

Exploring Fairness in Online Nursing Assessments: Insights from Nursing Professors and Students

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ABSTRACT

Background: Fairness in online assessment encompasses the equitable and unbiased evaluation of students' knowledge and skills within a digital learning environment, and it is one of the most critical aspects of assessment. This study examined the perceptions of nursing professors and students regarding the fairness of online exams at Shiraz University of Medical Sciences (SUMS), Shiraz, Iran.

Methods: This qualitative study was conducted using content thematic analysis. The participants were seven nursing professors and 21 nursing students selected from the school of nursing at SUMS, Iran, using purposive sampling from June 2021 to September 2022. To collect data, semi-structured interviews were conducted individually and online across various platforms until data saturation was reached. The study incorporated researcher reviews, peer evaluations, and oversight by an external observer to ensure data accuracy. Four criteria of Lincoln and Guba were considered to evaluate scientific accuracy and strength.

Results: The research revealed three primary themes: fairness, challenges, and strategies for practical online nursing assessments. These themes encompassed 10 categories and 33 subcategories. Both participant groups highlighted the significance of content validity and assessing diverse cognitive skills. However, potential nursing faculty bias and constraints of online testing formats were identified as challenges to achieving fair evaluation.

Conclusion: The study highlighted the necessity for ongoing enhancements in the design and execution of online nursing examinations to achieve increased fairness and effectiveness. Established procedures ensured data accuracy and research strength.

Keywords: Fairness, Online Exam, Perception, Nursing, Students, Assessment, Professors

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Please cite this paper as:

Asefi H, Zarifsanaiey N,
Bazrafkan L, Navipour E.
Exploring Fairness in Online
Nursing Assessments: Insights
from Nursing Professors
and Students. *Interdiscip
J Virtual Learn Med Sci.*
2024;15(4):343-354.doi:10.30476/
ijvlms.2024.104821.1321.

Received: 16-11-2024

Revised: 30-11-2024

Accepted: 30-11-2024

Introduction

Fairness in online assessment refers to the principles and practices that ensure all students are evaluated in a manner that is equitable, unbiased, and reflective of their true abilities and knowledge in the online environment (1). Fairness in online assessments is critical for ensuring accurate evaluations of nursing students and fostering equitable educational opportunities within this vital profession (1). The significance of fairness has garnered considerable global attention across various educational contexts, particularly in nursing education, where the implications for clinical performance and patient outcomes are profound (2). A fair online exam reflects individual student capabilities and promotes a just society by ensuring equal educational and professional opportunities for future nurses (3).

While achieving absolute fairness in any assessment might be unrealistic, the continuous pursuit of improvement along the fairness spectrum is essential (4). This quest is rooted in a long history of test quality that dates back to the 19th century, coinciding with the rise of standardized testing (5). During this period, an increasing emphasis on fairness and validity led to the development of new assessment practices and methodologies, such as correlation and factor analysis (6).

Despite these advancements, concerns about fairness in assessments remain prevalent. Heidarzadeh and colleagues reported a significant prevalence (32.5%) of perceived injustice and inequity in assessment processes, underscoring the urgent need to explore fairness, particularly in the context of online nursing assessments (7). Limited research has specifically addressed the challenges and opportunities for online fair evaluations in nursing. While studies have examined equity in online assessments, there is a pressing need to investigate the unique biases that may arise in online nursing evaluations, especially concerning critical nursing skills such as decision-making and patient interaction (8, 9).

Furthermore, the high-stakes nature of

online nursing exams—impacting licensing and career trajectories—calls for rigorous research to ensure their fairness compared to traditional assessment methods. Cheng and Crumbley's research highlights how question bank design can influence test fairness, emphasizing the importance of exploring how these designs can mitigate biases in online nursing evaluations (10). Faculty concerns regarding limited assessment methods and the monitoring of students during online exams further illustrate the necessity for training and support in developing fair online assessments (4). This knowledge gap becomes even more pronounced, particularly in the context of the swift shift to online education prompted by the COVID-19 pandemic, which has not been adequately addressed in current literature. This study aims to bridge these significant knowledge gaps by focusing on the perceptions of nursing faculty and students regarding fairness in online nursing exams. By examining these perspectives, the research seeks to identify specific areas for improvement, thus contributing to the advancement of fairer online assessments in nursing education. The insights gained from this evaluative process are expected to enhance the quality of learning experiences for nursing students and ultimately improve clinical performance and patient outcomes.

