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AIM AND SCOPE

Journal of Education and Research in Nursing (J Educ Res Nurs) is an international, scientific, open access, online-only periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official publication of Koç University Semahat Arsel Nursing Education, Practice and Research Center (SANERC), published quarterly in March, June, September, and December. The publication language of the journal is English and the journal accepts English manuscripts only.

All expenses of the journal are covered by SANERC. Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at http://jer-nursing.org/. The journal guidelines, technical information, and the required forms are available on the journal's web page.

Journal of Education and Research in Nursing aims to share the experience and the knowledge from Türkiye and different cultures through original studies in nursing and healthcare as well as protect and improve the public health and strengthen the nursing profession by providing the opportunity to transfer current knowledge into practice. The journal contributes to the literature by publishing manuscripts at the highest scientific and clinical value in nursing research, practice, and education. The journal publishes original articles, reviews, case reports, and letters to the editors that are prepared in accordance with ethical guidelines. The journal also welcomes contributions from other healthcare professionals on issues that have a direct impact on nursing practice.

The target audience of the journal is primarily researchers, practitioners, educators and executive nurses as well as other healthcare professionals, policy makers and students of nursing and health.

Journal of Education and Research in Nursing currently indexed in GALE (2010), Tubitak Ulakbim Medicine (2012), EBSCO (2017), CINAHL (2017), DOAJ (2021), Research4Life (2021), Hinari (2021), SCILIT (2021), OUCI (2021), CNKI (2022), MIAR (2024), SUDOC (2024), Zeitschriften Datenbank (2024), Electronic Journal Library (2024), and EmCare (2025).

The editorial and publication processes of the journal are shaped in accordance with the guidelines of the International Committee of Medical Journal Editors (ICMJE), World Association of Medical Editors (WAME), Council of Science Editors (CSE), Committee on Publication Ethics (COPE), European Association of Science Editors (EASE), and National Information Standards Organization (NISO). The journal is in conformity with the Principles of Transparency and Best Practice in Scholarly Publishing (doaj.org/bestpractice).

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INSTRUCTIONS TO AUTHORS

Journal of Education and Research in Nursing (J Educ Res Nurs) is an international, scientific, open access, online-only periodical published in accordance with independent, unbiased, and double-blinded peer-review principles. The journal is the official publication of Koç University Semahat Arsel Nursing Education, Practice and Research Center (SANERC), published quarterly in March, June, September, and December. The publication language of the journal is English and the journal accepts English manuscripts only. The authors of the previously accepted Turkish articles are required to send English version of their articles when the publication process starts.

All expenses of the journal are covered by SANERC. Processing and publication are free of charge with the journal. No fees are requested from the authors at any point throughout the evaluation and publication process. All manuscripts must be submitted via the online submission system, which is available at http://jer-nursing.org. The journal guidelines, technical information, and the required forms are available on the journal's web page.

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EDITORIAL AND PUBLICATION PROCESS

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Originality, high scientific quality, and citation potential are the most important criteria for a manuscript to be accepted for publication. Manuscripts submitted for evaluation should not have been previously presented or already published in an electronic or printed medium. The journal should be informed of manuscripts that have been submitted to another journal for evaluation and rejected for publication. The submission of previous reviewer reports will expedite the evaluation process. Manuscripts that have been presented in a meeting should be submitted with detailed information on the organization, including the name, date, and location of the organization.

PEER REVIEW PROCESS

Manuscripts submitted to Journal of Education and Research in Nursing will go through a double-blind peer-review process. Each submission will be reviewed by at least two external, independent peer reviewers who are experts in their fields in order to ensure an unbiased evaluation process. The editorial board will invite an external and independent editor to manage the evaluation processes of manuscripts submitted by editors or by the editorial board members of the journal. The Editor in Chief is the final authority in the decision-making process for all submissions. Reviewers who seek assistance from a trainee or colleague in the performance of a review should acknowledge these individuals' contributions in the written comments submitted to the editor. Reviewers must maintain the confidentiality of the manuscript, which may prohibit the uploading of the manuscript to software or other AI technologies where confidentiality cannot be assured. Reviewers must request permission from the journal prior to using AI technology to facilitate their review.

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At submission, the journal should require authors to disclose whether they used artificial intelligence (AI)– assisted technologies (such as Large Language Models [LLMs], chatbots, or image creators) in the production of submitted work. Authors who use such technology should describe, in both the cover letter and the submitted work, how they used it. Use of AI for writing assistance should be reported in the acknowledgment section. Authors who used AI technology to conduct the study should describe its use in the methods section in sufficient detail to enable replication to the approach, including the tool used, version, and prompts where applicable. Chatbots (such as ChatGPT) should not be listed as authors because they cannot be responsible for the accuracy, integrity, and originality of the work, and these responsibilities are required for authorship. Therefore, humans are responsible for any submitted material that included the use of AI-assisted technologies. Authors should carefully review and edit the result because AI can generate authoritative-sounding output that can be incorrect, incomplete, or biased. Authors should not list AI and Alassisted technologies as an author or co-author, nor cite AI as an author. Authors should be able to assert that there is no plagiarism in their paper, including in text and images produced by the AI. Humans must ensure there is appropriate attribution of all quoted material, including full citations.

ETHICAL GUIDELINES

An approval of research protocols by the Ethics Committee in accordance with international agreements (World Medical Association Declaration of Helsinki "Ethical Principles for Medical Research Involving Human Subjects," amended in October 2013, www.wma.net) is required for experimental, clinical, and drug studies and for some case reports. If required, ethics committee reports, or an equivalent official document will be requested from the authors. Submissions which do not have ethical approval will be reviewed according to COPE's Research, Audit and Service Evaluations guideline.

Such manuscripts can be rejected after editorial review due to the lack of ethics committee approval.

For manuscripts concerning experimental research on humans, a statement should be included that written informed consent of patients and volunteers was obtained following a detailed explanation of the procedures that they may undergo.

It is the authors' responsibility to protect the patients' anonymity carefully. For photographs that may reveal the identity of the patients, signed releases of the patient or their legal representative should be enclosed, and the publication approval must be provided in the Methods section.

For studies carried out on animals, an approval research protocols by the Ethics Committee in accordance with international agreements (Guide for the care and use of laboratory animals, 8th edition, 2011" and/or "Interna-

tional Guiding Principles for Biomedical Research Involving Animals, 2012") is required. Also, the measures taken to prevent pain and suffering of the animals should be stated clearly in such studies.

Information on patient consent, the name of the ethics committee, and the ethics committee approval number and date should also be stated in the Methods section of the manuscript.

PLAGIARISM AND ETHICAL MISCONDUCT

Journal of Education and Research in Nursing is extremely sensitive about plagiarism. All submissions are screened by a similarity detection software (iThenticate by Cross-Check) at any point during the peer-review and/or production process.

When you are discussing others' (or your own) previous work, please make sure that you cite the material correctly in every instance.

Authors are strongly recommended to avoid any form plagiarism and ethical misconduct that are exemplified below.

Self-plagiarism (text-recycling): Overlapping sections or sentences with the author's previous publications without citing them. Even if you are the author of the phrases or sentences, the text should not have unacceptable similarity with the previously published data.

Salami slicing: Using the same data of a research into several different articles. Reporting the same hypotheses, population, and methods of a study is into different papers is not acceptable.

Data Fabrication: It is the addition of data that never occurred during the gathering of data or the experiments. Results and their interpretation must be based on the complete data sets and reported accordingly.

Data Manipulation/Falsification: It means manipulating research data with the intention of giving a false impression. This includes manipulating images (e.g. micrographs, gels, radiological images), removing outliers or 'inconvenient' results, changing data points, etc.

In the event of alleged or suspected research misconduct, e.g., plagiarism, citation manipulation, and data falsification/fabrication, the Editorial Board will follow and act according to COPE flowcharts.

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Journal of Education and Research in Nursing does not consider preprint publications as prior publication. In other words, authors are allowed to present and discuss their findings on a non-commercial preprint server before submission to a journal.

Authors must provide the journal with the pre-print server deposition of their article accompanying its DOI during initial submission.

If the article is published in the Journal of Education and Research in Nursing, it is the responsibility of the authors to update the archived preprint and link it to the published version of the article.

AUTHORSHIP

Each person listed as an author should fulfill the authorship criteria recommended by the International Committee of Medical Journal Editors (ICMJE - www.icmje.org). The ICMJE recommends that authorship is based on the following four criteria:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; AND
3. Final approval of the version to be published; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

In addition to being accountable for the parts of the work he/she has done, an author should be able to identify which co-authors are responsible for specific other parts of the work. Also, authors should have confidence in the integrity of the contributions of their co-authors.

All those designated as authors should meet all four criteria for authorship, and all who meet the four criteria should be identified as authors. Those who do not meet all four criteria should be acknowledged in the title page of the manuscript.

Journal of Education and Research in Nursing requires corresponding authors to submit a signed and scanned version of the Copyright Agreement and Acknowledgement of Authorship form (available for download at http://jer-nursing.org) during the initial submission process to act appropriately on authorship rights and to prevent ghost or honorary authorship. If the editorial board suspects a case of "gift authorship," the submission will be rejected without further review. As part of the submission of the manuscript, the corresponding author should also send a short statement declaring that he/she accepts to undertake all the responsibility for authorship during the submission and review stages of the manuscript.

CHANGE OF AUTHORSHIP

Journal of Education and Research in Nursing reviews the authorship according to the author's declaration in the Title Page, thus it is the authors responsibility to send the final order of the complete author names. Requests in the change of authorship (e.g. removal/addition of the authors, change in the order etc) after submission are subject to editorial approval. Editorial Board will investigate this kind of cases and act following COPE flowcharts.

Change of authorship requests should be submitted to the Editorial Office with an official letter stating the reasons of the change. The letter must be signed by all authors and include their approval on the change in authorship. If the request is approved by the Editorial Board, authors need to submit a new Copyright Agreement Form according to the final order list.

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APPEALS AND COMPLAINT

The Editorial Board of the journal handles all appeal and complaint cases within the scope of COPE guidelines. In such cases, authors should get in direct contact with the editorial office regarding their appeals and com-

plaints. When needed, an ombudsperson may be assigned to resolve claims that cannot be resolved internally. The Editor in Chief is the final authority in the decision-making process for all appeals and complaints.

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Article Withdrawal Process

In accordance with the publication policies of the Journal of Education and Research in Nursing, the duties and responsibilities of the author(s) and the editorial board during the withdrawal of an article are given below.

Responsibilities of the Authors

The author(s) has an obligation to cooperate with the journal editor in the withdrawal process if he/she notices an error or mistake in the pre-checking stage of the manuscript or in a published work. Withdrawal requests will not be considered for a manuscript in the review process or in the publication phase. Author(s) who wish to withdraw their study outside of the review process or the publication phase are obliged to fill out and send the Withdrawal Form via e-mail at kare@karepb.com. The Editorial Board will review the withdrawal notification and respond within 15 days at the latest. Authors cannot submit their manuscripts to another journal for evaluation unless the editorial board approves the withdrawal request for manuscripts whose copyrights have been transferred to the Journal of Education and Research in Nursing at the submission stage.

Responsibilities of the Editorial Board

The editorial board of the Journal of Education and Research in Nursing has the obligation to initiate an investigation into any suspected copyright infringement, ethical statement violation, or plagiarism regarding studies that are published ahead of print, or under review. If the editorial board determines that there is a violation of copyright, ethical statement, or plagiarism in the work under evaluation, it withdraws the work from the evaluation and returns it to the authors by citing the detected situations in detail. In the event that copyright infringement or plagiarism is determined to have occurred in a published work or a work in early view, the Editorial Board may recommend to the publishers or editorial boards, of which study was previously published, to ensure the validity and reliability of the published studies or to withdraw them.

MANUSCRIPT PREPARATION

The manuscripts should be prepared in accordance with ICM-JE-Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals (updated in December 2018 - http://www.icmje.org/icmje-recommen-dations.pdf). Authors are required to prepare manuscripts in accordance with the CONSORT guidelines for randomized research studies, STROBE guidelines for observational original research studies, STARD guidelines for studies on diagnostic accuracy, PRISMA guidelines for systematic reviews and meta-analysis, ARRIVE guidelines for experimental animal studies, and TREND guidelines for non-randomized public behavior. To find the right guideline for your research, please complete the questionnaire by Equator Network here.

The style of the manuscripts should be prepared according to AMA Manual of Style 11th Edition.

Manuscripts can only be submitted through the journal's online manuscript submission and evaluation system, available at jern.manuscriptmanager.net. Manuscripts submitted via any other medium and submissions by anyone other than one of the authors will not be evaluated.

Manuscripts submitted to the journal will first go through a technical evaluation process where the editorial office staff will ensure that the manuscript has been prepared and submitted in accordance with the journal's guidelines. Submissions that do not conform to the journal's guidelines will be returned to the submitting author with technical correction requests.

Authors are required to submit the following:

- Copyright Agreement and Acknowledgement of Authorship Form, and
- ICMJE Potential Conflict of Interest Disclosure Form (should be filled in by all contributing authors) during the initial submission. These forms are available for download at http://jer-nursing.org.

Preparation of the Manuscript

Title page: A separate title page should be submitted with all submissions and this page should include:

- The full title of the manuscript as well as a short title (running head) of no more than 50 characters,
- Name(s), affiliations, highest academic degree(s), and ORCID IDs of the author(s),
- Grant information and detailed information on the other sources of support,
- Name, address, telephone (including the mobile phone number), and email address of the corresponding author,
- Acknowledgment of the individuals who contributed to the preparation of the manuscript but who do not fulfill the authorship criteria.

Abstract: An abstract should be submitted with all submissions except for Letters to the Editor. The abstract of Research Articles should be structured with subheadings (Background, Methods, Results, and Conclusion). Please check Table 1 below for word count specifications.

Keywords: Each submission must be accompanied by a minimum of three to a maximum of five keywords for subject indexing at the end of the abstract. The keywords should be listed in full without abbreviations. The keywords should be selected from the National Library of Medicine, Medical Subject Headings database (https://www.nlm.nih.gov/mesh/MBrowser.html).

Manuscript Types

Research Articles: This is the most important type of article since it provides new information based on original research.

Acceptance of original papers will be based upon the originality and importance of the investigation. The main text of original articles should be structured with Introduction, Material and Methods, Results, and Discussion subheadings. Please check Table 1 for the limitations for Original Articles.

Clinical Trials

Journal of Education and Research in Nursing adopts the ICMJE's clinical trial registration policy, which requires that clinical trials must be registered in a publicly accessible registry that is a primary register of the WHO International Trials Registry Platform (ICTRP) or in ClinicalTrials.gov.

Instructions for the clinical trials are listed below.

- Clinical trial registry is only required for the prospective research projects that study the relationship between a health-related intervention and an outcome by assigning people.
- To have their manuscript evaluated in the journal, author should register their research to a public registry at or before the time of first patient enrollment.
- Based on most up to date ICMJE recommendations, Journal of Education and Research in Nursing accepts public registries that include minimum acceptable 24-item trial registration dataset.
- Authors are required to state a data sharing plan for the clinical trial registration. Please see details under "Data Sharing" section.
- For further details, please check ICMJE Clinical Trial Policy at http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/clinical-trial-registration.html

Data Sharing

As of 1 January 2019, a data sharing statement is required for the registration of clinical trials. Authors are required to provide a data sharing statement for the articles that reports the results of a clinical trial. The data sharing statement should indicate the items below according to the ICMJE data sharing policy:

- Whether individual deidentified participant data will be shared,
- What data in particular will be shared,
- Whether additional, related documents will be available,
- When the data will be available and for how long,
- By what access criteria will be shared.

Authors are recommended to check the ICMJE data sharing examples at

http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/clinical-trial-registration.html

While submitting a clinical trial to Journal of Education and Research in Nursing,

- Authors are required to make registration to a publicly accessible registry according to ICMJE recommendations and the instructions above.
- The name of the registry and the registration number should be provided in the Title Page during the initial submission.
- Data sharing statement should also be stated in the Title Page even the authors do not plan to share it.

Clinical trial and data sharing policy of the journal will be valid for the articles submitted from 1 March 2021.

Reporting Statistical Analysis

Statistical analysis to support conclusions is usually necessary. Statistical analyses must be conducted in accordance with international statistical reporting standards (Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. Br Med J 1983: 7; 1489-93). Information on statistical analyses should be provided with a separate subheading under the Materials and Methods section and the statistical software that was used during the process must be specified.

Values for reporting statistical data, such as p values and CIs should be presented and rounded appropriately. P values should be expressed to 2 digits to the right of the decimal point unless the first 2 digits are zeros, in which case 3 digits to the right of the decimal place should be provided (eg, instead of $p<0.01$, report as $p=0.002$). However, values close to 0.05 may be reported to 3 decimal places because the 0.05 is an arbitrary cut point for statistical significance (eg, $p=0.053$). P values less than 0.001 should be designated as $p<0.001$ rather than exact values (eg, $p=0.000006$).

Units should be prepared in accordance with the International System of Units (SI).

Editorial Comments: Invited brief editorial comments on selected articles are published in the Journal of Education and Research in Nursing. Editorials should not be longer than 1000 words excluding references. Editorial comments aim to provide a brief critical commentary by reviewers with expertise or with high reputation in the topic of the research article published in the journal. Authors are selected and invited by the journal to provide such comments. Abstract, Keywords, and Tables, Figures, Images, and other media are not included.

Review Articles: Reviews prepared by authors who have extensive knowledge on a particular field and whose scientific background has been translated into a high volume of publications with a high citation potential are welcomed. These authors may even be invited by the journal. Reviews should describe, discuss, and evaluate the current level of knowledge of a topic in clinical practice and should guide future studies. The subheadings of the review articles should be planned by the authors. However, each review article should include an "Introduction" and a "Conclusion" section. Please check Table 1 for the limitations for Review Articles.

Case Reports: There is limited space for case reports in the journal and reports on rare cases or conditions that constitute challenges in diagnosis and treatment, those offering new therapies or revealing knowledge not included in the literature, and interesting and educative case reports are accepted for publication. The text should include Introduction, Case Presentation, and Discussion with an unstructured abstract. Please check Table 1 for the limitations for Case Reports.

Letters to the Editor: This type of manuscript discusses important parts, overlooked aspects, or lacking parts of a previously published article. Articles on subjects within the scope of the journal that might attract the readers' attention, particularly educative cases, may also be submitted in the form of a "Letter to the Editor." Readers can also present their comments on the published manuscripts in the form of a "Letter to the Editor." Abstract, Keywords, and Tables, Figures, Images, and other media should not be included. The text should be unstructured. The manuscript that is being commented on must be properly cited within this manuscript.

Table 1. Limitations for each manuscript type

Type of manuscript	Word limit*	Abstract word limit	Reference limit	Table limit	Figure limit
Research Article	4000	250 (Structured)	35	5	10
Review Article	5000	250	50	5	10
Case Report	1200	200	15	No tables	5
Letter to the Editor	400	No abstract	5	No tables	No media

*: Word limit should not include the abstract, references, tables, and figure legends.

Tables

Tables should be included in the main document, presented after the reference list, and they should be numbered consecutively in the order they are referred to within the main text. A descriptive title must be placed above the tables. Abbreviations used in the tables should be defined below the tables by footnotes (even if they are defined within the main text). Tables should be created using the "insert table" command of the word processing software and they should be arranged clearly to provide easy reading. Data presented in the tables should not be a repetition of the data presented within the main text but should be supporting the main text.

