of Chinese herb and spices to replace excessive sodium intake) was developed. Subsequently, additional components were added in 2020 (for this pilot study), including the use of a storytelling video to exemplify how to culturally manage HTN and the use of a social media platform, WeChat, to interact with patients remotely on HTN management. With this 2-pronged approach, the WeChat-based CALM intervention aimed to improve blood pressure (BP) control (primary outcome) and other secondary outcomes, including medication adherence and self-efficacy. In this paper, the WeChat-based intervention will be used to refer to the WeChat-based CALM intervention.

WeChat is one of the most popular social networking media apps among Chinese immigrants. WeChat, installed on a smart phone, iPad, and computer or laptop, is an affordable method of delivering health-related information to a wide audience of Chinese immigrants. WeChat is one of the few social medial platforms that can be used when patients travel to China. Other popular social media platforms, such as Facebook, Messenger, LINE, and WhatsApp, cannot be used in China. For studies that need to follow up on Chinese participants traveling to China, WeChat is a realistic possibility.

Aims and Innovation

The specific aim was to test the feasibility and efficacy of the WeChat-based intervention in improving HTN control, medication adherence, and self-efficacy in managing HTN. If the WeChat intervention is found to be effective, it could

potentially be adapted to help Chinese immigrants improve their HTN management in broader clinical settings.

Methods

Procedure Overview

This study was conducted with a 1-group, pre- and posttest design. Data were collected via self-report questionnaires for demographic information, medication adherence, physical activities, and confidence in following the HTN regimen and salt intake. BP was also measured.

Ethics Approval

Institutional review board approval was obtained from San Francisco State University (X17-41).

Setting

Participants were recruited in 2020 from a low-income housing apartment complex for older adults subsidized by the US Housing and Urban Development Division. It is located near Chinatown in the San Francisco Bay Area. It serves approximately 200 older citizens, 80% of whom are Chinese immigrants.

Sample

A convenience sample of 20 Chinese immigrants with HTN was recruited from the aforementioned housing apartment complex for older adults. Inclusion criteria were the following: (1) self-identified as a Chinese immigrant aged 18 years and older; (2) having a diagnosis of HTN for at least one year; (3) having taken HTN medications for more than 1 month prior to study enrollment; and (4) being able to speak and read Chinese. Exclusion criteria were based on self-report, as follows: being medically unstable or having concurrent psychiatric problems.

Sample Size

The sample size (N=20) was determined based on the resources available in the study period and the study objectives, which aimed to pilot-test the intervention.

Measurements

All questionnaires, including demographic information, clinical factors, and medication adherence were administered using pencil and paper and completed by the study participants.

Descriptive Factors

Demographic factors were modified from the national guideline developed by the Centers for Disease and Control and Prevention [10]. Measurements of language and cultural factors, such as immigrant status and location of birth, were developed from our previous studies [10]. Duration of HTN diagnosis (in years) referred to the duration of time from the first diagnosis of HTN until the study interview [10].

Primary Outcome

BP measurement was the primary outcome. An Omron brand digital BP machine (code HEM-7201) was used to measure participants' BP following the standard processes identified by the Joint National Committee VII affiliated with National Heart,

Lung, and Blood Institute (). BP measurements were obtained twice. The values for systolic and diastolic BPs were averaged.

Secondary Outcomes

Measurement of Medication Adherence

The Medication Adherence Scale measures adherence to medication with 3 scales—whether patients missed, forgot, or were not careful about taking their medication [10]. A Likert scale ranging from “None of the time” to “All of the time” was used. The Cronbach α was .65 [10]. The total scores for the 3 scales were summed, ranging from 3 to 15. The lowest score (3) represented the best adherence, and the highest score (15) represented the poorest adherence (reverse scored).

Measurement of Self-Efficacy in Managing HTN

The Self-Efficacy in Managing Hypertension Scale measures patients' self-efficacy in managing their HTN through 6 items. A scale ranging from 1 (no self-efficacy) to 10 (highest self-efficacy) was used. The Cronbach α was .91 [10]. The total scores for the 6 items were summed, with a range of 6 to 60. The lowest score (6) represented the lowest efficacy, and the highest score (60) represented the highest efficacy.

Study Procedures

Before the study launch, 1 bilingual and bicultural intervention registered nurse (RN) was recruited and trained in the study procedures. The RN was able to speak 2 dialects of Chinese, including Mandarin and Cantonese, which were used to interview the study participants. This RN had extensive experience working in hospitals, which included previously working as a nursing assistant and working with Chinese patients. The RN was trained for 2 days by the principal investigator in the following areas: (1) basic HTN information, (2) pharmacological and nonpharmacological HTN treatment, (3) BP measurement following the Joint National Committee VII guideline, (4) interview and counseling techniques, and (5) practicing role playing for interviewing and counseling.

The intervention RN obtained a written consent indicating agreement to participate during the initial visit with the study participants. The participants then filled out self-reported questionnaires for sociodemographic and cultural data as well as a health and smoking history.

Once completed, the questionnaires were reviewed for completion by the RN. The RN then measured the participant's BP twice in a sitting position. As mentioned earlier, 2 readings were averaged and used as baseline data. If the 2 BP measurements differed by more than 5 mmHg, another BP measurement was taken. The average among the 3 measurements was recorded.

Additionally, participants viewed an educational and storytelling video (20 mins) via YouTube using a laptop provided by the research RN. The video was narrated by 4 Chinese immigrants sharing how they had a stroke because of uncontrolled HTN and how to prevent another episode of stroke by optimizing their BP control via practice using both Western (taking BP

medication regularly) and Chinese medicine (eg, acupuncture and doing Tai Chi). The details of video development were presented and published previously [9]. At the end of the video, the RN discussed strategies for HTN management, including common culturally specific barriers or solutions. For instance, if patients perceived herbs to be superior to Western drugs, the RN would discuss with them about why they thought herbs were superior, how to balance the intake of herbs and Western medications, and the importance of adherence to Western drugs. During the discussion, the RN assessed participants' lifestyles and suggested specific culturally congruent strategies to facilitate BP control via improvement of medication adherence, physical activity, weight change, and sodium intake. There was time for participants to ask questions and request clarification.

Follow-up sessions through both WeChat and in-person office visits were then scheduled by the RN. A total of 4 WeChat phone calls were scheduled for the intervention group at 2, 4, 6, and 8 weeks. These calls discussed issues relating to HTN management, such as medication adherence, physical activity, weight change, and sodium intake. At 3 months, participants came in for an office visit to measure their BP, and the RN assessed if they needed a referral to cardiology if their BP remained high. No intervention was given. Participants received a shopping bag as a token of appreciation for their time and effort for participating in the study. At 6 months, participants came in for a final office visit to conclude the study. The primary outcome (ie, BP control) and secondary outcomes, including medication adherence and self-efficacy in HTN management, were measured at 6 months. No intervention was given. Participants were given US \$40 gift cards as an appreciation for their time and effort.

Data Analysis

All data were analyzed using IBM SPSS Statistics (version 27; IBM Corp). Descriptive statistics were used to screen data for missing values and outliers and to describe the demographic and clinical variables. A paired sample *t* test (2-tailed) was used to examine the difference between pre- and postintervention in terms of change in BP and medication adherence. Statistical significance was set at .05.

Results

Sample Characteristics

Table 1 shows study participants' demographic, cultural, and clinical data. The mean age was 68.9 (SD 10.2; range 51-86) years. The majority of the participants were female (n=13, 65%), had less than (or) a high school degree (n=15, 75%), were married (n=16, 80%), not religious (n=13, 65%), and not employed (n=12, 60%). Participants had the following cultural and linguistic background: first-generation Chinese (n=17, 85%), born in Mainland China (n=17, 85%), and spoke Cantonese (n=15, 75%). The average number of years living in the United States was 20.9 (SD 13.6) years, ranging from 2 to 55 years. The average years of HTN diagnosis was 8.9 (SD 5.5) years, ranging from 3 to 22 years.

Table 1. Baseline characteristics of Chinese immigrants with hypertension (N=20).

Variables	Values
Age (years), mean (SD; range)	68.7 (10.2; 51-86)
Gender, n (%)	
Women	13 (65)
Men	7 (35)
Education, n (%)	
Primary school	4 (20)
Middle school	5 (25)
High school	6 (30)
Associate's degree	3 (15)
Bachelor's degree	1 (5)
Master's degree and above	1 (5)
Marital status, n (%)	
Married	16 (80)
Divorced or separated	1 (5)
Single	1 (5)
Widowed	1 (5)
Missing	1 (5)
Religion, n (%)	
None	13 (65)
Buddhism	3 (15)
Catholic	1 (5)
Christian	2 (10)
Missing	1 (5)
Are you living with your family or friends(s)? n (%)	
No	1 (5)
Yes	18 (90)
Missing	1 (5)
Employment, n (%)	
Retired	7 (35)
Part-time	1 (5)
Not employed	12 (60)
Generation, n (%)	
First generation	17 (85)
Second generation	3 (15)
Location of birth, n (%)	
Mainland China	15 (75)
Taiwan	2 (10)
Hong Kong	2 (10)
Other	1 (5)
Annual income (US \$), n (%)	
≤9999	12 (60)
10,000-99,999	3 (15)

Variables	Values
20,000-29,999	1 (5)
50,000-59,999	1 (5)
Refused to answer	3 (15)
Language used to communicate with doctor or nurse, n (%)	
Cantonese	15 (75)
Mandarin	5 (25)
Baseline BP ^a control rate (systolic BP<130 mmHg and diastolic BP<80 mmHg)	2 (10)

^aBP: blood pressure.