Methods

Study Design and Setting

This study utilized a qualitative content thematic analysis approach, employing individual interviews at the School of Nursing, Shiraz University of Medical Sciences (SUMS), Iran, from June 2021 to September 2022.

Participants and Sampling

The participants in this study consisted of seven nursing professors with at least one year of teaching experience in online courses and 21 nursing students who had completed at least four semesters of their program and had one year of online educational experience. Participants were purposively recruited from

nursing faculty, and those who expressed a willingness to participate were included in the study. Individuals who chose not to continue during the interview for any reason were excluded.

Tools/Instruments

The researchers used qualitative methods to explore professors' and students' perceptions of fairness in online examinations. Data was primarily collected through semi-structured interviews. The central question posed to participants was: "Can you explain what you mean by a fair exam?" The inquiry was focused on various aspects, including the challenges of online exams, factors influencing exam fairness, procedures for ensuring reliability and validity, the role of feedback in promoting fairness, the drawbacks of online exams compared to traditional paper-and-pencil tests, and potential strategies to improve exam accessibility for students with disabilities. Specific questions included: "What are the potential drawbacks of using online exams compared to paper-and-pencil tests?" and "How can technology enhance the accessibility of exams for students with disabilities?"

The following techniques were used in the interview process: prompting, example giving, use of explorative questions, paraphrasing of the volunteer's answer, listening, and use of follow-up questions. The interviewer also practiced bracketing and interviewed in a way that he/she did not interpret any of the interview responses made by the interviewee. All the semi-structured interviews ended with the participants' resumes of what had been discussed during the interview, the notification of whether the interview was over or would be continued in the following meetings, and the acknowledgment of the participants' time and contribution. Also, each interview was recorded, and the transcripts were taken on the same day to avoid record losses.

Rigor - To enhance the reliability of the data, the team utilized four criteria: validity, confirmability, reliability, and transferability (5). Member checking was employed by sharing

the transcripts with participants, allowing them to verify the accuracy and validity of the data. This process enhanced the credibility of the findings and allowed participants to clarify and expand on their responses. Additionally, five experts in e-learning and nursing reviewed the transcriptions, offering their professional insights and expertise to validate the data further. Throughout the research process, multiple meetings among the authors facilitated dynamic discussions and comparative interpretations, ultimately leading to a consensus on the data analysis. Continuous and comparative analysis of the data, along with ongoing reviews of the research process, were conducted to enhance the confirmability of the findings. Validation was achieved through long-term interaction with participants, continuous observation, addressing potential biases, and seeking colleagues' opinions.

Data Collection

Semi-structured interviews were used to gather data from seven professors and 21 students via Adobe Connect, WhatsApp, and Skype. Participants were assured that their identities would remain confidential throughout the research process. This means that any data collected would not be linked back to them personally. This assurance helps participants feel secure, encouraging them to share their thoughts and experiences more freely, which can lead to richer data. Participants were explicitly informed that they had the right to withdraw from the study at any moment without any repercussions. This could be due to discomfort, change of mind, or any other reason. This ethical consideration fosters trust and respects participants' autonomy, making them feel more in control of their involvement in the research.

Prior to the commencement of the interviews, participants received detailed information regarding the study's objectives, methodologies, potential risks, and anticipated benefits. They were asked to provide their consent to participate. The interviews were conducted online using

a synchronous semi-structured format. This means that both the interviewer and participant were present at the same time, allowing for real-time interaction. The semi-structured approach utilized in this study combined a set of predetermined questions with the flexibility to delve deeper into topics based on the participants' answers. This method facilitated a more natural and engaging dialogue, allowing researchers to obtain richer insights from participants.

The interviews were facilitated through popular applications such as Adobe Connect, WhatsApp, and Skype, which made them accessible for participants regardless of location. The choice of these widely used platforms could reduce technological barriers and enhance participant comfort, leading to more effective communication.