Figures and Figure Legends

Figures, graphics, and photographs should be submitted as separate files (in TIFF or JPEG format) through the submission system. The files should not be embedded in a Word document or the main document. When there are figure subunits, the subunits should not be merged to form a single image. Each subunit should be submitted separately through the submission system. Images should not be labeled (a, b, c, etc.) to indicate figure subunits. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legends. Like the rest of the submission, the figures too should be blind. Any information within the images that may indicate an individual or institution should be blinded. The minimum resolution of each submitted figure should be 300 DPI. To prevent delays in the evaluation process, all submitted figures should be clear in resolution and large in size (minimum dimensions: 100 × 100 mm). Figure legends should be listed at the end of the main document.

All acronyms and abbreviations used in the manuscript should be defined at first use, both in the abstract and in the main text. The abbreviation should be provided in parentheses following the definition.

When a drug, product, hardware, or software program is mentioned within the main text, product information, including the name of the product, the producer of the product, and city and the country of the company (including the state if in USA), should be provided in parentheses in the following format: "Discovery St PET/CT scanner (General Electric, Milwaukee, WI, USA)"

All references, tables, and figures should be referred to within the main text, and they should be numbered consecutively in the order they are referred to within the main text.

Limitations, drawbacks, and the shortcomings of original articles should be mentioned in the Discussion section before the conclusion paragraph.

References

Both in-text citations and the references must be prepared according to the AMA Manual of Style 11th Edition.

While citing publications, preference should be given to the latest, most up-to-date publications. Authors are responsible for the accuracy of references If an ahead-of-print publication is cited, the DOI number should be provided. Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/MEDLINE/PubMed. When there are six or fewer authors, all authors should be listed. If there are seven or more authors, the first three authors should be listed followed by "et al." In the main text of the manuscript, references should be cited in superscript after punctuation. The reference styles for different types of publications are presented in the following examples.

Journal Article: Campbell MR, Fisher J, Anderson L, Kreppel E. Implementation of early exercise and progressive mobility: Step to success. Crit Care Nurse. 2015;35(1):82-88.

Book Section: Fikremariam D, Serafini M. Multidisciplinary approach to pain management. In: Vadivelu N, Urman RD, Hines RL, eds. Essentials of Pain Management. New York, NY: Springer New York; 2011:17-28.

Books with a Single Author: Patterson JW. Weedon's Skin Pathology. 4th ed. Churchill Livingstone; 2016.

Editor(s) as Author: Etzel RA, Balk SJ, eds. Pediatric Environmental Health. American Academy of Pediatrics; 2011.

Conference Proceedings: Morales M, Zhou X. Health practices of immigrant women: indigenous knowledge in an urban environment. Paper presented at: 78th Association for Information Science and Technology Annual Meeting; November 6-10; 2015; St Louis, MO. Accessed March 15, 2016. https://www.asist.org/files/meetings/am15/proceedings/openpage15.html

Thesis: Maiti N. Association Between Behaviours, Health Characteristics and Injuries Among Adolescents in the United States. Dissertation. Palo Alto University; 2010.

Online Journal Articles: Tamburini S, Shen N, Chih Wu H, Clemente KC. The microbiome in early life: implications for health outcomes. Nat Med. Published online July 7, 2016. doi:10.1038/nm4142

Websites: International Society for Infectious Diseases. ProMed-mail. Accessed February 10, 2016. http://www. promedmail.org

Epub Ahead of Print Articles: Cai L, Yeh BM, Westphalen AC, Roberts JP, Wang ZJ. Adult living donor liver imaging. Diagn Interv Radiol. 2016 Feb 24. doi: 10.5152/dir.2016.15323. [Epub ahead of print].

REVISIONS

When submitting a revised version of a paper, the author must submit a detailed "Response to the reviewers" that states point by point how each issue raised by the reviewers has been covered and where it can be found (each reviewer's comment, followed by the author's reply and line numbers where the changes have been made) as well as an annotated copy of the main document. Revised manuscripts must be submitted within 30 days from the date of the decision letter. If the revised version of the manuscript is not submitted within the allocated time, the revision option may be canceled. If the submitting author(s) believe that additional time is required, they should request this extension before the initial 30-day period is over.

Accepted manuscripts are copy-edited for grammar, punctuation, and format. Once the publication process of a manuscript is completed, it is published online on the journal's webpage as an ahead-of-print publication before it is included in its scheduled issue. A PDF proof of the accepted manuscript is sent to the corresponding author and their publication approval is requested within 2 days of their receipt of the proof.

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JERN Journal of Education and Research in Nursing

EDITORIAL

Dear Readers,

We are pleased to share with you the 2026 Issue 1 (Volume 23, Issue 1, March 2026) of the Journal of Education and Research in Nursing.

The studies presented in this issue address contemporary and significant topics that contribute to the advancement of nursing education and clinical practice. The articles examine essential dimensions of professional development, including the enhancement of nursing students' communication and patient handover skills, self-regulated learning, perceptions of clinical self-efficacy, academic help-seeking behaviors, and evidence-based nursing competencies. In addition, factors that directly influence the quality of clinical care—such as medication adherence, kinesiophobia, patient mobility, and activities of daily living—are investigated across different patient populations. Studies evaluating nursing students' healthy lifestyle skills and disaster preparedness in the aftermath of disasters address critical challenges faced by the nursing profession today. Moreover, the validity and reliability studies included in this issue make a valuable contribution to strengthening scientific rigor and measurement in nursing research. Collectively, these studies are expected to inform educational practices, enhance clinical care, and contribute to the delivery of safe and high-quality nursing services.

I am pleased to announce that our journal is indexed in the databases of Tubitak Ulakbim Medicine (2012), EBSCO (2017), CINAHL (2017), DOAJ (2021), Research4Life (2021), Hinari (2021), GALE (2022), CNKI (2022), SCILIT (2023), OUCI (2023), MIAR (2024), SUDOC (2024), Zeitschriften Datenbank (2024), Electronic Journal library (2024), EmCare (2025), and we are working to publish our journal within the framework of international academic publishing standards. The studies with a high level of evidence from you have been instrumental in achieving these goals, and we know how important the valuable contributions of our journal's stakeholders, our readers, editors, managing director and advisory board members are.

As for our March 2026 issue, a total of 11 valuable original studies is presented in this issue. The titles of the articles are as follows:

The original articles are titled "Evaluation of Foreign National Cases from a Forensic Medicine Perspective", "The Effect of Structured Communication on Enhancing Nursing Students' Patient Handover Skills: A Pilot Study", "The Effects of the Case-based Learning Method on Nursing Students' Self-regulated Learning and Clinical Self-efficacy Perception: A Quasi-experimental Study", "Validity and Reliability Study of the Turkish Version of the Medication Adherence Rating Scale", "Validity and Reliability Study of a Scale to Measure Academic Help-seeking Behaviors Among Nursing Students in Ghana", "Nursing Students' Healthy Living Skills and Disaster Preparedness: A Relationship Study After the Kahramanmaraş Earthquakes (Mw 7.7 and Mw 7.6) in Türkiye", "Enhancing Communication Skills and Self-compassion in Nursing Students: A Quasi-experimental Comparative Study of Online and Face-to-face Courses", "Examining the Relationship Between Kinesiophobia, Patient Mobility, and Activities of Daily Living in Patients with Chest Tubes After Thoracic Surgery: A Relational Study with Multiple Linear Regression Analyses", "The Relationship Between Nursing Students' Medical Error Tendencies and Their Evidence-based Nursing Competencies: An Analytical Cross-sectional Study", "Psychometric Evaluation of the Turkish Version of the Student Perception of Effective Teaching in Clinical Simulation Scale" and "Ethics Through Metaphors: A Qualitative Inquiry into Nursing Students' Perceptions".

I would like to express my endless thanks to our authors who have contributed to present the updated information obtained from the results of their studies to our readers in order to provide quality and safe nursing care services to society, to the members of the editorial board who has contributed to the publication of our journal, and to the members of the advisory board who has carefully evaluated each article.

"Let us never consider ourselves finished nurses... we must be learning all of our lives."
Florence Nightingale

Kind regards,
Prof. Sevilay Şenol Çelik, PhD, RN

JERN Journal of Education and Research in Nursing

Original Article

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Evaluation of Foreign National Cases from a Forensic Medicine Perspective

Abstract

Background: Global migration has increased the number of foreign nationals residing in Türkiye, creating challenges for healthcare services, particularly in forensic medicine. Cultural, linguistic, and socioeconomic barriers often hinder migrants' access to appropriate trauma care, emphasizing the need for culturally competent approaches in forensic practice.

Aim: This study aimed to evaluate the sociodemographic characteristics and trauma histories of foreign nationals in Türkiye, addressing the limited research on forensic cases involving migrants from a transcultural nursing perspective.

Methods: A retrospective analysis was conducted on hospital records between October 10, 2021 and August 30, 2024. The sample included 120 foreign nationals who presented to the emergency department, had forensic notifications filed, and subsequently attended the same hospital's forensic medicine polyclinic. Data were collected using an "Individual Information Form" and analyzed using descriptive statistics and Chi-square tests with KNIME software.

Results: The sample consisted of 120 foreign nationals, including 78 males and 42 females, with mean ages of 37.6 years (standard deviation [SD]=12.3) and 41.0 years (SD=14.8), respectively. Among the cases, 50.83% were related to traffic accidents and 31.67% to physical assaults. Significant differences in trauma types were observed across nationalities and genders ($p<0.05$). Sociodemographic factors such as age, gender, and nationality influenced the nature and context of trauma.

Conclusion: Nationality and other sociodemographic variables significantly shape traumatic experiences. Integrating transcultural nursing principles, interpreter support, and cultural sensitivity training into forensic medical practice can improve the accuracy of evaluations and enhance the quality of trauma care for migrant populations.

Keywords: Cultural sensitivity, forensic medicine, foreign nationals, migration, transcultural nursing, trauma

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Introduction

According to the United Nations High Commissioner for Refugees (UNHCR), the global number of forcibly displaced persons reached 117.3 million by the end of 2023, with Türkiye hosting approximately 3.6 million Syrian refugees, the largest refugee population worldwide.[1] This demographic shift has coincided with a 45% increase in emergency department visits by foreign nationals in Turkish healthcare facilities between 2019 and 2023, with forensic cases representing an increasing proportion of these visits. These figures underscore the growing demands on Türkiye's healthcare system and highlight the need for targeted approaches in forensic medicine.[2]

Migrants often face cultural, linguistic, and socioeconomic barriers that hinder access to healthcare, and these challenges are particularly pronounced in forensic cases involving trauma, assault, or accidents.[3] Despite international attention to migrant health, a critical gap remains in understanding how cultural factors influence trauma documentation, treatment adherence, and the accuracy of forensic evaluations. Previous studies in Türkiye have examined healthcare access barriers for migrants,[4,5] but none have systematically investigated trauma patterns in forensic medical services through a culturally sensitive lens.

This study addresses this gap by applying Leininger's Transcultural Nursing Theory, which emphasizes culturally congruent care (care aligned with patients' cultural values, beliefs, and lifeways) to improve health outcomes. The theory's three modes of action (cultural care preservation, accommodation, and repatterning) provide a framework for understanding how cultural factors shape trauma disclosure, help-seeking behaviors, and forensic documentation accuracy (Fig. 1). The model was operationalized to guide nurses in providing culturally congruent care during forensic assessments, ensuring that trauma evaluation aligns with patients' cultural values. In forensic contexts, culturally competent care is essential for both accurate assessment and effective intervention.[6]

Traumatic experiences among foreign nationals are influenced not only by individual factors (age, gender, personal history) but also by external factors such as violence, occupational accidents, family-related violence, and forced displacement.[7] Many migrants present with complex trauma histories related to conflict, war, or persecution in their countries of origin, necessitating culturally informed approaches to care.[8] Accurate documentation and culturally sensitive evaluation are therefore critical, particularly as the number of foreign nationals in Türkiye continues to rise.[9]

The present study examines the sociodemographic characteristics and trauma histories of foreign nationals presenting to emergency and forensic medical services in Türkiye, with an emphasis on culturally sensitive nursing. By integrating transcultural nursing principles into forensic practice, the study aims to improve trauma care quality, enhance patient recovery, and inform inclusive health policies for diverse migrant populations.

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Aim of the Study

This study aims to assess the role of culturally competent care in forensic medical practice and to identify key sociodemographic and trauma-related factors that influence the accuracy and effectiveness of forensic evaluations for foreign nationals in Türkiye.

Research Questions

1. What are the sociodemographic characteristics (e.g., nationality, gender, age) of foreign nationals presenting with trauma to emergency and forensic medical services in Türkiye?
2. How do trauma histories (e.g., previous traumatic experiences, trauma types) influence forensic medical examination and outcomes among foreign nationals?
3. How do cultural differences influence foreign nationals' trauma disclosure, compliance with treatment, and experiences in forensic medical care?

Materials and Methods

Research Design and Location

The research design was retrospective and descriptive, following a quantitative research methodology. This design enabled the quantitative analysis of demographic variables (independent variables) and trauma outcomes (dependent variables), with nationality, gender, and age serving as primary independent variables, while trauma type, severity, and treatment outcomes served as dependent variables. This design was chosen to analyze healthcare utilization patterns, identify demographic trends, compare trauma types and outcomes, and inform evidence-based policy recommendations. The study was conducted at a primary healthcare provider in Western Türkiye, which handles over 200,000 annual emergency visits and includes a forensic medicine unit with multilingual staff.

Research Population and Sample

The study population consisted of individuals who presented to the Hospital Emergency Service and Forensic Medicine Polyclinic between October 10, 2021 and August 30, 2024. Sample size was determined using a convenience sampling methodology based on the total number of foreign nationals meeting the inclusion criteria during the study period. A post-hoc power analysis was conducted using G*Power 3.1.9.7 software. With a sample size of 120, an alpha level of 0.05, and observed effect sizes (Cramér's V ranging from 0.30 to 0.45 for Chi-square tests), the achieved statistical power ranged from 0.82 to 0.95, indicating adequate power for detecting significant associations. The sample included 120 foreign national cases aged 18 and over, all of whom had a documented history of trauma. Excluded from the study were Turkish citizens, individuals under 18 years of age, those without a documented history of trauma, and cases with incomplete medical records.

Data Collection Tools

Data were obtained from the individual case files by the researchers. The "Individual Information Form" was developed based on a comprehensive literature review and validated through expert consultation (including eight nurses, three forensic medicine physicians, and seven emergency physicians) to ensure content relevance and clarity. The form included structured questions covering demographic characteristics (age, gender, nationality), trauma details (type, location, severity), perpetrator information, medical intervention requirements, and timing of healthcare presentation (Table 1). The information collected specifically included the following:

- Sociodemographic Characteristics: Age, gender, nationality.
- Trauma Histories: Type of trauma, location where the trauma occurred, and whether the trauma resulted in a bone fracture.
- Information About the Perpetrator: Identity of the perpetrator.
- Medical Intervention: Whether the trauma could be treated with simple medical intervention.
- Timing of Presentation: The time elapsed between the occurrence of trauma and presentation to the Forensic Medicine Polyclinic.

Data Collection

The research team collected data between September and October 2024. Medical records were accessed via the hospital's electronic health record system following institutional approval. Each case was systematically reviewed using a standardized form. To ensure inter-rater reliability, two researchers independently assessed a random sample of 20 cases (16.7%), achieving 95% agreement; discrepancies were resolved through consensus with a third researcher. Data were anonymized, coded numerically, and cases with missing critical information (demographics or primary trauma outcomes) were excluded.

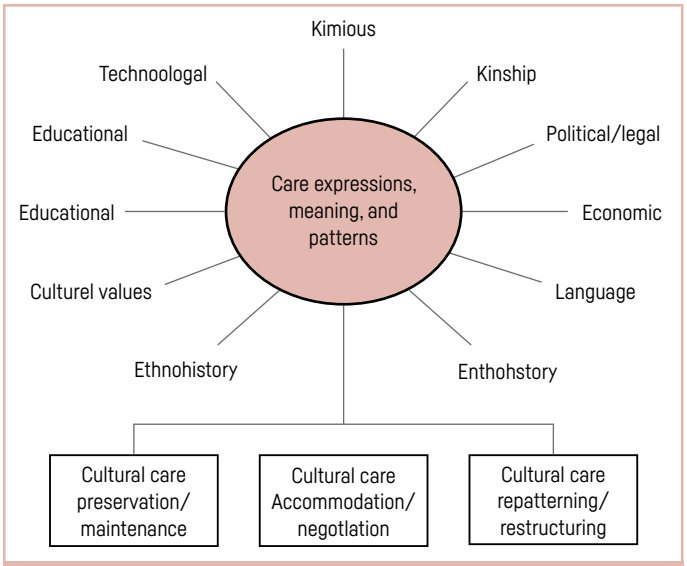

Figure 1. Leininger's transcultural nursing theory (adapted Sunrise Model).

Statistical Analysis

Data from foreign national individuals were coded and analyzed using the KNIME Analytics Platform (Version X.X, KNIME AG, Zurich, Switzerland). Descriptive statistics were calculated for sociodemographic and trauma variables. Associations between categorical variables were assessed using Chi-square or Fisher's Exact tests as appropriate, and standardized residuals were examined to identify significant deviations. Effect sizes were calculated using Cramér's V to assess the magnitude of associations, with values of 0.1, 0.3, and 0.5 interpreted as small, medium, and large effects, respectively. Cases with missing critical data (e.g., demographic variables or trauma outcomes) were excluded from specific analyses, while partially incomplete records were handled on a case-by-case basis. This approach ensured that missing data did not bias the statistical results. Statistical significance was set at $p<0.05$ (95% confidence interval).

Ethical Considerations

The study protocol was designed in accordance with the principles outlined in the Declaration of Helsinki. Ethical approval was obtained from the Balıkesir Atatürk City Hospital Non-interventional Clinical Research Ethics Committee (Approval Number: 2024/09/50, Date: 19.09.2024). Written informed consent was obtained from all individuals included in the study during their clinical assessment, in line with ethical approval procedures.

Table 1. Independent and dependent variables of the study

Independent variables	Dependent variables
Age	Type of trauma
Gender	Location of trauma
Nationality	Bone fracture occurrence
	Perpetrator identity
	Medical intervention requirement
	Timing of healthcare presentation

Table 2. Distribution of participants by gender and nationality (n=120)

Nationality	Gender				Total
	Female		Male		
	F	%	F	%	
Syria	5	16.1	26	83.9	31
United Kingdom	0	0.0	1	100.0	1
Ukraine	1	33.3	2	66.7	3
Azerbaijan	11	100.0	0	0.0	11
Afghanistan	6	35.3	11	64.7	17
Iraq	4	28.6	10	71.4	14
Iran	4	36.4	7	63.6	11
Russia	6	42.9	8	57.1	14
France	2	22.2	7	77.8	9
Germany	2	40.0	3	60.0	5
Netherlands	0	0.0	2	100.0	2
Austria	1	50.0	1	50.0	2
Total	42	35.0	78	65.0	120

Mean age (SD): Male=37.6 (12.3), Female=41.0 (14.8), Overall=38.85 (13.2). Statistical analysis: χ^2=32.45, df=11, p=0.001, Cramér's V=0.52 (large effect size). F : Frequency; SD: Standard deviation.

Table 3. Gender distribution across multiple variables (n=120)

Variables	Gender				Statistical analysis
	Male		Female		
	F	%	F	%	
Treatment type					
Medical	67	85.9	36	85.7	χ^2=10.12, df=1, p=0.001
Surgical	11	14.1	6	14.3	
Reason for admission					
Assault	29	37.3	9	21.4	χ^2=8.25, df=3, p=0.008
Traffic accident	36	46.2	25	59.5	
Work accident	8	10.3	5	11.9	
Fall	5	6.4	3	7.1	
Location of incident					
Home	28	35.9	14	33.3	χ^2=12.34, df=4, p=0.001
Urban open area	36	46.2	13	31.0	
Intercity highway	5	6.4	6	14.3	
Workplace	9	11.5	5	11.9	
Hotel	–	–	4	9.5	
Perpetrator relationship					
Unknown person	33	42.3	19	45.2	χ^2=11.56, df=3, p=0.013
Friend	16	20.5	5	11.9	
Relative	9	11.5	8	19.0	
One-sided	20	25.6	10	23.8	
Simple medical intervention status					
Treatable	42	66.7	21	33.3	χ^2=5.78, df=1, p=0.016
Not treatable	36	63.2	12	36.8	

F: Frequency.