In terms of a response rate for the study participation, 29 participants were approached, and 20 were enrolled in the study, resulting in 69% (20/29) response rate. For those 9 participants who refused to take part in the study, the reasons were as follows: could not read Chinese (n=1); were not interested in the study (n=5); did not want to provide personal information, such as demographics (n=1); and were too busy to participate in several sessions of the interview process (n=2).

Change in Outcomes Over a 2-Month Period

Table 2 represents the BP changes over the duration of the study.

Table 2 shows that the mean baseline systolic BP was 131.43 (SD 9.61) mmHg, and the mean diastolic BP was 79.79 (SD 9.62) mmHg. The 6-month outcome showed a reduction of systolic BP (−0.74, SD 9.18 mmHg; $P=.05$) and diastolic BP (−0.96, SD 6.92 mmHg; $P=.001$). The mean score for medication adherence at baseline was 4.50 (SD 1.70), and it significantly improved to 3.65 (SD 1.18) at 6 months (reverse scored, with a possible range being 1-5 and 1 indicating the best score). Self-efficacy in HTN management had a trend in reduction from a baseline of 8.28 (SD 1.25) to 7.93 (SD 1.48) at 6 months, with a mean difference of 0.34 (SD 2.02). In this scale, a score of 0 represents the least efficacious, and a score of 10 indicates the most efficacious.

Table 2. Changes in outcomes over the 6-month period. Italicized P values are statistically significant.

Outcomes	Outcome change			
	Baseline, mean (SD)	6 months, mean (SD)	Mean difference (SD)	P value
Systolic blood pressure	131.43 (9.61)	130.68 (7.37)	−0.74 (9.18)	.05
Diastolic blood pressure	79.79 (9.62)	78.83 (7.94)	−0.96 (6.92)	.001
Medication adherence (reservedly scored)	4.50 (1.70)	3.65 (1.18)	0.85 (0.90)	.001
Self-efficacy in managing hypertension	8.28 (1.25)	7.93 (1.48)	0.34 (2.02)	.74

Discussion

Principal Findings

This study tested the efficacy of a culturally and linguistically sensitive social media-based intervention (WeChat) in Chinese immigrants with HTN to evaluate its efficacy in improving BP control and medication adherence. In a sample of 20 participants, the majority were first-generation, Cantonese-speaking female individuals born in mainland China.

The results revealed that our social media-based intervention led to a significant improvement in the primary outcomes, including systolic and diastolic BP, as well as the secondary outcome of medication adherence. There was no significant difference for the other secondary outcome, which was self-efficacy.

Comparison With Prior Work

The reduction in BP was significant but on a small scale both in our study and in the study by Bray et al [11] (−0.74 vs −5.4 mmHg for systolic BP and −0.96 vs −2.7 mmHg for diastolic BP). The consistent results may be due to similarities between

the 2 interventions (ie, our WeChat-based intervention and Bray et al's home BP intervention) and due to intervention simplicity and intensity.

Regarding intervention simplicity, we asked the participants to watch a video (20 mins) and engage in counseling (20 mins) with a nurse to individualize their self-management of HTN. The subsequent WeChat calls (5 mins/time) were simply to follow up with each participant to discuss any issues and solutions for their individualized self-management of HTN. Bray et al [11] asked participants to take an initial training session lasting 40-50 minutes on how to perform home BP monitoring, to transfer data electronically to the research office, and self-titrate BP medications. Accordingly, the research team followed up with each participant once per month for safety advice in the case of high and low BP readings via phone calls.

In terms of intervention intensity, our WeChat study had participants watch one 20-minute video plus a 20-minute counselling session for the initial visit followed by 4 WeChat calls (5 min/time). The total intervention time was 60 minutes. Bray et al [11] also implemented the initial visit for 40-50

minutes followed by a monthly phone call interaction for 12 months (estimated total intervention time: 100-110 mins).

In taking a detailed look, Bray et al's [11] participants showed slightly greater reductions in both systolic and diastolic BP compared to our study participants, which may be explained by the following factors: first, the longer duration of the study and the larger sample size could both contribute to a more accurate observation of BP changes. Bray et al [11] had a sample of 263 participants, and the study was conducted over 12 months. A systematic review on a randomized controlled trial for Asian American lifestyle interventions [8] also showed that half of the studies had a sample size of fewer than 100 subjects, which hindered the assessment of intervention effectiveness. Thus, our smaller sample size with a shorter period may hinder the efficacy of our WeChat-based intervention. Second, the higher baseline BP readings may exhibit greater improvement of BP that may be observed. For instance, Bray et al [11] recruited participants with a systolic BP 140 mmHg, while our study's average baseline systolic BP was 131.4 (SD 9.61) mmHg. The higher levels of baseline systolic BP [11] may explain why they observed more BP improvement in their study compared to our study.

Bove et al [12] had a larger-scale reduction in systolic BP (-18.2 mmHg). This study was conducted over a period of 4 years, with a sample of 241 participants. In addition, Bove et al [12] required patients to have a systolic BP 140 mmHg, the same requirement as Bray et al [11]. Our study did not have a requirement for average baseline systolic BP. The telemedicine intervention in Bove et al [12] was intense. They required patients to report their BP, heart rate, weight, steps per day, and tobacco use twice per week for the entire 6-month follow-up period. They also used an automated system that would send a message to patients when systolic BP was more than 140 mmHg, and a nurse would reach out to patients who did not send reports for 2 weeks to provide motivation. On the other hand, both Bray et al [11] and our study only involved minimal labor. In sum, the comparisons among Bove et al's study [12], Bray et al's study [11] and our study demonstrated that a longer length of follow-up, a larger sample, a more intensive intervention, and the requirement of participant's systolic BP to be over 140mmHg may generate a larger effect in improving BP. However, future researchers are advised to balance the intensity of an intervention and its impact on outcomes. An intensive intervention is hard to carry out over the long term; thus, participants' adherence to the treatment regimen can be significantly compromised. In addition, an intensive intervention also requires much more labor, which may not be economically efficient. It is recommended that future studies include participants with systolic BP over 140 mmHg to gain the most benefit of a telemedicine intervention on HTN management.

In terms of medication adherence (a secondary outcome), our study showed significant improvements in adherence at 6 months, but the Bove et al's [12] study showed no significant change at 6 months in their general US population. This could be due to our individualized and culturally sensitive counseling sessions implemented by our bicultural and bilingual RN. During the counseling sessions, the RN discussed the importance of medication adherence and its potential challenges. The most

common scenario was that participants addressed their concerns about not taking their medication daily. The RN would then advise them to associate their medication taking with ritual routine activities. For instance, for those who use incense to pray to their ancestors or God, they were advised to put the medications next to the incense. This advice was appreciated by our participants.

In terms of the other secondary outcome, self-efficacy, our study did not show improvement (mean 8.28, SD 1.25) at baseline and at 6 months (mean 7.93, SD 1.48; $P=.74$). Similarly, Fors et al's [13] trial did not find significant improvements in self-efficacy in participants with chronic pulmonary disease or heart failure at the 6-month follow-up after their telemedicine intervention. Self-efficacy is the patient's belief in their ability to accomplish behavior change. As such, the longer the time in between patient education and follow-up, the less likely the patient will be confident in their own abilities of self-management. In a study to determine what works and what does not work in self-management strategies for patients with chronic pain, it was found that the continuous effort to self-manage chronic pain was arduous, and motivation decreased over time [14]. Neither Fors et al's [13] study nor our study provided intermittent, close follow-ups after the intervention. For example, in Fors et al [13], patients received 1 telephone call 1-4 weeks after their discharge date. In our intervention, patients received 4 calls every other week for 2 months. At the 6-month follow-up, it had been 4 months since the last intervention, which could explain the slight reduction in self-efficacy. Given this, future studies should investigate whether intermittent support, such as booster sessions and support groups (eg, every month), can help improve self-efficacy.

Limitations

The limitations of this study include a small sample size, a relatively short intervention duration (6 months), and a narrow age range for participants (ranging from 51-86 years) instead of our target age range of 18 years and older. Despite these limitations, our study showed significant improvement in BP and medication adherence. However, it is anticipated that if the study had a longer duration, a larger sample size, and the requirement of systolic BP over 140 mmHg as eligibility criteria, the data could show more significant improvement in both primary (BP control) and secondary outcomes (medication adherence and self-efficacy). Another limitation is that our secondary outcomes, including medication adherence and self-efficacy, were self-reported. Thus, there may be self-report bias. In the future, other objective measures, such as pill counts, may be used to verify the data. Given our narrow age range of 51-85 years, the results of our pilot study should be carefully interpreted and applied to a future larger-scale study. For instance, since our sample did not include any adults aged 18-50 years (younger adults), the efficacy of the proposed WeChat-based intervention in medication adherence may be different from that in adults aged 51 years and older. Younger adults have their life priority in working extensively to make earnings and taking care of young children; thus, their medication adherence may be more compromised. Therefore, it is advised that for future studies, a study design and

implementation be carefully discussed with experts who are very familiar with studying and taking care of younger adult patients (eg, 18-50 years).