Each interview lasted between 30 to 45 minutes. This timeframe was chosen to balance thoroughness with participants' convenience. It provided sufficient time to address essential topics while being brief enough to honor their schedules. This timeframe also contributed to sustaining participants' engagement and concentration, thereby minimizing the potential for fatigue during the discussions. All interviews were audio recorded to document participants' responses accurately. These recordings preserve the subtleties of speech, including tone and emphasis, which are essential for qualitative analysis. Following the interviews, the audio files were transcribed verbatim, creating a comprehensive written account of the discussions. This transcription serves as a reliable record for analysis, enabling researchers to thoroughly investigate participants' responses while ensuring that no details are overlooked.

Data Analysis

The research team thoroughly analyzed the data by employing a rigorous thematic analysis process. Four authors collaborated to categorize the data into themes that accurately reflected the essential elements. To ensure transparency in reporting the

study's methods and results, the team adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist, maintaining the study's rigor (11).

Interviews and data analysis utilized a conventional thematic analysis approach, following the method outlined by Graneheim and Lundman (12). This analytical process was iterative, involving a continuous back-and-forth between the original text and relevant excerpts. Initially, the researchers read the transcriptions multiple times, carefully examining the text to gain a deep understanding of the content. The analysis unit was established by consolidating the transcriptions from the interviews.

The text was divided into meaningful units, summarized, and labeled with initial themes. These themes were developed through collaborative discussions among the authors, ensuring that each theme accurately represented the fundamental meaning of the data. Any discrepancies between coders were resolved through consensus meetings, where differing interpretations were thoroughly discussed until an agreement was reached.

The identified themes were then compared based on their similarities and differences, leading to the development of subcategories and overarching categories. These categories underwent ongoing discussion and refinement among the researchers, with reflection continuing until a final coding scheme was established. Ultimately, the underlying meanings that represented the content of the categories were synthesized into coherent themes.

Ethics - In the initial phone conversation, the researcher outlined the study's objectives and subsequently emailed an informed consent form for participants to fill out. To maintain anonymity, respondents were instructed not to include their names on the forms, which were later decoded by a research assistant to minimize errors. Participation was entirely voluntary, enabling individuals to withdraw at any time, and they were given the chance to review the study's findings prior to finalization.

Results

In this research, the sample consisted of seven nursing professors and 21 students. The majority of professors were female (85.0%) and held a PhD (100.0%), with a median of 18.7 years of teaching experience. Additionally, 57% of students were female, with a median age of 22.5 years. The in-depth analysis of the participants' descriptions generated three main themes: fairness, challenges, and strategies for effective online nursing assessments. These themes encompass 10 categories and 33 subcategories. Together, these main themes, along with their respective categories and subcategories, provide a comprehensive overview of the evaluation methods and practices utilized by professors and students.

Main Findings

The interviews were transcribed entirely, and a comprehensive content analysis was performed. Themes were identified based on the interpretations derived from each interview's content. The following section presents several instances of the thematic analysis method applied based on the interviews.

Theme 1: Fairness in Online Nursing Exams

This theme focuses on the characteristics of fair online nursing exams and strategies to achieve fairness. Interviewees highlighted several aspects:

- *Test Design and Delivery:*

Participants emphasized the importance of clear instructions and the absence of technical glitches. One professor noted, "Clear instructions are essential; they help reduce anxiety and confusion during exams" (Participating Professor No. 4).

Another participant noted that "practice exams resembling the actual online exam enhance student preparedness" (Participating Student No. 2). These subcategories illustrate that well-structured assessments can contribute to a more equitable evaluation environment.

- *Question Design and Bias:*

There were significant concerns regarding the ambiguity of specific questions. A professor stated, "Avoiding difficult or misleading questions is crucial for enabling students to demonstrate their understanding accurately." (Participating Professor No. 3).

Participants also highlighted the need for diversity in exam scenarios: "It's important that our questions reflect diverse patient populations to prepare students for real-world situations" (Participating Student No. 5). This emphasizes the relationship between question design and the overall fairness perceived by students.

- *Assessment Strategies:*

The significance of utilizing a variety of assessment methods was highlighted. One professor remarked, "We need to assess critical thinking, not just rote memorization. Incorporating case studies is vital" (Participating Professor No. 7).

Another participant added, "Multiple assessment methods enable us to gain a more comprehensive understanding of a student's abilities" (Participating Student No. 6). This highlights how diverse assessment strategies contribute to a more equitable evaluation of student competencies.

- *Student Support and Feedback:*

Participants stressed the need for adequate support during exams. A student shared, "Having access to technical support during the exam made a significant difference for me" (Participating Student No. 8).

