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Breast Health Education as a Motivator for Breast Self-Examination Practice in High-Risk Women: Grounded Theory Analysis

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Abstract

Background: Women in low-resource regions face a higher risk of breast cancer. Implementing a breast health initiative that promotes breast self-examination practice could aid in the early detection and prevention of breast cancer complications.

Objective: This study aimed to explore and comprehend the experiences of high-risk women, focusing on their breast self-examination practice and the factors that influence their effectiveness in managing breast health.

Methods: This research used a qualitative approach to perform semistructured interviews with 11 high-risk women who had a family history of breast cancer recruited from the oncology department of a hospital using purposive and theoretical sampling during the period from August 2024 to April 2025. The analysis of the data was conducted using the grounded theory approach by Strauss and Corbin to formulate a theoretical model for breast self-examination practices.

Results: This study highlighted breast health education as a motivator of and the core category for breast self-examination practice. This study found perceptual, attitudinal, and familial support drivers of breast self-examination practice for early diagnosis of breast cancer and better living.

Conclusions: This study enhances the body of knowledge regarding the experiences of high-risk women. Health care providers play a significant role in using this framework to steer innovative educational interventions that promote breast health in culture-bound communities.

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KEYWORDS

breast self-examination practice; breast health education; breast cancer; high-risk women; breast self-examination

Introduction

Worldwide, 2.3 million women were diagnosed and 760,000 died of breast cancer (BC) in 2022 [1]. BC is the second most common type of cancer and among the major causes of pathological complications [2]. Approximately 15% to 20% of women diagnosed with BC have a family member who has also been diagnosed with the disease [3]. A family history of BC elevates the likelihood of developing the illness, particularly among close blood relatives who have had BC. Women with a first-degree relative (sister, daughter, or mother) diagnosed with BC face nearly double the risk. If a woman has 2 first-degree relatives diagnosed with BC, her risk increases by roughly 3 times [4].

In Asia, Pakistan records the highest rate of BC incidence at 23.1% [5]. Additionally, 23.8% of women in Pakistan have a family history of BC. The average age of family members diagnosed with BC has been found to be 49.2 years [6]. Moreover, 95.2% of these individuals have at least one family member who was affected. The most common relative diagnosed with BC is the mother, accounting for 47.6% [7]. The World Health Organization–recognized tools for BC screening are mammography, clinical breast examination, and breast self-examination (BSE) [1]. Although mammography has proven to be a reliable and valid BC screening method, awareness of this tool and its accessibility and affordability to women have been low in poor-resource countries [8]. BSE and clinical breast examination come in handy in such countries. BSE practice is a more acceptable method due to cultural issues, and evidence has proved that 40% of diagnosed BCs are detected through BSE [9], thus validating the usefulness of the procedure in BC screening [3].

Among high-risk Pakistani women with a family history of BC, merely 15% are knowledgeable about the disease, and only 4.18% use BSE as a screening measure for BC [10]. Just 1% regularly practices BSE, whereas 3.6% do so occasionally [11]. Furthermore, late-stage presentation of BC (stages III or IV) is prevalent throughout the country, with nearly 35.2% of delayed cases occurring among high-risk Pakistani women [12]. It has been demonstrated that 40% of diagnosed BCs are identified through BSE [13].

In Pakistani culture, the concept of the “breast” is more associated with sexuality than with health, making discussions about it taboo due to conservative societal norms [14]. Cultural influences significantly affect breast health awareness among Pakistani women, with many refraining from performing BSE due to the stigma surrounding self-examination and embarrassment over discussing private body parts or undergoing medical assessment [15,16]. Misunderstandings, societal expectations, and false beliefs hinder the BSE practice and lead to delays in seeking help among women. The influence of culture has resulted in women not being motivated to carry out BSE or being taught how to [17].

Despite the significance of cultural values, there is a lack of research on the implementation of BSE practice measures among women at high risk. To improve this situation, it is essential to investigate the BSE practice viewpoints of high-risk women. This study used a grounded theory approach to create a conceptual understanding based on participants’ lived experiences, aiming to formulate a conceptual model or theory rooted in participants’ perspectives.

The purpose of this study was to explore and comprehend the experiences of high-risk women, focusing on their BSE practice and the factors that influence their effectiveness in managing breast health.

Methods

Study Design

This study used the grounded theory approach by Strauss and Corbin [18] and adhered to the COREQ (Consolidated Criteria for Reporting Qualitative Research) checklist to ensure rigor [19]. Grounded theory is a qualitative research method aimed at developing a theory that is firmly based on data that are collected and analyzed systematically. This approach is especially effective for examining intricate social processes, such as BSE practice, as it seeks to understand how people develop and sustain behaviors about a specific health issue.

Participant Selection

The data were gathered between August 2024 and April 2025. The researchers applied both purposive and theoretical sampling to select data sources and participants. Oncology nurses asked 11 high-risk women to participate in the study, and no one declined to take part in the interviews. The timing and date were arranged based on the availability of the participants, and the researchers provided thorough explanations about the study. At first, purposive sampling was used to identify participants who met certain eligibility criteria: (1) female participants with mothers diagnosed with BC, (2) proficiency in the Urdu language, and (3) willingness to take part. When the investigation advanced, theoretical sampling was used to enhance evolving theory. Theoretical sampling is an iterative process in which data collection and analysis are conducted simultaneously, using the emerging analysis to guide the selection of subsequent data to collect. Collected data were coded and analyzed to form initial concepts, categories, and themes. The selection of new participants was based on their marital status (unmarried, married, or widowed) and level of education (primary school, middle school, tenth grade, or higher) to understand the concepts, fill the gaps, refine categories, and expand the theory. Theoretical sampling persisted until data saturation was reached, when no further relevant data or insights were produced. The aforementioned 11 high-risk participants from diverse communities took part in the study (Table 1).

Table . Participant characteristics.

Participant ID	Age (y)	Marital status	Educational level	Region
HRW1[a]	21	Married	Tenth grade	Urban
HRW2	24	Married	Tenth grade	Urban
HRW3	22	Married	Primary school	Urban
HRW4	21	Unmarried	Tenth grade	Rural
HRW5	26	Married	Graduation (16 years of education)	Urban
HRW6	24	Married	Primary school	Rural
HRW7	22	Married	Primary school	Rural
HRW8	27	Married	Tenth grade	Urban
HRW9	24	Widowed	Primary school	Semiurban
HRW10	25	Married	Middle school	Rural
HRW11	23	Unmarried	Twelfth grade	Semiurban

[a] HRW: high-risk women.

Ethical Considerations

The Research Ethics Committee of the Institute of Allied Health Sciences associated with the hospital provided ethics approval for this study, with reference IAHS/WMC/786/008-02. All participants provided informed consent, and information was provided on their right to leave the study at any point without facing repercussions. Participant data were anonymized to ensure confidentiality, and all research materials were securely stored. Participants were not provided any compensation for their participation.

Data Collection

Data were gathered through semistructured interviews (Table 2). These interviews were conducted in person, with audio recordings made of participants, along with observations and verbatim transcriptions. Each interview lasted approximately 35 to 50 minutes. Field notes were kept providing contextual details. Several participants were interviewed more than once, with 81.8% (9/11) taking part in a second interview to enhance the data and facilitate clarification, deeper exploration, and a richer understanding of emerging themes. Data were gathered until data saturation was achieved, which is defined as the point at which no new themes or insights arise. Due to logistical constraints and participant preferences, transcripts were not returned to participants for member verification. Nonetheless, to maintain ethical standards and ensure the accuracy of the transcriptions, a method of double transcription and validation was used [20,21].

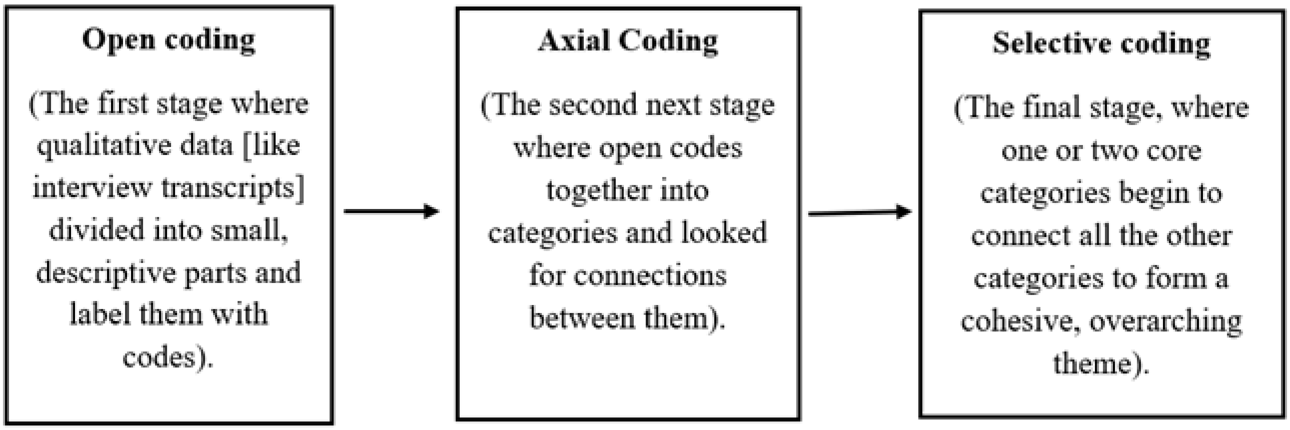
Table . Interview guideline.

Category	Questions
Opening questions	• "Do you think that you should take care of your breast health? Or do you think that breast health is important for women health?" • "What do you know about breast health as you are at risk of breast cancer or what do you know about breast cancer as your mother is suffering from the same condition?" • "Do you know how to do breast self-examinations practice or what are the methods of breast self-examination practice?" • "Do you examine your breast? Or do you think that you should do breast self-examination practice?"
Probing questions	• "Do you have the ability or confidence to do your breast self-examination practice?" • "What changes do you observe during breast examination?" • "Can you explain the change or discuss the changes with anyone, or do you think that change should be discussed?" • "What will you do to manage changes in your breasts to maintain your breast health?" • "Do you think that you need support or assistance, and how did you receive such support?"
Closing question	• "Is there anything you would like to share or add?"

Analysis

Analysis of the data was conducted following the grounded theory approach by Strauss and Corbin [18], which involved open, axial, and selective coding (Figure 1).

Figure 1. Coding process.



Open coding

(The first stage where qualitative data [like interview transcripts] divided into small, descriptive parts and label them with codes).

Axial Coding

(The second next stage where open codes together into categories and looked for connections between them).

Selective coding

(The final stage, where one or two core categories begin to connect all the other categories to form a cohesive, overarching theme).

Coding of interview transcripts was done using verbatim data. Conceptual sensitivity to achieve reflexivity and analytic consensus was maintained by using multiple coders in discussion, where codes were reached through ongoing discussions and adjustments to the coding framework. The coding tree (Table 3) shows that the initial codes were organized into 5 subcategories under a single main category and were subsequently combined to create the final thematic model. Constant comparative analysis was used for the development of themes, in which new data were continually assessed against existing codes and categories. This approach allowed for the refinement of the emerging theory and affirmed its applicability across diverse participant experiences [22,23], directed at identifying repeated patterns and connections within the data [20,24,25]. The process resulted in the documentation of the key themes: the desire for breast health awareness, family support, change in perceptions and attitude, and early diagnosis of BC (Figure 2).

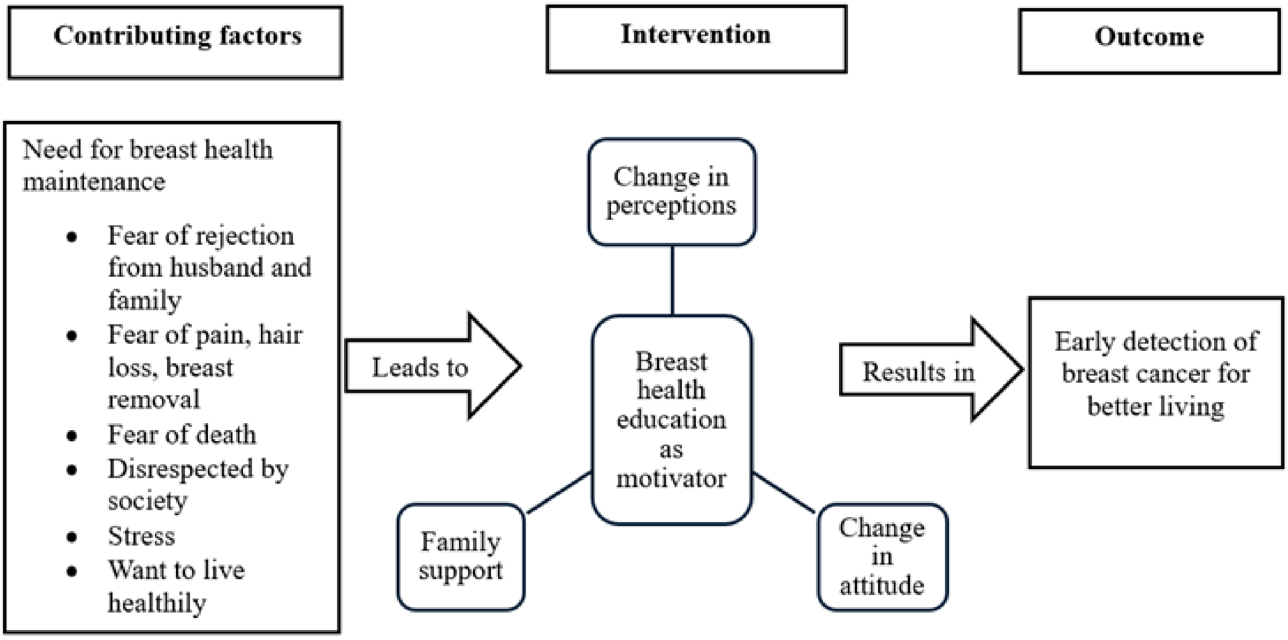
Table . Coding process for the category of breast health education as a motivator.

Level of coding	Code or category	Participant code
Open coding	- Realization of health issues related to BC[a]. - Awareness of BC symptoms. Motivation to seek information about BC. - Cultural issues related to delay in health-seeking behavior. - Family support from mother - Change of perceptions - Breast health awareness - Change in attitude	- “I know that I AM at risk of breast cancer because my mother is suffering from this and I saw my mother’s condition.” [Participant 1] - “My mother discusses her problems with me, and I feel her pain.” [Participant 5] - “My mother is suffering from pain, stress, hair loss, and many other problems.” [Participant 3] - “My mother told me that my condition was better if she know about breast cancer and she wish for me to have all information about breast cancer, and I also want to know about this.” [Participants HRW 5] - “My mother hides her problem from all family and when she can’t bear her problem than she disclosed to her mother-in-law and she agreed to visit the doctor.” [Participants HRW 7] - “I saw my mother’s condition, and I was worried. My mother guided me to touch the breast is not wrong it’s our body part; we can discuss our problems with lady doctor because she is also women like us. She can understand us.” [Participants HRW 4] - “I did breast examinations to feel any change in my breast like pain, swelling for early identification of cancer.” [Participants HRW 11]
Axial coding	- Category: BSE[b] practice (subcategory 1: breast health maintenance; subcategory 2: symptoms awareness) - Category: influential factors (subcategory 1: change in perception of BC and BSE; subcategory 2: change in attitude; subcategory 3: family support)	- Open codes: “I can do breast examination by touch and observation.” [Participant HRW 4] - Open code: “I know the symptoms like pain in breast, swelling in breast, discharge.” [Participant HRW 6] - Open code: “My mother told me that breasts are like other body parts, breast problems are like other problems of body, breast touch is not wrong.” [Participant HRW 9] - Open code: “Realizing the importance of early diagnosis, performing Breast examination.” [Participant HRW 11] - Open code: “I can understand breast health issues and have support from mothers in early health seeking behavior such as to visit doctor for my problem.” [Participant HRW 9]
Selective coding	- Category: breast health education as motivator	- Realization of breast health issues, and need for BSE practice for identification of any breast change, and that leads to early BC diagnosis for healthy living

[a] BC: breast cancer.

[b] BSE: breast self-examination.

Figure 2. The theory of breast health education as a motivator among high-risk women for breast self-examination practice.



Credibility and Trustworthiness

The reliability and credibility of this study were maintained through implementation of several approaches as suggested by recognized qualitative research guidelines [26]. These included (1) member checking, in which initial interpretations and findings were shared with high-risk participants to check the accuracy and authenticity; (2) triangulation, which involved comparing various data sources—such as interview transcripts and field notes—to enhance the validity of the results; (3) investigator triangulation through ongoing team discussions during the data analysis phase to confirm consistency and individual bias reduction; and (4) an audit trail by keeping thorough documentation, such as coding decisions, to facilitate external review and transparency.

Results

The core category of the study was breast health education as a motivator, emphasizing the vital role that awareness and understanding of one's breast health plays in promoting BSE practice for BC screening (Figure 2).

Contributing Conditions: Need for Breast Health Maintenance

Understanding the mother's BC situation and being aware of BC symptoms such as pain or hair loss, fear of rejection from society, and stress creates the need for breast health maintenance and can inspire participants to take part in screening activities such as BSEs for early detection and instill hope for improved health. Family support, especially support from mothers who realized their own situation and understood their daughters' need for breast health, motivated participants to change their perceptions of health care choices and the way in which they sought health services and build a positive attitude to engage in health-seeking behaviors such as BSE practice.

Intervention Conditions: Key Factors Influencing BSE Practice

Change in Perceptions

Cultural factors significantly influence health care choices and the way in which individuals seek health services. The participants recognized that being aware of breast health is a key aspect of women's health. They adjusted their views regarding breast health and, through family support, appeared motivated to pursue health-seeking behaviors.

Change in Attitude

Cultural values shape women's attitudes, leading to feelings of anxiety surrounding BC diagnoses and embarrassment when discussing the topic. Participants acknowledged the significance of early detection for improving quality of life and demonstrated motivation for maintaining breast health.

Family Support

In Pakistani culture, family support, particularly from mothers, plays an essential role in influencing their daughters' perceptions regarding health care choices. The encouragement from mothers has a significant impact on promoting their daughters' health.

Outcome: Early Detection of BC for Better Living

The objective of BSE practice is to facilitate the early identification of BC through health education, thereby enhancing quality of life and promoting better living. Early diagnosis of BC significantly increases the likelihood of survival for patients.

This core category emerged in various driving themes, such as the realization of breast health issues, the change in participants' perceptions and attitude, and participants' need for BSE practice for identification of any breast change that would lead to early BC diagnosis (Table 4).

Table . Major themes with participant quotes.

Theme	Participant quote
Need for breast health maintenance	• "I am aware that I have a higher risk of developing breast cancer because my mother is currently facing this illness, and I have witnessed her suffering from pain, stress, hair loss, and various other challenges." [Participant HRW 3]
Change in perceptions	• "I observed my mother's situation, and it concerned me. My mother taught me that examining our breasts is natural; it's a part of our bodies, and we can talk about our issues with a female doctor because she is also a woman like us. She can realize our experiences." [Participant HRW 4]
Change in attitude	• "I possess knowledge about breast self-examination and various methods, like using my fingers to feel any changes in the breast, such as discomfort or swelling, and I can also monitor any change between both breasts." [Participant HRW 11]
Family support	• "My mother shares her issues with me; I empathize with her struggles. She mentioned that her situation could have improved if she had been informed about breast cancer, and she hopes I have all the knowledge regarding it, which I also wish to acquire." [Participant HRW 5] • "My mother reminds my sister and me to conduct monthly breast checks, always assuring us that she is by our side." [Participant HRW 9]
Early detection of breast cancer for better living	• "I perform breast examinations every month because I am aware of my mother's situation; she was diagnosed very late. The doctors informed us that if she had been diagnosed sooner, her condition would be in a better state than it is now. Therefore, I have hope that I will not endure the same fate as my mother. I am determined to lead a healthier life." [Participant HRW 1] • "I perform breast self-examination regularly with a hope that I will live a healthy life." [Participant HRW 8]

Discussion

Principal Findings

The results of this research highlight the importance of health education in encouraging BSE practice among Pakistani high-risk women. This research adds to the grounded theory concerning BSE practice by demonstrating how health education influences various elements of preventive and promotional health care, such as perceptual change, attitudinal change, and familial support for BSE. The primary theme, breast health education as a motivator, emerged as a key factor influencing behaviors related to BSE practice. This observation is consistent with the health belief model, which suggests that people are likely to engage in health-promoting behavior when they recognize a significant degree of susceptibility to a health issue [27]. The findings of this study on BC symptoms served as a trigger for embracing BSE practice, underpinning the idea that awareness of potential health risks fosters change in behavior [28].