Conclusions

The WeChat-based HTN management program found a significant improvement in BP and medication adherence. Compared to a traditional health care model (eg, a team of a doctor, a nurse, a medical assistant, and a receptionist), the proposed WeChat-based HTN management program simply requires a 20-minute video viewing by patients on their own and another 10-20 minutes counseling with a nurse for an initial visit. For subsequent follow-up visits, in most cases, only a 5-minute phone or video chat was necessary. Thus, the intervention is of low cost and easy to implement. Further investigation is recommended to generate more robust results with a larger sample size and a longer follow-up period. In addition, the intervention should be culturally sensitive to the study population to generate clinically meaningful results. Furthermore, patients with a higher reading of BP (eg, systolic BP \geq 140 mmHg) should be given higher priority for HTN

management to prevent further serious complications, such as a stroke.

Implications for Clinical Practice

This social media-based program is a low-cost and easy-to-establish intervention that can be further tested to establish more robust findings, which in turn can help with HTN management in Chinese immigrants. Due to the high rates of HTN in Chinese immigrants in the United States, this intervention could be effective controlling BP. In addition, because of its easy-to-establish nature, this intervention can potentially be applicable to other chronic diseases that share similarities with HTN, such as diabetes. However, it is important to note that the interventions should be managed by researchers and practitioners who are familiar with the cultural and linguistic backgrounds of the target population to generate the best outcomes for the patients through culturally sensitive care. Furthermore, this intervention should be further tested across different regions and clinical settings to establish more robust results. The long-term goal is that the intervention is implemented in clinical settings to help Chinese immigrants at large achieve better HTN management.

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Conflicts of Interest

None declared.

References

- Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, Joint National Committee on Prevention, Detection, Evaluation, Treatment of High Blood Pressure. National Heart, Lung, Blood Institute, National High Blood Pressure Education Program Coordinating Committee. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. *Hypertension* 2003 Dec;42(6):1206-1252. [doi: [10.1161/01.HYP.0000107251.49515.c2](https://doi.org/10.1161/01.HYP.0000107251.49515.c2)] [Medline: [14656957](https://pubmed.ncbi.nlm.nih.gov/14656957/)]
- Benjamin EJ. Correction to: Heart disease and stroke statistics—2017 update: a report from the American Heart Association. *Circulation* 2017 Mar 07;135(10):e646. [doi: [10.1161/cir.0000000000000491](https://doi.org/10.1161/cir.0000000000000491)]
- Sheng C, Liu M, Kang Y, Wei F, Zhang L, Li G, et al. Prevalence, awareness, treatment and control of hypertension in elderly Chinese. *Hypertens Res* 2013 Sep 13;36(9):824-828. [doi: [10.1038/hr.2013.57](https://doi.org/10.1038/hr.2013.57)] [Medline: [23759756](https://pubmed.ncbi.nlm.nih.gov/23759756/)]
- Chen M, Hu J. Health disparities in Chinese Americans with hypertension: a review. *Int J Nurs* 2014 Sep;1(3):318-322. [doi: [10.1016/j.ijnss.2014.07.002](https://doi.org/10.1016/j.ijnss.2014.07.002)]
- Kramer H, Han C, Post W, Goff D, Diez-Roux A, Cooper R, et al. Racial/ethnic differences in hypertension and hypertension treatment and control in the multi-ethnic study of atherosclerosis (MESA). *Am J Hypertens* 2004 Oct;17(10):963-970. [doi: [10.1016/j.amjhyper.2004.06.001](https://doi.org/10.1016/j.amjhyper.2004.06.001)] [Medline: [15485761](https://pubmed.ncbi.nlm.nih.gov/15485761/)]
- Hooper K, Batalova J. Chinese Immigrants in the United States. 2015. URL: <https://www.migrationpolicy.org/article/chinese-immigrants-united-states--2013> [accessed 2023-07-14]
- Li WW, Lai WS. [The Use of Telemedicine Interventions to Improve Hypertension Management Among Racial Ethnic Minorities: A Systematic Review]. *Hu Li Za Zhi* 2016 Aug;63(4):25-34. [doi: [10.6224/JN.63.4.25](https://doi.org/10.6224/JN.63.4.25)] [Medline: [27492293](https://pubmed.ncbi.nlm.nih.gov/27492293/)]
- Bender MS, Choi J, Won GY, Fukuoka Y. Randomized controlled trial lifestyle interventions for Asian Americans: a systematic review. *Prev Med* 2014 Oct;67:171-181 [FREE Full text] [doi: [10.1016/j.ypmed.2014.07.034](https://doi.org/10.1016/j.ypmed.2014.07.034)] [Medline: [25086326](https://pubmed.ncbi.nlm.nih.gov/25086326/)]
- Li WW, Gomez CA, Tam JWY. Pilot test of a culturally sensitive hypertension management intervention protocol for older Chinese immigrants: Chinese medicine as longevity modality. *Comput Inform Nurs* 2015 Nov;33(11):495-501. [doi: [10.1097/CIN.000000000000195](https://doi.org/10.1097/CIN.000000000000195)] [Medline: [26571335](https://pubmed.ncbi.nlm.nih.gov/26571335/)]

10. Li WW, Stewart AL, Stotts NA, Froelicher ES. Cultural factors and medication compliance in Chinese immigrants who are taking antihypertensive medications: instrument development. *J Nurs Meas* 2005 Dec 01;13(3):231-252. [doi: [10.1891/jnum.13.3.231](https://doi.org/10.1891/jnum.13.3.231)] [Medline: [16605045](https://pubmed.ncbi.nlm.nih.gov/16605045/)]
11. Bray EP, Jones MI, Banting M, Greenfield S, Hobbs FDR, Little P, et al. Performance and persistence of a blood pressure self-management intervention: telemonitoring and self-management in hypertension (TASMINH2) trial. *J Hum Hypertens* 2015 Jul 08;29(7):436-441. [doi: [10.1038/jhh.2014.108](https://doi.org/10.1038/jhh.2014.108)] [Medline: [25566874](https://pubmed.ncbi.nlm.nih.gov/25566874/)]
12. Bove AA, Homko CJ, Santamore WP, Kashem M, Kerper M, Elliott DJ. Managing hypertension in urban underserved subjects using telemedicine--a clinical trial. *Am Heart J* 2013 Apr;165(4):615-621. [doi: [10.1016/j.ahj.2013.01.004](https://doi.org/10.1016/j.ahj.2013.01.004)] [Medline: [23537980](https://pubmed.ncbi.nlm.nih.gov/23537980/)]
13. Fors A, Blanck E, Ali L, Ekberg-Jansson A, Fu M, Lindström Kjellberg I, et al. Effects of a person-centred telephone-support in patients with chronic obstructive pulmonary disease and/or chronic heart failure - A randomized controlled trial. *PLoS One* 2018;13(8):e0203031 [FREE Full text] [doi: [10.1371/journal.pone.0203031](https://doi.org/10.1371/journal.pone.0203031)] [Medline: [30169539](https://pubmed.ncbi.nlm.nih.gov/30169539/)]
14. Devan H, Hale L, Hempel D, Saipe B, Perry MA. What works and does not work in a self-management intervention for people with chronic pain? Qualitative systematic review and meta-synthesis. *Phys Ther* 2018 May 01;98(5):381-397. [doi: [10.1093/ptj/pzy029](https://doi.org/10.1093/ptj/pzy029)] [Medline: [29669089](https://pubmed.ncbi.nlm.nih.gov/29669089/)]

Abbreviations

BP: blood pressure

CALM: Chinese Medicine as Longevity Modality

HTN: hypertension

RN: registered nurse

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Original Paper

The Association Between Korean American Nurse and Primary Care Provider Burnout, Areas of Worklife, and Perceptions of Pandemic Experience: Cross-sectional Study

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Abstract

Background: Korean immigrants are among the fastest-growing ethnic minority groups and make up the fifth-largest Asian group in the United States. A better understanding of the work environment factors and its impact on Korean American nurse and primary care provider (PCP) burnout may guide the development of targeted strategies to help mitigate burnout and workplace stressors, which is critical for the retention of Korean American nurses and PCPs to promote better alignment of national demographic trends and meet patients' preference for cultural congruence with their health care providers (HCPs). Although there is a growing number of studies on HCP burnout, a limited number of studies specifically focus on the experience of ethnic minority HCPs, particularly during the COVID-19 pandemic.

Objective: In light of these gaps in literature, the aim of this study was to assess burnout among Korean American HCPs and to identify work conditions during a pandemic that may be associated with Korean American nurse and PCP burnout.

Methods: A total of 184 Korean American HCPs (registered nurses [RNs]: n=97; PCPs: n=87) practicing in Southern California responded to a web-based survey between February and April 2021. The Maslach Burnout Inventory, Areas of Worklife Survey, and Pandemic Experience & Perceptions Survey were used to measure burnout and work environment factors during the pandemic. A multivariate linear regression analysis was used to assess work environment factors associated with the 3 subcategories of burnout.

Results: No significant differences were found in the level of burnout experienced by Korean American nurses and PCPs. For RNs, greater workload ($P<.001$), lower resource availability ($P=.04$), and higher risk perception ($P=.02$) were associated with higher emotional exhaustion. Greater workload was also associated with higher depersonalization ($P=.003$), whereas a greater (professional) community ($P=.03$) and higher risk perception ($P=.006$) were associated with higher personal accomplishment. For PCPs, greater workload and poor work-life balance were associated with higher emotional exhaustion (workload: $P<.001$; worklife: $P=.005$) and depersonalization (workload: $P=.01$; worklife: $P<.001$), whereas only reward was associated with personal accomplishment ($P=.006$).