Another student noted, "Receiving feedback after exams helps me to identify my mistakes and learn how to improve" (Participating Student No. 9). This illustrates how robust support mechanisms enhance the fairness of the online exam experience.

Theme 2: Challenges of Online Nursing Exams

This theme explores the difficulties associated with online nursing exams:

- *Technology Dependence:*

Numerous participants expressed concerns about becoming overly dependent on technology. One student commented, “Technical issues can disrupt the entire exam experience” (Participating Student No. 9), highlighting the challenges posed by technological failures that can undermine the exam’s integrity.

- *Skill Assessment Limitations:*

Participants noted difficulties in assessing hands-on skills. A professor stated, “It’s challenging to evaluate practical skills in a virtual environment” (Participating Professor No. 6).

Another participant expressed concern, stating, “I am apprehensive that my real-life performance is not being accurately evaluated through an online format” (Participating Student No. 10). This highlights the limitations of online assessments in effectively measuring critical nursing competencies.

Standardization and Equity:

Concerns about fairness and equity were raised. One student mentioned, “Not all students have equal access to technology, which affects performance” (Participating Student No. 10).

Another professor remarked, “We need standardized procedures for proctoring to ensure everyone is treated equally” (Participating Professor No. 5). These comments illustrate how the lack of standardization can exacerbate inequities in online assessments.

Theme 3: Strategies for Effective Online Nursing Exams

- *Faculty Development:*

The importance of training for faculty was highlighted. A professor noted, “Training on effective online exam design is crucial for improving assessment quality” (Participating Professor No. 7).

Another participant remarked, “Continuous professional development allows us to remain updated with best practices” (Participating Professor No. 1). This reflects the connection

between faculty preparedness and the overall effectiveness of online assessments.

- *Technology Integration:*

Participants discussed the need for robust technology infrastructure. A professor stated, “Investing in reliable online platforms is essential for seamless exam delivery” (Participating Professor No. 1).

A participating student expressed a similar viewpoint, stating, “When the technology functions effectively, it enhances the overall experience” (Participating Student No. 11). This emphasizes how technology integration directly impacts the quality of the exam experience.

- *Policy and Procedures:*

Establishing clear policies is essential for the effective administration of examinations. A participant noted, “Transparent policies enable students to understand what to anticipate, thereby alleviating anxiety” (Participating Professor No. 2).

Another participant emphasized, “We need clear guidelines on how technical issues will be handled during exams” (Participating Student No. 12). These insights highlight the importance of well-defined policies in fostering a fair and organized assessment environment.

Finally, the findings from the thematic analysis of the interviews were organized into three primary themes, 10 categories, and 33 codes, as presented in Table 1.

Discussion

This study explored the viewpoints of nursing professors and students regarding the fairness of online examinations through qualitative thematic analysis. The findings revealed three main themes: the significance of fairness in online nursing assessments, the challenges related to these assessments, and effective strategies for practical online evaluation.

Nursing professors emphasized the critical role of fairness in online nursing assessments, advocating for a structured approach to test design and analysis.