This research emphasizes that educating individuals about breast health plays a critical role in encouraging them to perform BSE. Those with greater knowledge about BC were found to be more motivated to engage in practices that promote breast health. This highlights the significance of educational programs aimed at improving people's understanding of BC, the misperceptions about it and its associated risks, and the advantages of different screening strategies [29].

Knowledge affects an individual's views and interpretations of sociocultural contexts, as well as their ability to foresee results and make choices. Greater awareness and a favorable change in perceptions of BC and the taboos of BSEs can greatly enhance BSE practice [30]. This aligns with the principles of social cognitive theory. According to social cognitive theory, knowledge affects perception by influencing how people decode social situations and anticipate outcomes [31].

Education about breast health can alleviate feelings of embarrassment and fear, resulting in a more favorable outlook on BSEs and the pursuit of medical consultations due to cultural impact [32]. These conclusions correspond with the change theory and the stages of change model by Lewin [33], which can be used to foster more constructive attitudes toward change. Individuals and groups adjust to new circumstances, handle resistance, and reinforce new behaviors [33].

Cultural context affects behavior change. The PEN-3 cultural model has also already demonstrated how cultural context matters in interventions, such as those for cancer awareness and screening [34]. Naturally occurring support from family members has been shown to increase healthy lifestyle behaviors such as BC screening measures (eg, BSE) through providing information and role-modeling. Family members have an impact on women's decisions and actions throughout their BC journey, such as (1) confirming breast changes, (2) managing personal emotions, (3) seeking the information, (4) seeking alternative forms of treatment, and (5) advocating for conventional treatment [35]. Family support, especially from mothers, acts as a significant environmental factor that plays an important role in influencing BSE practice. Respectable family support increases a woman's awareness of and interest in undergoing early cancer screening. If a woman receives good emotional support, then she is more likely to behave well for her health [36].

The influence of culture on perception, attitude, and family support, especially from mothers, regarding BSE practice is a core observation of this study. The participants' ability to adopt cultural practices such as family support and change in perception of and attitude toward women's breast health in response to health needs determines the importance of culturally sensitive interventions [37]. This study highlighted the need for BSE practices that are culturally and contextually relevant, such as breast health education targeting participant negative cultural beliefs related to BC and BSE (eg, the taboo of touching oneself) by fostering positive perceptions of this body part, such as the fact that it is a woman's body part, which means that it is also a part of health and not only a part of sexuality, and fostering a positive attitude about BC and its screening measures (eg, BSE) by encouraging women to talk about BC with their family members (eg, with their mothers). Family support motivates women regarding the fact that BSE is not a wrong concept. The breast is a part of their body, which they have a responsibility to be aware of. All these efforts will lead toward behavior change and the promotion of preventive behaviors.

Limitations

This study was carried out at a single hospital, representing a limited group of high-risk women in the area. Grounded theory seeks to create theories based on contexts and data, which might restrict the applicability of the results to different populations.

Conclusions

This study offers convincing evidence underscoring the vital role of breast health education in promoting BSE practices among high-risk women in Punjab, Pakistan. The findings provide essential insights into how improved breast health education can bring about positive changes in attitudes, perceptions, and the involvement of family support systems. This research marks the first effort to develop a grounded theory that presents a new conceptual model to understand the processes related to effective breast health management in similar culture-bound communities.

Funding

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Data Availability

The data from this study cannot be accessed publicly because of ethical reasons and the need to maintain the confidentiality of the participants.

Conflicts of Interest

None declared.

References

1. Breast cancer. World Health Organization. URL: https://www.who.int/news-room/fact-sheets/detail/breast-cancer [accessed 2025-09-04]
2. Breast cancer statistics. Canadian Cancer Society https://www.canada.ca/en/public-health/services/chronic-diseases/cancer/breast-cancer.html. URL: https://cancer.ca/en/cancer-information/cancer-types/breast/statistics [accessed 2025-09-04]
3. Breast cancer facts and statistics. Breast Cancer Organization. URL: https://www.breastcancer.org/facts-statistics [accessed 2025-09-04]
4. Key statistics for breast cancer. American Cancer Society. URL: https://www.cancer.org/cancer/types/breast-cancer/about/how-common-is-breast-cancer.html [accessed 2025-09-04]
5. Zaheer S, Shah N, Maqbool SA, Soomro NM. Estimates of past and future time trends in age-specific breast cancer incidence among women in Karachi, Pakistan: 2004-2025. BMC Public Health 2019 Jul 25;19(1):1001. [doi: 10.1186/s12889-019-7330-z] [Medline: 31345204]
6. Tufail M, Wu C. Exploring the burden of cancer in Pakistan: an analysis of 2019 data. J Epidemiol Glob Health 2023 Jun;13(2):333-343. [doi: 10.1007/s44197-023-00104-5] [Medline: 37185935]
7. Bukhari N, Haider G, Yousuf A, Khan S, Hameed MA. The role of family history on the risk of developing breast cancer. Pak J Med Res 2020;59(4):141-146 [FREE Full text]
8. Mishra GA, Pimple SA, Mittra I, Badwe RA. Screening for breast cancer: cost-effective solutions for low- & middle-income countries. Indian J Med Res 2021 Aug;154(2):229-236. [doi: 10.4103/ijmr.IJMR_2635_20] [Medline: 34854430]
9. Idrees S, Mayilvaganan S, Jagannath S, et al. Validation of cost-effective model for breast self-examination. Ann Med 2023;85(2):166-171. [doi: 10.1097/MS9.0000000000000211]

10. Majeed AI, Raza F, Riaz SK, Kanwal J, Khan SA, Hafeez A. Knowledge, practice, and attitude analysis for breast cancer awareness & prevention among Pakistani women: a cross-sectional study. J Soc Obstet Gynaecol Pak 2021;11(3):165-170 [FREE Full text]
11. Manzoor A, Waqar SH, Janjua A, Shah SA. Breast self-examination knowledge and practice among newly diagnosed patients of carcinoma breast. J Soc Obstet Gynaecol Pak 2018;7(3):137-143 [FREE Full text]
12. Gulzar F, Akhtar MS, Sadiq R, Bashir S, Jamil S, Baig SM. Identifying the reasons for delayed presentation of Pakistani breast cancer patients at a tertiary care hospital. Cancer Manag Res 2019;11:1087-1096. [doi: 10.2147/CMAR.S180388] [Medline: 30774437]
13. Ferdowsy J. Breast cancer awareness and breast self-examination among female nursing students in Dhaka, Bangladesh. Saudi J Nurs Health Care 2020 Oct 21;3(10):270-283. [doi: 10.36348/sjnhc.2020.v03i10.002]
14. Saeed S, Asim M, Sohail MM. Fears and barriers: problems in breast cancer diagnosis and treatment in Pakistan. BMC Womens Health 2021 Apr 14;21(1):151. [doi: 10.1186/s12905-021-01293-6] [Medline: 33853583]
15. Naz N, Khanum S, Dal Sasso GT, de Souza M. Women's views on handling and managing their breast cancer in Pakistan: a qualitative study. Diseases 2016 Apr 14;4(2):17. [doi: 10.3390/diseases4020017] [Medline: 28933397]
16. Ullah Z, Khan MN, Din ZU, Afaq S. Breast cancer awareness and associated factors amongst women in Peshawar, Pakistan: a cross-sectional study. Breast Cancer (Auckl) 2021;15:11782234211025346. [doi: 10.1177/11782234211025346] [Medline: 34248356]
17. Moey SF, Sowtali SN, Mohamad Ismail MF, Hashi AA, Mohd Azharuddin NS, Che Mohamed N. Cultural, religious and socio-ethical misconceptions among Muslim women towards breast cancer screening: a systematic review. Asian Pac J Cancer Prev 2022 Dec 1;23(12):3971-3982. [doi: 10.31557/APJCP.2022.23.12.3971] [Medline: 36579977]
18. Strauss A, Corbin J. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 2nd edition: Sage Publications; 1998.
19. 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 Dec;19(6):349-357. [doi: 10.1093/intqhc/mzm042] [Medline: 17872937]
20. Corbin J, Strauss A. Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory, 3rd edition: Sage Publications; 2008.
21. Heath H, Cowley S. Developing a grounded theory approach: a comparison of Glaser and Strauss. Int J Nurs Stud 2004 Feb;41(2):141-150. [doi: 10.1016/s0020-7489(03)00113-5] [Medline: 14725778]
22. Glaser BG, Strauss AL, Strutzel E. The discovery of grounded theory; strategies for qualitative research. Nurs Res 1968 Jul;17(4):364. [doi: 10.1097/00006199-196807000-00014]
23. Corbin JM, Strauss A. Grounded theory research: procedures, canons, and evaluative criteria. Qual Sociol 1990;13(1):3-21. [doi: 10.1007/BF00988593]
24. Creswell JW. Qualitative Inquiry and Research Design: Choosing Among Five Approaches, 3rd edition: Sage Publications; 2013:83-107.
25. de Chesnay M, editor. Nursing Research Using Grounded Theory: Qualitative Designs and Methods in Nursing: Springer Publishing; 2023.
26. Lincoln Y, Guba E. Naturalistic Inquiry: Sage Publications; 1985.
27. Rosenstock IM. Historical origins of the health belief model. Health Educ Monogr 1974 Dec;2(4):328-335. [doi: 10.1177/109019817400200403]
28. Dewi TK, Ruiter RA, Ardi R, Massar K. The role of psychosocial variables in breast self-examination practice: results from focus group discussions in Surabaya, Indonesia. Psychooncology 2022 Jul;31(7):1169-1177. [doi: 10.1002/pon.5905] [Medline: 35184356]
29. Shi Y, Ma Z, Yao S, Lu N, Wu Y, Cheng F. Effects of interventions on the screening behavior in female first-degree relatives of breast cancer patients: a systematic review. Public Health Nurs 2024;41(1):22-36. [doi: 10.1111/phn.13252] [Medline: 37712430]
30. Assfa Mossa K. Perceptions and knowledge of breast cancer and breast self-examination among young adult women in southwest Ethiopia: application of the health belief model. PLoS ONE 2022;17(9):e0274935. [doi: 10.1371/journal.pone.0274935] [Medline: 36129946]
31. Bandura A. Social Foundations of Thought and Action: A Social Cognitive Theory: Prentice Hall; 1986.
32. Dhakal R, Adhikari C, Karki P, et al. Attitude sustains longer than subjective norm and perceived behavioral control: results of breast cancer screening educational intervention. PLoS ONE 2023;18(2):e0281184. [doi: 10.1371/journal.pone.0281184] [Medline: 36763623]
33. Lewin K. Frontiers in group dynamics: concept, method and reality in social science; social equilibria and social change. Hum Relat 1947;1(1):5-41. [doi: 10.1177/001872674700100103]
34. White K, Garces IC, Bandura L, McGuire AA, Scarinci IC. Design and evaluation of a theory-based, culturally relevant outreach model for breast and cervical cancer screening for Latina immigrants. Ethn Dis 2012;22(3):274-280 [FREE Full text] [Medline: 22870569]

35. Wan Mamat WH, Jarrett N, Lund S. An exploration of family members' roles in the context of breast cancer: a narrative study in Malaysia. MJMHS 2022 Nov 15;18(6):14-20. [doi: 10.47836/mjmhs.18.6.3]
36. Yuliatun L, Saputriyana T, Masitah PD, Astari AM, Fevriasanty FI. The relationship of knowledge, family support, and health information accessibility with breast self-examination motivation. IJOMS 2023;2(10):3283-3293. [doi: 10.55324/ijoms.v2i10.588]
37. Joo JY, Liu MF. Culturally tailored interventions for ethnic minorities: a scoping review. Nurs Open 2021 Sep;8(5):2078-2090. [doi: 10.1002/nop2.733] [Medline: 34388862]

Abbreviations

BC: breast cancer
BSE: breast self-examination
COREQ: Consolidated Criteria for Reporting Qualitative Research

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Differential Association of Inflammation With Pain and Physical Function in Knee Osteoarthritis by Race Focusing on Non-Hispanic Whites and Asian Americans: Pilot Study in Florida

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Abstract

Background: The current body of work has not yet addressed the potential racial differences in the relationship between systemic inflammation and knee osteoarthritis (OA) symptoms, including pain and physical function.

Objective: This pilot study aimed to investigate this association specifically among non-Hispanic Whites and Asian Americans.

Methods: We cross-sectionally analyzed 40 community-dwelling participants aged 50 - 70 years with self-reported knee OA pain, including 20 non-Hispanic Whites and 20 Asian Americans. Knee OA symptoms were assessed using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and physical function subscales. The serum levels of C-reactive protein (CRP), tumor necrosis factor-alpha (TNF-α), and interleukin-10, as systemic inflammatory markers, were measured. Univariate and multivariable analyses, using stepwise linear regression models, were conducted to examine the correlation between these inflammatory markers and OA symptoms, with systematic adjustment for age.

Results: In non-Hispanic Whites, the above inflammatory markers did not correlate with knee pain or physical function. In Asian Americans, bivariate analyses revealed that CRP and TNF-α levels were associated with worse WOMAC pain scores (r=1.325, P=.041; and r=2.418, P=.036, respectively), and CRP levels were also linked to worse WOMAC physical function scores (r=4.950, P=.035). Multivariate analyses confirmed the association of CRP levels with both worse WOMAC pain (β=1.328, P=.046) and physical function (β=4.974, P=.034) scores in Asian Americans.

Conclusions: CRP may be a clinically relevant marker for knee OA symptoms, specifically in Asian Americans; however, caution is warranted owing to the exploratory nature of this study. Future research is set to benefit from leveraging a larger sample, incorporating additional inflammatory markers, and including racially diverse samples to validate and augment these findings.

Trial Registration: Clinicaltrials.gov NCT02512393; https://www.clinicaltrials.gov/study/NCT02512393

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KEYWORDS
Asian Americans; inflammation; knee osteoarthritis; pain; physical function

Introduction

Background

Knee osteoarthritis (OA) is one of the leading causes of pain, daily living impairments, and disability in people aged ≥45 years. Although local inflammation aggravates OA joint pathologies, systemic inflammatory markers are also elevated in OA, especially in the presence of symptoms such as pain and reduced physical function [1,2]. Notwithstanding, the evidence remains controversial. The pooled results of a meta-analysis indicated a weak correlation between serum C-reactive protein (CRP) levels and knee OA pain [1]. Other studies have identified no significant association between serum CRP levels and knee OA pain or physical function [3,4]. A recent systematic review also reported conflicting associations of other markers, such as interleukin (IL)-6, with pain scores in patients with knee OA [5].

Several researchers argue that inconsistent evidence regarding the relationship between inflammation and knee OA symptoms is attributable to sex-specific differences [6-8]. However, considerably less attention has been focused on the possibility of racial/ethnic disparities in these relationships. Racial/ethnic minority groups, owing to systemic inequities and environmental challenges, may develop a different inflammatory fingerprint than their non-Hispanic White counterparts (ie, epigenetics) [9]. They are also disproportionately susceptible to chronic knee OA pain [10-12]. Nonetheless, most studies on inflammation and knee OA symptoms have failed to specify the racial composition of their samples, predominantly included non-Hispanic White participants, or adopted typical approaches that report average effects from race/ethnicity-adjusted analyses, possibly obscuring crucial dissimilarities. Overlooking such differences potentially hinders the development of personalized approaches to analgesic care and interventions that improve physical function, ultimately impeding efforts to reduce pain inequities across groups.

To our knowledge, no study has elucidated the potential racial/ethnic differences in the relationship between systemic inflammatory markers and knee OA symptoms. Only recently, Overstreet et al [13] found that the expressions/profiles of biomarkers underlying inflammation associated with chronic low back pain-related outcomes (ie, pain interference, pain at rest, and movement-evoked pain) differed between non-Hispanic Whites and non-Hispanic Blacks.

Study Aim

This pilot study investigated the relationship between inflammation and knee OA symptoms (ie, pain and physical function) by race. Specifically, we compared non-Hispanic Whites to Asian Americans. Asian Americans constitute a rapidly growing minority yet have been underrepresented in knee OA research, despite emerging evidence indicating that they experience greater knee OA symptoms than non-Hispanic Whites [10,11]. This underscores the critical importance of studying this population.

Methods

Study Design and Participants

This cross-sectional analysis used baseline data from a randomized controlled trial (RCT) registered at clinicaltrials.gov (NCT02512393) to assess the efficacy of transcranial direct current stimulation (tDCS) in mitigating knee OA pain. The parent trial employed a double-blind, sham-controlled, parallel-group design, in which participants were randomly assigned to receive either active tDCS (n=20) or sham tDCS (n=20). Participants underwent daily 20-minute stimulation sessions for 5 consecutive days. Additional details regarding the design and procedures of the parent RCT are reported elsewhere [14,15]. At baseline, a total of 40 individuals with self-reported knee OA pain (20 non-Hispanic Whites and 20 Asian Americans) were recruited in North Central Florida between September 2015 and August 2016. Prior to the intervention, participants completed comprehensive baseline assessments, including demographic characteristics, clinical measures, knee OA pain severity, physical function, and relevant biological factors. The breadth and depth of these baseline data provided a robust foundation for the present cross-sectional analyses.

Recruitment was conducted through a combination of posted flyers, email advertisements, and community-based outreach efforts at local clinics, hospital-based outpatient services, and community centers. Flyers and electronic announcements described the study purpose, eligibility criteria, and contact information for the research team. Interested individuals contacted the study staff and were provided with additional information about the study. Some participants were recruited via direct referral from treating clinicians in outpatient settings. Potential participants then underwent a standardized screening process, which included an initial telephone screening followed by an in-person eligibility assessment to confirm the inclusion and exclusion criteria prior to enrollment.

Because the present analyses were conducted using baseline data from a parent RCT, the eligibility criteria reflected those of the parent trial rather than being tailored specifically for the current secondary analysis. Participants were eligible if they were aged 50 - 70 years; reported unilateral or bilateral knee OA pain according to the American College of Rheumatology criteria [16,17]; were able to speak and read English; were willing to be randomly assigned to either the intervention or control group; were available to complete five consecutive daily tDCS sessions and weekly follow-up phone assessments for 3 weeks; had no plans to change pain-related medication regimens during the study period; had no contraindications identified through the tDCS safety screening questionnaire (eg, epilepsy) [18]; and were willing and able to provide written informed consent prior to enrollment. Exclusion criteria ensured that participants did not have concurrent medical conditions that could confound OA-related outcomes or coexisting diseases that could hinder protocol completion. Thus, the following were the exclusion criteria: (1) having undergone prosthetic knee replacement or non-arthroscopic surgery on the affected knee, (2) a serious medical illness, such as uncontrolled hypertension, heart failure, or a recent history of acute myocardial infarction, (3) peripheral neuropathy, (4) systemic rheumatic disorders, such as rheumatoid arthritis, systemic lupus erythematosus, and fibromyalgia, (5) alcohol or substance abuse, (6) cognitive impairment, defined as a Mini-Mental Status Exam score of 23 or lower, (7) a history of brain surgery, tumor, seizure, stroke, or intracranial metal implantation, (8) pregnancy or lactation, and (9) hospitalization for a psychiatric illness within the past year.