Conclusions: Findings from this study underscore the importance of strategies to promote a healthy work environment across multiple levels that recognize demographic variation among Korean American RNs and PCPs, potentially influencing their burnout mitigation needs. A growing recognition of identity-informed burnout experiences across frontline Korean American RNs and PCPs argues for future explorations that capture nuance both across and within this and other ethnic minority nurse and

PCP groups. By recognizing and capturing these variations, we may better support the creation of targeted, burnout-mitigating strategies for all.

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KEYWORDS

Korean American; registered nurses; primary care providers; burnout; pandemic; work environment

Introduction

Background

Even before the COVID-19 pandemic, 35% to 45% of nurses and 40% to 54% of physicians in the United States reported experiencing burnout [1-5]. Higher levels of burnout have been linked to lower job satisfaction and higher job turnover, as well as increased medical errors, poor patient health outcomes, and lower patient satisfaction scores [3,6-8]. Burnout may also threaten clinicians' own health over the long term [9,10].

Updating the Quadruple Aim

The triple aim, which sought to enhance patient experience and improve population health while reducing costs, was expanded to the quadruple aim, recognizing the critical threat of burnout among health care providers (HCPs) [11]. Most recently, a proposed "quintuple aim" suggests that the future of health care involves the early recognition and mitigation of health disparities [12]. This push, as well as emergent work on differential experiences of burnout among providers of color [13], argues for an expanded and nuanced view of HCP burnout that is contextualized within their cultural, racial/ethnic, and other socially informed or self-selected group memberships, such as the Korean American HCP group who often gets lumped with other Asian American groups [14], despite being one of the largest and fastest-growing Asian American groups.

A Growing Need for Korean American Providers

In 2020, approximately 24 million US residents self-identified as Asian. Of these 24 million US residents, approximately 1.9 million self-identified as Korean [15]. Korean immigrants are among the fastest-growing ethnic minority groups and make up the fifth-largest Asian group in the United States [16].

Studies across the health care literature have demonstrated that ethnic minority adults, including Korean American individuals, display a preference for providers from their background, those able to speak their native language, and who are familiar with historical challenges to accessing needed service [17]. Given this preference for cultural congruence, the need for Korean American HCPs has never been greater and is growing in alignment with demographic trends nationally [17]. Critical to the retention of Korean American HCPs is an understanding of what factors burn them out, potentially impacting their longevity in the field.

Impact of Discrimination on Korean American Provider Well-being During COVID-19

Discrimination, bullying, and incivility, especially in the workplace, undermine the culture of safety for both HCPs and patients alike. As such, in 2018, the Joint Commission has issued

a Sentinel Event Alert on the physical and verbal violence against health care workers [18]. Numerous studies have found that mistreatment and discrimination toward HCPs are associated with higher levels of HCP burnout [19,20]. Additionally, a study on North American Asian HCPs and their experiences of discrimination during the COVID-19 pandemic demonstrated a surge of microaggressions related to the pandemic and a lack of institutional and public acknowledgment of the issue [21].

Aspects of the Work Environment Impacting Burnout

The Job Demands-Resources Theory suggests that job strain occurs when there is a mismatch between the demands placed on an individual and their ability to meet those demands [22-24]. It considers a wide range of both positive and negative work environment factors with indicators of employee well-being. Hence, burnout is often the result of high job demands including heavy workload, role ambiguity, role conflict, role stress, stressful events, and work pressure, among others [22-24]. As such, work environment factors such as work process inefficiencies; excessive workloads; organizational climate factors; and deterioration in control, autonomy, and meaning at work have been associated with burnout among physicians and nurses [1,5,25-28].

Aim of the Study

Although there is a growing number of studies on HCP burnout, a limited number of studies specifically focus on the experience of ethnic minority HCPs, particularly during the COVID-19 pandemic. A better understanding of the work environment factors that cause a mismatch between the demands placed on the HCPs and their ability to meet those demands leading to burnout may guide the development of targeted strategies to help mitigate HCP burnout. In light of these gaps in literature, the aim of this study was to assess burnout among Korean American HCPs and to identify work conditions during a pandemic that may be associated with Korean American nurse and primary care provider (PCP) burnout.

Methods

Study Population and Recruitment

Registered nurses (RNs), nurse practitioners (NPs), Doctors of Medicine (MDs), and physician assistants (PAs) who provide direct patient care in Southern California were eligible to participate. The participants were grouped into RNs or PCPs (NPs, MDs, and PAs) based on their scope of practice. The decision to organize providers into these groups was informed by previous studies, which have shown that burnout levels are impacted by specific patient care tasks performed by different members of the health care team [29,30]. Although NPs are also RNs, they were grouped with PCPs since their scope of practice

more closely aligns with PCPs, including but not limited to diagnosing patient conditions, initiating or managing medical treatment, and prescribing medications or nonpharmacologic treatments [31].

Recruitment methods included the distribution of an informational flyer (in English) via email to approximately 196 RN and NP members of the Korean American Nurses Association of Southern California and approximately 4440 Korean American PCPs (MDs and PAs) within the Seoul Medical Group, Independent Practitioner Association; 200 members of the Korean American Medical Association of Southern California; and 40 members of the Korean American Graduate Medical Association. Recruitment fliers (in English) were also used as an advertisement through the social media platforms Facebook, Instagram, and KakaoTalk. Additional participants were referred to the study via word of mouth from participants of the study.

Measures

Demographic and Employment Information

Demographic information included participant gender, age (in years), education level, professional degree, tenure (years of work experience), work setting (acute care hospital or medical center vs ambulatory or outpatient care setting vs skilled nursing facility vs both acute care and another setting vs other), and marital status.

Burnout

The Maslach Burnout Inventory–Human Services Survey (MBI-HSS) was found to be valid and reliable in previous studies evaluating employee burnout [32]. The MBI-HSS includes 22 items and 3 subscales (emotional exhaustion=9 items, depersonalization=5 items, and personal accomplishment=8 items). Response options for each of the 9 items ranged from “never” (0) to “everyday” (6) with a total possible average score ranging from 0-6.

Areas of Worklife

The Areas of Worklife Survey (AWS) is a survey created to assess employees’ perceptions of work setting qualities that play a role in whether they experience work engagement or burnout. These work setting qualities include workload (amount of work), control (opportunity to make choices and decisions, solve problems, and contribute to the fulfillment of responsibilities), reward (recognition—financial and social—for contributions on the job), community (organization’s social environment or communities characterized by support, collaboration, and positive feelings), fairness (extent to which the organization has consistent and equitable rules for everyone), and values (what is important to the organization and to its members) [33]. A mismatch between an individual and their perceptions of the work setting may lead to emotional exhaustion, cynicism, and inefficacy of burnout, whereas a match would indicate higher engagement with one’s work [33]. The AWS has been used in conjunction with the MBI to assess the work environment factors associated with burnout and has demonstrated reliability and validity across a variety of occupational settings [33]. The AWS includes 28 items and 6

subscales (workload=5 items, control=4 items, reward=4 items, community=5 items, fairness=6 items, and values=4 items), measured on a 5 - point Likert scale, rated from 1 (strongly disagree) to 5 (strongly agree).

Pandemic Experience and Perceptions

The Pandemic Experience & Perceptions Survey (PEPS) assesses the perception of work settings specifically during pandemics, such as COVID-19, that impacts the way people work, with potential implications for employees’ health, well-being, and work engagement [34]. The survey includes a total of 35 items and 6 subscales (impact=3 items, resources=5 items, risk perception=7 items, worklife=7 items, leadership=12 items, and work setting=1 item). For the purposes of this study, only 23 items from the PEPS were included: items 4-8 (resources: rated on a 1-5 scale ranging from “completely inadequate” to “completely adequate”), items 9-14 (risk perception: rated on a 1-5 scale ranging from “no risk at all” to “life-threatening risk”), items 16-22 (worklife: rated on a 1-5 scale ranging from “strongly disagree” to “strongly agree”), and items 23-27 (leadership: rated on a 1-5 scale ranging from “not at all” to “frequently, if not always”).

Data Collection

Data were collected on the web between February and April 2021, using the REDCap (Research Electronic Data Capture; Vanderbilt University) system. Participants completed the electronic survey, which includes items from the demographic questionnaire, MBI-HSS, AWS, and PEPS. Each participant was assigned a unique record ID number automatically by REDCap upon the completion of the survey. The only identifiable data record linking the participant to the record ID number was their email address. The principal investigator reviewed all data collection forms on an ongoing basis for data completeness, duplication, and accuracy as well as protocol compliance.

Statistical Analysis

Univariate analysis included descriptive statistics used to analyze participant demographics, levels of burnout, areas of worklife, and pandemic experience and perception. To assess for differences between RNs and PCPs, 2-tailed *t* tests were used for continuous variables and chi-square analyses were used for categorical variables. Bivariate Pearson correlation analysis was used to explore statistically significant factors associated with the 3 subcategories of burnout. All results with $P < .05$ were included in the multivariate linear regression analysis using the backward elimination method, to develop the most parsimonious final model to assess for factors associated with the 3 subcategories of burnout. All analysis was conducted using SPSS statistical software (version 24; IBM Corp).