Table 1: Themes, categories, and codes for online nursing exam evaluation

Themes	Categories	Subcategories (codes)
Fairness in Online Nursing Assessments	Test Design and Delivery	<ul style="list-style-type: none"> • Clarity of online exam instructions • Absence of technical glitches during exams • Accessibility features for students with disabilities • Alignment of online exam format with course learning objectives • Availability of practice exams similar to the actual online exam
	Question Design and Bias	<ul style="list-style-type: none"> • Absence of ambiguous or misleading questions • Representation of diverse patient populations and scenarios in exam questions • Avoidance of stereotypes in case studies or simulations • Focus on essential nursing knowledge and skills • Balance between multiple-choice, open-ended, and simulation-based questions
	Assessment Strategies	<ul style="list-style-type: none"> • Integration of various assessment methods beyond multiple-choice questions (e.g., case studies, simulations) • Opportunities for students to demonstrate critical thinking and clinical judgment skills • Clear grading criteria for online assessments
	Student Support and Feedback	<ul style="list-style-type: none"> • Availability of technical support during online exams • Prompt and constructive feedback on online exam performance • Opportunities for students to clarify exam questions or address technical difficulties
Challenges in Online Nursing Assessments	Technology Dependence	<ul style="list-style-type: none"> • Limited internet access or technical issues faced by students • Security concerns regarding online exams • Potential for cheating or plagiarism in online assessments
	Skill Assessment Limitations	<ul style="list-style-type: none"> • Difficulty in replicating hands-on skills through online assessments • Challenges in evaluating critical thinking and decision-making skills in a virtual environment
	Standardization and Equity	<ul style="list-style-type: none"> • Inconsistency in online exam design and delivery across different nursing programs • Lack of standardized procedures for online proctoring • Unequal access to technology and resources among students
Strategies for Effective Online Nursing Assessments	Faculty Development	<ul style="list-style-type: none"> • Training for faculty on effective online exam design and delivery • Incorporation of best practices for online assessment in nursing education • Support for faculty in developing online simulations and case studies
	Technology Integration	<ul style="list-style-type: none"> • Utilization of reliable and secure online exam platforms • Exploration of innovative technologies for online skills assessment in nursing (e.g., virtual simulations) • Investment in infrastructure to ensure seamless online exam delivery
	Policy and Procedures	<ul style="list-style-type: none"> • Development of clear policies and procedures for online exam administration and proctoring • Establishment of a system for addressing technical issues and student appeals • Transparency in online exam policies and expectations for students

They underscored the need to construct fair tests, administer them effectively, and analyze results to inform future assessments. This structured framework is essential for ensuring that evaluations align with educational objectives, as supported by Oermann and colleagues, who advocate for systematic assessment design to enhance validity and reliability (13). In contrast, nursing students prioritized content validity, calling for exams that accurately reflect course content and learning objectives. They stressed the importance of diverse assessment methods, including various question types beyond multiple-choice and practical assessments such as simulations and skills demonstrations. This aligns with findings from Tepgec and Ifenthaler, which highlight the necessity for assessments that encompass a broader range of competencies to prepare students for real-world nursing scenarios (14).

Several studies have explored the perspectives of professors and students on key components for crafting assessments that effectively evaluate learning outcomes. Key findings underscore the significance of content validity and the consideration of cognitive domains in question formulation (15). Participants expressed distinct viewpoints influenced by their varied backgrounds and experiences. Nursing students tended to emphasize practical performance evaluations, while nursing professors preferred systematic functional assessments and observational evaluations. This divergence illustrates the need for a balanced approach that integrates theoretical knowledge and practical skills, as supported by Gill and colleagues, who noted that reliance on question banks can complicate the assessment process (16).

Challenges in online nursing assessments were evident throughout the study. Professors expressed concerns about potential bias in their evaluations, while students reported issues with unclear grading criteria and flawed evaluation methods. Limited access to technology, unreliable platforms, and inadequate educational facilities further disadvantage students, exacerbated by

inconsistencies in exam design and proctoring procedures across programs. This concern is echoed by Winstone and colleagues, who documented how infrastructure challenges can hinder equitable assessment practices (17).

Both nursing faculty and students emphasized the importance of content validity, ensuring that exams accurately reflect course content. The study revealed potential biases due to factors such as lack of feedback and inadequate reliability assessments, underscoring the need for robust evaluation procedures. Uncontrollable access to exams and dissatisfaction with infrastructure—such as incorrect exam times and poor testing environments—highlight the necessity for well-equipped testing facilities, consistent with previous research indicating that inadequate testing environments can significantly affect student performance and perceptions of fairness (18).

DeCoito and Estaiteyeh's investigation into academic dishonesty among nursing students in online examinations revealed underlying motivations for such misconduct, strategies for deterrence, and the resultant impact on examination integrity. Their findings were found to parallel the current research by identifying challenges associated with rampant cheating in online assessments, compromises the fairness of examinations (8). However, their methodology incorporated advanced measures such as webcams and Proctor Track to mitigate cheating behaviors, a strategy not adopted in our online examination platform (19).

Moreover, Mazzoli and colleagues elucidated the profound influence of educational policy gaps and relational dynamics on the principles of justice and meritocracy. Their research unveiled the intricate interplay of these elements, highlighting their potential to engender biased assessments that impede students' educational advancement (20). The parallels in perspectives between Mazzoli's study and our own remain steady concerning student viewpoints. However, the divergence lies in their respective objectives and methodologies. Cheng and Crumbley

observed that students' reliance on question banks could impede teachers' examination and grading processes when both parties draw from the same question repository (19). While the utilization of question banks was a focal point in their research, it is imperative to advocate for a deliberate and efficient use of these resources by educators and learners to foster the creation of novel questions and mitigate constraints arising from question bank overreliance (21, 22).