Results

The sample comprised 120 foreign nationals, including 78 males (65.0%) and 42 females (35.0%), with mean ages of 37.6 years (standard deviation [SD]=12.3) and 41.0 years (SD=14.8), respectively. Syrian nationals represented the largest group (n=31, 25.8%), followed by Afghan nationals (n=17, 14.2%) and Iraqi nationals (n=14, 11.7%). Gender distribution varied significantly across nationalities (χ^2=32.45, df=11, p=0.001, Cramér's V=0.52, large effect) (Table 2).

Traffic accidents were the most common trauma type (50.8%), followed by physical assaults (31.7%). Most incidents occurred in urban open areas and homes. Gender differences were significant: males experienced more assaults, whereas females experienced more traffic accidents. Perpetrator patterns also differed by gender, with females more often assaulted by unknown persons or relatives, while males were more frequently involved in incidents perpetrated by friends. Forty-six percent of cases presented within 24 hours, 26.7% between 25 hours and 7 days, and 26.7% after more than 7 days, with no significant gender differences (χ^2 values: 2.45–11.89, df=2–4, p<0.05, Cramér's V=0.30–0.40, medium effect) (Table 3).

Medical intervention was required in the majority of cases (85.8%), while surgical treatment was needed in 14.2%. No significant gender differences were observed in treatment type or intervention complexity (χ^2>0.18, p>0.67) (Table 3).

Unknown persons were the most frequent perpetrators (43.3%), followed by unilateral trauma without a perpetrator (25.0%), friends (17.5%), and relatives (14.2%). Nationality influenced perpetrator patterns (χ^2=45.32, df=30, p=0.01, Cramér's V=0.35, medium effect) (Table 4).

Discussion

In this study, males comprised more than half of the sample, and the mean age of females was higher than that of males. This male predominance aligns with regional migration patterns and occupational exposure to high-risk activities, consistent with findings from European studies.[10,11] The slightly higher mean age among females may reflect family-based migration through reunification programs.[12] Factors such as greater mobility in public spaces, higher participation in hazardous occupations, and cultural norms influencing help-seeking behavior may explain these patterns. According to the results of this study, Syrian nationals accounted for one-fourth of the cases, reflecting Türkiye's role as the primary host country for Syrian refugees since 2011.[13] Populations from conflict zones experience cumulative trauma (pre-migration violence, perilous journeys, and post-migration stressors) necessitating specialized forensic assessment. Gender distribution varied across nationalities; for instance, all Azerbaijani cases were female, whereas Dutch cases were male. These variations likely reflect migration purpose, occupational roles, and sociocultural context.

Traffic accidents were the leading cause of trauma in the present study, exceeding the national average for Turkish citizens.[14] Contributing factors include unfamiliarity with local traffic patterns, language barriers, and employment in high-risk sectors. Males experienced more assaults, while females were more affected by traffic incidents. These findings highlight the need for gender-targeted prevention strategies, such as assault prevention programs for males and traffic safety education for females.[15] Analysis revealed culturally mediated patterns: female victims from Western countries were primarily assaulted by strangers, whereas Syrian women more often reported acquaintances as perpetrators.[16,17] These trends reflect differences in social integration, reporting behaviors, and vulnerability. Leininger's cultural care accommodation model emphasizes adapting forensic protocols to recognize how cultural norms influence trauma disclosure.[18] Culturally sensitive interview techniques are essential to collect accurate information without reinforcing stereotypes.

In this study, while nearly half of the cases presented within 24 hours, more than half experienced delays in accessing care, which may compromise evidence integrity and legal documentation. Barriers include fear of authorities, language difficulties, and lack of trust in the healthcare system.[7,19] Proactive outreach, multilingual resources, and trust-building initiatives are crucial to ensure timely and equitable care. Bridging the gap between timely access to care and culturally sensitive forensic practice requires integrating both systemic and cultural perspectives. Leininger's three care modalities (preservation, accommodation, and repatterning) provide guidance for culturally competent forensic care.[20] Preservation involves maintaining culturally supportive practices while ensuring forensic requirements; accommodation entails adapting protocols to patient needs, such as providing gender-concordant examiners or prayer spaces; and repatterning includes educating patients about proce-

Table 4. Trauma exposure by nationality and perpetrator relationship (n=120)

Nationality	Perpetrator relationship	Number of cases	% Of total cases	% Within nationality
Syria	Unknown person	13	10.83	41.93
	Friend	14	11.66	45.16
	Relative	1	0.8	3.22
	One-sided	3	2.5	9.66
United Kingdom	One-sided	1	0.88	100.00
Ukraine	Friend	1	0.88	33.33
	Relative	2	1.66	66.66
Azerbaijan	Unknown person	6	5	54.54
	Relative	3	2.5	27.27
	One-sided	2	1.66	18.18
Afghanistan	Unknown person	7	5.83	41.17
	Friend	6	5	35.29
	Relative	4	3.33	23.52
Iraq	Unknown person	2	1.66	14.28
	One-sided	12	10	85.71
Iran	Unknown person	5	4.16	45.45
	Relative	1	0.83	9.09
	One-sided	5	4.16	45.45
Russia	Unknown person	7	5.83	50.00
	Relative	6	5	42.85
	One-sided	1	0.83	7.14
France	Unknown person	8	6.66	88.88
	One-sided	1	0.83	11.11
Germany	Unknown person	4	3.33	80.00
	One-sided	1	0.83	20.00
Netherlands	One-sided	2	1.66	100.0
Austria	One-sided	2	1.66	100.0

Statistical analysis: χ^2=32.45, df=11, p=0.001, Cramér's V=0.52 (large effect size).

dural necessity while respecting cultural concerns.[21] Cultural competence should be viewed as an ongoing learning process rather than a static skill.

The findings of the present study underscore the need for culturally tailored forensic protocols, mandatory staff training, professional interpreter services, multilingual documentation, and trauma-informed care approaches. Gender-sensitive interventions, including assault prevention programs for males and traffic safety education for females, are recommended. Expanding access to post-trauma support services may improve recovery outcomes and mitigate long-term effects. Coordinated efforts among healthcare authorities, migrant organizations, and policymakers are required to ensure interventions are culturally appropriate and effective.[22,23] Furthermore, the findings suggest that transcultural nursing education programs and policy frameworks should explicitly address forensic scenarios involving foreign nationals, promoting equitable, culturally sensitive, and evidence-based healthcare delivery.

Limitations

This study was conducted in a single hospital in Balıkesir Province using a retrospective design. Therefore, the findings cannot be generalized to all hospitals or foreign national populations in Türkiye. Data were limited to variables recorded in the medical files, and information on patients' previous medical history or detailed socioeconomic factors, such as income, education level, and working conditions, was not available. The retrospective design also limited the ability to establish causal relationships between trauma exposure and long-term outcomes. Prospective, multi-center studies following individuals over time would help clarify recovery trajectories and better account for cultural and socioeconomic factors. Additionally, some potential influencing factors, such as mental health issues or substance use, were not assessed. Including these variables in future research could provide a more comprehensive understanding of foreign nationals' trauma experiences.

Conclusion

The increasing presence of foreign nationals in Türkiye adds complexity to forensic healthcare. Our findings indicate that gender, age, nationality, trauma type, and timing significantly shape case evaluations, highlighting the need for transcultural approaches. In clinical practice, integrating transcultural and trauma-informed nursing training into healthcare can strengthen cultural competence, enhance communication, and improve patient outcomes.[8,20,21] Future research should address psychosocial factors, social support, intergenerational trauma, and digital or language-accessible interventions.[3,20,24] At the policy level, equitable forensic care and migrant-sensitive regulations are essential to ensure fair access for diverse populations.[22] Bridging forensic medicine with culturally competent nursing is key to meeting the needs of a multicultural society.

Ethics Committee Approval: The study was approved by the Balıkesir Atatürk City Hospital Non-interventional Clinical Research Ethics Committee (Approval Number: 2024/09/50, Date: 19.09.2024).

Informed Consent: Written informed consent was obtained from all individuals included in the study.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Original Article

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The Effect of Structured Communication on Enhancing Nursing Students' Patient Handover Skills: A Pilot Study

Abstract

Background: Effective, structured communication among healthcare professionals is essential for patient safety and continuity of care. The SBAR (Situation–Background–Assessment–Recommendation) framework is an internationally recognized method that standardizes clinical information exchange. Although SBAR has been widely used and validated in clinical settings, its integration into undergraduate nursing education remains limited and inconsistent.

Aim: This study aimed to assess the impact of an educational intervention using the SBAR tool on undergraduate nursing students' ability to deliver structured patient handovers and to explore their attitudes toward its use.

Methods: A pilot experimental study was conducted with 32 seventh-semester nursing students from a university. Participants were randomly assigned to an experimental group (SBAR training) or a control group. Performance was evaluated in a simulated handover scenario based on structure and content. Additionally, completion time and attitudes were assessed via questionnaire. Descriptive statistics (means, standard deviations) and independent samples t-tests were used for data analysis.

Results: The experimental group achieved significantly higher scores in the "Situation" and "Background" components of SBAR, with large effect sizes. Although no statistical significance was found for "Recommendation," the effect size was moderate. Handover duration was significantly longer in the experimental group, potentially indicating a more analytical approach. Acceptance of the tool was universal, with positive attitudes regarding its usefulness and curricular integration.

Conclusion: Students found the SBAR tool easy to understand, reported fewer errors during simulated handovers, and expressed strong support for its inclusion in undergraduate nursing education.

Keywords: Clinical competence, education, nursing, patient handoff, Situation–Background–Assessment–Recommendation, students, undergraduate

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Introduction

Effective communication among healthcare professionals is a critical factor in ensuring patient safety and enhancing the functional efficiency of healthcare services. A significant proportion of adverse events in clinical settings has been attributed to communication failures during patient handovers.[1] Strengthening communication within and between multidisciplinary teams is therefore a fundamental component of high-quality and safe healthcare delivery.[2]

Structured communication tools such as SBAR (Situation–Background–Assessment–Recommendation) have been widely adopted to enhance the clarity, accuracy, and completeness of information transfer among healthcare professionals.[3] SBAR has been recognized internationally as a best-practice framework for standardized clinical communication.[4] Because effective communication is a cornerstone of professional nursing practice, it is essential that these competencies be cultivated early during undergraduate education. Within the field of education, SBAR has demonstrated notable utility. Recent studies have shown that training in the use of SBAR improves communication clarity, enhances students' confidence, and strengthens their clinical decision-making skills.[5,6] In particular, a systematic review of 12 studies found that SBAR-based simulations significantly improved the communication competence of nursing students.[7] Moreover, experimental research has reported substantial gains in students' self-efficacy and clinical decision-making abilities following SBAR-centered educational interventions.[5]

Despite the growing recognition of structured communication tools in clinical practice, the incorporation of SBAR into undergraduate nursing education remains inconsistent and insufficiently standardized across institutions.[8,9] Only a limited number of empirical studies have systematically evaluated its educational outcomes, and most existing initiatives are fragmented, lacking a uniform pedagogical framework. This gap may hinder the development of key competencies among nursing students, such as clinical prioritization, information synthesis, and interprofessional communication—skills that are essential for patient safety and effective teamwork.[9] Addressing this educational gap is therefore critical to preparing future nurses for real-world clinical challenges. The aim of this study is to evaluate the effectiveness of the SBAR tool on nursing students' handover skills and to explore their attitudes and acceptance of the tool regarding its integration into the undergraduate nursing curriculum. Given the limited integration of structured communication tools into undergraduate nursing curricula, this study was designed as a pilot investigation to assess the feasibility and educational

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impact of SBAR-based training on nursing students. Conducting the study on a small scale allowed the researchers to test the intervention process, identify potential methodological challenges, and obtain preliminary evidence of its effectiveness before implementing the program in a larger and more diverse student population.

Accordingly, the study addressed the following research questions:

1. Does SBAR-based training improve the ability of nursing students to perform structured and comprehensive patient handovers?
2. How do students perceive the usefulness and applicability of the SBAR tool in their clinical education?
3. What is the level of acceptance and intention to integrate SBAR into undergraduate nursing curricula?

Materials and Methods

Study Design

This study was designed as a pilot randomized experimental study aiming to evaluate the effectiveness of an educational intervention based on the SBAR tool in enhancing structured communication skills among undergraduate nursing students. Participants were randomly allocated to an intervention group or a control group using computer-generated simple randomization. Given the pilot nature of the study, the primary aim was to assess feasibility and obtain preliminary estimates of effect sizes rather than to conduct a fully powered randomized controlled trial. Reporting of the study followed the CONSORT extension for pilot and feasibility randomized trials, where applicable. The study was conducted in March 2025 during the spring academic semester.

Participants and Inclusion Criteria

Participants were recruited through convenience sampling from a fourth-year nursing course at a public university. The participants were senior (seventh-semester) nursing students enrolled in an eight-semester undergraduate program, ensuring that all had completed the majority of their theoretical and clinical coursework. A total of 38 students were enrolled in the "Diagnostic Nursing" course during the study period, of whom 32 met the inclusion criteria and agreed to participate voluntarily. They were randomly assigned to two equal groups (n=16 per group): an intervention group, which received SBAR-based training, and a control group, which received no relevant instruction. Group allocation was performed using simple randomization generated by a computer-based random number system. The randomization procedure was carried out by an independent researcher to ensure objectivity.

The sample size was determined in accordance with methodological guidance for pilot studies, which typically emphasize feasibility testing and preliminary effect estimation rather than hypothesis testing. Although no formal power analysis was conducted, the inclusion of 32 participants (16 per group) was considered appropriate to obtain preliminary data and assess feasibility for a future full-scale study. Of these, 32 met the inclusion criteria and agreed to participate. The inclusion criteria were:

1. Enrollment as a senior (seventh-semester) student in an eight-semester undergraduate nursing program,
2. Completion of at least one clinical placement, ensuring prior exposure to clinical communication environments, and
3. Willingness to participate voluntarily.

All eligible students who met these criteria and provided informed consent were included in the study.

Data Collection Tools

The data collection tool included the SBAR framework. The SBAR framework is an existing, internationally validated communication model originally developed by Kaiser Permanente to improve the clarity and accuracy of clinical information exchange.[10] It has since been widely adopted by major healthcare organizations such as the Agency for Healthcare Research and Quality (AHRQ)[1] and the Canadian Patient Safety Institute (CPSI).[3] In the present study, SBAR was used as an educational framework to guide training design rather than as a newly developed instrument or measurement tool. Students' handover responses were evaluated using a four-point SBAR performance rubric assessing content completeness and structural clarity. Each SBAR component (Situation, Background, Assessment, Recommendation) was rated on a binary scale (0=not adequately addressed, 1=adequately addressed), resulting in a total score ranging from 0 to 4. A perfect score (4/4) indicated complete and systematic application of the SBAR framework. The rubric was developed based on previously validated tools used in SBAR-related educational research,[5,7] ensuring content validity. Inter-rater reliability was assessed between two independent evaluators, yielding a high level of agreement (Cohen's κ=0.86).

Intervention Procedure

The intervention was conducted in a simulation laboratory at a university and implemented by two faculty members experienced in clinical nursing education. The SBAR training session lasted approximately 90 minutes and was delivered in a classroom-based workshop format. Prior to the exercise, the intervention group attended a structured 45-minute educational session on the SBAR communication framework, which included a short theoretical lecture, a demonstration of an SBAR-based handover, and guided discussion. The SBAR framework consists of four structured components: Situation (a concise statement of the patient's current status), Background (relevant clinical history and contextual information), Assessment (the healthcare provider's interpretation or judgment of the situation), and Recommendation (the proposed plan of action or intervention). Students were trained to apply these four steps systematically when organizing and delivering patient handovers. Following the training, students were asked to complete a written patient handover scenario based on a standardized hypothetical case. The control group completed the same handover exercise without prior exposure to SBAR training. Both groups performed the task under identical conditions to ensure consistency and fairness. Students in the control group also received SBAR instruction to ensure ethical parity. All participants subsequently completed an anonymous electronic questionnaire assessing the clarity, usability, and perceived educational value of the SBAR method. Their performance was assessed based on the four SBAR components and the total time taken to complete the patient handover scenario.

Statistical Analysis

Statistical analysis was conducted using IBM SPSS Statistics for Windows, version 28.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics (means, standard deviations) were calculated for all measured variables. Independent samples t-tests were used to examine between-group differences, while effect sizes (Cohen's d) were computed to estimate the magnitude of observed effects. Statistical significance was set at $p<0.05$.

Ethical Considerations

The study received ethical approval from the Ethics and Deontology Committee of the Department of Nursing, University of Patras (Approval Number: 44531/24-022025, Date: 24.02.2025). All participants were thoroughly informed about the aims and procedures of the research and provided written informed consent prior to participation. Anonymity and confidentiality of data were strictly maintained throughout the study. The research was conducted in full accordance with the principles outlined in the Declaration of Helsinki.[11]

Results

Quantitative Findings on SBAR Performance

A total of 32 nursing students participated in the study, all of whom were enrolled in the 7th semester of the undergraduate program. The participants' mean age was 22.1±0.8 years (range: 21–23), with 87.5% female (n=28) and 12.5% male (n=4). These demographic characteristics were similar across the intervention and control groups.

The intervention group achieved higher mean scores across all SBAR components, indicating a positive impact of the educational intervention (Table 1). Specifically, for the *Situation* component, the trained nursing students had a mean score of 0.534 (standard deviation [SD]=0.192) compared to 0.319 (SD=0.241) in the control group. This difference was statistically significant (t=2.798, p=0.009), with a large effect size (Cohen's d=0.99), suggesting a strong educational impact. Similar results were observed in the *Background* component, where the difference was even more pronounced (0.916 vs. 0.544) and statistically significant (t=3.083, p=0.005), with a very large effect size (Cohen's d=1.09). In contrast, the *Assessment* component showed nearly identical means (0.616 vs. 0.606) with no statistically significant difference (t=0.096, p=0.924, Cohen's d=0.03), suggesting that the training had minimal influence on this aspect. For the *Recommendation* component, although the difference in mean scores (0.770 vs. 0.079) appeared substantial, it did not reach statistical significance (t=1.485, p=0.148), possibly due to variability and the small sample size. However, the effect size (Cohen's d=0.52) was moderate, indicating potential practical relevance in educational settings.

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Table 1. Mean scores and standard deviations in SBAR components and handover time by training group

Assessment category	Trained group (N=16) Mean±SD	Control group (N=16) Mean±SD
Situation	0.534±0.192	0.319±0.241
Background	0.916±0.235	0.544±0.421
Assessment	0.616±0.258	0.606±0.328
Recommendations	0.770±0.197	0.079±0.173
Handover duration*	18:56±3:52	10:30±4:00

*: Handover time expressed in minutes:seconds (mm:ss). SBAR: Situation–Background–Assessment–Recommendation, SD: Standard deviation.

Finally, regarding handover duration, the intervention group spent significantly more time (M=18:56, SD=3:52) compared to the control group (M=10:30, SD=4:00). Handover duration was recorded in minutes and seconds (mm:ss) for each participant. This difference was highly statistically significant (t=6.867, p<0.001), with a very large effect size (Cohen's d=2.43), possibly reflecting a more thorough, focused, and structured presentation of information by the trained students (Table 2).