Measurement

The collected basic characteristics included age, sex (male vs female), marital status (partnered vs unpartnered), BMI (kg/m^2), and Kellgren–Lawrence (KL) radiographic grade (0 - 1 vs 2 - 4), pain catastrophizing, and negative affect. The study assessed pain catastrophizing using the pain catastrophizing scale (PCS), a 13-item measure designed to evaluate catastrophic thinking related to pain across three dimensions: rumination, magnification, and helplessness [19,20]. Each item was scored on a 5-point Likert scale ranging from “not at all” (0) to “all the time” (4). The PCS demonstrated adequate internal consistency, with subscale alphas ranging from 0.66 to 0.87 (α for all items=0.87) [19], and its sensitivity to psychosocial interventions for chronic pain has been well established [21]. Negative affect was assessed using the 10-item negative affect subscale of the Positive and Negative Affect Schedule (PANAS-NA) [22]. Respondents are asked to rate on a 5-point scale (1 = “very slightly or not at all”; 5 = “extremely”) their agreement with 10 descriptors of negative affect (afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared, and upset). The PANAS has been validated and demonstrates reliability, with an alpha coefficient range of .84 to .87 for negative affect [23].

Knee OA Symptoms: Knee OA Pain and Physical Function

Knee OA pain and physical function were measured using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) pain and physical function subscales, where higher scores indicate greater pain and physical functional disability [24]. The pain subscale includes 5 items on a 5-point Likert scale (0 being none to 4 being extreme) measuring the pain severity during walking, climbing stairs, sleeping, resting, and standing. The participants' responses to the pain questions were summed up to derive an aggregated score of pain intensity (range 0 - 20). The physical function subscale asks patients to rate the degree of difficulty in accomplishing 17 activities of daily living on a 5-point scale (0 being none to 4 being extreme). The participants' responses were aggregated to produce a composite score of functional disability (range 0 - 68). The subscales in WOMAC demonstrate reliability and validity in evaluating knee OA in patients [24,25].

Inflammatory Markers

In this study, we also gathered data regarding the following inflammatory markers: CRP, tumor necrosis factor-alpha (TNF-α), IL-1β, IL-6, and IL-10. Owing to substantial missing data (45.0% - 80.0%), we excluded IL-1β and IL-6 from the current analysis. In the original study [15], blood samples were obtained prior to treatment initiation (ie, tDCS) on day 1 and after completing the fifth treatment on day 5. For our analysis, we utilized pre-treatment data acquired on day 1. Blood was drawn into ethylenediaminetetraacetic acid plasma tubes. Samples were inverted five times and stored on ice until further processing. Within 30 min of being collected, samples were centrifuged at 1600×*g* and 4°C for 15 min, aliquoted, and immediately stored in a −80°C freezer.

The plasma samples underwent solid-phase extraction using an Oasis™ Hydrophilic–Lipophilic-Balanced (30 mg) 96-well plate along with a vacuum manifold (Waters Corp.), according to the manufacturer's protocol. Briefly, the plate was conditioned with acetonitrile and equilibrated twice with 0.1% trifluoroacetic acid (TFA) in high-performance liquid chromatography (HPLC)-grade water. Samples were acidified with 1% TFA (1:1) and loaded onto the plate. The plate was washed thrice with 0.1% TFA in HPLC-grade water. The samples were eluted in 60% acetonitrile/40% HPLC-grade water/0.1% TFA and dried in a Savant AES1010 Automatic Environmental SpeedVAC® w/VaporNet Radiant Cover (Thermo Fisher Scientific). Thereafter, they were reconstituted using the original sample volume in assay buffer.

Plasma CRP levels were measured in duplicate using enzyme-linked immunosorbent assays, following the manufacturers' instructions (cat# DCRP00, R&D Systems, Minneapolis, MN; cat# ADI-900 - 071, Enzo Life Sciences, Inc., Farmingdale, NY, respectively). For CRP, the average intra- and interassay CV values were <10.0% and <7.0%, respectively. TNF-α and IL-10 plasma levels were measured in triplicate using a commercial multiplex immunoassay kit (cat# HCYTMAG-60Kl; MilliporeSigma, Burlington, MA) and analyzed using the MILLIPLEX® Analyzer 3.1 xPONENT® System (Luminex Corporation) . Data acquisition was accomplished using the same system and data analysis performed via MILLIPLEX® Analyst Software. Intra- and interassay CVs were <19.0% for all markers.

Statistical Analysis

Descriptive and comparative statistics were employed to determine sample characteristics. As the inflammatory markers were not normally distributed, log transformation was applied to mitigate skewness. When missing data were present (CRP, n=4), listwise deletion was performed, resulting in a streamlined dataset for analysis. Race-stratified analyses were conducted owing to an observed interaction between race and certain inflammatory markers, such as CRP (data not shown). We examined the relationships between BMI and each inflammatory marker, aiming to circumvent possible collinearity (since adiposity proves to be significantly associated with systemic inflammation), and specifically investigated their associations with knee OA symptoms. Multivariable linear regression models were used in the main analysis of each outcome.

Explanatory variables included age, sex, marital status, BMI, and KL radiographic grade, all of which potentially affect both inflammation and knee OA symptoms [26,27]. Pain catastrophizing and negative affect were also considered because of their relation to knee OA symptoms [28-30]. Candidate variables comprised those with *P*<.200 in bivariate analyses: single-factor analysis of variance in cases of variance equality, the Kruskal–Wallis test for qualitative variables, and the simple linear regression test for quantitative variables. Multivariable analysis based on stepwise selection at an alpha value of .05 was conducted to preserve the most relevant variables in the model and distinguish those independently associated with the outcomes. In all multivariable models, systematic adjustment for age was performed. Finally, we conducted diagnostic tests to ensure that the multivariable models satisfied linear regression model assumptions. All statistical analysis was carried out using R Studio (version 4.0.2; R Foundation for Statistical Computing) [31].

Ethical Considerations

The Institutional Review Board (IRB) of the University of Arizona considers investigators engaged in research if (1) they interact with participants for research purposes; (2) they have access to identifying study information; (3) they obtain informed consent from research participants; or (4) the University of Arizona directly receives part of federal funds for the study (ie, the University of Arizona is the prime awardee). If none of the above are true, then the researchers would not require IRB approval. Thus, this secondary analysis of deidentified data from an existing RCT was determined to be exempt from IRB review. Informed written consent was obtained from all participants in the parent trial, and participants were compensated for their time and participation.

Results

Table 1 presents the characteristics of the participants by race. The groups differed in terms of age, BMI, KL radiographic grade, and pain catastrophizing. Asian American participants were significantly younger than non-Hispanic White participants (mean [SD] 54.80 [7.74] vs 65.10 [7.41] years; *P*=.001) and had a lower BMI (mean [SD] 25.02 [3.59] vs 27.98 [3.28] kg/m^2; *P*=.001). A greater proportion of Asian Americans had lower KL radiographic grades (0 – 1) compared with non-Hispanic Whites (80% vs 25%; *P*=.001). Asian American participants also reported higher pain catastrophizing scores than non-Hispanic White participants (mean [SD] 1.33 [1.25] vs. 0.31 [0.74]; *P*=.004). There were no significant differences between the groups in the levels of CRP, TNF-α, and IL-10, or in any WOMAC subscales (*P*>.05).

Table . Comparison of basic characteristics, inflammatory markers, and WOMAC[a] subscale scores between non-Hispanic Whites and Asian Americans (n=40).

Variables	Non-Hispanic Whites (n=20)	Asian Americans (n=20)	*P* value
Age (years), mean (SD)	65.10 (7.41)	54.80 (7.74)	.001[b]
Sex, n (%)			.205
Male	12 (60)	7 (35)	
Female	8 (40)	13 (65)	
Marital status			.127[c]
Married/partnered	13 (65)	18 (90)	
Nonmarried/unpartnered	7 (35)	2 (10)	
Body mass index, kg/m^{2,} mean (SD)	27.98 (3.28)	25.02 (3.59)	.001[b]
Kellgren-Lawrence radiographic grade (grade 0 – 1)			.001[c,b]
Grade 0 – 1	5 (25)	16 (80)	
Grade 2 – 4	15 (75)	4 (20)	
Pain catastrophizing scale score, range: 0 – 6; mean (SD)	0.31 (0.74)	1.33 (1.25)	.004[b]
Negative affect scale score, range: 10 – 50, mean (SD)	14.00 (4.29)	20.15 (9.02)	.165
Inflammatory markers, mean (SD)			
C-reactive protein, ng/nl	2295.27 (3002.13)	1001.12 (898.91)	.114
Tumor necrosis factor-α, pg/ml	10.33 (5.56)	7.51 (3.67)	.067
Interleukin-10, pg/ml	8.38 (5.27)	6.78 (3.69)	.273
Clinical pain measures, mean (SD)			
WOMAC pain, range: 0 – 20	4.90 (2.61)	4.40 (2.74)	.559
WOMAC physical function, range: 0 – 68	16.50 (9.86)	13.6 (9.95)	.361

[a] WOMAC: Western Ontario and McMaster Universities Osteoarthritis.

[b] Significant results.

[c] Fischer exact test.

Table 2 presents the relationships between BMI and inflammatory markers by race. Pearson correlation analyses showed no statistically significant associations between BMI and log-transformed CRP, TNF-α, or IL-10 in either non-Hispanic Whites or Asian Americans (all *P*>.05). Similarly, ANOVA analyses revealed no significant differences in inflammatory marker levels across BMI categories in either group. These findings indicate that BMI was not strongly correlated with inflammatory markers in this sample and did not raise major concerns about multicollinearity in subsequent analyses, as shown in Table 2.

Table . Relationships between BMI and inflammatory markers by race (n=40).

	Non-Hispanic Whites (n=20)			Asian Americans (n=20)		
	log(CRP)[a], ng/nl	log(TNF-α)[b], pg/ml	log(IL-10)[c], pg/ml	log(CRP), ng/nl	log(TNF-α), pg/ml	log(IL-10), pg/ml
Pearson correlation coefficient	0.179	−0.079	−0.190	0.364	0.292	0.218
P value	.507	.740	.421	.115	.212	.356
18.5≤BMI<25[d], mean (SD)	7.49 (1.53)	2.22 (0.59)	2.01 (0.71)	6.13 (0.91)	1.79 (0.62)	1.74 (0.64)
25≤BMI<30[e], mean (SD)	6.75 (0.54)	2.20 (0.33)	1.97 (0.71)	7.11 (0.79)	1.97 (0.38)	1.74 (0.33)
BMI≥30[f], mean (SD)	7.73 (0.73)	2.26 (0.64)	1.87 (0.82)	6.71 (1.07)	2.22 (0.57)	2.11 (0.67)
ANOVA *P* value	.194	.971	.929	.096	.551	—[g]

[a] CRP: C-reactive protein.

[b] TNF-α: tumor necrosis factor-alpha.

[c] IL-10: interleukin-10.

[d] Non-Hispanic Whites (n=5), Asian Americans (n=11).

[e] Non-Hispanic Whites (n=9), Asian Americans (n=7).

[f] Non-Hispanic Whites (n=6), Asian Americans (n=2).

[g] not applicable.

Table 3 presents the results of bivariate and multivariable analyses in both non-Hispanic Whites and Asian Americans. In non-Hispanic Whites, both analyses indicated that only pain catastrophizing was associated with worse WOMAC pain score and WOMAC physical function score (*P*<.050). In Asian Americans, bivariate analysis indicated that CRP and TNF-α levels were associated with a worse WOMAC pain score (*r*=1.325, *P*=.041; *r*=2.418, *P*=.036, respectively), while the CRP level was also related to a worse WOMAC physical function score (*r*=4.950, *P*=.035). In multivariable analysis adjusting for age, only the CRP level was associated with a worse WOMAC pain score (β=1.328, *P*=.046) and a WOMAC physical function score (β=4.974, *P*=.034) in Asian Americans. Of note, the IL-10 level was not significantly associated with WOMAC pain or physical function scores in either non-Hispanic White or Asian American participants in bivariate or multivariable analyses.

Table . Bivariate and multivariable analyses (n=40).

	Non-Hispanic Whites (n=20)								Asian Americans (n=20)							
	WOMAC[a] pain				WOMAC physical function				WOMAC pain				WOMAC physical function			
	Bivariate analysis		Multivariable analysis		Bivariate analysis		Multivariable analysis		Bivariate analysis		Multivariable analysis		Bivariate analysis		Multivariable analysis	
	r	*P* value	β (SE)[b]	*P* value	*r*	*P* value	β (SE)	*P* value	*r*	*P* value	β (SE)	*P* value	*r*	*P* value	β (SE)	*P* value
Age	−0.133	.101	−.062 (0.058)	.304	−0.170	.592	.048 (0.283)	.868	0.030	.724	.032 (0.076)	.683	0.278	.360	.284 (0.266)	.300
Sex	0.043	.378	—[c]	—	0.108	.157	—	—	0.027	.488	—	—	0.001	.921	—	—
Marital status	0.037	.414	—	—	0.004	.802	—	—	0.013	.637	—	—	0.000	.931	—	—
BMI	0.211	.259	—	—	0.682	.335	—	—	0.029	.872	—	—	−0.144	.828	—	—
KL[d] radiographic grade	0.087	.207	—	—	0.002	.860	—	—	0.006	.754	—	—	0.001	.897	—	—
Pain catastrophizing	2.548	<.001[e]	2.370 (0.572)	.001[e]	7.115	.013[e]	7.252 (2.764)	.018[e]	0.478	.345	—	—	1.395	.449	—	—
Negative affect	−0.068	.631	—	—	−0.720	.167	—	—	0.130	.053	—	—	0.279	.269	—	—
log(CRP)[f], ng/nl	−1.035	.157	—	—	−2.789	.283	—	—	1.325	.041[e]	1.328 (0.616)	.046[e]	4.950	.035[e]	4.974 (2.157)	.034[e]
log(TNF-α)[g], pg/ml	−0.115	.930	—	—	−2.613	.596	—	—	2.418	.036[e]	—	—	6.716	.118	—	—
log(IL-10)[h], pg/ml	−0.861	.395	—	—	−4.158	.273	—	—	1.134	.349	—	—	2.297	.604	—	—

[a] WOMAC: Western Ontario and McMaster Universities Osteoarthritis.

[b] SE: standard error.

[c] not applicable.

[d] KL: Kellgren-Lawrence.

[e] Significant results.

[f] CRP: C-reactive protein.

[g] TNF-α: tumor necrosis factor-alpha.

[h] IL-10: interleukin-10.

Discussion

Principal Findings and Comparison With Previous Works

This pilot study investigated whether differences in the relationship between inflammation and knee OA symptoms (pain and physical function) exist between non-Hispanic Whites and Asian Americans. Our adjusted analyses indicated that the CRP level persists as a clinically relevant marker for both knee OA pain and functional disability in Asian Americans. The findings emphasize that inflammatory underpinnings of knee OA symptoms potentially vary among specific racial groups, echoing the results of Overstreet et al [13], which focused on patients with chronic low back pain.

However, interpretation needs caution. The proportion of individuals with early-stage knee OA (KL radiographic grade 0 - 1) significantly differed between the two groups, with 25% and 80% of non-Hispanic Whites and Asian Americans falling into this category, respectively. Evidence suggests that in early-stage knee OA, inflammation is a major reason why patients seek medical assistance in outpatient departments, and anti-inflammatory treatment may be more effective during this stage; in contrast, in late-stage knee OA, pain may not primarily originate from inflammation but rather from other sources that require further investigation [32], a phenomenon corroborated by our study. Furthermore, in the current study, men constituted 60% and 35% of the non-Hispanic White and Asian American samples, respectively. Although this sex composition was not statistically significant, a previous study has reported sex-specific relationships exhibiting weaker associations of CRP and TNF-α with knee pain among men [7]; this possibly, in part, explains our insignificant findings for non-Hispanic Whites.

The findings wherein no relationships were established between inflammatory markers and knee OA symptoms among non-Hispanic Whites aligns with an earlier study predominantly based on non-Hispanic White samples [3]. However, it contrasts with results reported by Zhu et al [33], who found serum CRP to be cross-sectionally and longitudinally associated with knee pain in patients with knee OA, as well as with other research reporting significant associations between knee OA pain and TNF-α [7,34,35]. Nonetheless, direct comparisons are challenging owing to the unknown racial composition of these studies, our pilot study's cross-sectional nature characterized by small sample sizes, varying socioeconomic and clinical characteristics across the study populations, and the multidimensional nature of pain assessed using various tools across the studies.

Notably, the IL-10 level was not associated with knee OA symptoms in either non-Hispanic White or Asian American participants. IL-10 is an anti-inflammatory cytokine that regulates immune homeostasis and may slow the progression of knee OA [36]. Several studies in knee OA have reported null or negative associations between IL-10 levels and clinical pain and function [7,37,38]. Imamura et al [37] found no relationship between serum IL-10 levels and WOMAC pain scores in individuals with painful knee OA and sensitization. Perruccio et al [7] reported that higher serum IL-10 levels were associated with lower WOMAC pain scores, regardless of sex. Similarly, Zhu et al [38] examined longitudinal associations between inflammatory and metabolic markers and WOMAC outcomes and found that an IL-10–related component, characterized by predominantly anti-inflammatory markers, was negatively associated with WOMAC pain and function scores. Yet, none of the aforementioned studies examined racial differences in the associations between IL-10 and knee OA symptoms, limiting comparisons with the present findings and underscoring the need for future research that explicitly considers race.

As health care practices in the United States shift toward precision and targeted medicine, considering demographic factors that potentially influence mechanistic processes is imperative [13]. We acknowledge that our pilot investigation may not have immediate clinical implications. However, our race-specific findings may inform health care providers that treatments chiefly developed based on data from non-Hispanic Whites may not provide optimal analgesic care for Asian Americans and suggest that the future development of novel OA treatment approaches may ultimately vary according to race, depending on the therapeutic target.

Based on our findings, future studies involving larger samples are required to validate our results and facilitate more advanced modeling (eg, with mediators/moderators) to augment current knowledge. In addition, future studies may substantially benefit from leveraging a larger pool of biomarkers that could be analyzed as possible correlational factors for knee OA symptoms. Simultaneously, several studies [5,39], including our own, have relied on a single marker as a measure of inflammatory status; however, recognizing that the inflammatory system is complex and involves multiple feedback mechanisms is indispensable. For example, a study by Zhu et al [38] attempted to address these issues by examining the patterns of 19 different inflammatory markers and adipokines derived from principal component analysis and subsequently exploring their association with knee OA symptoms. Future studies should ascertain whether these associations differ across racial/ethnic groups and also include individuals from other racial/ethnic minority groups, such as non-Hispanic Blacks and Hispanics.

Limitations

This pilot study has certain limitations. First, as this study represents a secondary, cross-sectional analysis of baseline data from a parent RCT, both the study design and the measures available for analysis were determined by the objectives of the parent trial rather than the specific aims of the current study. In addition, the sample size was defined by the feasibility-oriented goals of the parent pilot trial, rather than by statistical power considerations for the present secondary analysis. As such, the findings should be interpreted as exploratory. These design features may also introduce potential sources of bias, including selection bias related to the original eligibility criteria and measurement bias due to reliance on pre-specified baseline assessments. Second, the findings may not be generalizable as they are based on an extremely small convenience sample from a specific region. Furthermore, owing to the small sample size, we could not account for or control heterogeneity within racial groups (ethnicity). Third, the presence of unknown or unmeasured confounding factors, such as the use of nonsteroidal anti-inflammatory drugs, comorbid conditions, psychosocial factors like depression or anxiety, and synovial inflammation, cannot be ruled out. Fourth, the cross-sectional design hindered our ability to determine the directionality of the relationships between variables. Finally, our study was limited by the number of biomarkers assayed.

Conclusions

This pilot study provides pioneering evidence of race-specific relationships between inflammatory markers and knee OA symptoms among non-Hispanic Whites and Asian Americans. Based on our findings, racial/ethnic differences in this context warrant further exploration, with potential implications for the formulation of personalized strategies for managing knee OA symptoms.