Ethics Approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Cedars Sinai Medical Center (STUDY00000931; approved on August 27, 2020). Informed consent was obtained from all individual participants included in the study.

Results

Univariate Analysis Results: Participant Demographics, Burnout, Areas of Worklife, and Pandemic Experience and Perceptions

Table 1 describes responses from 184 Korean American HCPs (RNs: n=97; PCPs: n=87). Most of the participants were female (RNs: 76/97, 78%; PCPs: 72/87, 83%) and married (RNs: 59/97, 61%, PCPs: 58/87, 67%). The average age was 38.9 (SD 9.9) years for RNs and 41.5 (SD 9.8) years for PCPs. A majority of RNs (63/97, 65%) reported working in acute care settings with average of 4.6 years of work experience, whereas a majority of

PCPs (62/87, 71%) reported working in ambulatory or outpatient care settings with an average of 5.3 years of work experience. Although no statistically significant differences were seen in emotional exhaustion ($P=.85$) or depersonalization ($P=.52$) between the 2 HCP groups, PCPs reported statistically significant higher levels of personal accomplishment ($P=.03$). There were also no significant differences in their perceptions of workload ($P=.99$), control ($P=.33$), community ($P=.84$), fairness ($P=.30$), value ($P=.86$), worklife ($P=.10$), and leadership ($P=.08$); however, significant differences were noted in reward ($P<.001$), resource availability ($P=.03$), and risk perception ($P=.02$).

Table 1. Univariate analysis: participant demographics, burnout, areas of worklife, and pandemic experience and perceptions.

Variable	RN ^a (n=97)	PCP ^b (n=87)	P value
Gender, n (%)			.45
Female	76 (78)	72 (83)	
Male	21 (22)	15 (17)	
Age (years), mean (SD)	38.9 (9.9)	41.5 (9.8)	.08
Education, n (%)			<.001
Associate's degree	12 (12)	0 (0)	
Bachelor's degree	68 (70)	2 (2)	
Master's degree	17 (18)	66 (76)	
PhD ^c , MD ^d , or other doctoral degree	0 (0)	19 (22)	
Marital status, n (%)^e			.69
Divorced	1 (1)	0 (0)	
Married	59 (61)	58 (67)	
Single	36 (37)	28 (32)	
Widowed	1 (1)	1 (1)	
Work experience or tenure (years), mean (SD)	4.6 (3.9)	5.3 (6.5)	.68
Work setting, n (%)^e			<.001
Acute care hospital or medical center	63 (65)	19 (22)	
Ambulatory or outpatient care setting	20 (21)	62 (71)	
SNF ^f	8 (8)	0 (0)	
Both (acute and ambulatory or SNF)	0 (0)	6 (7)	
Other (eg, public health or academic)	6 (6)	0 (0)	
Burnout (0-6 scale), mean (SD)			
Emotional exhaustion	3.2 (1.4)	3.3 (1.4)	.85
Depersonalization	2.2 (1.3)	2.3 (1.4)	.52
Personal accomplishment	3.9 (1.0)	4.2 (1.0)	.03
Areas of worklife (1-5 scale), mean (SD)			
Workload	3.2 (0.7)	3.2 (0.7)	.99
Control	3.6 (0.7)	3.7 (0.9)	.33
Reward	2.6 (0.6)	2.9 (0.6)	<.001
Community	3.6 (0.6)	3.6 (0.7)	.84
Fairness	3.0 (0.7)	3.1 (0.7)	.30
Value	3.5 (0.7)	3.5 (0.8)	.86
Pandemic experience and perceptions (1-5 scale), mean (SD)			
Resource availability	3.6 (0.9)	3.9 (0.8)	.03
Risk perception	2.6 (0.5)	2.4 (0.5)	.02
Worklife	3.4 (0.7)	3.6 (0.7)	.10
Leadership	3.3 (0.9)	3.5 (0.8)	.08

^aRN: registered nurse.^bPCP: primary care provider.^cPhD: Doctor of Philosophy.^dMD: Doctor of Medicine.^eData may not add up to 100% due to rounding.

^fSNF: skilled nursing facility.

Bivariate Pearson Correlation Analysis Results (RN Versus PCP): Association Between Burnout, Areas of Worklife, and Pandemic Experiences and Perceptions

Multimedia Appendix 1 describes the statistically significant factors associated with the 3 subcategories of burnout. The variables found to be statistically significant ($P < .05$) were entered into the multivariate linear regression models.

Multivariate Linear Regression Analysis Results: Association Between Areas of Worklife, Pandemic Experience and Perceptions, and Burnout

Table 2 describes the statistically significant areas of worklife and pandemic experience and perceptions factors associated

with the 3 subcategories of burnout. For RNs, greater workload ($P < .001$), lower resource availability ($P = .04$), and higher risk perception ($P = .02$) were associated with higher emotional exhaustion. Greater workload was also associated with higher depersonalization ($P = .003$), whereas a greater (professional) community ($P = .03$) and higher risk perception ($P = .006$) were associated with higher personal accomplishment. For PCPs, greater workload ($P < .001$) and poor work-life balance ($P = .005$) were associated with higher emotional exhaustion (workload: $P < .001$; worklife: $P = .005$) and depersonalization (workload: $P = .01$; worklife: $P < .001$), whereas only reward was associated with personal accomplishment ($P = .006$).

Table 2. Multivariate linear regression analysis: association between areas of worklife, pandemic experience and perceptions, and burnout^a.

Burnout subcategory, associated factor	RN ^b (n=97)			PCP ^c (n=87)		
	Estimate (SE)	95% CI	P value	Estimate (SE)	95% CI	P value
Emotional exhaustion (RN: adjusted $R^2 = .321$; PCP: adjusted $R^2 = .303$)						
Workload	.344 (.189)	.319 to .065	<.001	.424 (.183)	.453 to 1.179	<.001
Reward	-.195 (.225)	-.882 to .012	.06	— ^d	—	—
Resource availability	-.236 (.176)	-.714 to -.016	.04	—	—	—
Risk perception	.218 (.219)	.102 to .973	.02	—	—	—
Worklife	.217 (.234)	-.030 to -.898	.07	-.273 (.189)	-.920 to -.169	.005
Depersonalization (RN: adjusted $R^2 = .069$; PCP: adjusted $R^2 = .311$)						
Workload	.302 (.187)	.207 to .948	.003	.208 (.197)	.013 to .798	.01
Worklife	—	—	—	-.379 (.204)	-1.172 to -.360	<.000
Personal accomplishment (RN: adjusted $R^2 = .134$; PCP: adjusted $R^2 = .195$)						
Reward	—	—	—	.301 (.183)	.151 to .879	.006
Community	.246 (.181)	.049 to .769	.03	—	—	—
Value	.199 (.155)	-.031 to .586	.08	—	—	—
Risk perception	.269 (.175)	.144 to .837	.006	—	—	—
Worklife	—	—	—	.205 (.154)	-.011 to .601	.06

^aOnly the factors remaining in the final backward elimination model are shown in the table.

^bRN: registered nurse.

^cPCP: primary care provider.

^dNot applicable.

Discussion

Principal Findings

This study identified several aspects of the work environment associated with burnout for Korean American RNs and PCPs. As mentioned previously, the Job Demands-Resources Theory states that job demands such as heavy workload contribute to HCP burnout, whereas job resources, such as resource availability and social support, as well as recognition (reward) from peers and supervisors, contribute to professional well-being [22-24], which our findings support.

Korean American RNs

Higher workload was associated with higher emotional exhaustion and depersonalization for RNs. With higher workloads come increased nurse encounters with patients and their caregivers and families, which may potentiate higher levels of emotional exhaustion and depersonalization. This may be particularly related to “emotional dirty work,” including diffusing charged patient interactions and other nuanced components of nursing tasks [35-37].

Emotionally draining or contentious interactions with patients’ families changed for nursing staff in the era of COVID-19.

Although many hospitals sought to limit the number of visitors, nurses had to find creative ways to support patient-family interactions through phone- or web-based platforms [38]. Additionally, increased physical barriers were created by personal protective equipment (PPE), which limited the visibility of nurses' facial expressions and discouraged other means of nonverbal shows of support, such as casual touching [39,40], thus creating additional communication barriers.

Furthermore, many nurses themselves were dealing with increased patient assignments from their coworkers calling in sick or from dealing with childcare or other issues resulting from the pandemic. This may possibly provide additional context for how our participants interpreted the concept of "workload."

Higher risk perception and lower resource availability were also associated with higher emotional exhaustion, which has also been shown in other studies [41,42]. The critical shortage of N95 masks and other PPEs at the beginning of the pandemic, as well as risk perception including concerns of transmitting COVID-19 to their families or communities, may have contributed to the higher RN emotional exhaustion.

Our findings also show that a greater sense of community is associated with higher personal accomplishment for Korean American RNs, which may help mitigate the negative effects of burnout. In a highly hierarchy-oriented culture, wherein someone's role in the organization determines their "status," established rules (often related to age) may prevent younger (or novice) employees from approaching older, high-status employees for guidance and support, and younger employees may be more susceptible to workplace bullying [43]. Despite some modern shifts, perceived or actual traditional hierarchies within Korean culture often pervade the workplace [43]. Particularly among Korean American nurses in our study, the appreciation for nursing communities may be due to the ability of these groups to challenge hierarchy by creating safe spaces for nurses of all backgrounds and experience levels.