Student Perceptions and Experiences After the Training

Following the assessment, all participants–including those in the control group who subsequently received SBAR training–completed an online questionnaire to evaluate their experiences and perceptions regarding the implementation of SBAR in undergraduate education. The findings were overwhelmingly positive (Table 3). All nursing students (100%) expressed a desire for SBAR to be formally integrated into their nursing curriculum and agreed that SBAR can reduce communication errors in clinical settings. A total of 87.5% reported increased confidence in their role as nursing students, and 71.9% believed that SBAR would improve their communication during clinical practice. The presentation of the SBAR method was rated as "very" or "completely" understandable by 97% of the participants, with an average comprehension score of 4.5/5. Regarding ease of use, 84.4% found the tool "easy" or "very easy" to use. Interestingly, while 46.9% of students stated they felt capable of applying SBAR in a real clinical setting, 53.1% responded "maybe," indicating a need for further support and hands-on training.

Finally, 96.9% of students rated the inclusion of tools like SBAR as "very" or "extremely important" to their professional development, and an equal percentage agreed that SBAR contributes meaningfully to patient safety improvement.

Discussion

This study evaluated the impact of SBAR training on undergraduate nursing students' ability to perform structured patient handovers. The results demonstrated that targeted training significantly improved specific aspects of structured communication. In particular, trained students scored significantly higher in the "Situation" and "Background" components, with large effect sizes. These findings suggest that education can enhance students' ability to effectively convey critical information related to the patient's current status and relevant clinical history–two essential pillars of clinical communication.[6,7]

These results align with previous studies that have supported the positive impact of SBAR training in educational settings. Integrating SBAR into simulation-based scenarios has been shown to increase clarity, completeness, and student confidence during handovers.[5,6] Additionally, the use of structured communication tools can improve the quality of interprofessional information exchange and reduce errors.[7] A particularly notable finding was the significant difference in the time spent completing the written handover. On average, the experimental group spent 8.5 minutes more than the control group. Although extended handovers may be viewed as a drawback in time-pressured clinical environments, within the context of education, this additional time reflects more systematic thinking, analytical reasoning, and diligence–characteristics that support the quality of learning and future clinical safety. This finding is consistent with studies suggesting that SBAR use may increase the time required for handovers but improves their overall quality.[5]

The post-training questionnaire results were also highly encouraging. The unanimous agreement among students regarding the inclusion of SBAR in the nursing curriculum highlights its perceived educational value. Most nursing students reported increased confidence, and the tool was rated as easy to understand and use. These findings reflect the low cognitive and emotional burden associated with SBAR, making it accessible and appealing to students with limited clinical experience.[12,13]

Table 2. Independent samples t-test results for SBAR components and handover time

Variable	t (df)	p	Cohen's d	Effect size interpretation
Situation	2.798 (30)	0.009	0.99	Significant, large
Background	3.083 (23.5)	0.005	1.09	Significant, large
Assessment	0.096 (30)	0.924	0.03	Not significant
Recommendations	1.485 (29.5)	0.148	0.52	Not significant, medium effect
Handover duration*	6.867 (30)	<0.001	2.43	Significant, very large effect

*: Handover time expressed in minutes:seconds (mm:ss). t: t-value (t-statistic), df: Degrees of freedom, Cohen's d: effect size measure.

Table 3. Student perceptions after SBAR training

Question	Response summary
Participation in more SBAR seminars/workshops?	Yes: 87.5%, Maybe: 12.5%, No: 0%
Presentation understanding (mean score: 4.5) (Likert 1–5)	Completely: 56.3%, Very: 40.6%, Moderate: 3.1%
Ability to apply SBAR in a clinical setting?	Yes: 46.9%, Maybe: 53.1%, No: 0%
Ease of using SBAR (mean score: 4.2) (Likert 1–5)	Very easy: 37.5%, Easy: 46.9%, Difficult: 6.2%, Moderate: 9.4%
Importance for patient safety (mean score: 4.8) (Likert 1–5)	Extremely: 78.1%, Very: 18.8%, Moderate: 3.1%
Confidence boost after SBAR use?	Yes: 87.5%, Maybe: 12.5%, No: 0%
Improved clinical communication (mean score: 4.7) (Likert 1–5)	Agree: 71.9%, Neutral: 28.1%, Disagree: 0%
Should SBAR be part of the curriculum?	Yes: 100%
SBAR reduces clinical communication errors?	Yes: 100%
Importance of SBAR for professional development (mean score: 4.7) (Likert 1–5)	Extremely: 68.8%, Very: 28.1%, Moderate: 3.1%

Furthermore, the shared belief that SBAR can help reduce communication errors underscores students' awareness of the importance of safe and accurate information transfer in clinical settings. Their positive attitudes confirm that tools like SBAR can play a key role in advancing the professional competence of future nurses.[9,14,15]

Although the results demonstrated statistically significant improvements in the "Situation" and "Background" components, no significant differences were observed in the "Assessment" and "Recommendation" components. This pattern may reflect the inherent complexity of these stages, which require higher levels of clinical reasoning, prioritization, and decision-making—skills that typically evolve through advanced clinical exposure. Additionally, the relatively small sample size and short duration of the intervention may have limited the ability to detect more subtle effects. It is also possible that written rather than verbal handover scenarios restricted the authenticity and dynamic interaction typical of clinical communication, thereby influencing student performance. Future research incorporating larger samples, extended training, and realistic simulation-based environments could provide deeper insights into these aspects.

Limitations

Although the findings of the present study are encouraging, certain limitations should be acknowledged. The relatively small sample size (n=32) limits the generalizability of the results to broader student populations and may have affected the statistical power, particularly in components where no significant differences were observed. Additionally, the fact that the assessment was conducted in a simulated rather than a real clinical environment may affect the external validity of the findings.

Furthermore, the evaluation process may have been subject to potential observer bias, as the evaluators were aware of group allocation despite efforts to apply consistent scoring criteria. Another possible source of bias is the Hawthorne effect, whereby students might have modified their performance simply because they were aware of being observed during the intervention. Moreover, the evaluation relied on specific scoring tools and self-reported questionnaires, which may not fully capture the long-term educational impact of the training. Nevertheless, the study provides valuable insights into the educational utility of SBAR and lays the groundwork for future large-scale investigations in real clinical settings.

Conclusion

This pilot study highlighted the positive impact of SBAR training on nursing students' ability to deliver comprehensive, clear, and structured patient handovers. Trained participants demonstrated significantly higher performance in key components of the tool, such as presenting the patient's current condition and background, indicating the contribution of SBAR to enhancing students' communication competence. In parallel, the unanimous acceptance of the tool by the nursing students and their favorable attitude toward its integration into undergraduate curricula further support the need for systematic incorporation of standardized communication training in academic nursing education. The use of SBAR not only improves clinical communication but also serves as an educational strategy that enhances students' confidence and professional readiness. Based on these findings, the broader implementation of SBAR training in nursing programs is recommended. Future research involving larger and more representative samples may further strengthen the generalizability of the results and assess the long-term impact of the tool on graduates' clinical performance.

Ethics Committee Approval: The study was approved by the Ethics and Deontology Committee of the Department of Nursing, University of Patras (Approval Number: 44531/24-022025, Date: 24.02.2025).

Informed Consent: Written informed consent was obtained from the participants.

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The Effects of the Case-based Learning Method on Nursing Students' Self-regulated Learning and Clinical Self-efficacy Perception: A Quasi-experimental Study

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Abstract

Background: Developing clinical self-efficacy (CSE) and self-regulated learning skills is essential for nursing students to navigate complex clinical environments and ensure safe patient care effectively.

Aim: The purpose of this research was to explore how the case-based learning approach influences nursing students' self-regulated learning abilities and their perceptions of CSE.

Methods: This study employed a quasi-experimental design with a single-group pretest-posttest approach, conducted with 48 first-year nursing students from a public university in Türkiye. Over six weeks, participants engaged in weekly sessions based on the case-based learning model. Data were collected using three instruments: the Student Information Form, the Self-Regulated Learning Scale for Clinical Nursing Practice, and the Clinical Self-Efficacy Perception Scale. The collected data were analyzed using SPSS version 22.0, applying descriptive statistics, paired t-tests, and linear regression techniques.

Results: Among the participants, 89.1% were female, with a mean age of 20.29±2.98 years. Following the intervention, no statistically significant difference was found in self-regulated learning scores ($p>0.05$); however, CSE perception scores showed a marked and statistically significant improvement ($p<0.001$). Regression analysis indicated that the predictive ability of self-regulated learning scores on CSE increased after the intervention, with explained variance rising from 11.2% at pretest to 16.3% at posttest.

Conclusion: Case-based learning effectively enhances nursing students' CSE, while the limited short-term gains in self-regulated learning highlight the need for sustained support. Developing both skills together is crucial for academic and professional success.

Keywords: Education, nursing, self-efficacy, self-regulated learning

Introduction

Nursing is an applied health discipline that goes beyond the simple transmission of theoretical knowledge; it requires the holistic development of decision-making, problem-solving, and clinical reasoning skills.[1] In today's rapidly changing healthcare environment, the growing complexity of patient care and ongoing technological advancements increase the risk of clinical errors, reduce performance, and threaten patient safety. Therefore, nurses must not only maintain up-to-date knowledge but also apply it effectively in complex clinical situations.[2] Undergraduate nursing programs, however, often struggle to translate theory into practice, and traditional lecture-based approaches may limit students' critical thinking and foster passive learning. In this context, nursing students need to adopt effective learning strategies that enable them to actively manage their learning and develop self-directed, competent clinical practice.[3,4]

At this stage, the concept of self-regulated learning (SRL) becomes increasingly important. SRL refers to a dynamic and intentional process through which learners establish their own academic goals and actively control, adapt, and direct their thoughts, motivations, and behaviors to reach those goals.[5,6] Students with well-developed SRL skills actively engage in learning, develop strategies, monitor their learning processes, and make necessary adjustments to achieve their learning objectives.[5,7,8] These skills not only support academic achievement and professional development but also enable individuals to become lifelong learning professionals.[8,9]

One of the fundamental components of SRL is an individual's perception of self-efficacy (SE).[5,10] SE describes an individual's confidence in their ability to effectively carry out a particular task. Those with strong self-efficacy tend to be more engaged in learning, exert more effort toward reaching their goals, and demonstrate greater resilience in the face of difficulties.[10,11] Clinical self-efficacy (CSE), in particular, reflects nursing students' confidence in applying clinical skills, making decisions, and assuming responsibility.[12] Previous studies emphasize that SE plays a crucial role in shaping students' clinical competence, supporting their professional growth, and ensuring safe clinical practices.[4,13] In this context, Chen and Hung[14] in 2025 reported that integrat-

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ing SRL activities with a flipped classroom approach not only improved nursing skills performance but also enhanced both clinical self-efficacy and SRL, illustrating the practical benefits of fostering self-efficacy in nursing education.

One instructional method that may be effective in enhancing these two critical variables—SRL and CSE—is case-based learning (CBL). Unlike traditional lecture-based approaches, CBL actively engages students in analytical thinking, decision-making, and problem-solving through realistic clinical scenarios. This approach not only helps students acquire knowledge but also apply it within a clinical context, thereby improving their ability to plan, evaluate, and regulate their learning while simultaneously increasing their confidence in clinical decision-making.[15–18] In alignment with the principles of SRL, CBL also fosters metacognitive awareness, strengthens motivation to learn, and supports the development of effective problem-solving strategies.[18,19]

Hwang and Oh[3] in 2021 suggested that SE and SRL should be considered together to enhance nursing students' problem-solving ability. Although previous studies highlight the importance of examining SRL and CSE concurrently, no experimental research has explored their combined effects, with most existing studies being descriptive or correlational.[3,10,20] To address this gap, the present study examines SRL and CSE concurrently within a structured case-based learning intervention. This approach provides insights into the interrelated effects of these constructs. Clarifying the role of case-based learning in enhancing SRL and CSE can guide the development of evidence-based, student-centered educational strategies, support curriculum redesign, and foster high-quality learning environments. Ultimately, such insights can help prepare nursing students to actively manage their learning and perform effectively in complex clinical settings.

Aim

The purpose of this research was to explore how the case-based learning approach influences nursing students' abilities in SRL and their perceptions of CSE.

Research Hypotheses

H1: The application of the case-based learning approach leads to a statistically significant improvement in nursing students' SRL from pretest to posttest.

H2: Following the implementation of case-based learning, nursing students exhibit a significant change in their CSE scores between the pretest and posttest assessments.

H3: Nursing students' post-intervention SRL scores serve as significant predictors of their CSE outcomes in the posttest evaluation.

Materials and Methods

Research Design

This study utilized a quasi-experimental design involving a single group with measurements taken before and after the intervention. To comply with reporting standards for quasi-experimental studies, the TREND (Transparent Reporting of Evaluations with Nonrandomized Designs) Statement Checklist was utilized during the preparation of this report.[21]

Population and Sample of the Study

The study population consisted of first-year nursing students enrolled in the Faculty of Health Sciences at a university in Türkiye during the Spring term of the 2024–2025 academic year. First-year students were selected because they had no prior clinical experience or established practice habits, allowing the educational intervention's effect to be observed more clearly. The total class size was 57 students, and the entire class was initially intended to participate in the study. However, three students declined to participate, and six students were excluded due to incomplete attendance in the case-based learning sessions. Consequently, the study was completed with 48 students. Using G*Power 3.1.9.4 software, an a priori power analysis indicated that a minimum sample size of 34 participants was required for a paired samples t-test, assuming an effect size of 0.5, a significance level (α) of 0.05, and statistical power (1-β) of 0.80.[22] Therefore, the final sample of 48 participants included in this study was deemed sufficient.

Inclusion Criteria

- Enrollment as a first-year student in the Nursing Department,
- Registration in the Fundamentals of Nursing course,
- Participation in clinical practice activities,
- Citizenship of the Republic of Türkiye,
- Voluntary agreement to participate in the study.

Exclusion Criteria

- Being a foreign national,
- Refusal to sign the informed consent form.
- Missing one or more of the six case-based learning sessions,
- Failure to participate in either the pretest or posttest assessments.

Data Collection Instruments

Data were collected through an online survey consisting of three measurement tools used in the study. This survey was developed by integrating the Student Information Form, the Self-Regulated Learning Scale for Clinical Nursing Practice (SRLS-CNP), and the Clinical Self-Efficacy Perception Scale.

Student Information Form: Developed by the researchers based on relevant literature, this form includes questions regarding participants' demographic characteristics and clinical experiences. The form consists of six items covering variables such as age, gender, weighted grade point average, attitude toward the nursing profession (liking the profession), and self-perceived competence in hospital and laboratory practices.

Self-Regulated Learning Scale for Clinical Nursing Practice: The scale, originally created by Iyama and Maeda[23] in 2017 to measure students' SRL within clinical practice environments, was adapted into Turkish by Senol and Orgun[24] in 2018. The scale includes 16 items divided into two subscales: "Motivation" and "Learning Strategies." Each item is rated on a 5-point Likert scale from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Total scores range from 16 to 80, with no specific cutoff values. Higher scores reflect stronger use of SRL strategies.[24] The original study reported a Cronbach's alpha coefficient of 0.853,[23] while the Turkish adaptation demonstrated a reliability coefficient of 0.898.[24] In the present study, the Cronbach's alpha value of the scale at posttest was found to be 0.85.

Clinical Self-Efficacy Perception Scale: The scale, created by Cheraghi et al.[25] in 2009 to evaluate nursing students' self-efficacy perceptions related to their clinical performance, was adapted into Turkish and tested for validity and reliability by Zaybak[26] in 2016. This Likert-type scale contains 37 items with 11 response options ranging from 0%, 10%, 20%, ... up to 100%. The response option "0%" corresponds to "not sure," while "100%" corresponds to "completely sure." The scale comprises four subdimensions: Data Collection, Diagnosis and Planning, Implementation, and Evaluation. Scores for the total scale and its subdimensions are evaluated based on item mean scores. The scale does not have a cutoff point. The minimum possible item mean score is 0, and the maximum is 100. Higher scores reflect greater self-efficacy in clinical performance, whereas lower scores indicate reduced confidence in this area. The scale's Cronbach's alpha coefficient was reported as 0.98.26 In the present study, the Cronbach's alpha value at posttest was found to be 0.96.

Implementation Process

The research was conducted in three sequential phases: pretest (first phase), case discussion sessions (second phase), and posttest (third phase) (Fig. 1).

First Phase: Pretest

At the beginning of the study, participants completed three measurement tools: the Student Information Form, the Self-Regulated Learning Scale, and the Clinical Self-Efficacy Perception Scale. These instruments provided baseline data on students' demographic characteristics, SRL skills, and perceptions of CSE before the intervention.

Second Phase: Case-based Sessions

The case-based learning sessions were conducted in a classroom setting and the educational intervention was structured over six consecutive weeks, with one session held each week. Each session lasted approximately 40–50 minutes. A total of 48 students were organized into six groups of eight students each, based on voluntary participation. Each week, a different group presented a case while the remaining students participated in the case session.

Six multi-stage nursing cases covering respiratory, cardiovascular, gastrointestinal, infectious, neurological, and endocrine system care were used.[27] Each group

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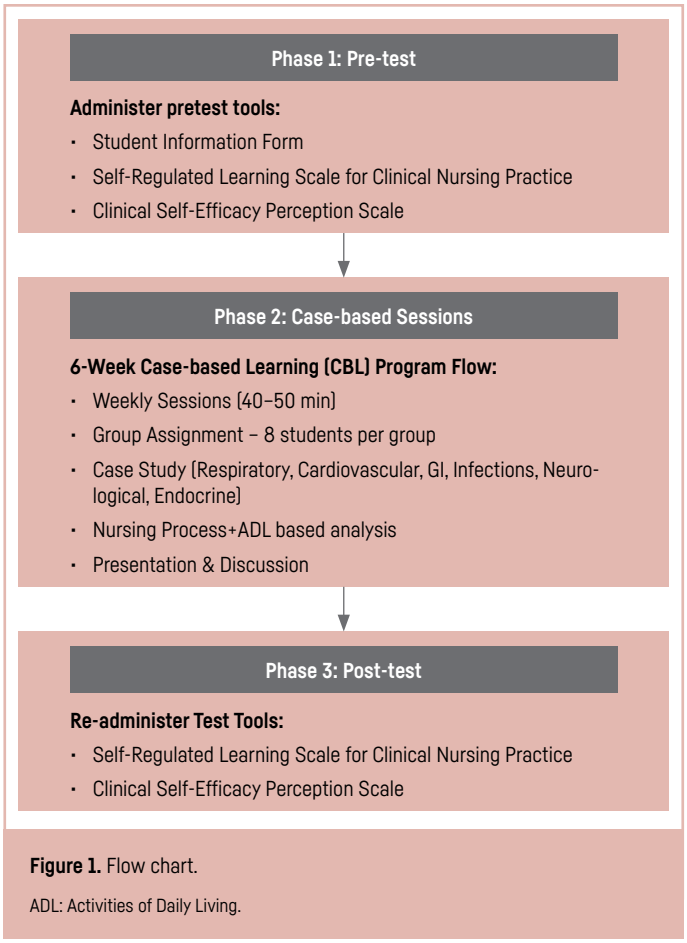

Figure 1. Flow chart.

ADL: Activities of Daily Living.

received standardized case data from the researcher and discussed the case according to the Nursing Process framework and the Activities of Daily Living (ADL) model. Students formulated nursing diagnoses, set goals, planned and implemented interventions, and developed a comprehensive care plan. The prepared care plans were presented to the entire class. Presentations were analyzed through instructor-guided question-and-answer sessions and group discussions, during which the instructor asked questions, answered students' queries, and facilitated class-wide discussion to deepen understanding and provide feedback.

Each session followed a standardized flow (opening and orientation: 5 minutes; case presentation: 10 minutes; group analysis and Nursing Process application: 15 minutes; care plan preparation: 10 minutes; presentation and instructor-guided question-and-answer/discussion: 5 minutes).