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Data Availability

The datasets generated during and/or analyzed during this study are available from the corresponding author on reasonable request.

Authors' Contributions

CL and CKK were responsible for the conception or design of the work. HA contributed to the acquisition of the data. CL and CKK were involved in the analysis and interpretation of the data, as well as drafting the work. CKK and HA revised the manuscript critically for important intellectual content. All authors gave final approval of the version to be published and agreed to be accountable for all aspects of the work.

Conflicts of Interest

HA is the Editor-in-Chief of *Asian/Pacific Island Nursing*. CKK reports consulting relationships with TLC, AposHealth, Kolon Tissue Gene, Express Scripts, Levicept, Enlivex, Pleryon, Avalor, GSK, Moebius Sun, Xalud, and Novartis. CNW’s institution has received research grants from Amgen, Cumberland Pharmaceuticals, Novartis, Lilly, AbbVie, UCB, Pfizer, Artiva, and Bristol Myers Squibb.

References

1. Jin X, Beguerie JR, Zhang W, et al. Circulating C reactive protein in osteoarthritis: a systematic review and meta-analysis. Ann Rheum Dis 2015 Apr;74(4):703-710. [doi: 10.1136/annrheumdis-2013-204494] [Medline: 24363360]
2. Berenbaum F. Osteoarthritis as an inflammatory disease (osteoarthritis is not osteoarthrosis!). Osteoarthr Cartil 2013 Jan;21(1):16-21. [doi: 10.1016/j.joca.2012.11.012]
3. Penninx B, Abbas H, Ambrosius W, et al. Inflammatory markers and physical function among older adults with knee osteoarthritis. J Rheumatol 2004 Oct;31(10):2027-2031. [Medline: 15468370]
4. Stürmer T, Brenner H, Koenig W, Günther KP. Severity and extent of osteoarthritis and low grade systemic inflammation as assessed by high sensitivity C reactive protein. Ann Rheum Dis 2004 Feb;63(2):200-205. [doi: 10.1136/ard.2003.007674] [Medline: 14722211]
5. Dainese P, Wyngaert KV, De Mits S, Wittoek R, Van Ginckel A, Calders P. Association between knee inflammation and knee pain in patients with knee osteoarthritis: a systematic review. Osteoarthr Cartil 2022 Apr;30(4):516-534. [doi: 10.1016/j.joca.2021.12.003]
6. Kaarvatn MH, Jotanovic Z, Mihelic R, et al. Associations of the interleukin-1 gene locus polymorphisms with risk to hip and knee osteoarthritis: gender and subpopulation differences. Scand J Immunol 2013 Feb;77(2):151-161. [doi: 10.1111/sji.12016] [Medline: 23216199]
7. Perruccio AV, Badley EM, Power JD, et al. Sex differences in the relationship between individual systemic markers of inflammation and pain in knee osteoarthritis. Osteoarthr Cartil Open 2019;1(1-2):100004. [doi: 10.1016/j.ocarto.2019.100004] [Medline: 36474721]
8. Perruccio AV, Chandran V, Power JD, Kapoor M, Mahomed NN, Gandhi R. Systemic inflammation and painful joint burden in osteoarthritis: a matter of sex? Osteoarthr Cartil 2017 Jan;25(1):53-59. [doi: 10.1016/j.joca.2016.08.001]
9. Aroke EN, Joseph PV, Roy A, et al. Could epigenetics help explain racial disparities in chronic pain? J Pain Res 2019;12(701–10):701-710. [doi: 10.2147/JPR.S191848] [Medline: 30863142]
10. Ahn H, Weaver M, Lyon DE, et al. Differences in clinical pain and experimental pain sensitivity between Asian Americans and Whites with knee osteoarthritis. Clin J Pain 2017 Feb;33(2):174-180. [doi: 10.1097/AJP.0000000000000378] [Medline: 28060784]
11. Lee C, Kwoh CK, Park J, Park L, Ahn H. Disparities in clinical and experimental pain between Non-Hispanic White and Asian American individuals with knee osteoarthritis and the role of pain catastrophizing: pilot study in Florida. Asian Pac Isl Nurs J 2025 Feb 25;9:e64415. [doi: 10.2196/64415] [Medline: 39999436]
12. Vaughn IA, Terry EL, Bartley EJ, Schaefer N, Fillingim RB. Racial-ethnic differences in osteoarthritis pain and disability: a meta-analysis. J Pain 2019 Jun;20(6):629-644. [doi: 10.1016/j.jpain.2018.11.012] [Medline: 30543951]
13. Overstreet DS, Strath LJ, Sorge RE, et al. Race-specific associations: inflammatory mediators and chronic low back pain. Pain 2024 Jul 1;165(7):1513-1522. [doi: 10.1097/j.pain.0000000000003154] [Medline: 38323608]

14. Ahn H, Woods AJ, Kunik ME, et al. Efficacy of transcranial direct current stimulation over primary motor cortex (anode) and contralateral supraorbital area (cathode) on clinical pain severity and mobility performance in persons with knee osteoarthritis: an experimenter- and participant-blinded, randomized, sham-controlled pilot clinical study. Brain Stimul 2017;10(5):902-909. [doi: 10.1016/j.brs.2017.05.007] [Medline: 28566193]
15. Suchting R, Colpo GD, Rocha NP, Ahn H. The effect of transcranial direct current stimulation on inflammation in older adults with knee osteoarthritis: a Bayesian residual change analysis. Biol Res Nurs 2020 Jan;22(1):57-63. [doi: 10.1177/1099800419869845] [Medline: 31416344]
16. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis: classification of osteoarthritis of the knee. Arthritis & Rheumatism 1986 Aug;29(8):1039-1049. [doi: 10.1002/art.1780290816]
17. Altman R, Alarcón G, Appelrouth D, et al. The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hip. Arthritis Rheum 1991 May;34(5):505-514. [doi: 10.1002/art.1780340502] [Medline: 2025304]
18. Woods AJ, Antal A, Bikson M, et al. A technical guide to tDCS, and related non-invasive brain stimulation tools. Clin Neurophysiol 2016 Feb;127(2):1031-1048. [doi: 10.1016/j.clinph.2015.11.012] [Medline: 26652115]
19. Sullivan MJL, Stanish WD. Psychologically based occupational rehabilitation: the Pain-Disability Prevention Program. Clin J Pain 2003;19(2):97-104. [doi: 10.1097/00002508-200303000-00004] [Medline: 12616179]
20. Sullivan MJ, Thorn B, Haythornthwaite JA, et al. Theoretical perspectives on the relation between catastrophizing and pain. Clin J Pain 2001 Mar;17(1):52-64. [doi: 10.1097/00002508-200103000-00008] [Medline: 11289089]
21. Sullivan MJL, Ward LC, Tripp D, French DJ, Adams H, Stanish WD. Secondary prevention of work disability: community-based psychosocial intervention for musculoskeletal disorders. J Occup Rehabil 2005 Sep;15(3):377-392. [doi: 10.1007/s10926-005-5944-7] [Medline: 16119228]
22. Rosenstiel AK, Keefe FJ. The use of coping strategies in chronic low back pain patients: relationship to patient characteristics and current adjustment. Pain 1983 Sep;17(1):33-44. [doi: 10.1016/0304-3959(83)90125-2] [Medline: 6226916]
23. Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. J Pers Soc Psychol 1988 Jun;54(6):1063-1070. [doi: 10.1037//0022-3514.54.6.1063] [Medline: 3397865]
24. Bellamy N, Buchanan WW, Goldsmith CH, Campbell J, Stitt LW. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol 1988 Dec;15(12):1833-1840. [Medline: 3068365]
25. Roos EM, Klässbo M, Lohmander LS. WOMAC osteoarthritis index. Reliability, validity, and responsiveness in patients with arthroscopically assessed osteoarthritis. Western Ontario and MacMaster Universities. Scand J Rheumatol 1999;28(4):210-215. [doi: 10.1080/03009749950155562] [Medline: 10503556]
26. Hunter DJ, McDougall JJ, Keefe FJ. The symptoms of osteoarthritis and the genesis of pain. Rheum Dis Clin North Am 2008 Aug;34(3):623-643. [doi: 10.1016/j.rdc.2008.05.004] [Medline: 18687276]
27. Heidari B, Hajian-Tilaki K, Babaei M. Determinants of pain in patients with symptomatic knee osteoarthritis. Caspian J Intern Med 2016;7(3):153-161. [Medline: 27757198]
28. Somers TJ, Keefe FJ, Pells JJ, et al. Pain catastrophizing and pain-related fear in osteoarthritis patients: relationships to pain and disability. J Pain Symptom Manage 2009 May;37(5):863-872. [doi: 10.1016/j.jpainsymman.2008.05.009] [Medline: 19041218]
29. Dave AJ, Selzer F, Losina E, et al. Is there an association between whole-body pain with osteoarthritis-related knee pain, pain catastrophizing, and mental health? Clin Orthop Relat Res 2015 Dec;473(12):3894-3902. [doi: 10.1007/s11999-015-4575-4] [Medline: 26443774]
30. Finan PH, Quartana PJ, Smith MT. Positive and negative affect dimensions in chronic knee osteoarthritis: effects on clinical and laboratory pain. Psychosom Med 2013 Jun;75(5):463-470. [doi: 10.1097/PSY.0b013e31828ef1d6] [Medline: 23697467]
31. The R project for statistical computing. URL: https://www.r-project.org/ [accessed 2025-01-08]
32. Li L, Li Z, Li Y, Hu X, Zhang Y, Fan P. Profiling of inflammatory mediators in the synovial fluid related to pain in knee osteoarthritis. BMC Musculoskelet Disord 2020 Feb 14;21(1):99. [doi: 10.1186/s12891-020-3120-0] [Medline: 32059658]
33. Zhu Z, Jin X, Wang B, et al. Cross-sectional and longitudinal associations between serum levels of high-sensitivity c-reactive protein, knee bone marrow lesions, and knee pain in patients with knee osteoarthritis. Arthritis Care Res (Hoboken) 2016 Oct;68(10):1471-1477. [doi: 10.1002/acr.22834] [Medline: 26748954]
34. Loukov D, Karampatos S, Maly MR, Bowdish DME. Monocyte activation is elevated in women with knee-osteoarthritis and associated with inflammation, BMI and pain. Osteoarthr Cartil 2018 Feb;26(2):255-263. [doi: 10.1016/j.joca.2017.10.018]
35. Stannus OP, Jones G, Blizzard L, Cicuttini FM, Ding C. Associations between serum levels of inflammatory markers and change in knee pain over 5 years in older adults: a prospective cohort study. Ann Rheum Dis 2013 Apr;72(4):535-540. [doi: 10.1136/annrheumdis-2011-201047] [Medline: 22580582]
36. Mabey T, Honsawek S. Cytokines as biochemical markers for knee osteoarthritis. World J Orthop 2015 Jan 18;6(1):95-105. [doi: 10.5312/wjo.v6.i1.95] [Medline: 25621214]
37. Imamura M, Ezquerro F, Marcon Alfieri F, et al. Serum levels of proinflammatory cytokines in painful knee osteoarthritis and sensitization. Int J Inflam 2015;2015:329792. [doi: 10.1155/2015/329792] [Medline: 25821631]

38. Zhu J, Ruan G, Cen H, et al. Association of serum levels of inflammatory markers and adipokines with joint symptoms and structures in participants with knee osteoarthritis. Rheumatology (Oxford) 2022 Mar 2;61(3):1044-1052. [doi: 10.1093/rheumatology/keab479] [Medline: 34114615]
39. Dainese P, Mahieu H, De Mits S, Wittoek R, Stautemas J, Calders P. Associations between markers of inflammation and altered pain perception mechanisms in people with knee osteoarthritis: a systematic review. RMD Open 2023 May;9(2):e002945. [doi: 10.1136/rmdopen-2022-002945] [Medline: 37225282]

Abbreviations

CRP: C-reactive protein
IL-10: interleukin-10
KL: Kellgren–Lawrence
OA: osteoarthritis
PANAS: Positive and Negative Affect Schedule
PCS: Pain Catastrophizing Scale
SE: standard error
TNF-α: tumor necrosis factor-alpha
WOMAC: Western Ontario and McMaster Universities Osteoarthritis Index

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Association Between Parental Smoking Status and Adolescent Mental Health: Population-Based Study

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Abstract

Background: Adolescents' mental health problems significantly affect their long-term psychological and physical health. Although peer influence grows during adolescence, parental influence remains critical. Parental smoking is associated with behavioral problems in adolescents.

Objective: This study aimed to investigate the association between parental smoking, particularly maternal smoking, and adolescents' mental health outcomes in South Korea, as research in this area is limited.

Methods: We analyzed data from the nationwide Korea National Health and Nutrition Examination Survey from 2012 to 2017. A total of 2761 adolescents were included in the final analysis after excluding those with missing data. We used ANOVA and chi-square tests to compare adolescents' and parents' baseline characteristics and mental health. In addition, multiple logistic regression analyses were conducted to examine the association between parental smoking status and adolescents' mental health.

Results: Our logistic regression analyses revealed that mothers' current smoking habits were significantly associated with their adolescents' cognitive stress (odds ratio [OR] 1.65, 95% CI 1.06 - 2.56), experiences of melancholy (OR 2.09, 95% CI 1.20 - 3.65), and suicidal ideation (OR 2.39, 95% CI 1.17 - 4.88). Furthermore, adolescents whose mothers were current smokers and had cognitive stress demonstrated higher cognitive stress (OR 2.09, 95% CI 1.12 - 3.90), melancholy (OR 2.27, 95% CI 1.10 - 4.71), and suicidal ideation (OR 2.74, 95% CI 1.21 - 6.23) than those whose mothers were not smokers and had no cognitive stress.

Conclusions: Efforts to improve adolescents' mental health require considering their mothers' smoking status and stress levels. This highlights the need to develop programs to enhance adolescent mental health, manage maternal stress, and promote smoking cessation.

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KEYWORDS

parental smoking; adolescent mental health; suicidal ideation; melancholy; cognitive stress

Introduction

Adolescence is a critical period for the development and maintenance of social and emotional habits that are important for mental health [1]. Mental health issues during adolescence have considerable long-term impacts on one's physical and psychological status, with parental behaviors playing a critical role in this developmental stage [2], including in school connectedness [3,4], emotional and physical health [5], substance misuse [6], and suicide-related injury risk [7,8]. Therefore, prevention and early intervention are essential for effective mental health management and improved social outcomes [9].

Several variables affect the mental health of children and adolescents, including school-, peer-, and family-related factors [10]. However, there is renewed interest in family-related factors that affect children's mental health. In particular, the relationship between parental and children's mental health requires further verification and support [11].

Researchers have identified several parental health-risk behaviors as predictors of poor mental health in children. Parental smoking, particularly maternal smoking, is associated with internalizing and externalizing behavioral problems in children [12-14]. Maternal smoking has been linked to mental health issues in children, including symptoms of melancholy, anxiety, and suicidal ideation [15]. Parental smoking is associated with the initiation and regular use of smoking among children and adolescents [16]. The direct effects of smoking on children and adolescents may be attributed to an induced biological vulnerability to the addictive properties of nicotine, whereas the indirect effects may be driven by nicotine-induced behavioral problems in childhood [17].

A systematic review and meta-analysis showed that compared with smoking cessation, continued smoking was associated with increased depression, stress, and poor overall mental health [18]. However, to our knowledge, no studies have examined the association between parental smoking (as reported by parents) and adolescents' mental health in Asian cultures. Furthermore, as Asian cultures are more receptive to men engaging in smoking than women, societal acceptance of female smoking remains low despite increasing smoking rates in women [19]. In South Korea, the prevalence of depression among adolescents reached 20.3% in 2021, and smoking remains a significant public health concern, with 4.5% of high school students reporting current use [20]. These high rates of mental health issues and smoking highlight the urgent need to understand the family-related factors influencing adolescent well-being in this cultural context.

We expected that parents' sex and smoking status would have differential effects on the mental health outcomes of adolescents. This study examined the association between parental smoking, with a particular focus on maternal smoking, and adolescent mental health in the South Korean cultural context. The current findings will contribute to a more nuanced understanding of these relationships.

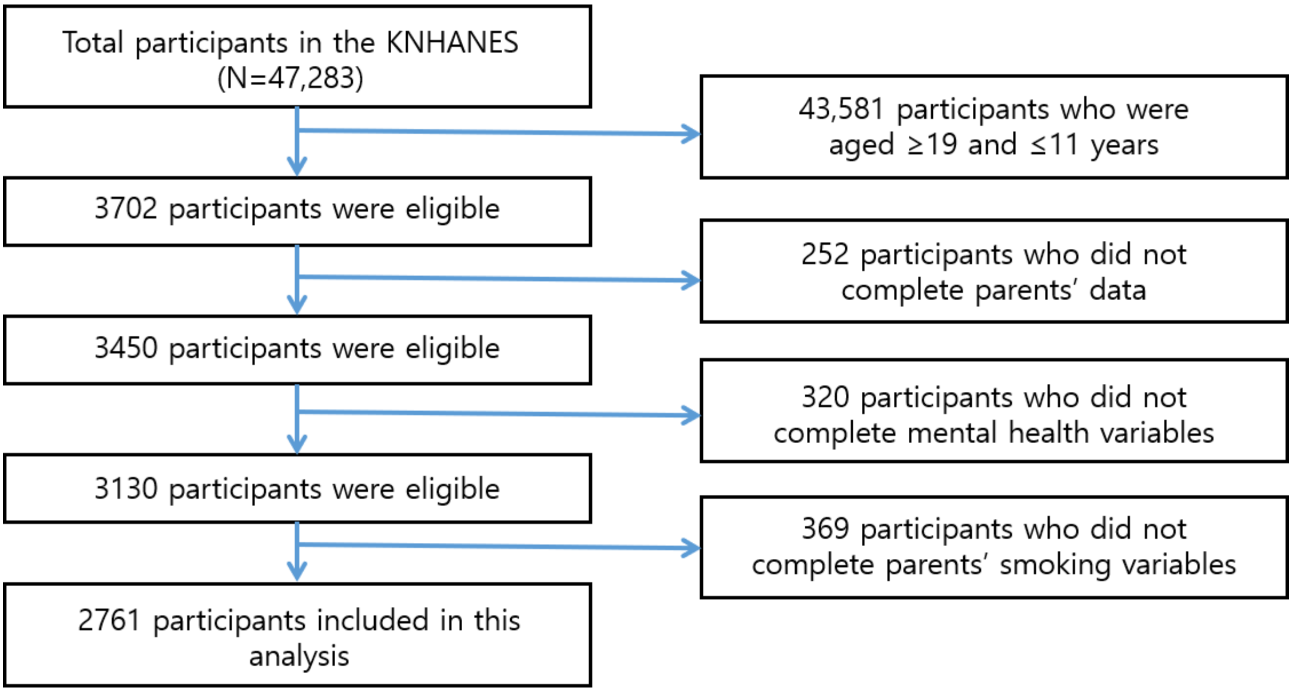
Methods

Study Design and Population

This study analyzed data from the Korea National Health and Nutrition Examination Survey (KNHANES), a cross-sectional, nationally representative survey conducted by the Korea Centers for Disease Control and Prevention from 2012 to 2017. The survey used a stratified multistage probability sampling design to draw a sample representative of the entire South Korean population. The KNHANES included health interviews, health behavior surveys, nutrition surveys, and health examinations.

Of the 47,283 participants enrolled in the KNHANES between 2012 and 2017, we included those aged 12 ‐ 18 years (n=3702). Participants with missing parental (n=252), mental health (n=320), or parental smoking (n=369) variables were excluded. Finally, we examined the data of 2761 adolescents enrolled in the KNHANES (Figure 1).

Figure 1. Schematic depicting the study population. KNHANES: Korea National Health and Nutrition Examination Survey.



Research Variables

Baseline Characteristics

We recorded the following baseline characteristics of adolescents: age, sex, household and personal income levels, smoking status, and alcohol consumption. In addition, we recorded the following baseline parental characteristics: age, education level, current economic activity, BMI, waist circumference, smoking status, and alcohol consumption.