Another interesting finding from this study was the association between higher risk perception and higher personal accomplishment. The association between higher risk perception and higher emotion exhaustion is often a common finding across studies [41,42]; however, the link between higher risk perception and higher personal accomplishment is unexpected. A potential explanation may be that despite the high risks, nurses' ability to commit to patients on the front lines during the COVID-19 pandemic may have instilled a higher sense of personal accomplishment for the participants of this study.

Korean American PCPs

For PCPS, higher workload and poor sense of worklife were associated with higher emotional exhaustion and depersonalization, whereas higher reward or recognition was associated with personal accomplishment. PCPs may feel particularly vulnerable to higher emotional exhaustion and depersonalization, reflecting a high volume of patient encounters associated with the heightened need for and concurrent deficit of independent practitioners during the COVID-19 pandemic [44]. For providers and ancillary staff, it is also possible that the effects of the "great resignation," a social phenomenon

wherein a large number of employees left their job in 2021, may have exacerbated certain negative aspects of insufficient nonclinical support staff. Specifically, about 25% of Asian adults in a study conducted by the Pew Research Center reported quitting a job in 2021, compared with 17% of White adults, which may possibly have impacted the clinical environment in which these Korean American PCPs practiced [45].

Reward, which is also conceptualized as financial and social recognition for contributions on the job [33], was associated with higher personal accomplishment for the Korean American PCPs in this study. A sense of personal accomplishment may be achieved through a validation of one's work or effort from their colleagues or certifications, awards, presentation opportunities, and promotions within the health care organization or professional organizations.

Similar to nurses, physicians have been recognized and hailed as health care "heroes" throughout the pandemic for their selfless acts and bravery. Although these PCPs certainly deserve much praise and attention, they deserve recognition in a way that is meaningful and enhances a sense of value to them. For instance, the "7 PM applause for health care heroes" initiative across the nation was a good way to show appreciation initially; however, it is not a sustainable strategy, nor does it address the underlying issue of HCP burnout. Furthermore, the term "health care heroes" masks the normalization of PCPs' risk of exposure to the virus [46] and other ongoing emotional, psychological, and ethical issues associated with both the COVID-19 and burnout pandemics. An ongoing organization culture of recognition comprised of both personal praise with formal recognition and including multiple platforms for giving and receiving recognition may be the optimal solution for all HCPs.

Implications

Professional Organizations

Nursing organizations such as the Korean American Nurses Association of Southern California, Asian American Pacific Islander Nurse Association, and National Coalition of Ethnic Minority Nurse Associations may serve as a professional community to share knowledge and resources; reward, recognize, and celebrate accomplishments; and help to minimize structural, societal, and cultural barriers contributing to burnout. Education and training opportunities may include assertiveness or generational differences in the workplace training, professional or leadership development including navigating the organizational hierarchy, effective communication, and the importance of self-care. In addition, they may also promote nurturing mentoring relationships as well as fellowship and networking opportunities including in-person (while observing COVID-19 precautions as needed) or web-based social hours, hiking or nature walks, and peer support groups for Korean American nurses by Korean American nurses.

Likewise, organizations such as the Korean American Medical Association of Southern California and Korean American Graduate Medical Association may serve as a professional community to help promote similar opportunities for Korean American PCPs. For instance, in a report by the American Medical Association on the experiences of ethnic minority

physicians in the United States during the COVID-19 pandemic, Asian physicians reported that access to support and fellowship with others of similar demographic backgrounds would improve the sustainment of their well-being [47]. Additionally, 44.8% of Asian physicians reported that advocacy opportunities to address health inequities, particularly related to the COVID-19 pandemic, would also help their ability to sustain their well-being [47]. Furthermore, being a member of a professional organization can also serve as a form of social proof or recognition of one's expertise and credibility in their field. It can also provide access to resources, training, and professional development opportunities as well as provide opportunities to recognize and celebrate personal accomplishments, which may be an effective burnout mitigation strategy, particularly for this group of Korean American PCP participants.

Community Partners

Moreover, these professional organizations may collaborate with community partners to provide comprehensive HCP wellness programs (eg, mindfulness, meditation, yoga, mental health counseling, stress or mental health first aid, and other activities) to help mitigate the adverse effects of burnout for Korean American HCPs. For instance, Korean American professional nursing and medical associations may collaborate with Korean community organizations such as the Korean Cultural Center, Los Angeles, to implement programs (eg, calligraphy and martial arts) for Korean American HCPs to promote overall well-being.

Furthermore, a community website or repository where Korean American HCPs and professional organizations can collaborate with community partners to share timely and accurate health information would benefit both HCPs and the community alike. According to a recent systemic review, up to 28.8% of social media posts about COVID-19 could be classified as misinformation [48]. Such incorrect information or misinformation not only jeopardizes measures to control the pandemic, but it also diverts resources and actions away from much needed communities. A community-based repository with translated materials (ie, in Korean) for HCPs and patients as well as a central location for shared resources (eg, masks and hand sanitizer donations) would be an effective strategy that enhances resource availability, builds a strong sense of community, and promotes well-being for both Korean American HCPs and the community.

Health Care Organization Partners

Targeted strategies for nurses and PCPs at the health care systems level, such as the distribution of fair workload and opportunities for all members of the health care team to practice at the top of their scope and being involved in decision-making opportunities, may improve a sense of control over their practice. Shared leadership councils, flexible work schedules, various nursing models, and the use of technology-based workers or assistants have been explored as potential strategies to promote nursing participation in decision-making processes, improve nursing workflow, and reduce workload.

Although PPE and other resource shortages are currently not as critical as they were at the start of the COVID-19 pandemic,

health care organizations must remain diligent and be prepared for whatever future catastrophes that they may face. Regular inventory checks of essential health care resources both within the health care organization and throughout the community are critical. Additionally, routine incident command system and emergency management training in collaboration with local ethnic communities may be helpful, especially in meeting the needs of culturally and linguistically diverse populations.

Research

There are several implications for future research. First, just as there is a critical need for culturally congruent care provided by HCPs with similar cultural backgrounds to the patients they care for, there is a need for more culturally congruent research to be conducted by ethnic minority researchers who share the same cultural background as their participants. Such researchers are more likely to understand the cultural context and nuance of the research topic. This can be particularly important when researching culturally sensitive topics, for instance, when the research involves Korean cultural practices or beliefs or making practical and impactful recommendations specific to Korean American HCPs.

Along these lines, research focusing on ethnic minority groups should closely examine potential factors that impact health disparities and parse out the variations and nuances that exist within these groups. For instance, lumping all Asian American groups together—that is, combining the Korean American group with others from East, South, and Central Asia—may not only miss important subcultural differences but also mask meaningful differences in health risks among these groups, including mental health-related risk factors. Therefore, future studies on ethnic minority groups should consider the cultural and sociodemographic heterogeneity as well as variations in health risk factors that distinguish each subgroup before aggregating them into one group.

Finally, more funding opportunities aimed at exploring identity-informed burnout experiences of HCPs and studies aimed at capturing nuances both across and within ethnic minority groups are needed. The COVID-19 pandemic has exasperated already high levels of burnout among HCPs around the globe. Supporting HCP well-being requires continuous investment in burnout research and information sharing to advance evidence-based solutions [49], contextualized within the HCPs' cultural, racial/ethnic, and other socially informed or self-selected group memberships.

Limitations

The study participants were recruited among Korean American nurses and PCPs practicing in Southern California; therefore, the findings from this study may not be generalizable to all nurses and PCPs. Additionally, the total study population could not be confirmed, especially as the participants were referred to the study via word of mouth from other participants. Consequently, the response rates could not be confirmed. Nonetheless, the methods applied and lessons learned from this study may guide further studies that apply more rigorous research methods to evaluate the work environment's impact

on burnout and the well-being of nurses and PCPs from various ethnic minority groups.

Furthermore, the assessment of Korean American nurses' and PCPs' experience with discrimination, such as "Asian Hate," during the pandemic and its impact on burnout was not within the scope of this study. Although we draw attention to the potential relationship between these factors among our study participants, further studies specifically assessing their experience with discrimination are needed to make direct correlations between nurse and PCP discrimination and burnout. Additional aspects of personal identity beyond ethnic/racial group, such as generation in the United States, language preference, and level of acculturation, among others, would allow for a more refined view of this experience among Korean

American nurses and PCPs and should be considered in future iterations of this work.

Conclusions

Three years into the start of the pandemic, the COVID-19 endemic seems more hopeful than the burnout endemic. Findings from this study underscore the importance of a multilevel nurse and PCP wellness program sponsored by professional organizations, communities, and the health care institutions in which these nurses and PCPs practice. Finally, a growing recognition of identity-informed burnout experiences across frontline Korean American nurses and PCPs argues for future explorations that capture nuance both across and within this and other ethnic minority nurse and PCP groups. By recognizing and capturing these variations, we may better support the creation of targeted, burnout-mitigating strategies for all.

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Authors' Contributions

All authors made substantial contributions to conception and design, the acquisition of data, or the analysis and interpretation of data; drafted the article or revised it critically for important intellectual content; and had granted final approval of the version to be published.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Bivariate Pearson correlation analysis.