All sessions were facilitated by an instructor with expertise in nursing fundamentals, who had received prior training to ensure consistency.

Third Phase: Posttest

After the six-week intervention, the Self-Regulated Learning Scale and the Clinical Self-Efficacy Perception Scale were re-administered to assess changes in students' self-regulated learning skills and clinical self-efficacy perceptions (Fig. 1).

Data Analysis

Data analysis was performed using SPSS (version 22.0; IBM Corp., Armonk, NY, USA). Participants' descriptive data were presented using frequencies, percentages, means, and standard deviations. To evaluate the normality of the scale scores, skewness and kurtosis values were examined. For variables that satisfied the normality assumption, paired-samples t-tests were conducted to compare pretest and posttest scores. Furthermore, multiple and simple linear regression analyses were conducted to examine the relationships between the study variables. A p-value of less than 0.05 was considered statistically significant in all analyses.

Table 1. Descriptive characteristics of students (n=48)

Variable	n	%
Gender		
Female	31	64.6
Male	17	35.4
Do you like the nursing profession?		
Yes	41	85.4
No	7	14.6
Do you consider yourself competent in laboratory practices?		
Yes	30	62.5
Partly	17	35.4
No	1	2.1
Do you consider yourself competent in hospital practices?		
Yes	29	60.4
Partly	19	39.6
	Min-max	**Mean±SD**
Mean age (years)	18–39	20.29±2.98
CGPA	1.58–3.60	2.73±0.45

SD: Standard deviation, CGPA: Cumulative grade point average.

Ethical Considerations

Before initiating the study, approval was granted by the Ethics Committee of Siirt University (Approval Number: 136429, Date: 20.03.2025). Formal permission was also obtained from the institution where the research took place (19.03.2025/136195). At the start of the online questionnaire, participants were presented with an informed consent form outlining the study's purpose and details, and they were required to provide consent before proceeding. The entire research process was conducted in full compliance with ethical standards and the principles of the Declaration of Helsinki.

Results

Among the nursing students participating in the study, 64.6% were female. The majority of participants (85.4%) reported that they liked the nursing profession. The proportion of students who perceived themselves as competent in laboratory practices was 62.5%, while 60.4% felt competent in hospital-based clinical practices. The mean age of the participants was 20.29±2.98 years, and their cumulative grade point average (CGPA) was 2.73±0.45 (Table 1).

Multiple linear regression analyses were conducted to identify the factors predicting participants' CSE and self-regulated learning for clinical nursing practice (SRLS-CNP) scores. For CSE, the overall model was not statistically significant ($F(6,41)=0.749$, $p=0.613$), explaining approximately 9.9% of the variance ($R^2=0.099$, Adjusted $R^2=-0.033$). None of the independent variables—including mean age, CGPA, gender, liking the nursing profession, perceived competence in laboratory practices, or perceived competence in hospital practices—significantly predicted CSE ($p>0.05$) (Table 2).

In contrast, the model predicting self-regulated learning was statistically significant ($F(6,41)=2.549$, $p=0.034$), accounting for 27.2% of the variance ($R^2=0.272$, Adjusted $R^2=0.165$). Among the predictors, only CGPA was a significant positive predictor of SRLS-CNP scores ($B=5.433$, $\beta=0.367$, $p=0.016$, 95% CI [1.084, 9.783]). Other variables, including mean age, gender, liking the nursing profession, and perceived competence in laboratory or hospital practices—were not significant predictors ($p>0.05$) (Table 2).

Regarding the findings related to the SRLS-CNP, the mean total score of participants who underwent the case-based learning intervention was 62.72±5.32 in the pretest and 63.04±6.73 in the posttest. The difference between pretest and posttest scores was not statistically significant ($t=-0.404$, $p=0.688$; Cohen's $d=0.005$) (Table 3).

Table 2. Factors predicting CSES and SRLS-CNP (post-test)

Dependent variables	Model	Independent variables	B	SE	β	t	p	95% CI	
								Lower	Upper
CSES	1	(Constant)	6.671	1.568		4.254	0.000	3.504	9.839
		Mean age (years)	-0.033	0.057	-0.088	-0.581	0.564	-0.149	0.082
		CGPA	0.065	0.402	0.026	0.162	0.872	-0.747	0.877
		Gender (Female=1)	0.607	0.388	0.260	1.567	0.125	-0.175	1.390
		Liking nursing profession (Yes=1)	0.165	0.486	0.052	0.340	0.735	-0.817	1.148
		Perceived competence in laboratory practices (Yes=1)	0.122	0.381	0.053	0.320	0.750	-0.648	0.892
		Perceived competence in hospital practices (Yes=1)	0.528	0.397	0.231	1.331	0.191	-0.274	1.330
		R=0.314	R^2=0.099						
		$F_{(6.41)}$=0.749	p=0.613						
SRLS-CNP	2	(Constant)	38.228	8.401		4.551	**0.000**	21.263	55.194
		Mean age (years)	0.114	0.307	0.051	0.373	0.711	-0.505	0.734
		CGPA	5.433	2.154	0.367	2.523	**0.016***	1.084	9.783
		Gender (Female=1)	3.100	2.076	0.222	1.493	0.143	-1.093	7.294
		Liking nursing profession (Yes=1)	3.522	2.605	0.186	1.352	0.184	-1.739	8.784
		Perceived competence in laboratory practices (Yes=1)	1.200	2.042	0.087	0.588	0.560	-2.924	5.324
		Perceived competence in hospital practices (Yes=1)	3.062	2.127	0.225	1.440	0.158	-1.234	7.357
		R=0.521	R^2=0.272						
		$F_{(6.41)}$=2.549	**p=0.034***						

*: Significance level p<0.05. CSES: Clinical Self-Efficacy Scale, SRLS-CNP: Self-Regulated Learning Scale in Clinical Nursing Practice, B: Unstandardized regression coefficient, SE: Standard error, β: Standardized regression coefficient, t: t-value, CI: Confidence interval, CGPA: Cumulative grade point average.

Table 3. Comparison of students' pre-test and post-test scores on the Self-regulated Learning Scale for Clinical Nursing Practice and subdimensions

	Pre-test mean±SD	Post-test mean±SD	t	p	Cohen's d
Self-regulated Learning Scale in Clinical Nursing Practice	62.72±5.32	63.04±6.73	-0.404	0.688	0.005
Subdimensions					
Motivation	27.62±2.87	27.75±3.36	-0.281	0.78	0.004
Learning strategies	35.10±3.31	35.29±3.93	-0.372	0.712	0.005

SD: Standard deviation.

Table 4. Comparison of students' pre-test and post-test scores on the Clinical Self-Efficacy Scale and its subdimensions

	Pre-test	Post-test	t	p	Cohen's d
Clinical Self-Efficacy Scale	65.92±1.23	71.03±1.13	-3.887	0.0	0.043
Subdimensions					
Data Collection	68.43±1.17	72.11±1.18	-2.980	0.005	0.031
Assessment	63.14±1.31	68.12±1.26	-2.948	0.005	0.039
Implementation	68.29±1.45	74.50±1.22	-3.584	0.001	0.046
Evaluation	61.11±1.52	67.46±1.52	-2.827	0.007	0.042

Examination of the Clinical Self-Efficacy Scale (CSES) results revealed that participants' mean total scores increased from 65.92±1.23 in the pretest to 71.03±1.13 in the posttest. This difference was statistically significant (t=-3.887, p<0.001; Cohen's d=0.043), indicating a small effect size (Table 4).

Regression analysis indicated that pretest scores on the Self-Regulated Learning Scale significantly predicted pretest scores on the CSES (B=0.078, β=0.335, t(46)=2.414, p=0.020, 95% CI [0.013–0.143]). The model explained 11.2% of the variance (R^2=0.112) and was statistically significant (F(1,46)=5.828, p=0.020). The Durbin-Watson statistic was 1.99, indicating no autocorrelation. At posttest, the predictive power of the Self-Regulated Learning Scale scores on CSES scores increased (B=0.068, β=0.403, t(46)=2.989, p=0.004, 95% CI [0.022–0.113]), with the model explaining 16.3% of the variance (R^2=0.163) and remaining significant (F(1,46)=8.934, p=0.004). The Durbin-Watson value was 2.196 (Table 5).

Discussion

The findings of this study revealed that students with higher grade point averages had higher self-regulated learning scores, indicating a positive and significant relationship between academic achievement and SRL. Similarly, previous

Table 5. Regression analysis results on the predictive effect of SRLS-CNP on CSES

Dependent variables	Model	Independent variables	B	SE	Standard (Beta)	t	p	95% CI	
								Lower	Upper
CSES (pre-test)	1	Constant	1.702	2.033	0.837	0.407	-2.391	5.794	
		SRLS-CNP (pre-test)	0.078	0.032	0.335	2.414	0.020	0.013	0.143
		R=0.335	R^2=0.112	F(1,46)=5.828		p=0.02*		Durbin-Watson: 1.99	
CSES (post-test)	2	Constant	2.836	1.436	1.976	0.054	-0.053	5.726	
		SRLS-CNP (post-test)	0.068	0.023	0.403 2.989	0.004	0.022	0.113	
		R=0.403	R^2=0.163	F (1,46)=8.934		p=0.004*		Durbin-Watson: 2.196	

*: Significance level p<0.05. SRLS-CNP: Self-Regulated Learning Scale for Clinical Nursing Practice, CSES: Clinical Self-Efficacy Scale, B: Unstandardized regression coefficient, SE: Standard error, β: Standardized regression coefficient, t: t-value, CI: Confidence interval.

research has reported that nursing students with higher academic achievement demonstrate more advanced SRL skills.[20,28] This suggests that successful students are more capable of consciously planning and managing their learning processes. Therefore, implementing instructional strategies aimed at strengthening SRL skills in nursing education may serve as an effective approach to enhance academic achievement.

In this study, no statistically significant difference was observed between the pretest and posttest total scores of the SRL Scale in Clinical Nursing Practice following the implementation of the case-based learning method. The absence of a significant difference suggests that the development of SRL skills may be limited in the short term. This finding aligns with the understanding that SRL is a complex and multidimensional process that requires long-term, repetitive, and continuous supportive educational approaches for effective development.[28,29] The effectiveness of SRL depends on students' ability to manage their learning processes, maintain motivation, and employ strategic behaviors, all of which take time to cultivate.[23,30] Additionally, perceived academic and social support in clinical settings has been shown to play a critical role in the development of students' SRL skills.[30] Therefore, it is recommended that the impact of case-based learning on SRL be reinforced through more comprehensive and long-term interventions.

In this study, a significant increase was observed in nursing students' perceived CSE following the implementation of case-based learning, with significant improvements across all subdomains, including data collection, diagnosis, implementation, and evaluation. These findings align with previous research demonstrating the effectiveness of case-based learning in enhancing both cognitive and practical competencies among nursing students. For instance, Kassabry et al. (2024)[31] emphasized that case-based learning strengthens critical thinking and clinical decision-making skills, which are fundamental to providing safe and effective patient care. Similarly, a comprehensive review by Yao et al. (2023)[2] reported that case-based learning interventions significantly improve academic achievement, critical thinking abilities, and clinical decision-making competencies in theoretical nursing courses. Liu et al.[32] in 2020 highlighted the effectiveness of case-based teaching in nursing skills education, noting marked improvements in students' clinical performance. Additionally, Choi et al.[33] in 2023 demonstrated that virtual clinical simulation combined with case-based clinical seminars effectively enhances nursing students' learning flow, self-efficacy, and satisfaction, underscoring that such student-centered and interactive approaches increase motivation and confidence in clinical skills. These findings suggest that realistic case-based education enhances problem-solving skills and clinical confidence. Overall, case-based learning is an effective, student-centered approach that improves CSE and prepares nursing students for complex clinical settings. Further research is needed to evaluate its integration alongside other supportive clinical factors.

In this study, regression analyses demonstrated that SRL skills in clinical practice significantly predicted CSE. The explanation of 11.2% of the variance in CSE scores by SRL scores at pretest, increasing to 16.3% at posttest, indicates that the case-based learning intervention positively influenced participants' abilities to regulate their learning processes, thereby enhancing their perceptions of clinical competence. These findings support the critical role of SRL in nursing education for improving clinical performance and professional self-confidence.[10,29] The literature similarly reports that high levels of SRL skills strengthen students' problem-solving abilities and contribute to more effective decision-making in clinical settings.[34,35] Moreover, self-efficacy is known to be effective in controlling the learning process and enhancing professional performance, showing a strong association with SRL.[11,20] Within this context, the case-based learning method is expected to foster students' responsibility for their learning, promoting development in both cognitive and affective domains.

Limitations

The study is limited to students from a single university, which restricts the generalizability of the findings. Additionally, the effects of the intervention were assessed only in the short term, and long-term impacts were not examined. Furthermore, the exclusive use of quantitative data in the research limited the opportunity to obtain more comprehensive insights into participants' experiences and perspectives. Another limitation is that concurrent learning experiences, such as clinical rotations or simulations, and variables such as weekly study or screen time were not monitored or controlled.

Conclusion

This study showed that case-based learning significantly enhances nursing students' CSE, while no notable short-term improvement was observed in SRL skills. Given the complex and long-term nature of developing self-regulation, extended follow-up is essential. The strong predictive role of SRL on CSE highlights the importance of fostering both skills together in nursing education. Overall, case-based learning stands out as an effective, student-centered strategy that supports both cognitive and practical competencies. Future studies should explore its long-term impact in varied educational contexts with larger samples.

Ethics Committee Approval: The study was approved by the Siirt University Ethics Committee (Approval Number: 136429, Date: 20.03.2025).

Informed Consent: Written informed consent was obtained from the participants.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Validity and Reliability Study of the Turkish Version of the Medication Adherence Rating Scale

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Abstract

Background: In individuals with chronic health conditions, adherence to medication therapy is the most fundamental component of self-management. Therefore, it is essential to assess patients' medication adherence using valid and reliable tools.

Aim: The purpose of this study is to test the validity and reliability of the Turkish version of the Medication Adherence Rating Scale (MARS).

Methods: Data for this descriptive and methodological study were obtained from patients with at least one chronic condition between April and June 2024. The Turkish version of the MARS was developed utilizing the translation-back translation methodology. The content validity ratio was determined through expert evaluations. The construct validity of the scale was assessed using confirmatory factor analysis. The scale's reliability was evaluated using parallel forms reliability (Medication Adherence Report Scale-5), correlations with other scales (namely the Chronic Illness Self-Management Scale – CISMS), Cronbach's alpha for internal consistency, and item-total score correlation coefficients.

Results: Confirmatory factor analysis validated the originally proposed three-factor structure of the scale. All model fit indices were within acceptable limits. A moderate and significant correlation was found with the Medication Adherence Report Scale used for parallel forms reliability ($p<0.001$). The total scale score showed significant correlations with all CISMS subscales ($p<0.05$). The Cronbach's alpha reliability coefficient for the total scale score was 0.70.

Conclusion: The Turkish version of the Medication Adherence Rating Scale, consisting of eight items (reduced from the original ten-item scale), has been shown to be a valid and reliable instrument.

Keywords: Chronic diseases, medication adherence, reliability, Turkish, validity

Introduction

Medication adherence refers to the practice of patients taking their prescription drugs at the specified dosage, intervals, and frequency, while consistently maintaining these habits.[1,2] Medication adherence is a critical issue that must be addressed to ensure the efficacy and safety of treatment. Non-adherence to drug therapy correlates directly with increased healthcare service utilization, elevated healthcare expenses, exacerbation of disease progression, diminished quality of life, and higher morbidity and mortality rates.[3,4] Consequently, adherence to medication is particularly important for individuals with chronic health conditions. Chronic illnesses necessitate prolonged treatment and care and are intrinsically linked to the patient's self-management.

In chronic illnesses, medication adherence is a crucial measure of self-management and adaptation to the condition.[5] Nevertheless, the World Health Organization (WHO) indicates that roughly fifty percent of individuals with chronic conditions fail to comply with their prescribed medical regimens.[6] Medication adherence is influenced by numerous factors, with key determinants including an individual's understanding of their medication, their attitude toward it, and their experiences with adverse effects.[2,4,7,8] Consequently, evaluating patients' medication adherence requires a multidimensional consideration of the patient.

Nurses are healthcare professionals who carefully examine medication adherence and assess patients in a multidimensional manner. They can simultaneously evaluate various elements, including the current impact of prescribed medications, potential side effects, and existing patient needs.[9] Through ongoing communication with patients and their families, nurses play a crucial role in mitigating risks and preventing errors in medication therapy. By fulfilling their educational responsibilities, they can enhance patients' correct medication use and adherence to treatment protocols.[10] Assessing medication adherence is essential for effectively maintaining the support and care provided to patients. Scales that assess medication adherence are commonly utilized for this purpose.

Although various versions of the Morisky Medication Adherence Scale (6-item and 8-item forms) are commonly used in Türkiye to assess medication adherence, these scales primarily focus on the behavioral dimension.[11,12] Although the 8-item version of the Morisky Medication Adherence Scale (MMAS-8) partially includes the attitudinal dimension, it remains inadequate in assessing critical factors influencing medication adherence, such as perceived side effects.[12] Other scales, such as the Medical Adherence Report Scale,[13] the Adherence to Refills

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and Medications Scale,[14] and the Medication Adherence Self-Efficacy Scale,[15] have also been adapted for use in chronic diseases through Turkish validity and reliability studies. However, these scales primarily assess whether patients take medications regularly, obtain timely prescriptions, forget doses, and the frequency of missed doses. In contrast, the Medication Adherence Rating Scale (MARS)[16] offers a more comprehensive framework by simultaneously evaluating three key dimensions: adherence behaviors, medication attitudes, and perceptions of side effects. This multidimensional structure addresses the limitations of existing unidimensional tools. Therefore, the aim of this study was to conduct a Turkish validity and reliability assessment of the *Medication Adherence Rating Scale* among adults with chronic health conditions. Consequently, the adaptation of instruments like MARS becomes particularly valuable for chronic disease management, where a holistic assessment of adherence determinants is clinically essential.

Research Questions

1. Is the Turkish version of the MARS scale at an acceptable level of construct validity for individuals with chronic illnesses?
2. Is the Turkish version of the MARS scale reliable for individuals with chronic illnesses?

Materials and Methods

Study Design, Setting, and Participants

The data for this descriptive and methodological study were gathered from April to June 2024. The research was carried out through in-person interviews with patients admitted to the internal medicine departments of a university hospital. Participants aged 18 and older, without communication impairments, possessing at least one chronic condition, and using a minimum of one medication were included in the study. We applied the following exclusion criteria: severe cognitive impairment, active psychiatric disorders, terminal illness, inability to complete questionnaires independently, and refusal to participate. For scale studies, it is advisable to achieve a sample size that is 5 to 10 times the number of items on the scale.[17,18] However, current publications recommend a minimum sample size of at least 200 to reduce error and bias in confirmatory factor analysis.[19–21] Taking this into consideration, the study was completed with a total of 310 patients who met the inclusion criteria and agreed to participate.

Data Collection Tools

Patient Demographic Information Form: The demographic information form, consisting of 16 questions, includes inquiries about patients' sociodemographic characteristics, such as age, gender, education level, employment status, marital status, socioeconomic status, and place of residence, as well as clinical characteristics, including diagnosis, duration of illness, frequency of health check-ups, medication adherence, exercise regularity, and smoking and alcohol consumption status.