We classified household and personal income based on equivalent income,

average monthly household incomenumber of family members, designating values reflecting the lowest 25% as the first quartile, and the subsequent 3 levels (25% each) as the second, third, and fourth quartiles. We categorized parental education levels as "below university graduation" and "university graduate or higher." We organized current economic activity as "yes" or "no" to represent whether parents were currently employed or unemployed. We classified smoking status according to whether participants currently smoked. We considered participants who consumed more than 30 mL of alcohol per day as heavy drinkers.

Well-trained examiners performed anthropometric measurements during the study period. We acquired measurements for height and waist circumference to the nearest

0.1 cm using a portable stadiometer (Seca 225, Seca) and a calibrated ruler (Seca 200, Seca) after exhalation and from the narrowest point between the lower borders of the ribcage and the iliac crest. We measured weight to the nearest 0.1 kg using a calibrated balance-beam scale (GL-6000 ‐ 20; G-tech). All instruments were calibrated regularly to ensure measurement accuracy, and inter-rater reliability tests were conducted periodically to minimize measurement bias. We calculated BMI as weight divided by height squared (kg/m^2).

Smoking Status

Smoking status was assessed using the question, “Are you currently smoking?” Participants could respond with “I smoke every day,” “I smoke sometimes,” “I smoked in the past, but I don’t smoke currently,” or “not applicable.” We classified participants’ smoking status as “current smoker,” “ex-smoker,” or “never smoked,” with “current smoker” including “every day or occasional smoking.”

Mental Health

The mental health variables included cognitive stress, experiences of melancholy, and suicidal ideation. The following questions were developed and reviewed by a panel of experts for epidemiological research, ensuring their validity as single-item questions. For cognitive stress, we classified the responses of “I feel very stressed,” “I feel stressed a lot,” and “I feel a little stressed” as “yes” and the response of “I hardly feel stressed” as “no.” We determined whether participants experienced melancholy based on the question, “Have you felt sad or depressed for at least 2 consecutive weeks within the last year to the extent that it disturbed your daily life?” To this, participants could answer “yes” or “no.” We assessed suicidal ideation using the question, “Have you thought of committing suicide in the last year?” The possible responses included “yes” and “no.”

We did not measure “experiences of melancholy” as a parental mental health variable in this study; however, we measured the difference in adolescents’ mental health based on whether their parents were diagnosed with depression. We defined participants as being diagnosed with depression if they responded “yes” to the question, “Have you ever been diagnosed with depression by a doctor?”

Statistical Analysis

We used the SAS survey procedure (version 9.3; SAS Institute Inc) to run a complex sample design and analyze the survey data. Mean and SE values were used to represent continuous variables, and mean percentage and SE values were used to represent categorical variables. We used an ANOVA and the chi-square test to compare the baseline characteristics and mental health variables of adolescents and parents. Subsequently, we performed multiple logistic regression analyses to evaluate the association between adolescents’ mental health variables and differences in parental smoking status. We examined the odds ratios (ORs) and 95% CIs after adjusting for age, sex, smoking status, alcohol consumption, and household income. In addition, we examined the ORs and 95% CIs in the association between adolescents’ mental health and mothers’ current smoking status and cognitive stress.

Ethical Considerations

The original data for the KNHANES were collected after being approved by the institutional review board of the Korea Centers for Disease Control and Prevention. Written informed consent was obtained from all participants prior to the original data collection. As this study is a secondary analysis using publicly available and deidentified data, it was determined to be exempt from a separate institutional review board review (number 1041078-202106-HRSB-172-01). No compensation was provided to participants for this specific analysis.

Results

Adolescents’ Mental Health According to Adolescents’ and Parents’ Baseline Characteristics

Table 1 shows adolescents’ mental health according to their baseline characteristics and mental health variables, along with those of their parents.

Table . Adolescents' mental health according to adolescents' and their parents' baseline characteristics (N=2761).

Variables	Cognitive stress			Experience of melancholy			Suicidal ideation		
	No (n=2059)	Yes (n=702)	*P* value	No (n=2536)	Yes (n=225)	*P* value	No (n=2600)	Yes (n=161)	*P* value
Adolescents									
Age (years), mean (SE)[a]	15.1 (0.05)	15.31 (0.08)	.02	15.12 (0.04)	15.52 (0.14)	.007	15.15 (0.04)	15.1 (0.16)	.73
Sex (male), mean % (SE)[b]	54.28 (1.19)	47.32 (2.10)	.005	53.78 (1.07)	38.69 (3.85)	<.001	53.47 (1.06)	37.24 (4.51)	<.001
Household income (lowest Q1), mean % (SE)	9.27 (0.95)	10.76 (1.40)	.34	9.43 (0.85)	12.03 (2.52)	.27	9.32 (0.81)	14.89 (4.01)	.09
Current smoker (yes), mean % (SE)	13.55 (0.90)	21.70 (1.91)	<.001	14.83 (0.86)	24.31 (3.35)	.001	14.98 (0.85)	25.84 (4.41)	.003
Heavy drinker (yes), mean % (SE)	31.93 (1.28)	41.48 (2.19)	<.001	32.61 (1.18)	53.36 (4.19)	<.001	33.38 (1.17)	49.83 (4.28)	<.001
Mothers									
Age (years), mean (SE)	44.15 (0.13)	44.62 (0.19)	.03	44.25 (0.12)	44.48 (0.35)	.52	44.26 (0.11)	44.41 (0.47)	.75
Education (≥ university), mean % (SE)	39.53 (1.55)	38.81 (2.32)	.77	39.62 (1.47)	36.32 (3.64)	.39	40 (1.44)	29.27 (4.10)	.02
Current economic activity (yes), mean % (SE)	66 (1.47)	63.2 (2.25)	.26	65.79 (1.34)	59.68 (3.99)	.12	65.29 (1.33)	65.15 (4.68)	.98
BMI (kg/m^2), mean (SE)	23.24 (0.09)	23.54 (0.17)	.10	23.29 (0.09)	23.58 (0.3)	.35	23.3 (0.09)	23.61 (0.38)	.42
Waist circumference (cm), mean (SE)	77.2 (0.25)	77.99 (0.46)	.11	77.36 (0.24)	77.81 (0.76)	.56	77.38 (0.24)	77.66 (0.94)	.77
Current smoker (yes), mean % (SE)	4.19 (0.61)	7.5 (1.24)	.006	4.66 (0.57)	9.16 (2.20)	.009	4.69 (0.56)	10.32 (3.24)	.02
Heavy drinker (yes), mean % (SE)	5.69 (0.71)	6.91 (1.27)	.36	5.71 (0.66)	9.24 (2.42)	.09	5.88 (0.66)	7.93 (2.65)	.39
Cognitive stress (yes), mean % (SE)	25.34 (1.41)	33.95 (2.16)	.001	26.42 (1.22)	39.78 (3.59)	<.001	26.69 (1.18)	40.64 (4.80)	.002

Variables	Cognitive stress			Experience of melancholy			Suicidal ideation		
	No (n=2059)	Yes (n=702)	*P* value	No (n=2536)	Yes (n=225)	*P* value	No (n=2600)	Yes (n=161)	*P* value
Diagnosis of depression (yes), mean % (SE)	3.89 (0.52)	5.21 (0.93)	.16	4.07 (0.48)	5.94 (1.79)	.23	4.1 (0.48)	6.25 (2.30)	.27
Fathers									
Age (years), mean (SE)	47.01 (0.15)	47.54 (0.23)	.04	47.11 (0.14)	47.41 (0.42)	.49	47.16 (0.14)	46.82 (0.53)	.54
Education (≥ university), mean % (SE)	50.72 (1.89)	45.87 (2.90)	.10	49.87 (1.81)	45.76 (4.69)	.38	49.89 (1.78)	43.87 (5.69)	.29
Current economic activity (yes), mean % (SE)	94.51 (0.88)	95.07 (1.15)	.66	94.67 (0.83)	94.39 (1.76)	.88	94.88 (0.77)	90.93 (4.25)	.24
BMI (kg/m^2), mean (SE)	24.89 (0.11)	24.70 (0.16)	.28	24.84 (0.10)	24.88 (0.26)	.90	24.84 (0.10)	24.99 (0.35)	.67
Waist circumference (cm), mean (SE)	86.12 (0.28)	86.19 (0.45)	.88	86.13 (0.27)	86.26 (0.65)	.84	86.09 (0.26)	86.85 (0.97)	.45
Current smoker (yes), mean % (SE)	42.95 (1.69)	46.15 (2.79)	.30	43.93 (1.59)	41.35 (4.40)	.58	44.11 (1.53)	37.34 (5.62)	.24
Heavy drinker (yes), mean % (SE)	25.46 (1.42)	28.86 (2.37)	.17	26.16 (1.36)	27.68 (4.01)	.71	26.78 (1.34)	18.17 (3.77)	.046
Cognitive stress (yes), mean % (SE)	29.03 (1.56)	32 (2.48)	.27	29.90 (1.44)	28.03 (3.87)	.65	29.6 (1.43)	32.3 (5.15)	.60
Diagnosis of depression (yes), mean % (SE)	2.07 (0.50)	0.42 (0.30)	.01	1.65 (0.41)	1.92 (1.15)	.81	1.73 (0.42)	0.68 (0.68)	.34

[a] Mean (SE) values represent continuous variables.

[b] Mean percentage (SE) values represent categorical variables.

Table . Adolescents' mental health and maternal smoking status (N=2761).

Maternal smoking status	Cognitive stress			Experience of melancholy			Suicidal ideation		
	Mean % (SE)	Model 1[a], OR[b] (95% CI)	Model 2[c], OR (95% CI)	Mean % (SE)	Model 1[a], OR (95% CI)	Model 2[c], OR (95% CI)	% Mean (SE)	Model 1[a], OR (95% CI)	Model 2[c], OR (95% CI)
Never smoked	24.33 (1)	1 (ref[d])	1 (ref)	7.82 (0.63)	1 (ref)	1 (ref)	5.53 (0.53)	1 (ref)	1 (ref)
Ex-smoker	35.19 (5.17)	1.72 (1.08-2.75)	1.63 (1.04-2.59)	10.52 (3.07)	1.45 (0.74-2.85)	1.32 (0.68-2.55)	10.23 (3.20)	1.97 (0.93-4.18)	1.74 (0.80-3.78)
Current smoker	37.83 (5.19)	1.88 (1.20-2.95)	1.65 (1.06-2.56)	15.07 (3.71)	2.09 (1.20-3.65)	1.64 (0.93-2.89)	12.39 (3.84)	2.39 (1.17-4.88)	1.72 (0.88-3.38)

[a] Model 1: adjusted for adolescents' age and sex.

[b] OR: odds ratio.

[c] Model 2: adjusted for adolescents' age, sex, household income, current smoking status, and heavy drinking status.

[d] ref: reference.

Regarding adolescents' cognitive stress, we found significant differences according to their age (*P*=.02), sex (*P*=.005), current smoking status (*P*<.001), and heavy drinking status (*P*<.001); maternal age (*P*=.03), current smoking status (*P*=.006), and cognitive stress (*P*=.001); and paternal age (*P*=.04) and diagnosis of depression (*P*=.01).

For adolescents' experiences of melancholy, we observed significant differences according to their age (*P*=.007), sex (*P*<.001), current smoking status (*P*=.001), and heavy drinking status (*P*<.001), as well as maternal current smoking status (*P*=.009) and cognitive stress (*P*<.001). No significant associations were found for the paternal variables.

Suicidal ideation showed significant differences according to adolescents' sex (*P*<.001), current smoking status (*P*=.003), and heavy drinking status (*P*<.001); maternal education level (*P*=.02), current smoking status (*P*=.02), and cognitive stress (*P*=.002); and paternal heavy drinking status (*P*=.046).

Association Between Adolescents' Mental Health and Parental Smoking Status

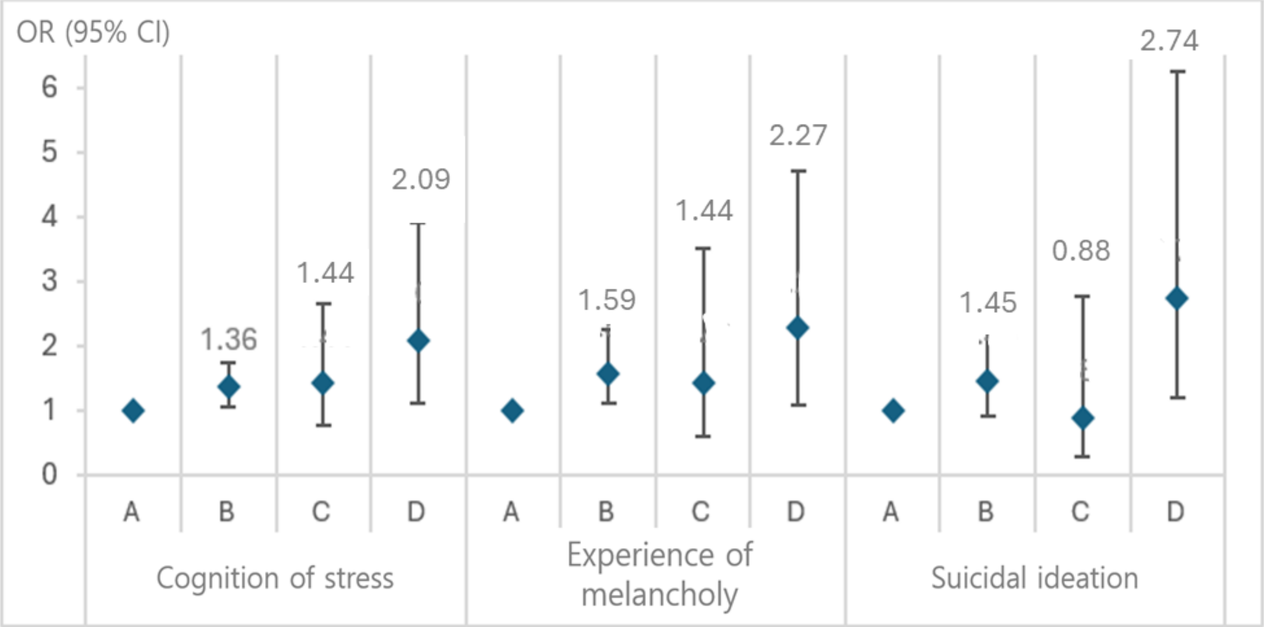
Table 2 presents the association between adolescents' mental health and maternal smoking status. In Model 1 of the logistic regression analysis, we adjusted for adolescent age and sex. In Model 2, we adjusted for adolescent age, sex, smoking status, alcohol consumption, and household income. The analysis revealed that maternal smoking status was significantly associated with adolescents' cognitive stress and melancholy (*P*=.03). The ORs for adolescents' cognitive stress were 1.72 (95% CI 1.08 - 2.75) and 1.63 (95% CI 1.04 - 2.59) in Models 1 and 2, respectively, in the group with mothers who were ex-smokers; the ORs were 1.88 (95% CI 1.20 - 2.95) and 1.65 (95% CI 1.06 - 2.56) in Models 1 and 2, respectively, in the group with mothers who were current smokers. The OR for adolescents' experience of melancholy was significant in Model 1 at 2.09 (95% CI 1.20 - 3.65) only in the group with mothers who were current smokers. In addition, the OR for adolescents' suicidal ideation was significant in Model 1 at 2.39 (95% CI 1.17 - 4.88) only in the group with mothers who were current smokers. Paternal smoking was not significantly associated with adolescents' mental health.

Association Between Adolescents' Mental Health and Mothers' Current Smoking Status and Cognitive Stress

Figure 2 shows the association between adolescents' mental health and mothers' current smoking status and cognitive stress. We classified mothers into 4 groups depending on their current smoking status and cognitive stress: Group A (reference group) for mothers who were "not current smokers and without cognitive stress," Group B for mothers who were "not current smokers but with cognitive stress," Group C for mothers who were "current smokers but without cognitive stress," and Group D for mothers who were "current smokers with cognitive stress." The significant ORs were 1.36 (95% CI 1.06 - 1.75) in Group B and 2.09 (95% CI 1.12 - 3.90) in Group D for adolescents' cognitive stress, and 1.59 (95% CI 1.11 - 2.27) in Group B and 2.27 (95% CI 1.10 - 4.71) in Group D for adolescents' experiences of melancholy.

However, adolescents' suicidal ideation was significant for only Group D (OR 2.74, 95% CI 1.21 - 6.23). Figure 2 shows that adolescents' mental health ORs in Group D (current smokers with cognitive stress) were higher than those in Group A (reference group).

Figure 2. Association between adolescents' mental health and mothers' current smoking status and cognitive stress (N=2761). OR: odds ratio.



Discussion

Principal Findings

This study examined the association between parental smoking status and the mental health of their adolescents in South Korea, specifically focusing on cognitive stress, melancholy, and suicidal ideation. Furthermore, we analyzed these factors separately for mothers and fathers to identify any differences in the effects.

We observed a significant relationship between adolescents' cognitive stress and their parents' age and current smoking status. As parents age and their physical aging progresses, their employment stability may decrease; in addition, they often have to care for their own older parents. This can expose their children to various stressful situations [21]. In addition, mental health problems such as parental depression can negatively affect children's cognitive health. However, strengthening protective factors across various areas of adolescents' lives may help prevent psychological health problems among adolescents [22]. Therefore, researchers should use multiple approaches to improve parental mental health and reduce perceived stress among adolescents.

Mothers' current smoking status and cognitive stress influenced their adolescents' experiences of melancholy, whereas fathers' smoking status had no such significant effect. Parent–child communication is related to adolescents' life satisfaction, with their relationships with mothers having a particularly strong influence on girls [23]. In contrast, adolescent aggression and depressive symptoms were associated with increased mother-adolescent conflict [24]. In South Korean culture, the mother-child relationship is notably close [25], which may explain why mothers have a stronger influence on their adolescents' mental health than fathers. The observed effects of maternal smoking could also be influenced by prevailing social norms. In many Asian cultures, women who smoke may be perceived as violating traditional norms, leading to moral judgments (eg, viewed as less respectable, lacking self-control, or not family-oriented). This social stigma can indirectly affect adolescents' mental health through social pressure, family reputation concerns, or community gossip.

Reiss et al [26] analyzed data from the German National Health Interview and Examination Survey for children and adolescents, revealing that children of parents with higher education levels had fewer mental health problems in response to stressful life situations than their peers. Moreover, Guerrero et al [27] reported that the children of parents with lower education levels required interventions to address their risk of developing mental health problems due to stressful situations. These results echo those of our study, as parents' level of education can create high expectations for their children to study or go to school. In addition, the expression of conflict can be attributed to differences in one's future goals.

Maternal smoking and cognitive stress consistently had significant effects on adolescents' mental health, as mothers' smoking status was associated with their adolescents' cognitive stress, melancholy, and suicidal ideation. Adolescents whose mothers were current smokers and experienced stress exhibited higher cognitive stress, melancholy, and suicidal ideation than those whose mothers did not smoke or experience stress. Amrock and Weitzman [28] analyzed data from the National Health Interview Surveys in the United States to examine the mental health of children aged 4 - 17 years and identified a negative effect of parental mental health and sex on adolescent mental health. However, our study found that only maternal cognitive stress significantly affected adolescents' cognitive stress, melancholy, and suicidal ideation. This could be because in South Korea, mothers are primarily responsible for raising their children; thus, their mental health may have a more significant influence on their children than that of their fathers. Moreover, in a study comparing mothers' child-rearing stress in the United States and South Korea, South Korean mothers showed substantially higher stress levels than did American mothers [29].