[[DOCX File, 34 KB - apinj_v7i1e42490_app1.docx](#)]

References

1. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA* 2002 Oct 23;288(16):1987-1993. [doi: [10.1001/jama.288.16.1987](#)] [Medline: [12387650](#)]
2. Aiken LH, Sermeus W, van den Heede K, Sloane DM, Busse R, McKee M, et al. Patient safety, satisfaction, and quality of hospital care: cross sectional surveys of nurses and patients in 12 countries in Europe and the United States. *BMJ* 2012 Mar 20;344(mar20 2):e1717-e1717 [FREE Full text] [doi: [10.1136/bmj.e1717](#)] [Medline: [22434089](#)]
3. McHugh MD, Kutney-Lee A, Cimiotti JP, Sloane DM, Aiken LH. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. *Health Aff (Millwood)* 2011 Feb;30(2):202-210 [FREE Full text] [doi: [10.1377/hlthaff.2010.0100](#)] [Medline: [21289340](#)]
4. Moss M, Good VS, Gozal D, Kleinpell R, Sessler CN. An official critical care societies collaborative statement: burnout syndrome in critical care healthcare professionals: a call for action. *Crit Care Med* 2016 Jul;44(7):1414-1421. [doi: [10.1097/CCM.0000000000001885](#)] [Medline: [27309157](#)]
5. Shanafelt TD, West CP, Sinsky C, Trockel M, Tutty M, Satele DV, et al. Changes in burnout and satisfaction with work-life integration in physicians and the general US working population between 2011 and 2017. *Mayo Clin Proc* 2019 Sep;94(9):1681-1694 [FREE Full text] [doi: [10.1016/j.mayocp.2018.10.023](#)] [Medline: [30803733](#)]
6. Cimiotti JP, Aiken LH, Sloane DM, Wu ES. Nurse staffing, burnout, and health care-associated infection. *Am J Infect Control* 2012 Aug;40(6):486-490 [FREE Full text] [doi: [10.1016/j.ajic.2012.02.029](#)] [Medline: [22854376](#)]
7. Montgomery AP, Azuero A, Baernholdt M, Loan LA, Miltner RS, Qu H, et al. Nurse burnout predicts self-reported medication administration errors in acute care hospitals. *J Healthc Qual* 2021;43(1):13-23. [doi: [10.1097/JHQ.0000000000000274](#)] [Medline: [33394839](#)]

8. Rizo-Baeza M, Mendiola-Infante SV, Sepehri A, Palazón-Bru A, Gil-Guillén VF, Cortés-Castell E. Burnout syndrome in nurses working in palliative care units: an analysis of associated factors. *J Nurs Manag* 2018 Jan 11;26(1):19-25. [doi: [10.1111/jonm.12506](https://doi.org/10.1111/jonm.12506)] [Medline: [28695723](https://pubmed.ncbi.nlm.nih.gov/28695723/)]
9. Salvagioni DAJ, Melanda FN, Mesas AE, González AD, Gabani FL, Andrade SMD. Physical, psychological and occupational consequences of job burnout: a systematic review of prospective studies. *PLoS One* 2017 Oct 4;12(10):e0185781 [FREE Full text] [doi: [10.1371/journal.pone.0185781](https://doi.org/10.1371/journal.pone.0185781)] [Medline: [28977041](https://pubmed.ncbi.nlm.nih.gov/28977041/)]
10. Toppinen-Tanner S, Ahola K, Koskinen A, Väänänen A. Burnout predicts hospitalization for mental and cardiovascular disorders: 10-year prospective results from industrial sector. *Stress and Health* 2009 Sep 21;25(4):287-296. [doi: [10.1002/smi.1282](https://doi.org/10.1002/smi.1282)]
11. Bodenheimer T, Sinsky C. From triple to quadruple aim: care of the patient requires care of the provider. *Ann Fam Med* 2014;12(6):573-576 [FREE Full text] [doi: [10.1370/afm.1713](https://doi.org/10.1370/afm.1713)] [Medline: [25384822](https://pubmed.ncbi.nlm.nih.gov/25384822/)]
12. Nundy S, Cooper LA, Mate KS. The quintuple aim for health care improvement: a new imperative to advance health equity. *JAMA* 2022 Feb 08;327(6):521-522. [doi: [10.1001/jama.2021.25181](https://doi.org/10.1001/jama.2021.25181)] [Medline: [35061006](https://pubmed.ncbi.nlm.nih.gov/35061006/)]
13. Martinez-Hollingsworth A, Barkley L. Wellbeing disparities among women of color providers in the safety net. 2022 Presented at: Western Institute of Nursing Conference; April 6-9, 2022; Portland, OR.
14. Gordon NP, Lin TY, Rau J, Lo JC. Aggregation of Asian-American subgroups masks meaningful differences in health and health risks among Asian ethnicities: an electronic health record based cohort study. *BMC Public Health* 2019 Nov 25;19(1):1551 [FREE Full text] [doi: [10.1186/s12889-019-7683-3](https://doi.org/10.1186/s12889-019-7683-3)] [Medline: [31760942](https://pubmed.ncbi.nlm.nih.gov/31760942/)]
15. Asian American and Pacific Islander Heritage Month: May 2022. United States Census Bureau. 2022 Apr 18. URL: <https://www.census.gov/newsroom/facts-for-features/2022/asian-american-pacific-islander.html> [accessed 2022-09-05]
16. Budiman A, Ruiz NG. Key facts about Asian Americans, a diverse and growing population. Pew Research Center. 2021 Apr 29. URL: <https://www.pewresearch.org/fact-tank/2021/04/29/key-facts-about-asian-americans> [accessed 2022-09-05]
17. Jang Y, Yoon H, Kim MT, Park NS, Chiriboga DA. Preference for patient-provider ethnic concordance in Asian Americans. *Ethn Health* 2021 Apr 25;26(3):448-459 [FREE Full text] [doi: [10.1080/13557858.2018.1514457](https://doi.org/10.1080/13557858.2018.1514457)] [Medline: [30145909](https://pubmed.ncbi.nlm.nih.gov/30145909/)]
18. The Joint Commission. Physical and verbal violence against health care workers. *Sentinel Event Alert* 2018 Apr 17;59:1-7 [FREE Full text]
19. Kemper KJ, Schwartz A, Pediatric Resident Burnout-Resilience Study Consortium. Bullying, discrimination, sexual harassment, and physical violence: common and associated with burnout in pediatric residents. *Acad Pediatr* 2020 Sep;20(7):991-997. [doi: [10.1016/j.acap.2020.02.023](https://doi.org/10.1016/j.acap.2020.02.023)] [Medline: [32114090](https://pubmed.ncbi.nlm.nih.gov/32114090/)]
20. Ulrich B, Barden C, Cassidy L, Varn-Davis N. Critical care nurse work environments 2018: findings and implications. *Crit Care Nurse* 2019 Apr;39(2):67-84. [doi: [10.4037/ccn2019605](https://doi.org/10.4037/ccn2019605)] [Medline: [30728131](https://pubmed.ncbi.nlm.nih.gov/30728131/)]
21. Shang Z, Kim JY, Cheng SO. Discrimination experienced by Asian Canadian and Asian American health care workers during the COVID-19 pandemic: a qualitative study. *CMAJ Open* 2021 Nov 16;9(4):E998-E1004 [FREE Full text] [doi: [10.9778/cmajo.20210090](https://doi.org/10.9778/cmajo.20210090)] [Medline: [34785529](https://pubmed.ncbi.nlm.nih.gov/34785529/)]
22. Bakker AB, van Veldhoven M, Xanthopoulou D. Beyond the demand-control model: thriving on high job demands and resources. *Journal of Personnel Psychology* 2010 Jan;9(1):3-16 [FREE Full text] [doi: [10.1027/1866-5888/a000006](https://doi.org/10.1027/1866-5888/a000006)]
23. Bakker AB, Demerouti E. Job demands-resources theory: taking stock and looking forward. *J Occup Health Psychol* 2017 Jul;22(3):273-285. [doi: [10.1037/ocp0000056](https://doi.org/10.1037/ocp0000056)] [Medline: [27732008](https://pubmed.ncbi.nlm.nih.gov/27732008/)]
24. Demerouti E, Bakker AB, Nachreiner F, Schaufeli WB. The job demands-resources model of burnout. *J Appl Psychol* 2001 Jun;86(3):499-512. [Medline: [11419809](https://pubmed.ncbi.nlm.nih.gov/11419809/)]
25. Balch CM, Oreskovich MR, Dyrbye LN, Colaiano JM, Satele DV, Sloan JA, et al. Personal consequences of malpractice lawsuits on American surgeons. *J Am Coll Surg* 2011 Nov;213(5):657-667. [doi: [10.1016/j.jamcollsurg.2011.08.005](https://doi.org/10.1016/j.jamcollsurg.2011.08.005)] [Medline: [21890381](https://pubmed.ncbi.nlm.nih.gov/21890381/)]
26. Spence Laschinger HK, Leiter MP. The impact of nursing work environments on patient safety outcomes: the mediating role of burnout/engagement. *J Nurs Adm* 2006 May;36(5):259-267. [doi: [10.1097/00005110-200605000-00019](https://doi.org/10.1097/00005110-200605000-00019)] [Medline: [16705307](https://pubmed.ncbi.nlm.nih.gov/16705307/)]
27. Spence Laschinger HK, Wong CA, Greco P. The impact of staff nurse empowerment on person-job fit and work engagement/burnout. *Nurs Adm Q* 2006 Oct;30(4):358-367. [doi: [10.1097/00006216-200610000-00008](https://doi.org/10.1097/00006216-200610000-00008)] [Medline: [17077717](https://pubmed.ncbi.nlm.nih.gov/17077717/)]
28. Spence Laschinger HK, Leiter M, Day A, Gilin D. Workplace empowerment, incivility, and burnout: impact on staff nurse recruitment and retention outcomes. *J Nurs Manag* 2009 Apr;17(3):302-311. [doi: [10.1111/j.1365-2834.2009.00999.x](https://doi.org/10.1111/j.1365-2834.2009.00999.x)] [Medline: [19426367](https://pubmed.ncbi.nlm.nih.gov/19426367/)]
29. Kim LY, Rose DE, Martinez-Hollingsworth A, Guo R, Ganz DA, Yano EM, et al. Primary care tasks associated with nursing burnout: a survey of registered and licensed vocational nurses in Veterans Health Administration patient-centered medical homes. *J Ambul Care Manage* 2021;44(4):304-313. [doi: [10.1097/JAC.0000000000000385](https://doi.org/10.1097/JAC.0000000000000385)] [Medline: [34054108](https://pubmed.ncbi.nlm.nih.gov/34054108/)]
30. Kim LY, Rose DE, Soban LM, Stockdale SE, Meredith LS, Edwards ST, et al. Primary care tasks associated with provider burnout: findings from a Veterans Health Administration survey. *J Gen Intern Med* 2018 Jan 25;33(1):50-56 [FREE Full text] [doi: [10.1007/s11606-017-4188-6](https://doi.org/10.1007/s11606-017-4188-6)] [Medline: [28948450](https://pubmed.ncbi.nlm.nih.gov/28948450/)]