Medication Adherence Rating Scale (MARS): The Medication Adherence Rating Scale was developed by Thompson et al.[16] in 2000 to evaluate patients' medication adherence levels. The original scale comprises 10 items divided into three subscales: medication adherence behavior (items 1–4), attitude toward taking medication (items 5–8), and negative side effects (items 9–10). Following the Turkish validity and reliability study of the scale, two items (items 7 and 8) were eliminated, resulting in a structure comprising a total of 8 items and 3 subscales. The Turkish adaptation of the 8-item scale includes the "medication adherence behavior" subscale (items 1, 2, 3, and 4), the "attitude toward taking medication" subscale (items 5 and 6), and the "negative side effects" subscale (items 7 and 8). All items on the scale are scored as "No=1" and "Yes=0." A higher score on the scale signifies greater medication adherence.[16] In the current study, the Cronbach's alpha reliability coefficient for the scale was found to be 0.70.

Medication Adherence Report Scale (MARS-5): This scale consists of 5 items and was developed by Horne et al.[22] in 1999 to assess medication adherence. The total score ranges from 5 to 25. A high score on the scale indicates strong adherence to drug therapy, whereas a low score indicates weak adherence. Temeloğlu Şen et al.[13] in 2019 conducted a Turkish validity and reliability assessment of the scale, reporting a Cronbach's alpha value of 0.78.

Chronic Illness Self-management Scale (CISMS): The original scale, developed by Ngai et al.[23] in 2020, consists of 23 items and 4 subscales: self-stigma, coping with stigma, health care efficacy, and treatment adherence. The Turkish adaptation of the scale was carried out by Öztürk et al.[24] in 2021, who determined that a 21-item version of the form was suitable for the Turkish context, with Cronbach's alpha coefficients for the subscales ranging from 0.789 to 0.876. The total score ranges from 21 to 105, with higher scores indicating better self-management. In this study, the Cronbach's alpha coefficients for the subscales were as follows: self-stigma, 0.876; coping with stigma, 0.730; health care efficacy, 0.866; and treatment adherence, 0.895.

Cross-Cultural Validation and Content Validity

The Turkish adaptation of the Medication Adherence Rating Scale (MARS) followed COSMIN (Consensus-based Standards for the Selection of Health Measurement Instruments) guidelines for cross-cultural validation,[25,26] comprising four key phases.

Forward Translation: Two bilingual translators, both native Turkish speakers fluent in English, independently translated the original MARS into Turkish. A reconciliation meeting was held to resolve discrepancies, resulting in Translation Version 1 (TV1).

Back-translation: Two other bilingual translators, blinded to the original MARS, back-translated TV1 into English. The research team compared the back-translations with the original MARS and revised TV1 to ensure conceptual equivalence, producing Translation Version 2 (TV2).

Expert Panel Review: Following Davis' methodology for instrument validation,[27] a panel of six PhD-prepared academic nurses with expertise in internal medicine nursing and nursing fundamentals (each with experience in scale validity and reliability) evaluated TV2. The panel assessed linguistic equivalence based on (1) clarity of item wording and (2) colloquial appropriateness within Turkish healthcare contexts. For content validity, each expert independently rated item relevance using Davis' 4-point Likert scale (1=not relevant to 4=highly relevant). The Item-Content Validity Index (I-CVI) was calculated as the proportion of experts rating each item as 3 or 4, and the Scale-Content Validity Index (S-CVI/Ave) was computed as the average of the I-CVIs.

Cognitive Debriefing: Cognitive interviews were conducted with 20 patients from the target population to evaluate the pre-final version (TV2). Participants rated each item's comprehensibility on a 5-point Likert scale (1=extremely unclear to 5=perfectly clear) and provided qualitative feedback on cultural relevance through open-ended questions.

Data Collection

The study employed a simple random sampling method to recruit participants from the internal medicine clinics of a university hospital. Eligible patients meeting the inclusion criteria (e.g., adults with chronic illnesses requiring long-term medication) were sequentially approached for participation. Prior to data collection, researchers consulted with the head nurse of each clinic to identify patients with special conditions, such as contact isolation, communication difficulties, or documented psychiatric diagnoses (e.g., major depressive disorder, bipolar disorder, or psychosis, as recorded in the hospital's patient registry system). These patients were excluded to avoid confounding factors in self-reported data. Following this screening, eligible patients were provided with verbal explanations about the study, and written informed consent was obtained. Participants were then asked to confirm the absence of any psychiatric diagnoses during the interview (if any psychiatric condition was reported, those patients were excluded), though no additional standardized psychiatric assessment tools were administered. Data collection was conducted through face-to-face interviews using the Patient Demographic Information Form, the Medication Adherence Rating Scale, the Medication Adherence Report Scale, and the Chronic Illness Self-Management Scale. The mean duration of data collection for each patient was 10 to 15 minutes.

Data Analysis

The data were analyzed using IBM SPSS Statistics 25.0 (IBM Corporation, Armonk, NY, USA). Frequency distributions were presented for categorical variables, and descriptive statistics were calculated for numerical variables. Validity analyses were conducted for the Turkish version of the Medication Adherence Rating Scale. The Davis technique was used to assess the scale's language and content validity, and the Content Validity Index (CVI) was computed.[27] Construct validity was examined through confirmatory factor analysis (CFA). Model fit was evaluated using χ^2/df (<3.0), the Comparative Fit Index (CFI) and Tucker–Lewis Index (TLI) (>0.90), the

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Table 1. Sociodemographic and clinical characteristics of the patients (n=310)

Characteristics	n	%	Characteristics	n	%
Age (mean±SD) (min-max)	60.31±15.69 (19–91)		Having a chronic disease*		
Sex			Cardiovascular system disease	31	10.0
Female	173	55.8	Nephrological disease	34	11.0
Male	137	44.2	Musculoskeletal system disease	6	1.9
Education			Endocrine system disease	57	18.4
Primary school	184	59.4	Respiratory system disease	35	11.3
Middle school	33	10.6	Neurological disease	27	8.7
High school	59	19.0	Gastroenterological disease	58	18.7
University and above	34	11.0	Oncological disease	62	20.0
Working status			Having comorbid disease		
Actively working	44	14.2	Yes	171	55.2
Not actively working (retired, student, etc.)	266	85.8	No	139	44.8
Marital status			Getting regular health checks		
Married	253	81.6	Yes	230	74.2
Single	57	18.4	No	80	25.8
Income			Using medications regularly		
Income is less than expenses	99	31.9	Yes	283	91.3
Income is equal to expenses	174	56.1	No	27	8.7
Income is more than expenses	37	11.9	Smoking		
Place of residence			Yes	37	11.9
Province	112	36.1	No	273	88.1
District	142	45.8	Alcohol use		
Village-town	56	18.1	Yes	11	3.5
			No	299	96.5

*: Diagnoses that caused patients to receive inpatient treatment in the hospital.

Root Mean Square Error of Approximation (RMSEA) (<0.08), and the Standardized Root Mean Square Residual (SRMR) (<0.10), as recommended in the psychometric literature.[18,28,29] Reliability analyses included parallel-forms reliability, internal consistency, and item-level analysis. Internal consistency was assessed using Cronbach's alpha, with $\alpha \geq 0.70$ considered acceptable.[30] Corrected item–total correlations were deemed adequate if $r \geq 0$.[30,31] Parallel-forms reliability was examined using the intraclass correlation coefficient (ICC, two-way random-effects model), with values interpreted as poor (<0.50), moderate (0.50–0.75), or excellent (>0.75).[32] Convergent validity was assessed using Pearson correlations between MARS and CISMS. Correlation coefficients were interpreted as weak (<0.30), moderate (0.30–0.50), or strong (>0.50), following COSMIN guidelines.[33] The significance level was set at $p<0.05$ for all statistical analyses performed in the study.

Ethical Considerations

The research was initiated after obtaining ethical approval from Ondokuz Mayis University Clinical Research Ethics Committee (Approval Number: OMU KAEK 2023/63, Date: 09.03.2023). Written permission (No: E-15374210-757.01-423436) was obtained from the university hospital where the study was to be conducted in order to collect data. In addition, written and verbal consent was obtained from all participating patients. Usage permissions for the scales employed in this study were obtained from the authors who conducted their validity studies. All stages of the research were carried out in accordance with the rules outlined in the Declaration of Helsinki.

Results

Sociodemographic and Clinical Characteristics of Patients

The mean age of the 310 patients participating in the study was 60.31 years (±15.69). Females constituted 55.8% of the sample, while 81.6% were married. A significant proportion of patients (85.8%) were unemployed, more than half (55.2%) had a comorbid condition, and one-fourth (25.8%) did not attend regular health check-ups (Table 1).

Content Validity Outcomes

The expert panel review confirmed strong content validity for the Turkish Medication Adherence Rating Scale. All items met Davis' threshold of Item-Content Validity Index (I-CVI) ≥0.83 for six raters, and the scale achieved an excellent Scale-Content Validity Index/Average (S-CVI/Ave) of 0.96. Cognitive debriefing with 20 patients from the target population showed that all items received a mean clarity score of ≥4.0 on a 5-point Likert scale, confirming linguistic accessibility and cultural appropriateness for the intended population. Based on qualitative feedback, minor revisions were made to enhance cultural relevance.

Structural Validity Outcomes

The original version of the Medication Adherence Rating Scale comprises 10 items and 3 subscales. Confirmatory factor analysis was conducted using the patients' responses to the scale items.[34] In confirmatory factor analysis, the path coefficients of the items must be statistically significant. Items 7 and 8 were removed from the scale because their path coefficients were not statistically significant. After the removal of these two items, which were originally part of the "attitude toward taking medication" subscale, the path coefficients for all remaining items reached statistical significance ($p<0.001$). The analysis corroborated the three-factor structure of the scale as initially proposed (Fig. 1).

When the model fit indices were examined, the following values were obtained: χ^2/df (24.692 /16)=1.543, Goodness of Fit Index (GFI)=0.981, Adjusted Goodness of Fit Index (AGFI)=0.956, Incremental Fit Index (IFI)=0.980, TLI=0.964, CFI=0.979, RMSEA=0.042, SRMR=0.033. All model fit indices were within acceptable limits (Table 2).

Reliability Analyses of the Scale

Parallel Forms Reliability

Parallel-forms reliability serves as an additional approach for evaluating the reliability of a scale. The Medication Adherence Report Scale (MARS-5) was utilized for

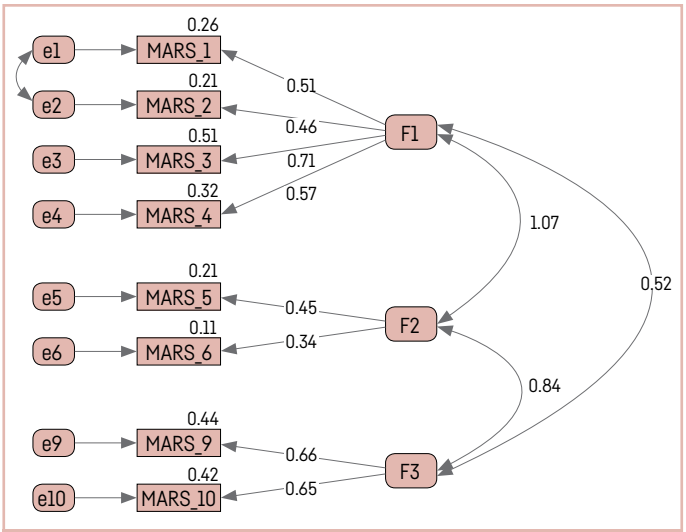

Figure 1. Path diagram with standardized path coefficients.

this purpose. It was determined that all subscales and the total score of the Medication Adherence Rating Scale, which had undergone validity and reliability testing, showed a moderate, significant correlation with the Medication Adherence Report Scale (MARS-5) (p<0.001) (Table 3).

Internal Consistency

The analysis of the relationship between scale items, subscales, and the total score revealed a significant contribution of each item to its respective subscale and to the total score (p<0.001).

The internal consistency of the Medication Adherence Rating Scale and its subscales was evaluated using the Cronbach's alpha reliability coefficient. The reliability coefficient, measured by Cronbach's alpha, for the Turkish version of the Medication Adherence Rating Scale, which was condensed to eight items following factor analysis, was determined to be 0.70 (Table 4).

Discussion

Medication adherence is a crucial aspect of adaptation to disease for individuals with chronic disorders. Non-adherence to drug therapy is significantly associated with negative health outcomes, worsening disease prognosis, and elevated healthcare expenses.[4] Consequently, assessing medication adherence in persons with chronic health conditions is essential. This study examined the validity and reliability of the Medication Adherence Rating Scale.

Following the validation of the scale's language, confirmatory factor analysis was performed. A factor loading is a coefficient that explains the relationship between an item and its corresponding factor, and such loadings should ideally approximate 1

Table 2. Goodness of fit indices of the Medication Adherence Rating Scale

	Goodness of fit indices of the model	Good fit values (acceptable values)
CMIN/DF	1.543	0–3
GFI	0.981	0.95–1.00
IFI	0.980	0.90–1.00
NFI	0.964	0.95–1.00
CFI	0.979	0.97–1.00
RMSEA	0.042	0–0.08
SRMR	0.033	0–0.06

CMIN/DF: Chi-square divided by degrees of freedom, GFI: Goodness of fit index, IFI: Incremental fit index, NFI: Normed fit index, CFI: Comparative fit index, RMSEA: Root mean square error of approximation, SRMR: Standardized root mean square residual.[28,37]

for each item.[35] In the current study, while testing the construct validity of the scale, items 7 and 8 were removed because their factor loadings were less than 0.30[36] and their test statistics were not significant. Following the removal of these items, two items remained on the "attitude toward taking medication" subscale. Despite the comparatively low factor loadings of these items (0.45 and 0.34, respectively), their contribution to the associated subscale was substantial. Furthermore, all goodness-of-fit metrics for the scale were found to be within acceptable parameters. The chi-square minimum divided by degrees of freedom (CMIN/DF) value, obtained by dividing the chi-square by the degrees of freedom, is generally considered indicative of a good fit when below 328 or 5.[37] In the present study, the CMIN/DF was 1.543, indicating a good fit. The GFI, CFI, IFI, and Normed Fit Index (NFI) values typically range from 0 to 1, where values exceeding 0.90 suggest a good fit and those above 0.95 indicate an excellent fit.[28,37] In this study, each of these values exceeded 0.95. The RMSEA evaluates the accuracy of the model's parameter estimations and its compatibility with the data. An RMSEA value of 0.05 or lower signifies a good fit, while values between 0.05 and 0.08 indicate an adequate fit.[38] In this study, the RMSEA value was below 0.05, indicating a good fit. Overall, all fit indices were within the acceptable range for a good model fit.

Cronbach's alpha serves as a reliability coefficient that assesses the internal consistency of a measurement instrument. A value nearing 1 signifies strong reliability, with a minimum threshold of 0.60 considered preferable.[39] In the current study, the Cronbach's alpha coefficient was lowest for the "attitude toward taking medication" subscale (α=0.40). This finding aligns with several studies evaluating the scale's validity. Fialko et al.[40] in 2008 reported a coefficient of 0.44 in their study, Owie et al.[41] in 2018 reported 0.50, and Zemmour et al.[42] in 2016 reported 0.47. The low validity and reliability coefficients of this subscale may be attributed to the lack of translation of attitudes toward medication-taking behaviors into adherence behaviors. Individuals may express a positive attitude toward medication adherence; however, they may still forget to take their medication and subsequently report irregular usage.[40] The similarity in meaning among certain questions in the “attitude toward taking medication” subscale and those in other subscales may have contributed to

Table 3. Correlation of MARS scores with MARS-5 and CISMS

	Factor 1		Factor 2		Factor 3		MARS_total	
	r	p	r	p	r	p	r	p
MARS-5	0.617	<0.001	0.403	<0.001	0.401	<0.001	0.653	**<0.001**
CISMS_self stigma	-0.255	<0.001	-0.050	0.382	-0.195	0.001	-0.256	**<0.001**
CISMS_coping with stigma	0.170	0.003	0.117	0.039	0.111	0.051	0.186	**0.001**
CISMS_health maintenance efficacy	0.249	<0.001	0.112	0.049	0.172	0.002	0.255	**<0.001**
CISMS_medication adherence	0.538	<0.001	0.257	<0.001	0.327	<0.001	0.523	**<0.001**

MARS-5: Medication Adherence Report Scale-5, CISMS: Chronic Illness Self-Management Scale, Factor 1: Medication Adherence Rating Scale_medication adherence behavior, Factor 2: Medication Adherence Rating Scale_ attitude toward taking medication, Factor 3: Medication Adherence Rating Scale_negative side effects.

Table 4. MARS item-total score correlation and Cronbach's alpha reliability coefficients

Items/subscales		Subscales		Total	
	Mean±SD	r	p	r	p
Factor 1	2.75±1.31		**α=0.70**		
Item 1	0.57±0.49	0.784	<0.001	0.674	<0.001
Item 2	0.65±0.47	0.752	<0.001	0.634	<0.001
Item 3	0.71±0.45	0.704	<0.001	0.651	<0.001
Item 4	0.81±0.38	0.643	<0.001	0.580	<0.001
Factor 2	1.37±0.73		**α=0.40**		
Item 5	0.71±0.45	0.726	<0.001	0.557	<0.001
Item 6	0.65±0.51	0.795	<0.001	0.523	<0.001
Factor 3	1.44±0.72		**α=60**		
Item 7	0.84±0.36	0.794	<0.001	0.550	<0.001
Item 8	0.60±0.48	0.894	<0.001	0.575	<0.001
Total	5.75±2.14		**α=0.70**		

MARS: Medication Adherence Rating Scale, α: Cronbach's α, SD: Standard deviation, Factor 1: Medication Adherence Rating Scale_medication adherence behavior, Factor 2: Medication Adherence Rating Scale_ attitude toward taking medication, Factor 3: Medication Adherence Rating Scale_negative side effects.

the low reliability coefficient. For example, the item *I take my medication only when I am sick* from the attitude toward taking medication subscale closely resembles the item *When you feel better, do you sometimes stop taking your medication*? from the medication adherence behavior subscale. The reliability coefficients for the other subscales were found to be acceptable, with medication adherence behavior at α=0.70, negative side effects at α=0.60, and the total score at α=0.70. In the original version of the scale, the Cronbach's alpha value for the total score was reported as 0.75,16 while it was reported as 0.60 in the study by Fialko et al.[40] in 2008, 0.76 in the study by Owie et al.[41] in 2018, and 0.72 in the study by Zemmour et al.[42] in 2016. It can be stated that the reliability coefficient obtained in the current study is similar to those in previous studies and is at an adequate level.

Analyzing the relationship between item scores and total scores is a method for assessing the dependability of a scale. Item-total score correlation reflects the relationship between scores derived from individual items and the overall test score. A strong and positive item-total correlation indicates that the items measure similar attributes. In the literature, an item-total correlation exceeding 0.20 is preferred.[43] The correlation coefficients for each item with its respective subscale ranged from 0.64 to 0.89, while the coefficients with the total score ranged from 0.52 to 0.67. It is evident that each item's contribution to its respective subscale and to the overall scale score is significantly high (p<0.001).

Parallel-forms reliability is a method that evaluates the consistency of results produced by two different but equivalent forms of a measurement tool when assessing the same construct.[44] In this study, the Medication Adherence Report Scale was used to assess parallel-forms reliability.[13,22] A moderate positive association was identified between the two scales. This signifies that the Medication Adherence Rating Scale is a reliable measurement instrument, affirming its consistency. Alongside the Medication Adherence Report Scale, the Morisky Medication Adherence Scale is another commonly used evaluation tool for treatment adherence that has established Turkish validity. In the current study, the MARS, which has undergone validity testing, assesses medication adherence more comprehensively. Indeed, certain sections of the MARS scale include components of the Morisky Medication Adherence Scale16. This indicates that MARS is a brief yet more comprehensive scale.