Lee et al [30] found that adolescents' mental health was significantly associated with maternal mental health and smoking status but not with paternal mental health. This difference may be because fathers often display cooperative and constructive problem-solving behaviors that adolescents tend to emulate. However, their focus on problem-solving may reduce emotional engagement, making interactions feel less supportive than the warmth typically provided by mothers [31]. Moreover, maternal depression can impair mother-child attachment and elevate maternal stress, leading to diminished nurturing behaviors. This creates a stressful home environment, potentially resulting in developmental challenges and emotional difficulties for adolescents [32]. Children may develop psychological symptoms as a result of receiving insufficient support during challenging moments, thereby necessitating the consideration of parental mental health [33]. By addressing parents' needs through family support programs, health professionals can improve the mental and behavioral health of adolescents as well as the happiness and nurturing nature of parents. Such family support programs can be a part of treatment and prevention [34].

Stress is a significant risk factor for smoking, as individuals often smoke to reduce stress [35]. In South Korea, the negative perception of women smoking likely means that the actual number of female smokers is substantially higher than the officially reported smoking rates [36]. Therefore, women may be more likely to smoke in personal spaces, such as their homes, than in public areas; therefore, children may be more likely to be exposed to their mothers' smoking.

Our findings provide valuable evidence supporting the influence of parental smoking on adolescents' mental health. However, this study has some limitations. First, our cross-sectional design limits causal interpretation. We analyzed data from the nationwide KNHANES; therefore, the results are associative rather than causative, restricting our ability to confirm causal relationships between parental smoking and adolescent mental health outcomes. Second, this study focused exclusively on South Korean adolescents and parents; therefore, the results may not apply to populations in different cultural or social environments, and their generalizability may be limited. Finally, the accuracy of self-reported parental smoking status remains a potential issue. The cultural stigma surrounding women engaging in smoking in South Korea may lead to the underreporting of mothers' smoking behaviors. Future research should consider a wider range of variables and interaction effects to provide a more comprehensive analysis of the factors affecting adolescent mental health and strengthen the understanding of these relationships across cultural contexts. In addition, future studies should incorporate longitudinal data to better understand the causality of these variables.

Limitations and Recommendations

The cross-sectional design of our study limits the ability to establish causality, while the self-reported nature of data presents a risk of underreporting, especially for maternal smoking due to cultural stigma. We recommend that future research use longitudinal data to better understand the causal relationships between variables. In addition, we suggest incorporating diverse measurement methods and standardized mental health scales to overcome the limitations of single-item, self-reported data.

Conclusions

We examined the relationship between parental smoking status and the mental health of adolescents in South Korea and found a significant association between adolescents' mental health and mothers' current smoking status. Moreover, maternal stress has a substantial association with their adolescents' well-being. We recommend programs to support mothers in managing their stress without having to rely on smoking and to quit smoking, as this can lead to improvements in their children's mental health. Therefore, systematic support at the national and domestic levels is required. Future research should explore additional factors affecting both parents' and adolescents' mental health.

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Conflicts of Interest

None declared.

References

1. Laurenzi CA, Mamutse S, Marlow M, et al. Critical life course interventions for children and adolescents to promote mental health. Glob Ment Health (Camb) 2023;10:e4. [doi: 10.1017/gmh.2022.58] [Medline: 36843881]
2. Mental health of adolescents. World Health Organization. URL: https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health [accessed 2025-10-07]
3. Kim J, Walsh E, Pike K, Thompson EA. Cyberbullying and victimization and youth suicide risk: the buffering effects of school connectedness. J Sch Nurs 2020 Aug;36(4):251-257. [doi: 10.1177/1059840518824395] [Medline: 30665324]
4. Areba EM, Taliaferro LA, Forster M, McMorris BJ, Mathiason MA, Eisenberg ME. Adverse childhood experiences and suicidality: school connectedness as a protective factor for ethnic minority adolescents. Child Youth Serv Rev 2021 Jan;120:105637. [doi: 10.1016/j.childyouth.2020.105637]

5. Luby JL, Barch D, Whalen D, Tillman R, Belden A. Association between early life adversity and risk for poor emotional and physical health in adolescence: a putative mechanistic neurodevelopmental pathway. JAMA Pediatr 2017 Dec 1;171(12):1168-1175. [doi: 10.1001/jamapediatrics.2017.3009] [Medline: 29084329]
6. Brewer S, Godley MD, Hulvershorn LA. Treating mental health and substance use disorders in adolescents: what is on the menu? Curr Psychiatry Rep 2017 Jan;19(1):5. [doi: 10.1007/s11920-017-0755-0] [Medline: 28120255]
7. Kim S, Kimber M, Boyle MH, Georgiades K. Sex differences in the association between cyberbullying victimization and mental health, substance use, and suicidal ideation in adolescents. Can J Psychiatry 2019 Feb;64(2):126-135. [doi: 10.1177/0706743718777397] [Medline: 29783849]
8. King CA, Brent D, Grupp-Phelan J, et al. Five profiles of adolescents at elevated risk for suicide attempts: differences in mental health service use. J Am Acad Child Adolesc Psychiatry 2020 Sep;59(9):1058-1068. [doi: 10.1016/j.jaac.2019.10.015] [Medline: 31830523]
9. Li Z. Exploring the mechanism of adolescent mental health. J Educ Humanit Soc Sci 2024;26:533-537. [doi: 10.54097/haktr932]
10. Moore GF, Cox R, Evans RE, et al. School, peer and family relationships and adolescent substance use, subjective wellbeing and mental health symptoms in Wales: a cross sectional study. Child Indic Res 2018;11(6):1951-1965. [doi: 10.1007/s12187-017-9524-1] [Medline: 30524519]
11. Kasingku JD, Warouw WN, Lumingkewas EM. Increasing educational awareness of parenting styles and family social support on adolescent mental health. J PAJAR (Pend Pengajaran) 2023;7(4):807. [doi: 10.33578/pjr.v7i4.9524]
12. Kuppens S, Moore SC, Gross V, Lowthian E, Siddaway AP. The enduring effects of parental alcohol, tobacco, and drug use on child well-being: a multilevel meta-analysis. Dev Psychopathol 2020 May;32(2):765-778. [doi: 10.1017/S0954579419000749] [Medline: 31274064]
13. Kang NR, Kwack YS, Song JK, et al. The impact of maternal adverse childhood experiences on offspring's internalizing and externalizing problems. Psychiatry Investig 2021 Nov;18(11):1050-1057. [doi: 10.30773/pi.2021.0343] [Medline: 34710961]
14. McGovern R, Bogowicz P, Meader N, et al. The association between maternal and paternal substance use and child substance use, internalizing and externalizing problems: a systematic review and meta-analysis. Addiction 2023 May;118(5):804-818. [doi: 10.1111/add.16127] [Medline: 36607011]
15. DeSerisy M, Cohen JW, Dworkin JD, et al. Early life stress, prenatal secondhand smoke exposure, and the development of internalizing symptoms across childhood. Environ Health 2023 Aug 25;22(1):58. [doi: 10.1186/s12940-023-01012-8] [Medline: 37620883]
16. Alves J, Perelman J, Ramos E, Kunst AE. Intergenerational transmission of parental smoking: when are offspring most vulnerable? Eur J Public Health 2022 Oct 3;32(5):741-746. [doi: 10.1093/eurpub/ckac065] [Medline: 35712820]
17. Kandel DB, Griesler PC, Hu MC. Intergenerational patterns of smoking and nicotine dependence among US adolescents. Am J Public Health 2015 Nov;105(11):e63-e72. [doi: 10.2105/AJPH.2015.302775] [Medline: 26378847]
18. Taylor G, McNeill A, Girling A, Farley A, Lindson-Hawley N, Aveyard P. Change in mental health after smoking cessation: systematic review and meta-analysis. BMJ 2014 Feb 13;348:g1151. [doi: 10.1136/bmj.g1151] [Medline: 24524926]
19. Sansone N, Yong HH, Li L, Jiang Y, Fong GT. Perceived acceptability of female smoking in China. Tob Control 2015 Nov;24 Suppl 4(4):iv48-iv54. [doi: 10.1136/tobaccocontrol-2015-052380] [Medline: 26240136]
20. The 17th (2021) Korea Youth Risk Behavior Survey statistics [Website in Korean]. Korea Disease Control and Prevention Agency. 2022. URL: https://www.kdca.go.kr/yhs/ [accessed 2025-11-12]
21. Penning MJ, Wu Z. Caregiver stress and mental health: impact of caregiving relationship and gender. Gerontologist 2016 Dec;56(6):1102-1113. [doi: 10.1093/geront/gnv038] [Medline: 26035875]
22. Collishaw S, Hammerton G, Mahedy L, et al. Mental health resilience in the adolescent offspring of parents with depression: a prospective longitudinal study. Lancet Psychiatry 2016 Jan;3(1):49-57. [doi: 10.1016/S2215-0366(15)00358-2] [Medline: 26654748]
23. Jiménez‐Iglesias A, García‐Moya I, Moreno C. Parent–child relationships and adolescents' life satisfaction across the first decade of the new millennium. Fam Relat 2017 Jul;66(3):512-526. [doi: 10.1111/fare.12249]
24. Lee DS, Cederbaum JA, Davis JP, Hurlburt MS, Mennen FE. Maternal and adolescent depressive symptoms and family conflict: an autoregressive cross-lagged examination of competing models in multi-stressed mothers and adolescents. Fam Process 2023 Mar;62(1):254-271. [doi: 10.1111/famp.12779] [Medline: 35545438]
25. Lee MK, Baker S, Whitebread D. Culture-specific links between maternal executive function, parenting, and preschool children's executive function in South Korea. Br J Educ Psychol 2018 Jun;88(2):216-235. [doi: 10.1111/bjep.12221] [Medline: 29654660]
26. Reiss F, Meyrose AK, Otto C, Lampert T, Klasen F, Ravens-Sieberer U. Socioeconomic status, stressful life situations and mental health problems in children and adolescents: results of the German BELLA cohort-study. PLoS One 2019;14(3):e0213700. [doi: 10.1371/journal.pone.0213700] [Medline: 30865713]
27. Guerrero AD, Herman A, Teutsch C, Dudovitz R. Evaluation of a health education intervention to improve parental knowledge and attitudes about chronic stress and depression among Head Start families. Health Promot Pract 2023 Mar;24(2):261-271. [doi: 10.1177/15248399211061132] [Medline: 34957866]

28. Amrock SM, Weitzman M. Parental psychological distress and children’s mental health: results of a national survey. Acad Pediatr 2014;14(4):375-381. [doi: 10.1016/j.acap.2014.02.005] [Medline: 24882378]
29. Chung KM, Ebesutani C, Bang HM, et al. Parenting stress and child behavior problems among clinic-referred youth: cross-cultural differences across the US and Korea. Child Psychiatry Hum Dev 2013 Jun;44(3):460-468. [doi: 10.1007/s10578-012-0340-z] [Medline: 23073610]
30. Lee J, Song K, Jeon S, et al. Association of maternal mental health and drinking/smoking with adolescents’ mental health based on the Korea National Health and Nutrition Examination Survey. Front Psychiatry 2023;14:1087300. [doi: 10.3389/fpsyt.2023.1087300] [Medline: 37415692]
31. Flynn HK, Felmlee DH, Shu X, Conger RD. Mothers and fathers matter: the influence of parental support, hostility, and problem solving on adolescent friendships. J Fam Issues 2018 Jun;39(8):2389-2412. [doi: 10.1177/0192513X18755423]
32. Alves RL, Portugal CC, Lopes IM, et al. Maternal stress and vulnerability to depression: coping and maternal care strategies and its consequences on adolescent offspring. Transl Psychiatry 2022 Nov 4;12(1):463. [doi: 10.1038/s41398-022-02220-5] [Medline: 36333302]
33. Spinelli M, Lionetti F, Pastore M, Fasolo M. Parents’ stress and children’s psychological problems in families facing the COVID-19 outbreak in Italy. Front Psychol 2020;11:1713. [doi: 10.3389/fpsyg.2020.01713] [Medline: 32719646]
34. Skeen S, Ahmad JH, Bachman G, et al. Supporting parents of adolescents: a powerful and under-utilised opportunity to influence adolescent development. Vulnerable Child Youth Stud 2023 Jan 2;18(1):1-9. [doi: 10.1080/17450128.2022.2088915]
35. Lawless MH, Harrison KA, Grandits GA, Eberly LE, Allen SS. Perceived stress and smoking-related behaviors and symptomatology in male and female smokers. Addict Behav 2015 Dec;51:80-83. [doi: 10.1016/j.addbeh.2015.07.011] [Medline: 26240941]
36. Woo J. Gendered stigma management among young adult women smokers in South Korea. Sociol Perspect 2018 Jun;61(3):487-508. [doi: 10.1177/0731121417751377]

Abbreviations

KNHANES: Korea National Health and Nutrition Examination Survey
OR: odds ratio

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Personal Agency Support Questionnaire in Acute Psychiatric Inpatients: Development and Instrument Validation Study

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Abstract

Background: Promoting personal agency may reduce perceived coercion and facilitate recovery in acute psychiatric care. However, no patient-reported tool currently exists to evaluate support for personal agency in this setting.

Objective: This study aimed to develop a patient-reported tool (the Personal Agency Support Questionnaire [PASQ]) to assess perceived support for personal agency and to evaluate its psychometric properties among inpatients in acute psychiatric wards.

Methods: We used a literature review and focus group interviews to generate a pool of items for the questionnaire, which was then refined using cognitive interviews and a pretest. We evaluated the construct validity, internal consistency, and test-retest reliability of the newly developed PASQ using a cross-sectional survey of inpatients in acute psychiatric wards. This study was conducted in collaboration with individuals who have lived experiences of mental illness.

Results: We analyzed data from 109 respondents (response rate: 109/178, 61.2%; mean age: 52.9, SD 16.9 years; women participants: 59/109, 54.1%; diagnosed with schizophrenia: 61/109, 56%). The 10-item PASQ demonstrated excellent convergent validity and acceptable discriminant validity. Internal consistency was high (Cronbach α=0.92), and test-retest reliability was moderate (intraclass correlation coefficient 0.68).

Conclusions: This PASQ is a valuable tool for assessing personal agency support in acute psychiatric wards, demonstrating promise for both clinical use in acute psychiatric wards and clinical research.

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KEYWORDS

inpatients; mental disorders; mental health; personal autonomy; psychometrics; surveys and questionnaires

Introduction

Acute psychiatric wards provide rapid treatment to stabilize the symptoms of individuals whose acute mental health challenges cannot be fully managed by community services [1]. Because acute psychiatric symptoms temporarily influence cognitive processes and impair behavioral control [2,3], involuntary treatment and behavioral restrictions are sometimes used to ensure safety [4]. Although many inpatients experience therapeutic benefits from psychiatric hospitalization, it is often a negative experience, with previous studies indicating a high frequency of traumatic events [5,6] that affect patients’ well-being and self-worth [7,8]. This increased distress caused by inpatient stays can lead to the subsequent avoidance of mental health services [6].

The psychiatric care system in Japan has one of the largest numbers of psychiatric beds globally (approximately 319,000), and a long average length of stay (263.2 d) remains a persistent concern [9]. To address this issue, the government has been promoting a shift from long-term hospitalization to community-based care, making the role of acute psychiatric wards—which emphasize short-term stabilization of acute symptoms—increasingly important [10]. Almost half of patients occupying these beds are there involuntarily, and Japanese acute wards use restrictive treatments at significantly higher rates than other countries [11,12]. Key strategies for addressing this urgent issue include minimizing the use of restrictive practices and enhancing staff awareness of the importance of supporting patients’ personal agency [5].

Personal agency is defined as an individual’s ability to control their own lives, pursue their goals [13,14], and perceive a sense of ownership of their own behavior [15]. It incorporates concepts such as intentionality, forethought, self-reactivity, and self-reflectiveness and operates through cognitive, motivational, affective, and choice processes [13]. Personal agency has been conceptualized as encompassing both intrinsic (internal states of being, such as self-confidence and self-awareness) and instrumental (ways of acting, such as goal-directed decision-making and behavioral control) agency [16,17]. This framework builds upon prior conceptualizations of agency, such as Kabeer's distinction between "power within" and "power to" [18].

Personal agency is conceptually related to other key concepts in psychiatric care, such as autonomy, empowerment, and personal recovery. Autonomy is commonly understood as acting in line with one's own values in psychiatry [19] and is regarded as an outcome achieved through processes that constitute personal agency [13,19,20]. In mental health services, support for autonomy emphasizes the promotion of self-determination, with shared decision-making highlighted as a contemporary approach [21,22]. Empowerment is a process by which individuals gain greater control over the decisions and actions that affect their health [23], encompassing both personal agency and broader social and environmental transformation [24]. Personal recovery refers to living a fulfilling life despite experiencing psychiatric symptoms [25] and represents a comprehensive framework in which personal agency is a central driving force that facilitates the recovery process [26-28]. In acute psychiatric care, symptoms and safety requirements often limit the extent to which higher-order processes, such as autonomy and empowerment, can be expressed [19,29]. In contrast, personal agency remains a central mechanism within the recovery process regardless of symptom severity or treatment phase [26-28,30]. Therefore, clarifying how personal agency is supported in daily care is particularly important in acute settings. Personal agency plays a crucial role in reducing feelings of coercion and involuntariness during hospitalization [8]; moreover, it contributes to patient engagement in care and long-term recovery [31,32].

Despite its importance, there are currently no tools available to assess support for personal agency from the patient's perspective. In acute settings, understanding how patients perceive the support they receive and how their voice is reflected in clinical practice is essential for maintaining a balance between safety and patients' personal agency and ultimately fostering care that supports their recovery. Therefore, the aim of this study was to develop and validate the Personal Agency Support Questionnaire (PASQ) as a practical checklist-type questionnaire, rather than a psychometric scale that measures latent constructs, that captures patient-perceived support for personal agency in acute psychiatric settings.

Methods

Overall Design

This study was conducted within acute psychiatric care settings, where supporting personal agency is especially relevant and challenging owing to acute symptoms, rapid clinical decision-making, and safety needs. It consisted of 3 phases. The development and psychometric evaluation of the PASQ were guided by the COSMIN (Consensus-Based Standards for the Selection of Health Measurement Instruments) checklist, which provides international standards for studies on measurement properties of health-related instruments (Checklist 1).

In phase 1, we conducted a literature review and focus group interviews to generate an item pool for the new questionnaire. Subsequently, we conducted cognitive interviews to refine these items.

In phase 2, we conducted a pretest to verify whether the questionnaire items were appropriate for the target group and evaluate the likely responses.

In phase 3, we evaluated the validity and reliability of the PASQ by a cross-sectional survey of inpatients in acute psychiatric wards. Reporting of phase 3 followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) statement for observational studies [33] to ensure methodological rigor and transparent reporting (Checklist 1).

Phase 1: Developing an Initial Item Pool and Cognitive Interview

In phase 1, we conducted a literature review and focus group interviews guided by best-practice recommendations for item pool generation [34]. We referred to existing patient-reported scales assessing various factors, such as recovery, empowerment, and autonomy, that had demonstrated reliability and validity for evaluating individuals with mental illness. From these scales, we incorporated the perspectives of research collaborators with lived experience of mental illness and extracted items according to 3 criteria: (1) the support aligned with personal agency; (2) the support included only the direct experiences of patients' interactions with staff, rather than support provided by hospitals or services; (3) the support focused on foundational aspects of personal agency relevant to acute psychiatric care, rather than directly targeting long-term social participation or self-actualization.

Through team discussions, we grouped items that met these criteria according to similarity in meaning to reduce redundancy and organize the item pool.

In parallel, focus group interviews were conducted with individuals who had experienced acute psychiatric hospitalization within the past 10 years. Participants were recruited from welfare service centers and nonprofit organizations in the Kansai region of Japan using convenience sampling (this approach was used primarily because of existing collaborative networks and logistical feasibility). The focus group interviews aimed to identify support that contributed to personal agency during acute hospitalization. Data collection and analysis were conducted iteratively and concurrently to capture diverse narratives, including unspoken perspectives and differing patterns. For the analysis, we focused on the experiences that were commonly identified as support for personal agency across participants, taking into account differences in backgrounds and experiences. These experiences were integrated and organized according to similarity.