To address the challenges in online nursing assessments, the research proposes several strategies for effective implementation. Developing faculty development programs that focus on effective online exam design, mitigating bias, and incorporating best practices for assessments is essential. For instance, the recent research by McGowan and colleagues demonstrated that targeted faculty training significantly improved assessment quality and reduced bias in evaluations (23). Additionally, investing in reliable and secure online platforms, exploring innovative assessment technologies like virtual simulations, and upgrading educational infrastructure are crucial steps (24). Research by Kavanagh and colleagues highlighted that the use of virtual simulations not only enhanced student engagement but also improved practical skill acquisition, thereby addressing content validity concerns (25). Implementing clear policies for online exam administration, establishing systems for addressing technical issues and student appeals, and ensuring transparency in exam expectations are equally essential strategies. A study conducted by Varga and colleagues found that clear communication regarding exam procedures and expectations significantly reduced student anxiety and improved perceptions of fairness (26). The study emphasizes the importance of a balanced approach to test design, considering both theoretical and practical dimensions to enhance the overall quality and fairness of online nursing assessments. This aligns with findings from Fung and colleagues, who suggested that a comprehensive assessment framework integrating various methodologies

can lead to more equitable outcomes in online education (27).

The findings of this study have significant implications for nursing education. To promote fairness in online assessments, nursing faculty development programs should focus on effective online exam design, mitigating bias, and incorporating best practices for online evaluations. Investing in reliable and secure online platforms, exploring innovative assessment technologies like virtual simulations, and upgrading educational infrastructure are vital. Developing clear policies for online exam administration, establishing systems for addressing technical issues and student appeals, and ensuring transparency in exam expectations are critical strategies for improving the online assessment landscape in nursing education.

Limitations and Suggestions

It is crucial to emphasize that this study was exclusively conducted via online interviews at a nursing school. Therefore, it is advisable to pursue additional independent research in diverse settings, engaging professors and students and employing a mix of quantitative and qualitative methods in face-to-face environments.

Conclusion

This research highlighted the importance of addressing the factors that impact the accuracy and fairness of online evaluations. By implementing strategies to reduce bias, ensuring rigorous test design, and taking student perspectives into account, educators can develop assessments that offer valuable feedback and accurately represent student learning. A collaborative approach that acknowledges the viewpoints of both nursing faculty and students is essential for fostering a more equitable online learning environment. Future research could explore the effectiveness of specific online assessment methods and the impact of faculty development programs on online exam design, as well as the long-term effects of online assessments on student learning outcomes and career trajectories.

Acknowledgments

We thank the research counselor at SUMS for their essential support in facilitating this study. We are also thankful to all the students and professors who participated in this project and cooperated in conducting the present study.

Authors' Contribution

HA, NZ, and LB devised the study concept, designed the study, supervised the intervention, data collection, and analysis, coordinated the research, and critically revised the manuscript. EN revised the manuscript. All authors have read and approved the content of the manuscript.

Conflict of Interest

The authors have no conflicts of interest to declare and have certified that they have seen and approved the manuscript. Nahid Zarifanaiey, as the Editor-in-Chief, was not involved in the peer-review and decision-making processes for this manuscript. A non-author chairperson carried out the peer review process of this paper.

Funding/Support

This research did not receive any outside funding or support.

Ethical Considerations

The study was approved by the local ethics council of Shiraz University of Medical Sciences (decree code: IR.SUMS.REC.1399.507). To adhere to ethical research guidelines, consent for participation was obtained from all participants. Each individual followed the approved research procedures following current regulations. During the initial phone call, the researcher explained the study's purpose and subsequently emailed the informed consent form for participants to complete, sign, and return. To ensure anonymity, respondents did not include their names on the forms, which were decoded by a research assistant to minimize errors. Participation was voluntary, and participants had the freedom to opt out at any time. identifiable information was published.

All methods were conducted under the Declaration of Helsinki.

Availability of Data and Materials

The data supporting this study's findings are available from the corresponding author on request.

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