Limitation

The validity and reliability assessment of the MARS scale was performed on individuals with chronic illnesses, excluding patients with psychiatric diagnoses. The absence of psychiatric patients in this study represents a restriction, considering that the original scale was validated in such populations.

Conclusion

The Turkish version of the Medication Adherence Rating Scale, finalized as an eight-item instrument, has proven to be a valid and reliable tool for assessing medication adherence in individuals with chronic conditions. By providing a psychometrically sound measure, this scale addresses the need for a practical and culturally appropriate assessment tool in the Turkish population. Its brevity makes it particularly suitable for busy clinical settings, allowing healthcare professionals to quickly identify non-adherence behaviors without burdening the patient.

Consequently, the scale is recommended for integration into routine nursing practice and research to monitor adherence, thereby supporting effective self-management strategies and improving health outcomes in chronic disease management.

Ethics Committee Approval: The study was approved by the from Ondokuz Mayis University Clinical Research Ethics Committee (Approval Number: 2023/63, Date: 09.03.2023).

Informed Consent: Written and verbal consent was obtained from all participating patients.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Validity and Reliability Study of a Scale to Measure Academic Help-seeking Behaviors Among Nursing Students in Ghana

Abstract

Background: Seeking academic assistance is a key component of effective learning and academic success in nursing education. However, there is currently no validated instrument specifically designed to measure this behavior within nursing education.

Aim: This study applied a structural equation modelling approach to evaluate the psychometric properties of three adapted scales intended to measure academic help-seeking behaviors among nursing students in Ghana.

Methods: The study employed a cross-sectional, analytical validation design. To determine the factor structure of the three scales, an exploratory factor analysis (EFA) was conducted. Confirmatory factor analysis (CFA) was used to assess convergent and discriminant validity and composite reliability. Model adequacy was evaluated using standard fit indices.

Results: CFA confirmed the unidimensionality of the scales, with item loadings ranging from 0.632 to 0.893. The measurement model demonstrated acceptable fit (Standardized Root Mean Square Residual [SRMR]=0.050, Chi-Square/Degrees of Freedom [CMIN/DF]=2.227, Comparative Fit Index [CFI]=0.924, Root Mean Square Error of Approximation [RMSEA]=0.078, Tucker–Lewis Index [TLI]=0.910, Adjusted Goodness-of-Fit Index [AGFI]=0.940). All academic help-seeking scales exhibited satisfactory composite reliability and convergent validity: executive scale (ω=0.914, average variance extracted [AVE]=0.582), instrumental scale (ω=0.748, AVE=0.500), and avoidance scale (ω=0.903, AVE=0.573). Correlation analyses showed that the instrumental scale was negatively correlated with both executive (r=-0.426, p<0.001) and avoidance scales (r=-0.268, p<0.001), whereas a positive correlation was found between the executive and avoidance scales (r=0.587, p<0.001).

Conclusion: The final version of the instrument demonstrated good psychometric properties, supporting its reliability for measuring nursing students' academic help-seeking behaviors.

Keywords: Academic, avoidance, executive, help-seeking behavior, instrumental, nursing students

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Introduction

The higher education learning system differs significantly from primary and secondary levels, introducing a new learning culture that often serves as a source of stress. This stress arises from demanding academic situations, leaving students feeling inadequate in meeting environmental expectations.[1,2] One effective strategy for addressing these difficulties and achieving educational success is academic help-seeking (AHS).[3–5]

Academic help-seeking is a proactive approach that combines self-regulation and social interaction to obtain support in understanding academic materials, concepts, and processes. It serves as both a problem-solving and self-regulated learning strategy, with students who engage in AHS demonstrating better academic outcomes than their peers who do not.[6,7] Successful AHS requires self-awareness, action-oriented behaviors, and incentive-based skills, enabling students to evaluate their learning progress, recognize when assistance is needed, and select appropriate sources of support.[8–10] Willingness to seek help is further influenced by contextual and social factors, including individual perceptions, prevailing social norms, classroom goal structures, and teaching methods.[11,12]

Since the 1980s, research interest in AHS has grown steadily, with a marked increase in the past decade, underscoring its fundamental role in shaping students' academic experiences. Researchers have explored the concept and theoretical frameworks of AHS, emphasizing its connections with other important educational factors.[13–17] However, because of its inherently social nature, AHS reflects diverse personal characteristics and complexities across multiple dimensions, including the factors that influence it, the ways in which it is enacted, and the outcomes it produces.[18,19] Moreover, the transition from high school to higher education introduces distinct challenges, particularly in adapting to new learning environments and engaging with different perspectives and ways of thinking.[19–21]

In the literature, AHS behaviors are typically classified into two main types: instrumental and executive.[17] Instrumental AHS, often referred to as adaptive help-seeking, involves students seeking assistance to improve their comprehension and problem-solving while relying minimally on external input.[17,22–24] Executive

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AHS, on the other hand, is considered nonadaptive, as students primarily seek help to complete tasks rather than to foster deeper understanding.[25] Additionally, scholars have identified avoidance of help-seeking as a third type of behavior.[26,27] In this case, students recognize their need for assistance but deliberately choose not to seek it, often due to feelings of inadequacy, anxiety, or fear of negative evaluation.[28–30] For instance, students may skip a question or guess an answer instead of asking for clarification. Such avoidance reflects an intentional, goal-oriented decision by students to disengage from help-seeking.[23]

Although higher education is often assumed to provide universal support, many students experience significant academic and emotional challenges. Consequently, AHS behaviors in college settings have become a critical area of research.[31] Nursing students, in particular, frequently face psychological and emotional difficulties, including academic burnout, with nearly 70% reporting feeling overwhelmed by their academic workload.[32] These challenges are often attributed to insufficient theoretical preparation, limited clinical practice experience, time pressures, low motivation, and difficulty adapting to the demands of higher education.[33,34] Evidence indicates that seeking academic assistance, whether through formal sources, such as educators and academic support services, or informal sources, such as classmates and family, enhances learning experiences, boosts self-confidence, and supports overall academic achievement.[6,10]

However, there is a notable lack of validated instruments for measuring academic help-seeking behaviors among nursing students, which limits educators' and researchers' ability to identify needs, address barriers, and implement targeted interventions. Developing a reliable and validated instrument to measure academic help-seeking in nursing education is therefore essential. Such an instrument would provide a deeper understanding of nursing students' behaviors, the factors influencing their willingness to seek help, and the types of support that most effectively promote learning and resilience. To address this gap, this study aimed to adapt and validate an existing academic help-seeking behavior instrument so that it can be used to measure academic help-seeking behaviors among nursing students, providing a context-specific, psychometrically sound instrument to support both academic success and professional development.

Study Question

1. Can the adapted Academic Help-Seeking Behavior Questionnaire for Nursing Students, derived from the Computer Science Help-Seeking Scales (CSHS), validly and reliably measure nursing students' instrumental, executive, and avoidance help-seeking behaviors?

Materials and Methods

Study Design

This research employed a quantitative, analytical cross-sectional design to evaluate the psychometric properties of three adapted scales intended to measure academic help-seeking behaviors among nursing students in Ghana. A comprehensive multiphase approach was implemented, including instrument adaptation, pilot testing, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and the assessment of validity and reliability.

Study Setting

The study was conducted at the Tamale Nurses' and Midwives' Training College (TNMTC), a public tertiary health institution located in Tamale, in the Northern Region of Ghana. The college was built and commissioned in 1974 in the Dohanayili community under the Tamale Metropolitan Assembly. Its mandate is to train nurses and midwives to provide competent, ethical, and professional healthcare services across the country. The college admits students from diverse regions of Ghana and serves as one of the key training centers for strengthening the health workforce, particularly in the northern sector of the country.

Sample Size and Sampling Procedure

In determining the appropriate sample size for this study, recommendations for factor analysis were carefully considered, given that the study involved the adaptation and validation of an existing questionnaire. Methodological experts emphasize that factor analysis requires a sufficiently large number of participants to ensure the stability and validity of the extracted factors. Classical guidelines suggest a ratio of 5–10 participants per item, with a minimum threshold of 100 cases.[35,36] Comrey and Lee[37] further classify sample sizes of 100 as poor, 200 as fair, 300 as good, 500 as very good, and 1,000 or more as excellent. More recent arguments also highlight that the required sample size may depend on the communalities of items and the number of indicators per factor.[38]

The adapted questionnaire comprised 29 items. Following the widely accepted guideline of "10 participants per item,"[39] a minimum of 290 participants was required. This study successfully collected data from 300 participants, thereby meeting the recommended standard for factor analysis. Participants were drawn from level 200 and level 300 nursing students. In the Ghanaian nursing education system, class represents the year of study, with level 200 indicating second-year and level 300 indicating third-year students. This sample size not only satisfies the minimum methodological requirements but also aligns with best-practice recommendations that a sample of 300 is considered "good" and provides a robust basis for factor analytic procedures.[36,37,40] A convenience sampling approach was employed, with participants selected based on their availability and willingness to participate. This pragmatic strategy was chosen to facilitate data collection within the academic setting while still ensuring adequate representation across the targeted year groups.

Data Tools

The questionnaire used in this study comprised two sections. The first section captured participants' demographic information, including age, class, and marital status, using a self-developed form. The second section consisted of the CSHS, originally developed in English by Pajares et al.[30]

Instrument Adaptation and Pilot-testing Procedures

This study adapted the CSHS and examined their content validity for use in the nursing context. The original CSHS includes four subscales: instrumental help-seeking, executive help-seeking, avoidance of help-seeking, and perceived benefits of help-seeking. It contains 36 items rated on an 8-point Likert scale ranging from 1 ("definitely false") to 8 ("definitely true"). Although the original CSHS comprises four scales, only three subscales (instrumental help-seeking, executive help-seeking, and avoidance of help-seeking) were retained. This decision was based on theoretical and contextual relevance to the study's focus on academic help-seeking behavior. Pajares et al.[30] noted that the scales can be adapted across various academic disciplines.

The instrumental help-seeking scale assesses a student's tendency to seek necessary information independently to complete tasks (e.g., "When I ask my teacher for help, I prefer to be given hints or clues rather than the answer," "When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer").[26,30] The executive help-seeking scale evaluates a student's tendency to rely on external help, such as from colleagues or educators, to finish tasks (e.g., "When I ask the teacher for help in this class, I prefer that the teacher do the work for me rather than explain to me how to do it," "When I ask another student for help on something I don't understand, I ask that student to do it for me").[30,41] The avoidance of help-seeking scale measures situations in which students need support but refrain from seeking it (e.g., "I don't ask for help in this class even when the work is too hard to solve on my own," "I would put down any answer rather than ask for help in this class").[30,42] Together, these scales provide a comprehensive assessment of help-seeking behaviors in academic settings.

The validity and reliability of these scales have been extensively established, with Pajares et al.,[30] China,[43] and Malone[44] confirming satisfactory internal consistency (>0.70) and content validity. The fourth scale, perceived benefits of help-seeking, was excluded from the present study because its items primarily capture the positive ramifications of seeking help on a task from an individual perspective (e.g., "I like to ask questions in this class," "I like to ask for help in this class because it helps me understand the topic more completely").[30]

In this study, content validity was assessed using the Content Validity Index (CVI) for the three subscales. A panel of five experts reviewed the items for relevance, clarity, and conceptual equivalence. The final decision was to retain the original structure of the scale while making minor adjustments to the wording to ensure the instrument was culturally sensitive and appropriate for the Ghanaian context. Minor terminolo-

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Table 1. Sociodemographic characteristics of participants

Characteristic	Category	EFA		CFA	
		n	%	n	%
Age (years)	Mean±SD	22.07 (1.51)		22.08 (2.02)	
Class[1]	Level 200	58	58.0	129	64.5
	Level 300	42	42.0	71	35.5
	Total	100		200	
Marital status	Single	96	96.0	184	92.0
	Married	4	4.0	16	8.0
	Total	100		200	

[1]: Class refers to the academic year of study in the Ghanaian nursing program (Level 200=second year, Level 300=third year). EFA: Exploratory factor analysis, CFA: Confirmatory factor analysis, SD: Standard deviation.

gy modifications were made, including replacing references to "Computer Science" with "Nursing" and changing "Teacher" to "Nurse educator." Each item was rated on a 4-point scale (1=not relevant, 4=highly relevant); all items scored above 0.80 and were retained.[45] The final CVI values for the subscales were 0.92 for instrumental help-seeking, 0.89 for executive help-seeking, and 0.85 for avoidance of help-seeking, indicating good content validity. The resulting adapted instrument, named the Academic Help-Seeking Behavior Questionnaire for Nursing Students (AHSBQ-NS), consists of 29 Likert-type items, preserving the original response format from 1 ("Strongly False") to 8 ("Strongly True").

A pilot study was then conducted to evaluate response patterns, item functionality, and the reliability of the adapted questionnaire.[46] Fifty nursing students from a different nursing training institution participated by completing the questionnaire and providing feedback regarding its clarity and ease of understanding. The feedback revealed no minor or major issues, so the questionnaire was retained in its adapted form. Analysis of the pilot data demonstrated acceptable to excellent reliability across the help-seeking scales: instrumental (α=0.716), executive (α=0.901), and avoidance of help-seeking (α=0.881).[47] Further details, including the specific items and Cronbach's alpha values for each scale of the Academic Help-Seeking Behavior Scales Questionnaire for Nursing Students, are presented in Appendix 1.

Data Collection Procedure

Approval to conduct the study was first obtained from the nursing college. Data collection was carried out between January 2024 and February 2024. The study population comprised nursing students, and arrangements were made with nurse educators to administer the questionnaire during scheduled class sessions. Each participant received a comprehensive explanation of the study objectives, and any questions raised were addressed prior to participation. Both verbal and written informed consent were obtained before distributing the questionnaires. Upon completion, participants were instructed to seal their responses in envelopes to ensure confidentiality and facilitate secure transport of the data.

Data Analysis

The analysis involved several statistical procedures to evaluate the psychometric properties of the adapted scales. Initially, data screening and cleaning were performed to ensure quality before proceeding to EFA, CFA, and additional assessments of validity and reliability. Participation was secured from 300 nursing students, and data entry was conducted using JMP Professional Statistical Software Version 17.1 (SAS Institute Inc., Cary, North Carolina, United States). No missing values or entry errors were detected. Following established guidelines, a sample of at least 100 participants is sufficient for EFA and at least 200 for CFA.[39,46,48] Accordingly, the dataset was randomly split into two subsamples: 100 cases for EFA and 200 for CFA. Screening indicated no outliers, and although the data showed non-normal distributions, factor analysis was conducted without transformation, as it is generally robust to violations of normality.[49,50] EFA was performed with IBM SPSS Statistics Version 27 (IBM Corp., Armonk, New York, United States) utilizing principal component analysis and Varimax rotation. The analysis aimed to extract three factors, guided by theoretical expectations.[30,43,51] Items displaying factor loadings below 0.40 were removed.[52,53] The Kaiser-Meyer-Olkin (KMO) statistic (>0.60) and Bartlett's Test of Sphericity (p<0.001) confirmed data suitability for EFA.54 CFA followed, conducted with SmartPLS Ver-

Table 2. Number of factors extracted in the academic help-seeking behavior questionnaire for nursing students (AHSBQ-NS): Results from exploratory factor analysis (EFA)

Items	Factor 1 (Executive help-seeking)	Factor 2 (Avoidance of help-seeking)	Factor 3 (Instrumental help-seeking)
IHS2	0.104	-0.114	**0.789**
IHS3	-0.027	0.021	**0.674**
IHS5	-0.122	-0.048	**0.745**
IHS7	-0.404	0.026	**0.555**
IHS10	-0.452	-0.292	**0.532**
EHS2	**0.644**	0.229	-0.149
EHS3	**0.807**	0.116	-0.161
EHS4	**0.744**	0.056	-0.174
EHS5	**0.826**	0.056	-0.100
EHS6	**0.729**	0.042	0.061
EHS7	**0.823**	0.113	-0.141
EHS8	**0.776**	0.173	0.032
EHS9	**0.824**	0.195	0.051
EHS10	**0.743**	0.224	-0.128
AHS1	0.373	**0.614**	-0.016
AHS2	0.393	**0.612**	-0.020
AHS3	0.071	**0.760**	0.064
AHS4	0.252	**0.685**	-0.083
AHS5	0.073	**0.679**	-0.143
AHS6	0.157	**0.695**	-0.078
AHS7	0.085	**0.744**	-0.058
AHS8	-0.117	**0.694**	0.003

Total variance explained (%): 55.74%.
KMO: 0.797.
Bartlett's Test of Sphericity (χ^2 (df), p-value): 1535.882 (406), <0.001. Extraction method: Principal component analysis, Rotation method: Orthogonal varimax with kaiser normalization, IHS: Instrumental help-seeking, EHS: Executive help-seeking, AHS: Avoidance of help-seeking.

Table 3. Model fit indices for the confirmatory factor analysis (CFA)

Name of index	Model I (Initial model)	Model II (After item deletion)	Model III (After modification indices)
CMIN/DF	2.646	2.836	2.227
CFI	0.871	0.883	0.924
RMSEA	0.091	0.096	0.078
TLI	0.855	0.866	0.910
AGFI	0.920	0.921	0.940
SRMR	0.058	0.052	0.050

CMIN/DF: Chi-square/degrees of freedom, CFI: Comparative fit index, RMSEA: Root mean square error of approximation, TLI: Tucker–lewis index, AGFI: Adjusted goodness-of-fit index, SRMR: Standardized root mean square residual.

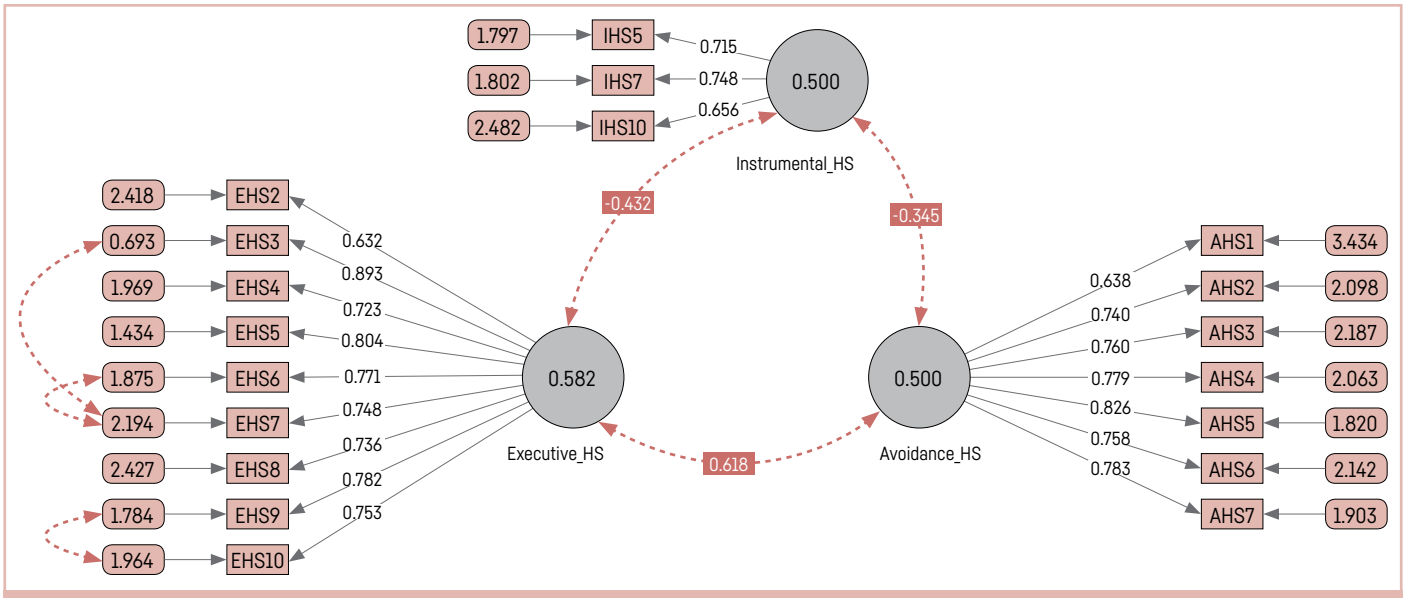

Figure 1. Measurement model of the three scales with a first-order structure (confirmatory factor analysis results).