Based on these findings, semantically redundant items were removed or integrated. Through collaborative discussions with our research collaborators with lived experience of mental illness, we selected items that supported personal agency while also considering the psychological burdens and contextual constraints of acute psychiatric settings. During this process, we examined how each support type was perceived and its effectiveness in acute contexts. For example, for the item of “information provision,” participants stated that “too much information can be confusing, and it is more important to understand what is happening now and what to do next.” Upon reflection of such views, the item was refined to ensure that it evaluated whether information was provided at a time and in a manner that patients could understand and accept.

Content validity was examined collaboratively alongside four research collaborators with lived experience of mental illness and one clinical expert. All reviewed each item for clarity, relevance to support for personal agency, and appropriateness for acute psychiatric contexts. A cognitive interview was then conducted with one of the focus groups to confirm that the instructions and item wording could easily be understood.

Phase 2: Pretest

In phase 2, we conducted a pretest with 20 people from 2 acute wards of a psychiatric hospital. One of these wards later participated in the main survey in phase 3 in May 2024. The pretest involved assessing the extent of the burden on questionnaire respondents and identifying items that were frequently left unanswered or often received identical responses.

Phase 3: Evaluation of the Questionnaire

Setting and Participants

To evaluate the validity and reliability of the PASQ, we conducted a cross-sectional survey among inpatients in 6 acute psychiatric wards across 2 psychiatric hospitals in Japan. The hospitals were selected using convenience sampling. Coincidentally, both hospitals were accredited by the Japan Council for Quality Health Care, which ensured a more structured and higher-quality treatment environment compared with many other psychiatric facilities in Japan.

Inpatients were included in this study if they met the following criteria: (1) they had been hospitalized for at least 1 week during their current stay; (2) the attending psychiatrist had confirmed that their mental state and treatment would not be affected by participation in the research; and (3) they were aged 18 years or older. We excluded inpatients who (1) were in isolation or physically restrained; (2) were primarily being treated for a physical illness; and (3) had a diagnosis of dementia or intellectual disability. Nursing managers in each ward identified eligible patients admitted during the study period (from May to September 2024). The first author explained the study to each participant and obtained their informed consent. The estimated required sample size for phase 3 was 100 participants, in accordance with the COSMIN (Consensus-Based Standards for the Selection of Health Measurement Instruments) checklist [35], which provides international guidelines for measurement studies.

Data Collection Procedures

The first author distributed paper-based self-administered questionnaires to each participant. If requested, the first author read the questions aloud or completed responses on the participants’ behalf, using only the exact wording of the items without providing additional explanations to minimize response bias. Participants were informed that their responses would remain confidential, would not affect their treatment, and would never be disclosed to the hospital staff involved in their care. They could either return the questionnaire to the first author directly or seal it in an envelope and place it in the ward’s collection box to ensure privacy.

Measures

The Personal Agency Support Questionnaire

The PASQ is a newly developed tool for assessing perceived support for personal agency even under restricted environments, including acute psychiatric care settings. It is rated on a 5-point Likert-type scale (0=“not at all” to 4=“very much”). A higher score indicates higher perception of the support for personal agency. As it assesses it in a checklist-like manner, it is not expected to be normally distributed. The Japanese version of the scale is provided in Multimedia Appendix 1.

The Japanese Version of Brief INSPIRE (Brief INSPIRE-J)

Given that personal agency is considered a central mechanism supporting personal recovery, and recovery-oriented support is conceptually linked to personal agency, we used the Brief INSPIRE-J to assess convergent validity. It is a shortened, 5-item version of the INSPIRE measure. Each item corresponds to 1 aspect of the concept of personal recovery (connection, hope, identity, meaning and purpose, and empowerment) and is rated on a 5-point Likert-type scale (0=“not at all” to 4=“very much”) [36]. A higher score indicates greater satisfaction of the service user with the professional support they received in their recovery-oriented practice. The validity and reliability of Brief INSPIRE-J have been confirmed in Japan (Cronbach $\alpha \geq 0.82$) [37]. In this study, the Brief INSPIRE-J exhibited high internal consistency, with a Cronbach α of 0.92.

The Japanese Version of the Kessler 6-Item Psychological Distress Scale

Because the psychological distress scale assesses internal emotional states [38], while the PASQ measures the perception of support, these 2 scales are theoretically assumed to assess conceptually distinct constructs. Therefore, we used the Kessler 6-item Psychological Distress Scale (K6) to examine divergent validity. The K6 comprises 6 items that ask respondents how frequently they have experienced symptoms of psychological distress. It is rated on a 5-point Likert-type scale (0=none of the time to 4=all the time) [38], with higher scores indicating a greater likelihood of the respondent having experienced distress. The Japanese version demonstrated equivalent screening performance to that reported for the original English versions (the area under the receiver operating characteristic curve 0.94, 95% CI 0.88 - 0.99) [39]. For K6 in this study, Cronbach $\alpha=0.80$, indicating good internal consistency.

Statistical Analysis

First, we conducted a descriptive analysis to examine the distribution of responses. Convergent validity was assessed assuming a significant and positive correlation with Brief INSPIRE-J; divergent validity was examined assuming an insignificant correlation with K6. The Shapiro-Wilk test demonstrated that the PASQ had a nonnormal distribution; therefore, Spearman's rank correlation coefficients, 95% CI, and *P* values were calculated. Correlation coefficients were interpreted based on Akoglu [40] as follows: 0.00 - 0.19: none/very weak; 0.20 - 0.39: weak; 0.40 - 0.59: moderate; 0.60 - 0.79: strong; and 0.80 - 1.00: very strong.

We calculated Cronbach α coefficients to measure internal consistency, with a value of 0.70 or higher considered sufficient [41]. We also calculated Cronbach α after removing each item and item-to-total correlations, which indicated how well each item aligned with the overall construct. In addition, to prevent inflation of the correlation value, we calculated corrected interitem correlations and the correlation between each item and the sum of the others. Item-to-total correlation and corrected interitem correlations of 0.30 or higher were considered acceptable [42], suggesting that the item contributed well to the overall reliability of the PASQ.

We assessed test-retest reliability in targeting 20 participants over approximately 2 weeks. This interval was established based on previous research, assuming that the memory and experience of the first response would not influence the second response and that little would change between responses. We calculated the intraclass correlation coefficients (ICCs) between the 2 time points to examine test-retest reliability. ICC values were classified as poor (<0.50), moderate (0.50 - 0.75), good (0.75 - 0.90), or excellent (>0.90), in line with Koo and Li [43]. Because the PASQ was developed as a short assessment questionnaire in a checklist manner, following previous studies [44,45], we did not perform factor analysis.

All statistical analyses were performed in *R* (Version 4.4.1; R Core Team) [46]. We used the psych [47] and tidyverse [48] packages for descriptive statistics and reliability analyses and the psych [47], lavaan [49], and irr [50] packages for ICCs. A *P* value of <.05 was considered statistically significant (2-tailed test).

Patient and Public Involvement

Because this research focused on patients' subjective experiences, 4 individuals who had experienced acute psychiatric admissions were involved as research collaborators throughout this study. They advised on the clarity and comprehensibility of item wording and the survey procedures to ensure that the items reflected patients' lived experiences during acute psychiatric hospitalization. Their feedback led to some of the items being revised to better reflect perceived support that is responsive to the individual's sense of readiness and current mental state. This patient and public involvement process followed ethical guidelines and adhered to the principles of meaningful involvement [51]. The study collaborators received a 5000 Japanese yen (US $31.60) gift card as a token of appreciation for attending 2 or 3 meetings.

Ethical Considerations

Because this study involved acute psychiatric inpatients, certain considerations were applied to the recruitment of participants. Attending psychiatrists could restrict the first author from approaching patients to explain the study, if such contact could negatively impact patients' treatment. The first author, who had no clinical or organizational role at the hospitals, explained the study to individual patients privately, without staff present. The voluntary nature of participation, the absence of any effect on treatment, and confidentiality were explained both verbally and in writing, and written informed consent was obtained from all patients. To ensure privacy, data were anonymized in a linkable manner to allow for consent withdrawal. Personal identifiers were stored separately. Data were managed on a password-protected computer and in a locked cabinet. No compensation was provided to participants. The study was approved by the Ethics Committee of the Kobe University Graduate School of Health Sciences and the Graduate School of Medicine at Kyoto University (approval 1172 and R4367), as well as the Ethics Committee of the participating hospital (approval 2024 - 1).

Results

Phase 1: Developing an Initial Item Pool and Cognitive Interview

From the 330 items extracted from existing patient-reported measures, 94 items were selected according to item-selection criteria and grouped according to similarities (eg, respect for strengths and values, support for coping with difficulties, and assistance with decision-making). Focus group interviews were conducted with 12 individuals. Over 8 sessions, commonly reported experiences of support for personal agency in acute settings were identified, such as feeling safe, the ability to express thoughts openly, and the ability to make choices based on recovery level. By integrating insights from both the literature review and the focus group interviews, 10 items were selected, and consensus was reached among the researchers and research collaborators on all items, including their wording and clarity. The cognitive interview confirmed that all items could be easily understood by patients. The instructional texts were revised to ask respondents to reflect on the support received throughout their entire hospitalization and to rate support provided by all staff members in the ward rather than specific individuals.

Phase 2: Pretest

The pretest was conducted with 21 participants from 2 wards. Although 4 participants required assistance (eg, reading support), all completed the questionnaire within approximately 5 minutes. No missing data or extreme response biases were observed.

Phase 3: Evaluation of the Questionnaire

Study Participants

During the recruitment period, we explained the study to 113 of 178 eligible inpatients. Four participants did not return their questionnaires, but the remaining 109 (response rate 61.2%) provided responses and were included in the analysis. Of these 109 participants, 14 (12.8%) requested assistance with either reading the questions or writing their answers. There were no missing values for the main variables. Participant characteristics are presented in Table 1. Over half of the participants (59/109, 54.1%) were women. The overall mean age of participants was 52.9 (SD 16.9) years. Schizophrenia was the most common diagnosis (62/109, 56%), followed by mood disorders (32/109, 29.4%).

Table . Demographic and clinical characteristics of respondents[a].

Variables	Values (N=109)
Age (y), mean (SD)	52.9 (16.9)
Duration of illness (y), mean (SD)	18.9 (15.9)
Length of current hospitalization (d), mean (SD)	36.4 (30.9)
Gender, n (%)	
Women	59 (54.1)
Men	50 (45.9)
Diagnosis, n (%)	
Schizophrenia	61 (56.0)
Mood disorders	32 (29.4)
Substance abuse	7 (6.4)
Anxiety disorder	4 (3.7)
Developmental disability	4 (3.7)
Epileptic psychosis	1 (0.9)
Type of hospitalization at the time of admission, n (%)	
Involuntary hospitalization for medical protection	66 (60.6)
Voluntary hospitalization	34 (31.2)
Involuntary hospitalization	7 (6.4)
Emergency hospitalization	2 (1.8)
Type of hospitalization at the time of the survey, n (%)	
Involuntary hospitalization for medical protection	56 (51.4)
Voluntary hospitalization	49 (45.0)
Involuntary hospitalization	4 (3.7)
Number of previous admissions to a psychiatric hospital, n (%)	
None	24 (22.9)
One	10 (9.5)
Two or more	71 (67.6)

[a] Subsample sizes vary for some variables because of missing responses (n=107 for age, n=105 for number of previous admissions to a psychiatric hospital, and n=99 for duration of illness).

Distribution of the Responses

Table 2 and Figure 1 illustrate the distribution of the responses to each item of the PASQ. Responses were generally skewed toward the higher categories (“quite a bit” and “very much”), with a median score of 3 for all items. Mean scores ranged from 2.48 (SD 1.29) to 2.93 (SD 1.21). A high proportion of respondents (almost 70%) answered “quite a bit” or “very much” to the following items: “Medical staff respect me as a person (75/109, 68.8%),” “Medical staff are involved so that I have a feeling of safety (77/109, 70.6%),” and “Medical staff provide support so that I can handle trouble (76/109, 69.7%).” Although these 3 items and item 6 demonstrated ceiling effects, they were retained to maintain content validity. In contrast, less than 60% of participants answered “quite a bit” or “very much” to the following items: “Medical staff try to understand the reason for my actions (63/109, 57.8%),” “Treatment and care are in line with what I want and the way I wish to be (63/109, 57.8%),” and “Medical staff share future treatment plans and expectations with me (62/109, 56.9%).”

Table . Personal Agency Support Questionnaire item responses and item-to-total correlations (N=109).

Item[a]	Mean (SD)	Median (IQR[b]; range)	Cronbach α when item is deleted[c]	Item-to-total correlation[d]	Corrected Interitem correlation[e]
1	2.83 (1.21)	3 (2; 0-4)	0.92	0.65	0.57
2	2.76 (1.18)	3 (2; 0-4)	0.91	0.78	0.72
3	2.93 (1.21)	3 (2; 0-4)	0.91	0.71	0.64
4	2.84 (1.16)	3 (2; 0-4)	0.91	0.81	0.76
5	2.61 (1.25)	3 (2; 0-4)	0.92	0.63	0.54
6	2.70 (1.32)	3 (2; 0-4)	0.91	0.75	0.67
7	2.48 (1.29)	3 (1; 0-4)	0.91	0.79	0.73
8	2.62 (1.35)	3 (2; 0-4)	0.91	0.80	0.74
9	2.51 (1.41)	3 (2; 0-4)	0.91	0.81	0.75
10	2.67 (1.31)	3 (2; 0-4)	0.90	0.84	0.79

[a] The wording of each item is presented in Figure 1.

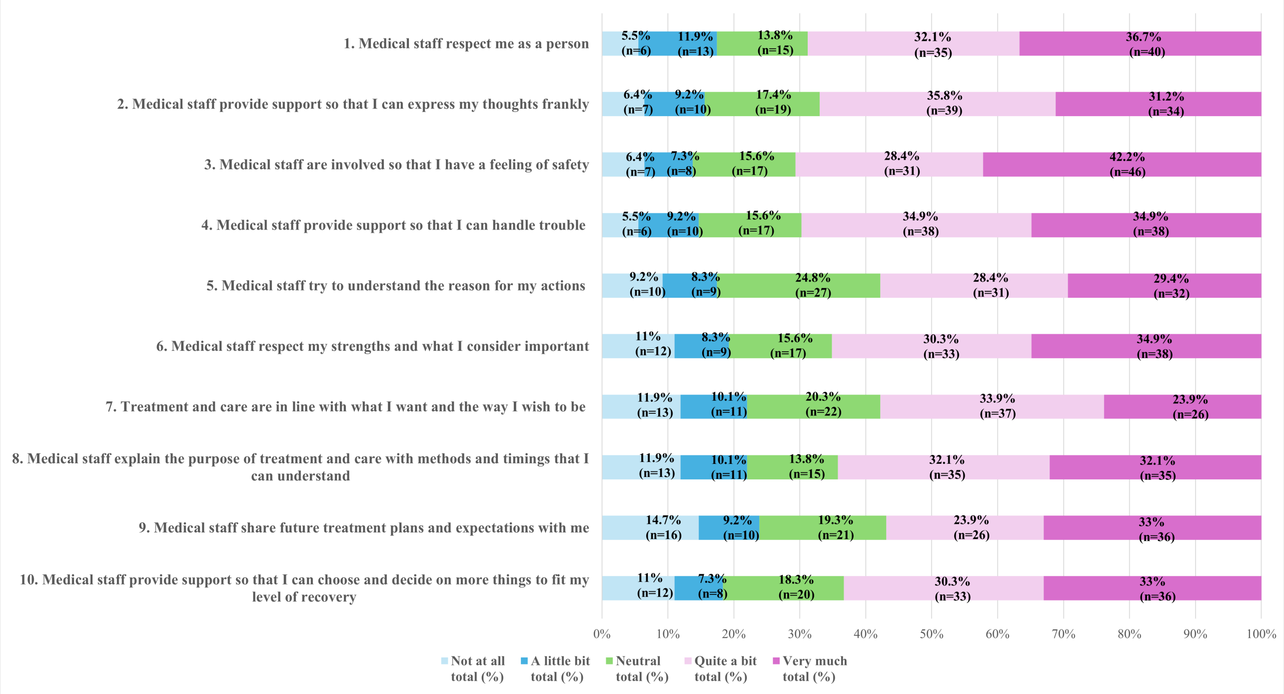
[b] IQR: interquartile range.

[c] Cronbach α when item is deleted: reliability coefficient of the scale if the respective item is removed.

[d] Item-to-total correlation: correlation between the item and the total scale score excluding that item.

[e] Corrected interitem correlation: average correlation between the item and all other items.

Figure 1. Distribution of responses to the Personal Agency Support Questionnaire items (N=109). Bars represent the percentage of participants selecting each response option on a 5-point Likert scale: not at all, a little bit, neutral, quite a bit, and very much.



Convergent and Divergent Validity

We found significant positive correlations between the total PASQ and total Brief INSPIRE-J scores (ρ=0.75, 95% CI 0.63 - 0.85; *P*<.001). There were significant weak and negative correlations between the total PASQ and total K6 scores (ρ=−0.32, 95% CI −0.49 to −0.13; *P*<.001).

Reliability

The total score of the PASQ demonstrated sufficient homogeneity of all items, with a Cronbach α coefficient of 0.92. No single item substantially reduced the internal consistency, with Cronbach α coefficients ranging from 0.90 to 0.92 when each item was removed. Item-to-total correlations ranged from 0.63 to 0.84, indicating strong associations between each item and the overall scale, while corrected interitem correlations ranged from 0.54 to 0.79, suggesting adequate interitem relatedness without excessive redundancy. The ICC value for the total score was 0.68 (95% CI 0.37-0.86; n=21), indicating moderate test-retest reliability.

Discussion

Key Findings and Interpretation

The newly developed PASQ assesses patients’ perceptions of the support for their personal agency. Although some participants required assistance to complete the survey, most were able to respond appropriately independently. This suggests that the PASQ is feasible for use in acute psychiatric wards. It also exhibited adequate convergent validity, acceptable divergent validity, good internal consistency, and moderate test-retest reliability among inpatients in acute psychiatric wards in Japan.

Although there are existing scales assessing support for similar concepts related to personal agency, such as empowerment and personal recovery [52-54], the PASQ is the first scale developed to evaluate support for personal agency. Several items generated from our study shared similarities with existing tools, such as the Health Care Climate Questionnaire, which assesses professionals’ support for patients’ autonomy [55]. Given that the Health Care Climate Questionnaire does not specifically assess care for patients with mental illness or acute care, the similarities observed between these tools suggest that there are fundamental elements involved in supporting patient personal agency, regardless of the type or stage of illness. However, each item of the PASQ reflects fundamental support elements in acute psychiatric wards. For example, the items related to a feeling of safety and respect reflect the importance of relational safety in acute psychiatric care, as highlighted in previous studies [56-58]. Support aligned with personal values, as captured by several items, contributes to self-understanding and a sense of consistency [59]. Furthermore, providing appropriate information and stage-appropriate choices, as addressed by other items, supports the regaining of control [8].

The relatively high scores for items related to a sense of safety and respect suggest that the psychiatric facilities prioritize these aspects during the acute phase of care. However, comparatively lower scores for items “Medical staff try to understand the reason for my actions,” “Treatment and care are in line with what I want and the way I wish to be,” and “Medical staff share future treatment plans and expectations with me” may reflect the challenge in supporting patients to participate in their treatment during the acute phase, despite its importance for personal agency [8,59,60].

PASQ and Brief INSPIRE-J scores exhibited a significant and strong correlation, confirming convergent validity. This finding supports the proposition that personal agency is key to promoting personal recovery [26-28]. The weak but significant negative correlation between PASQ and K6 did not support our hypothesis. However, this finding is consistent with previous studies, which found a negative relationship between personal agency and psychological distress [61,62]. It is therefore possible that perceived support for personal agency may be slightly associated with the extent of anxiety or depression, supporting the distinction between these concepts and the discriminant validity of the PASQ.