31. Scope of practice for nurse practitioners: professional role. American Association of Nurse Practitioners. 2022. URL: <https://www.aanp.org/advocacy/advocacy-resource/position-statements/scope-of-practice-for-nurse-practitioners> [accessed 2022-09-05]
32. Maslach C, Jackson SE, Leiter MP, Schaufeli WB, Schwab RL. Maslach Burnout Inventory Manual. 3rd ed. Palo Alto, CA: Consulting Psychologists Press; 1996.
33. Leiter M, Maslach C. Areas of worklife: a structured approach to organizational predictors of job burnout. In: Perrewe PL, Ganster DC, editors. Emotional and Physiological Processes and Positive Intervention Strategies. Bingley, United Kingdom: Emerald Group Publishing Limited; Dec 17, 2003:91-134.
34. Leiter MP. Pandemic Experiences & Perceptions Survey. Mind Garden. 2022. URL: <https://www.mindgarden.com/346-pandemic-experiences-perceptions-survey> [accessed 2022-09-05]
35. McMurray R, Ward J. 'Why would you want to do that?': Defining emotional dirty work. Human Relations 2014 Apr 10;67(9):1123-1143 [FREE Full text] [doi: [10.1177/0018726714525975](https://doi.org/10.1177/0018726714525975)]
36. Olmos-Ochoa TT, Bharath P, Ganz DA, Noël PH, Chawla N, Barnard JM, et al. Staff perspectives on primary care teams as de facto "hubs" for care coordination in VA: a qualitative study. J Gen Intern Med 2019 May 22;34(Suppl 1):82-89 [FREE Full text] [doi: [10.1007/s11606-019-04967-y](https://doi.org/10.1007/s11606-019-04967-y)] [Medline: [31011971](https://pubmed.ncbi.nlm.nih.gov/31011971/)]
37. Solimeo SL, Ono SS, Stewart KR, Lampman MA, Rosenthal GE, Stewart GL. Gatekeepers as care providers: the care work of patient-centered medical home clerical staff. Med Anthropol Q 2017 Mar 28;31(1):97-114. [doi: [10.1111/maq.12281](https://doi.org/10.1111/maq.12281)] [Medline: [26854283](https://pubmed.ncbi.nlm.nih.gov/26854283/)]
38. Abuhammad S, AlAzzam M, Mukattash T. The perception of nurses towards their roles during the COVID-19 pandemic. Int J Clin Pract 2021 Apr 23;75(4):e13919 [FREE Full text] [doi: [10.1111/ijcp.13919](https://doi.org/10.1111/ijcp.13919)] [Medline: [33296522](https://pubmed.ncbi.nlm.nih.gov/33296522/)]
39. Hampton T, Crunkhorn R, Lowe N, Bhat J, Hogg E, Afifi W, et al. The negative impact of wearing personal protective equipment on communication during coronavirus disease 2019. J Laryngol Otol 2020 Jul;134(7):577-581 [FREE Full text] [doi: [10.1017/S0022215120001437](https://doi.org/10.1017/S0022215120001437)] [Medline: [32641175](https://pubmed.ncbi.nlm.nih.gov/32641175/)]
40. Senicola CA, Smith JB, Wilson K. COVID-19 has changed patient-clinician communication: what can rehabilitation professionals do to enhance it? HSS J 2020 Nov 13;16(Suppl 1):141-145 [FREE Full text] [doi: [10.1007/s11420-020-09802-3](https://doi.org/10.1007/s11420-020-09802-3)] [Medline: [33223976](https://pubmed.ncbi.nlm.nih.gov/33223976/)]
41. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. JAMA 2020 Jun 02;323(21):2133-2134. [doi: [10.1001/jama.2020.5893](https://doi.org/10.1001/jama.2020.5893)] [Medline: [32259193](https://pubmed.ncbi.nlm.nih.gov/32259193/)]
42. Sharma M, Creutzfeldt C, Lewis A, Patel PV, Hartog C, Jannotta GE, et al. Health-care professionals' perceptions of critical care resource availability and factors associated with mental well-being during coronavirus disease 2019 (COVID-19): results from a US survey. Clin Infect Dis 2021 May 18;72(10):e566-e576 [FREE Full text] [doi: [10.1093/cid/ciaa1311](https://doi.org/10.1093/cid/ciaa1311)] [Medline: [32877508](https://pubmed.ncbi.nlm.nih.gov/32877508/)]
43. An Y, Kang J. Relationship between organizational culture and workplace bullying among Korean nurses. Asian Nurs Res (Korean Soc Nurs Sci) 2016 Sep;10(3):234-239 [FREE Full text] [doi: [10.1016/j.anr.2016.06.004](https://doi.org/10.1016/j.anr.2016.06.004)] [Medline: [27692254](https://pubmed.ncbi.nlm.nih.gov/27692254/)]
44. Chen C, Luo Q, Chong N, Westergaard S, Brantley E, Salsberg E, et al. Coronavirus disease 2019 planning and response: a tale of 2 health workforce estimator tools. Med Care 2021 Oct 01;59(Suppl 5):S420-S427 [FREE Full text] [doi: [10.1097/MLR.0000000000001606](https://doi.org/10.1097/MLR.0000000000001606)] [Medline: [34524238](https://pubmed.ncbi.nlm.nih.gov/34524238/)]
45. Parker K, Menasce Horowitz J. Majority of workers who quit a job in 2021 cite low pay, no opportunities for advancement, feeling disrespected. Pew Research Center. 2022 Mar 9. URL: <https://www.pewresearch.org/fact-tank/2022/03/09/majority-of-workers-who-quit-a-job-in-2021-cite-low-pay-no-opportunities-for-advancement-feeling-disrespected/> [accessed 2022-09-05]
46. Mohammed S, Peter E, Killackey T, Maciver J. The "nurse as hero" discourse in the COVID-19 pandemic: a poststructural discourse analysis. Int J Nurs Stud 2021 May;117:103887 [FREE Full text] [doi: [10.1016/j.ijnurstu.2021.103887](https://doi.org/10.1016/j.ijnurstu.2021.103887)] [Medline: [33556905](https://pubmed.ncbi.nlm.nih.gov/33556905/)]
47. Summary report: experiences of racially and ethnically minoritized and marginalized physicians in the U.S. during the COVID-19 pandemic. American Medical Association. 2021. URL: <https://www.ama-assn.org/system/files/summary-report-covid-mmps-survey.pdf> [accessed 2022-09-05]
48. Gabarron E, Oyeyemi SO, Wynn R. COVID-19-related misinformation on social media: a systematic review. Bull World Health Organ 2021 Jun 01;99(6):455-463A [FREE Full text] [doi: [10.2471/BLT.20.276782](https://doi.org/10.2471/BLT.20.276782)] [Medline: [34108756](https://pubmed.ncbi.nlm.nih.gov/34108756/)]
49. National Academies of Sciences, Engineering, and Medicine, National Academy of Medicine, Committee on Systems Approaches to Improve Patient Care by Supporting Clinician Well-Being. Taking Action Against Clinician Burnout: A Systems Approach to Professional Well-Being. Washington, DC: National Academies Press (US); 2019.

Abbreviations

AWS: Areas of Worklife Survey

HCP: health care provider

MBI-HSS: Maslach Burnout Inventory–Human Services Survey

MD: Doctor of Medicine

NP: nurse practitioner
PA: physician assistant
PEPS: Pandemic Experience & Perceptions Survey
PPE: Personal protective equipment
REDCap: Research Electronic Data Capture
RN: registered nurse

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