The PASQ exhibited high internal consistency, indicating sufficient homogeneity. Cronbach α values remained stable when items were deleted, suggesting limited redundancy. Item-to-total correlations were moderate to high, confirming that each item contributed meaningfully to the total score and that item deletion was not warranted. However, the moderate test-retest reliability suggests that the PASQ may not be entirely stable over time. This could be attributed to the rapid fluctuations in patients’ conditions in acute psychiatric settings [63] during the 2-week interval or the slightly smaller sample size in this study.

Limitations and Strengths

This study has 2 main limitations. First, it was conducted at only 2 psychiatric hospitals, both of which provide relatively high-quality care. This may explain the relatively high scores observed, suggesting that our findings may not be generalizable to a broader range of clinical settings. Differences in staffing levels, staff training and attitudes, collaboration with community services, and the physical environment may all affect how support for personal agency is provided and perceived. Future research should therefore examine the applicability and validity of the PASQ in more diverse psychiatric settings. Second, the test-retest reliability was not excellent, with wide 95% CIs, which may reflect changes in patient symptoms and the care context during the 2-week interval; a shorter interval with a larger sample size might be more appropriate for acute psychiatric settings. Despite these limitations, this study is valuable as the first to develop a questionnaire for assessing perceived support for personal agency in acute psychiatric wards. It is also strengthened by the involvement of individuals with lived experience of acute psychiatric hospitalization, who helped to ensure that the PASQ reflects users’ perspectives in acute settings.

Implications for Nursing Practice

The PASQ offers a practical approach to enable medical staff to understand how patients perceive support for personal agency in acute psychiatric wards and to apply these perspectives to clinical practice. Nurses, who work most closely with patients, face the challenge of maintaining a balance between delivering treatment, ensuring safety, and supporting patients’ agency [64]. The PASQ may be helpful for nurses to gain an understanding of patients’ subjective experiences and guide individualized care. Future studies could explore the use of the PASQ in staff training, interprofessional education, collaborative care planning in acute settings, and routine clinical reflection to enhance therapeutic engagement and communication. Furthermore, although the PASQ was developed and validated in acute settings, it may also be relevant in other contexts where agency may be compromised, such as long-term psychiatric hospitalization or trauma-related experiences. Future research should explore its applicability in such settings.

Conclusion

In this study, we developed and validated the PASQ, a patient-reported questionnaire that assesses perceived support for personal agency in acute psychiatric inpatients. The questionnaire demonstrated adequate convergent validity, acceptable divergent validity, good internal consistency, and moderate test-retest reliability. The PASQ shows promise as a valuable tool for both clinical practice in acute psychiatric wards and future clinical research.

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Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Authors' Contributions

Conceptualization: TK
Data curation: TK, MS
Formal analysis: TK
Funding acquisition: TK
Methodology: TK, RC, YH
Project administration: TK
Supervision: RC, YH, and MS
Writing – original draft: TK
Writing – review & editing: RC, YH, and MS

Conflicts of Interest

None declared.

Multimedia Appendix 1
Personal Agency Support Questionnaire (PASQ), Japanese version.
[PDF File, 335 KB - apinj_v10i1e83366_app1.pdf]

Checklist 1
STROBE and COSMIN checklists.
[PDF File, 421 KB - apinj_v10i1e83366_app2.pdf]

References

1. Johnson S, Dalton-Locke C, Baker J, et al. Acute psychiatric care: approaches to increasing the range of services and improving access and quality of care. World Psychiatry 2022 Jun;21(2):220-236. [doi: 10.1002/wps.20962] [Medline: 35524608]
2. Kozáková E, Bakštein E, Havlíček O, et al. Disrupted sense of agency as a state marker of first-episode schizophrenia: a large-scale follow-up study. Front Psychiatry 2020;11:570570. [doi: 10.3389/fpsyt.2020.570570] [Medline: 33391045]
3. Vogel DHV, Jording M, Weiss PH, Vogeley K. Temporal binding and sense of agency in major depression. Front Psychiatry 2024;15:1288674. [doi: 10.3389/fpsyt.2024.1288674] [Medline: 38645414]
4. Chieze M, Clavien C, Kaiser S, Hurst S. Coercive measures in psychiatry: a review of ethical arguments. Front Psychiatry 2021;12:790886. [doi: 10.3389/fpsyt.2021.790886] [Medline: 34970171]
5. Hallett N, Dickinson R, Eneje E, Dickens GL. Adverse mental health inpatient experiences: qualitative systematic review of international literature. Int J Nurs Stud 2025 Jan;161:104923. [doi: 10.1016/j.ijnurstu.2024.104923] [Medline: 39383709]
6. Jina-Pettersen N. Fear, neglect, coercion, and dehumanization: is inpatient psychiatric trauma contributing to a public health crisis? J Patient Exp 2022;9:23743735221079138. [doi: 10.1177/23743735221079138] [Medline: 35968056]
7. Bartl G, Stuart R, Ahmed N, et al. A qualitative meta-synthesis of service users’ and carers’ experiences of assessment and involuntary hospital admissions under mental health legislations: a five-year update. BMC Psychiatry 2024 Jun 27;24(1):476. [doi: 10.1186/s12888-024-05914-w] [Medline: 38937705]

8. Silva B, Bachelard M, Amoussou JR, et al. Feeling coerced during voluntary and involuntary psychiatric hospitalisation: a review and meta-aggregation of qualitative studies. Heliyon 2023 Feb;9(2):e13420. [doi: 10.1016/j.heliyon.2023.e13420] [Medline: 36820044]
9. Handbook of health and welfare statistics 2024: Table 2-27 Number of beds in hospitals by type of bed and hospital, establishing organ and bed size of hospital and Table 2-38 Average length of stay for inpatients by type of bed, by year. : Ministry of Health, Labour and Welfare; 2024 URL: https://www.mhlw.go.jp/english/database/db-hh/2-2.html [accessed 2026-01-16]
10. Annual health, labour and welfare report 2024 section i-02: health and medical services [Article in Japanese]. : Ministry of Health, Labour and Welfare; 2024 URL: https://www.mhlw.go.jp/english/wp/wp-hw17/index.html [accessed 2026-01-16]
11. Sugiura K, Yamada Y, Kirihara N, Akiyama T. Mental health and psychiatry in Japan. BJPsych Int 2024 Nov;21(4):100-101. [doi: 10.1192/bji.2024.24] [Medline: 40291619]
12. Newton-Howes G, Savage MK, Arnold R, Hasegawa T, Staggs V, Kisely S. The use of mechanical restraint in Pacific Rim countries: an international epidemiological study. Epidemiol Psychiatr Sci 2020 Dec 2;29:e190. [doi: 10.1017/S2045796020001031] [Medline: 33261713]
13. Bandura A. Social cognitive theory: an agentic perspective. Annu Rev Psychol 2001;52:1-26. [doi: 10.1146/annurev.psych.52.1.1] [Medline: 11148297]
14. Cavazzoni F, Fiorini A, Veronese G. How do we assess how agentic we are? A literature review of existing instruments to evaluate and measure individuals' agency. Soc Indic Res 2022 Feb;159(3):1125-1153. [doi: 10.1007/s11205-021-02791-8]
15. Yamaguchi S, Shiozawa T, Matsunaga A, et al. Development and psychometric properties of a new brief scale for subjective personal agency (SPA-5) in people with schizophrenia. Epidemiol Psychiatr Sci 2020 Apr 10;29:e111. [doi: 10.1017/S2045796020000256] [Medline: 32272978]
16. Malapit H, Quisumbing A, Meinzen-Dick R, et al. Development of the project-level Women's Empowerment in Agriculture Index (pro-WEAI). World Dev 2019 Oct;122:675-692. [doi: 10.1016/j.worlddev.2019.06.018] [Medline: 31582871]
17. Yount KM, Cheong YF, Maxwell L, Heckert J, Martinez EM, Seymour G. Measurement properties of the project-level Women's Empowerment in Agriculture Index. World Dev 2019 Dec;124:104639. [doi: 10.1016/j.worlddev.2019.104639] [Medline: 31798204]
18. Kabeer N. Resources, agency, achievements: reflections on the measurement of women's empowerment. Dev Change 1999 Jul;30(3):435-464. [doi: 10.1111/1467-7660.00125]
19. Bergamin J, Luigjes J, Kiverstein J, Bockting CL, Denys D. Defining autonomy in psychiatry. Front Psychiatry 2022;13:801415. [doi: 10.3389/fpsyt.2022.801415] [Medline: 35711601]
20. Sripada C. Mental disorders involve limits on control, not extreme preferences. In: King M, May J, editors. Agency in Mental Disorder: Oxford University Press; 2022:169-192. [doi: 10.1093/oso/9780198868811.003.0009]
21. Browne J, Penn DL, Bauer DJ, et al. Perceived autonomy support in the NIMH RAISE early treatment program. Psychiatr Serv 2017 Sep 1;68(9):916-922. [doi: 10.1176/appi.ps.201600480] [Medline: 28566027]
22. Hamann J, Holzhüter F, Blakaj S, et al. Implementing shared decision-making on acute psychiatric wards: a cluster-randomized trial with inpatients suffering from schizophrenia (SDM-PLUS). Epidemiol Psychiatr Sci 2020 Jun 16;29:e137. [doi: 10.1017/S2045796020000505] [Medline: 32539907]
23. Health promotion glossary. : World Health Organization; 1998 WHO/HPR/HEP/981 URL: https://iris.who.int/server/api/core/bitstreams/402acba9-d79c-4dad-89ae-5085cb528400/content [accessed 2026-01-16]
24. Ibrahim S, Alkire S. Agency and empowerment: a proposal for internationally comparable indicators. Oxf Dev Stud 2007 Dec;35(4):379-403. [doi: 10.1080/13600810701701897]
25. Anthony WA. Recovery from mental illness: the guiding vision of the mental health service system in the 1990s. Psychosoc Rehabil J 1993;16(4):11-23. [doi: 10.1037/h0095655]
26. Cripps L, Deyell Hood C. Recovery and mental health: exploring the basic characteristics of living well with mental illness. Ther Recreation J 2020;54(2). [doi: 10.18666/TRJ-2020-V54-I2-9948]
27. van Weeghel J, van Zelst C, Boertien D, Hasson-Ohayon I. Conceptualizations, assessments, and implications of personal recovery in mental illness: a scoping review of systematic reviews and meta-analyses. Psychiatr Rehabil J 2019 Jun;42(2):169-181. [doi: 10.1037/prj0000356] [Medline: 30843721]
28. Wood L, Alsawy S. Recovery in psychosis from a service user perspective: a systematic review and thematic synthesis of current qualitative evidence. Community Ment Health J 2018 Aug;54(6):793-804. [doi: 10.1007/s10597-017-0185-9] [Medline: 29188393]
29. Chatwiriyaphong R, Moxham L, Bosworth R, Kinghorn G. The experience of healthcare professionals implementing recovery-oriented practice in mental health inpatient units: a qualitative evidence synthesis. J Psychiatr Ment Health Nurs 2024 Jun;31(3):287-302. [doi: 10.1111/jpm.12985] [Medline: 37807633]
30. Lysaker PH, Leonhardt BL. Agency: its nature and role in recovery from severe mental illness. World Psychiatry 2012 Oct;11(3):165-166. [doi: 10.1002/j.2051-5545.2012.tb00121.x] [Medline: 23024671]
31. Åsbø G, Haavind H, Kruse SH, et al. "Why shouldn't I expect a lot from life?" - a qualitative study of what facilitates long-term recovery in first-episode psychosis. BMC Psychiatry 2025 Apr 28;25(1):423. [doi: 10.1186/s12888-025-06681-y] [Medline: 40295990]

32. Wyder M, Bland R, Crompton D. The importance of safety, agency and control during involuntary mental health admissions. J Ment Health 2016 Aug;25(4):338-342. [doi: 10.3109/09638237.2015.1124388] [Medline: 26743453]
33. von Elm E, Altman DG, Egger M, et al. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. J Clin Epidemiol 2008 Apr;61(4):344-349. [doi: 10.1016/j.jclinepi.2007.11.008] [Medline: 18313558]
34. Boateng GO, Neilands TB, Frongillo EA, Melgar-Quiñonez HR, Young SL. Best practices for developing and validating scales for health, social, and behavioral research: a primer. Front Public Health 2018;6:149. [doi: 10.3389/fpubh.2018.00149] [Medline: 29942800]
35. Mokkink LB, Prinsen CAC, Patrick DL, et al. COSMIN study design checklist for patient-reported outcome measurement instruments. : Amsterdam Public Health Research Institute, Amsterdam University Medical Centers; 2019 URL: https://www.cosmin.nl/wp-content/uploads/COSMIN-study-designing-checklist_final.pdf [accessed 2026-01-16]
36. Williams J, Leamy M, Bird V, et al. Development and evaluation of the INSPIRE measure of staff support for personal recovery. Soc Psychiatry Psychiatr Epidemiol 2015 May;50(5):777-786. [doi: 10.1007/s00127-014-0983-0] [Medline: 25409867]
37. Kotake R, Kanehara A, Miyamoto Y, et al. Reliability and validity of the Japanese version of the INSPIRE measure of staff support for personal recovery in community mental health service users in Japan. BMC Psychiatry 2020 Feb 7;20(1):51. [doi: 10.1186/s12888-020-2467-y] [Medline: 32028913]
38. Kessler RC, Andrews G, Colpe LJ, et al. Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med 2002 Aug;32(6):959-976. [doi: 10.1017/s0033291702006074] [Medline: 12214795]
39. Furukawa TA, Kawakami N, Saitoh M, et al. The performance of the Japanese version of the K6 and K10 in the World Mental Health Survey Japan. Int J Methods Psychiatr Res 2008;17(3):152-158. [doi: 10.1002/mpr.257] [Medline: 18763695]
40. Akoglu H. User's guide to correlation coefficients. Turk J Emerg Med 2018 Sep;18(3):91-93. [doi: 10.1016/j.tjem.2018.08.001] [Medline: 30191186]
41. Prinsen CAC, Mokkink LB, Bouter LM, et al. COSMIN guideline for systematic reviews of patient-reported outcome measures. Qual Life Res 2018 May;27(5):1147-1157. [doi: 10.1007/s11136-018-1798-3] [Medline: 29435801]
42. Lora E, Gaudenzi N, Buriani A, et al. The Italian version of the Postural Assessment Scale for Stroke Patients (PASS): transcultural translation and validation. Arch Physiother 2024;14:96-104. [doi: 10.33393/aop.2024.3092] [Medline: 39634674]
43. Koo TK, Li MY. A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med 2016 Jun;15(2):155-163. [doi: 10.1016/j.jcm.2016.02.012] [Medline: 27330520]
44. Raggi A, Bernard RM, Toppo C, et al. The EMPOWER occupational e-mental health intervention implementation checklist to foster e-mental health interventions in the workplace: development study. J Med Internet Res 2024 Mar 15;26:e48504. [doi: 10.2196/48504] [Medline: 38488846]
45. Punneng S, Arphorn S, Thanachoksawang C, et al. Developing a high school mental health action checklist in Thailand: insights on perception and communication. Front Public Health 2024;12:1437957. [doi: 10.3389/fpubh.2024.1437957] [Medline: 39444964]
46. R Core Team. The R project for statistical computing. The R Foundation. 2024. URL: https://www.R-project.org/ [accessed 2026-01-16]
47. Revelle W. Psych: procedures for psychological, psychometric, and personality research (version 24626). 2024. URL: https://cran.r-project.org/web/packages/psych/index.html [accessed 2026-01-16]
48. Wickham H, Averick M, Bryan J, et al. tidyverse: easily install and load the "Tidyverse"(Version 200). 2023. URL: https://CRAN.R-project.org/package=tidyverse [accessed 2026-01-16]
49. Jorgensen TD, Rosseel Y. lavaan: latent variable analysis (version 06-18). 2024. URL: https://CRAN.R-project.org/package=lavaan [accessed 2025-08-28]
50. Gamer M, Lemon J, Fellows I, irr SP. irr: various coefficients of interrater reliability and agreement (Version 0841). 2019. URL: https://CRAN.R-project.org/package=irr [accessed 2026-01-16]
51. Baines RL, Regan de Bere S. Optimizing patient and public involvement (PPI): identifying its "essential" and "desirable" principles using a systematic review and modified Delphi methodology. Health Expect 2018 Feb;21(1):327-335. [doi: 10.1111/hex.12618] [Medline: 28929554]
52. Barr PJ, Scholl I, Bravo P, Faber MJ, Elwyn G, McAllister M. Assessment of patient empowerment--a systematic review of measures. PLoS One 2015;10(5):e0126553. [doi: 10.1371/journal.pone.0126553] [Medline: 25970618]
53. Campbell S, Zhai J, Tan JY, Azami M, Cunningham K, Kruske S. Assessment tools measuring health-related empowerment in psychosocially vulnerable populations: a systematic review. Int J Equity Health 2021 Nov 17;20(1):246. [doi: 10.1186/s12939-021-01585-1] [Medline: 34789249]
54. Leamy M, Foye U, Hirrich A, et al. A systematic review of measures of the personal recovery orientation of mental health services and staff. Int J Ment Health Syst 2023 Oct 17;17(1):33. [doi: 10.1186/s13033-023-00600-y] [Medline: 37849003]
55. Williams GC, Freedman ZR, Deci EL. Supporting autonomy to motivate patients with diabetes for glucose control. Diabetes Care 1998 Oct;21(10):1644-1651. [doi: 10.2337/diacare.21.10.1644] [Medline: 9773724]

56. Davidson L. Recovering a sense of self in schizophrenia. J Pers 2020 Feb;88(1):122-132. [doi: 10.1111/jopy.12471] [Medline: 30801701]
57. Podolan M, Gelo OCG. The functions of safety in psychotherapy: an integrative theoretical perspective across therapeutic schools. Clin Neuropsychiatry 2023 Jun;20(3):193-204. [doi: 10.36131/cnfioritieditore20230304] [Medline: 37554697]
58. Roennfeldt H, Hamilton BE, Hill N, et al. Our wished-for responses: recommendations for creating a lived and embodied sense of safety during mental health crisis. Health Expect 2024 Jun;27(3):e14122. [doi: 10.1111/hex.14122] [Medline: 38898606]
59. Russo-Netzer P, Atad OI. Activating values intervention: an integrative pathway to well-being. Front Psychol 2024;15:1375237. [doi: 10.3389/fpsyg.2024.1375237] [Medline: 38629035]
60. Reis HT, Lemay EP Jr, Finkenauer C. Toward understanding understanding: the importance of feeling understood in relationships. Soc Personal Psychol Compass 2017 Mar;11(3):e12308. [doi: 10.1111/spc3.12308]
61. Benight CC, Harwell A, Shoji K. Self-regulation shift theory: a dynamic personal agency approach to recovery capital and methodological suggestions. Front Psychol 2018;9:1738. [doi: 10.3389/fpsyg.2018.01738] [Medline: 30298033]
62. Thoits PA. Personal agency in the stress process. J Health Soc Behav 2006 Dec;47(4):309-323. [doi: 10.1177/002214650604700401] [Medline: 17240922]
63. Bolsinger J, Jaeger M, Hoff P, Theodoridou A. Challenges and opportunities in building and maintaining a good therapeutic relationship in acute psychiatric settings: a narrative review. Front Psychiatry 2019;10:965. [doi: 10.3389/fpsyt.2019.00965] [Medline: 32009995]
64. Wyder M, Ehrlich C, Crompton D, et al. Nurses experiences of delivering care in acute inpatient mental health settings: a narrative synthesis of the literature. Int J Ment Health Nurs 2017 Dec;26(6):527-540. [doi: 10.1111/inm.12315] [Medline: 28295948]
65. Edanz: innovative scientific solutions. URL: https://jp.edanz.com/ac [accessed 2026-01-27]

Abbreviations

COSMIN: Consensus-Based Standards for the Selection of Health Measurement Instruments
ICC: intraclass correlation coefficient
K6: Kessler 6-item Psychological Distress Scale
PASQ: Personal Agency Support Questionnaire
STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

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