IHS: Instrumental help-seeking, EHS: Executive help-seeking, AHS: Avoidance of help-seeking.

Table 4. Factor loadings of the finalized version of the academic help-seeking behavior questionnaire for nursing students (AHSBQ-NS): Confirmatory factor analysis results

No.	Abbr.	Items	Factor loading
Scale 1: Instrumental help-seeking	IHS5	When I ask my nurse educator for help understanding the material in this class, I prefer that the nurse educator help me understand the general ideas rather than simply tell me the answer.	0.715
	IHS7	When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer.	0.748
	IHS10	When I ask a student for help with something I don't understand, I ask the student to explain it to me rather than just give me the answer.	0.656
Scale 2: Executive help-seeking	EHS2	When I ask my nurse educator for help on something I don't understand, I prefer that the nurse educator do it for me.	0.632
	EHS3	When I ask my nurse educator for help on something I don't understand, I prefer the nurse educator to just give me the answer rather than explain it.	0.893
	EHS4	When I ask the nurse educator for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.	0.723
	EHS5	When I ask my nurse educator for help, I want the nurse educator to do the work for me rather than help me be able to complete the work myself.	0.804
	EHS6	When I ask a student for help on something I don't understand, I prefer that the student just give me the answer rather than explain it.	0.771
	EHS7	When I ask a student for help with my work, I prefer that the student do the work for me rather than explain to me how to do it.	0.748
	EHS8	When I ask another student for help on something I don't understand, I ask that student to do it for me.	0.736
	EHS9	When I ask a student for help in this class, I want the work done for me rather than be helped to complete the work myself.	0.782
	EHS10	When I ask a student for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.	0.753
Scale 3: Avoidance of help-seeking	AHS1	I don't ask for help in this class even when the work is too hard to solve on my own.	0.638
	AHS2	If I need help to solve a problem, I prefer to skip it rather than ask for help.	0.740
	AHS3	I don't ask for help in this class even if I don't understand the lesson.	0.760
	AHS4	If I didn't understand something in this class, I would guess rather than ask someone for help.	0.779
	AHS5	I would rather do worse on an assignment I couldn't finish than ask for help in this class.	0.826
	AHS6	Even if the work was too hard to do on my own, I wouldn't ask for help in this class.	0.758
	AHS7	I would put down any answer rather than ask for help in this class.	0.783

IHS: Instrumental help-seeking, EHS: Executive help-seeking, AHS: Avoidance of help-seeking.

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Table 5. Internal consistency and convergent validity measures: Confirmatory factor analysis results

Subscale	McDonald's Omega (ω)	Average variance extracted (AVE)
Instrumental help-seeking	0.748	0.500
Executive help-seeking	0.914	0.582
Avoidance of help-seeking	0.903	0.573
Overall Instrument	0.896	

sion 4.0.9.6 (SmartPLS GmbH, Oststeinbek, Schleswig-Holstein, Germany). Model fit evaluation was based on six key indicators: Chi-square Minimum divided by Degrees of Freedom (CMIN/DF≤5.0), Comparative Fit Index (CFI≥0.90), Root Mean Square Error of Approximation (RMSEA≤0.08), Adjusted Goodness-of-Fit Index (AGFI≥0.90), Tucker-Lewis Index (TLI≥0.90), and Standardized Root Mean Square Residual (SRMR≤0.08).[54] During the analysis, items with loadings below 0.60 were eliminated to improve model fit, and model refinement was guided by modification indices.[55] Additional validity assessments included calculation of the average variance extracted (AVE) for convergent validity (AVE≥0.50) and the Heterotrait-Monotrait Ratio (HTMT) for discriminant validity (HTMT<0.85).[56] In the assessment of reliability, internal consistency was examined using Cronbach's alpha and McDonald's omega, with acceptable thresholds set at ≥0.70.[57-60] Spearman's rank correlation coefficients were finally computed using Jamovi Desktop Version 2.6.19 (The Jamovi Project, Sydney, New South Wales, Australia) to explore relationships between the three scales.

Ethical Consideration

Ethical approval for this study was obtained from the Ethics Committee of Nurses' and Midwives' Training College, Tamale (Approval Number: MOH/NMTC/51/280-23, Date: 19.12.2023). Participants were fully informed about the study's purpose, procedures, and their right to withdraw at any time without penalty, and written informed consent was obtained. Confidentiality was maintained using identification codes, and all data were securely stored. The study was conducted in strict accordance with the ethical principles set forth in the Declaration of Helsinki. Regarding the adapted instrument, the original authors of the CSHS permitted adaptation for other academic domains and recommended CFA for further validation; formal permission was therefore not required.[17]

Results

Sociodemographic Characteristics

Participants included in the EFA and CFA groups showed similar sociodemographic profiles. The mean age for the EFA group was 22.07 years (standard deviation [SD]=1.51), whereas the CFA group had a mean age of 22.08 years (SD=2.02). In terms of academic level, the majority of participants in both groups were enrolled at level 200, comprising 58.0% of the EFA group and 64.5% of the CFA group. Moreover, a large proportion of participants in both groups were single, with 96.0% in the EFA group and 92.0% in the CFA group (Table 1).

Exploratory Factor Analysis

EFA was conducted using the first sample to examine the underlying structure of the Academic Help-Seeking Behavior Questionnaire for Nursing Students (AHSBQ-NS). Principal component analysis with orthogonal varimax rotation was employed, with the number of factors set to three. The data's suitability for the EFA was confirmed: the KMO measure of sampling adequacy was 0.797 (greater than the acceptable threshold of 0.60), and Bartlett's Test of Sphericity was significant (χ^2=1535.882, df=406, p<0.001), satisfying the necessary assumptions.[61]

In the initial EFA model, items loaded distinctly onto their respective factors without any cross-loadings. The executive help-seeking scale emerged as the first factor, showing loadings between 0.294 and 0.824. The second factor was the avoidance of help-seeking scale, with item loadings between 0.453 to 0.759. The third factor, instrumental help-seeking, had item loadings between 0.314 and 0.736. The total variance explained by the model was 49.193%. Adhering to best practices, items with factor loadings ≥0.40 were retained, as such values reflect substantial contributions of items to their respective factors.[52,53] Items "IHS6" and "EHS1" were removed due to factor loadings below 0.40, enhancing the reliability of the factor structure. Following this adjustment, nine items each were retained for the three scales. The total variance explained was initially distributed as follows: 36.58% for the instrumental help-seeking scale, 62.06% for the executive help-seeking scale, and 47.40% for the avoidance of help-seeking scale. Since the extracted variance for the instrumental help-seeking and avoidance of help-seeking scales fell below the recommended 50% threshold,[62] additional refinements were made. Specifically, four items ("IHS1," "IHS4," "IHS8," "IHS9") from the instrumental help-seeking scale and one item ("AHS9") from the avoidance of help-seeking scale were removed due to communalities ≤0.30.[52]

The final EFA model demonstrated improved psychometric properties. Factor 1 (Executive Help-Seeking Scale) retained nine items, explaining 62.06% of the variance; Factor 2 (Avoidance of Help-Seeking Scale) included eight items, explaining

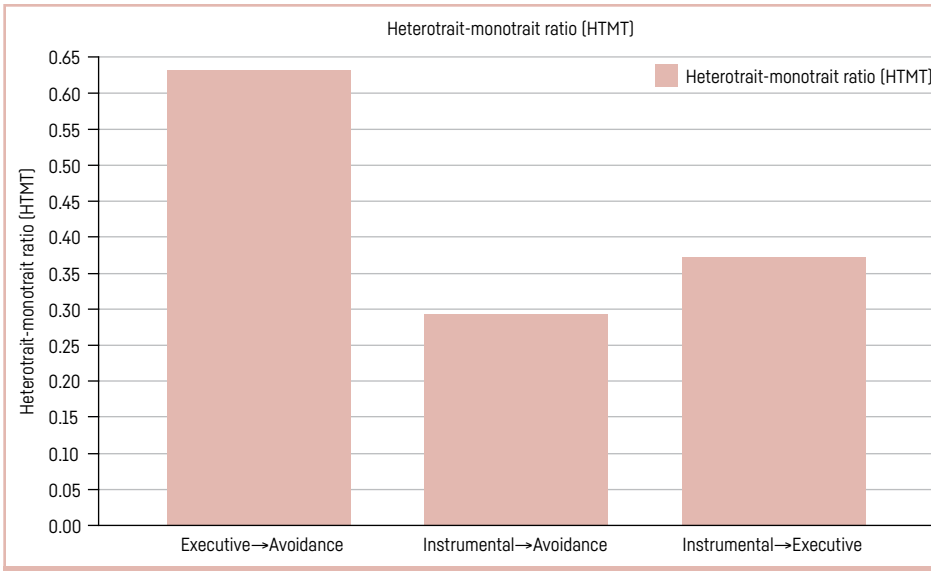

Figure 2. Discriminant validity – heterotrait-monotrait ratio of correlations (HTMT) (confirmatory factor analysis results).

Table 6. Cronbach's alpha for each subscale and "if item is deleted" values

No.	Abbr.	Items	If Item is deleted (Alpha)	Cronbach's Alpha (Scale)
Scale 1: Instrumental help-seeking	IHS5	When I ask my nurse educator for help understanding the material in this class, I prefer that the nurse educator help me understand the general ideas rather than simply tell me the answer.	0.655	**0.749**
	IHS7	When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer.	0.641	
	IHS10	When I ask a student for help with something I don't understand, I ask the student to explain it to me rather than just give me the answer.	0.696	
Scale 2: Executive help-seeking	EHS2	When I ask my nurse educator for help on something I don't understand, I prefer that nurse educator do it for me.	0.926	**0.927**
	EHS3	When I ask my nurse educator for help on something I don't understand, I prefer the nurse educator to just give me the answer rather than explain it.	0.913	
	EHS4	When I ask the nurse educator for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.	0.921	
	EHS5	When I ask my nurse educator for help, I want the nurse educator to do the work for me rather than help me be able to complete the work myself.	0.916	
	EHS6	When I ask a student for help on something I don't understand, I prefer that the student just give me the answer rather than explain it.	0.915	
	EHS7	When I ask a student for help with my work, I prefer that the student do the work for me rather than explain to me how to do it.	0.918	
	EHS8	When I ask another student for help on something I don't understand, I ask that student to do it for me.	0.919	
	EHS9	When I ask a student for help in this class, I want the work done for me rather than be helped to complete the work myself.	0.914	
	EHS10	When I ask a student for help with my work, I prefer to be given the answer rather than a explanation of how to do the work myself.	0.916	
Scale 3: Avoidance of help-seeking	AHS1	I don't ask for help in this class even when the work is too hard to solve on my own.	0.900	**0.903**
	AHS2	If I need help to solve a problem, I prefer to skip it rather than ask for help.	0.887	
	AHS3	I don't ask for help in this class even if I don't understand the lesson.	0.886	
	AHS4	If I didn't understand something in this class, I would guess rather than ask someone for help.	0.885	
	AHS5	I would rather do worse on an assignment I couldn't finish than ask for help in this class.	0.882	
	AHS6	Even if the work was too hard to do on my own, I wouldn't ask for help in this class.	0.888	
	AHS7	I would put down any answer rather than ask for help in this class.	0.886	
Overall Instrument				0.877

IHS: Instrumental help-seeking, EHS: Executive help-seeking, AHS: Avoidance of help-seeking.

50.70% of the variance; and Factor 3 (Instrumental Help-Seeking Scale) comprised five items, explaining 50.00% of the variance. Item loadings improved across all factors: Factor 1 (Executive Help-Seeking Scale) ranged from 0.644 to 0.826 (Cronbach's α=0.922), Factor 2 (Avoidance of Help-Seeking Scale) ranged from 0.612 to 0.760 (Cronbach's α=0.859), and Factor 3 (Instrumental Help-Seeking Scale) ranged from 0.532 to 0.789 (Cronbach's α=0.741) (Table 2). The model's overall variance explained reached 55.74%, with corrected item-total correlation (CITC) scores ranging from 0.443 to 0.780.[47] The final AHSBQ-NS comprised 22 items.

Confirmatory Factor Analysis

Model Fit and Factor Loadings

Confirmatory factor analysis was conducted using the second sample to validate the factor structure of the 22-item Academic Help-Seeking Behavior Questionnaire for Nursing Students. The initial CFA results indicated a poor model fit: CMIN/DF=2.646, CFI=0.871, RMSEA=0.091, TLI=0.855, AGFI=0.920, and SRMR=0.058. Although some indices such as CMIN/DF, SRMR, and AGFI met acceptable thresholds, the overall fit suggested the need for model revisions.

To improve model fit, iterative modifications were performed. Specifically, two items ("IHS2" and "IHS3") from the instrumental help-seeking scale and one item ("AHS8") from the avoidance of help-seeking scale were removed. In confirmatory factor analysis, it is generally recommended to retain at least three items per factor to ensure robust construct representation and reliability,[63,64] and this guideline informed the subsequent modifications to the model.

Table 7. Interrelationships among the three academic help-seeking behavior scales

Subscales	Instrumental help-seeking	Executive help-seeking	Avoidance of help-seeking
Instrumental help-seeking	–		
Executive help-seeking	-0.426***	–	
Avoidance of help-seeking	-0.268***	0.587***	–

*: p<0.05, **: p<0.01, ***: p<0.001.

After these adjustments, the revised model comprised 19 items across the three scales: instrumental help-seeking (three items), executive help-seeking (nine items), and avoidance of help-seeking (seven items). However, despite these revisions, the revised CFA model still demonstrated an inadequate fit, with the following indices: TLI=0.866, CMIN/DF=2.836, CFI=0.883, RMSEA=0.096, AGFI=0.921, and SRMR=0.052. Further refinements were guided by modification indices (MIs). Specifically, correlations were added between three pairs of error terms with-

in the executive help-seeking scale ("EHS3 and EHS7," "EHS6 and EHS7," and "EHS9 and EHS10"). Following these adjustments, the model achieved a good fit, with improved indices: RMSEA=0.078, CFI=0.924, CMIN/DF=2.227, TLI=0.910, AGFI=0.940, and SRMR=0.050 (Table 3).[40,65,66]

In the final CFA model, the factor loadings for the instrumental help-seeking scale items ranged from 0.656 to 0.748. For the executive help-seeking scale, item loadings ranged from 0.632 to 0.893. The avoidance of help-seeking scale items had loadings ranging from 0.638 to 0.826 (Fig. 1, Table 4). Overall, the finalized AHSBQ-NS consisted of 19 Likert-type items across three scales.

Validity and Reliability

Convergent validity was assessed by calculating the average variance extracted for each scale, yielding values between 0.500 and 0.582: the executive help-seeking scale (AVE=0.582), the instrumental help-seeking scale (AVE=0.500), and the avoidance of help-seeking scale (AVE=0.573). These values indicate satisfactory convergent validity (Table 5).

To assess discriminant validity, the Heterotrait-Monotrait Ratio was used. The HTMT values were 0.633 between the executive help-seeking and avoidance of help-seeking scales, 0.293 between the instrumental help-seeking and avoidance of help-seeking scales, and 0.372 between the instrumental help-seeking and executive help-seeking scales. All values were well below the recommended threshold of 0.85,56 confirming the distinctiveness of the scales (Fig. 2).

Internal consistency was evaluated using McDonald's omega (ω) and Cronbach's alpha (α) for each scale as well as the overall instrument. All three scales and the overall instrument demonstrated satisfactory reliability: the executive help-seeking scale (ω=0.914, α=0.927), the instrumental help-seeking scale (ω=0.748, α=0.749), and the avoidance of help-seeking scale (ω=0.903, α=0.903), with coefficient values surpassing the recommended threshold of 0.7057,58 (Table 5, 6).

Correlation Analysis

Spearman's rank correlation analysis revealed significant relationships among the three scales. The instrumental help-seeking scale was negatively correlated with both the executive help-seeking scale ($r=-0.426$, $p<0.001$) and the avoidance of help-seeking scale ($r=-0.268$, $p<0.001$). Additionally, the executive help-seeking scale showed a positive correlation with the avoidance of help-seeking scale ($r=0.587$, $p<0.001$) (Table 7).

Discussion

Help-seeking is a well-established determinant of academic success and serves as a protective factor against academic stress. However, validated instruments specifically designed for the nursing education context remain limited.[5,9,30] To address this gap, the present study adapted three scales from the existing CSHS to create the 19-item Academic Help-Seeking Behavior Questionnaire for Nursing Students. This instrument assesses three dimensions: (a) instrumental help-seeking, defined as seeking guidance to complete tasks independently; (b) executive help-seeking, relying on others to complete tasks without attempting them independently; and (c) avoidance of help-seeking, characterized by not seeking help even when it is needed. Items were reviewed and refined in consultation with nursing education experts to ensure content relevance and face validity. Pretesting indicated good clarity and feasibility, with participant feedback largely positive.

In the EFA, executive help-seeking emerged as Factor 1, avoidance as Factor 2, and instrumental help-seeking as Factor 3. Items loaded fully onto their respective factors without any cross-loadings. The absence of problematic cross-loadings indicates that items cluster cleanly around their intended constructs, supporting the factorial distinctiveness of the scales. While Pajares et al.[30] also reported a clear factor structure for the original CSHS, their factor ordering differed, with Executive as the first factor and Instrumental as the second. This discrepancy likely reflects contextual and disciplinary differences. Nursing education emphasizes clinical competence, rapid decision-making, and supervisor-guided learning,[67,68] factors that can plausibly elevate reliance on executive strategies and sharpen distinctions between avoidance and instrumental approaches. These contextual influences underscore the necessity of validating psychometric instruments within the specific populations where they will be applied, rather than assuming structural invariance across disciplines or cultures.[30]

Internal consistency was good across the three scales, indicating that items within each subscale are interrelated and reliably measure their intended constructs. These reliability coefficients are comparable to those reported in the original instrument development and subsequent adaptations.[30,42,43,51] The combination of high internal consistency and a coherent factor structure supports the conclusion that the instrument provides a stable and reliable measure of help-seeking tendencies among nursing students.

To build on the EFA, the study conducted CFA, which the original authors did not perform, to test the hypothesized three-factor measurement model. CFA results demonstrated satisfactory composite reliability and convergent validity: factor loadings exceeded the commonly accepted threshold of 0.60, composite reliability values surpassed 0.70, and average variance extracted values met recommended standards (≥0.50), indicating that each latent construct was well represented by its indicators.[36] Global model fit indices (CMIN/DF, CFI, TLI, RMSEA, AGFI, SRMR) also fell within acceptable ranges consistent with contemporary recommendations, supporting the adequacy and parsimony of the three-factor model.[36,65] Using both EFA and CFA provides complementary evidence of factorial validity and strengthens claims regarding the instrument's structural validity in the nursing student population.

Inter-scale relationships provide valuable construct-level information. The instrumental help-seeking scale correlated negatively with both the executive and avoidance help-seeking scales, whereas the executive and avoidance help-seeking scales were positively correlated. Conceptually, these patterns align with the interpretation that instrumental help-seeking reflects adaptive, autonomy-supporting behavior (seeking assistance that facilitates independent task completion),[13,17] while executive help-seeking reflects reliance on others that may undermine self-regulated learning, and avoidance of help-seeking reflects reluctance to seek help even when it is warranted.[17,28,29] Thus, higher instrumental tendencies are associated with lower reliance on others and lower avoidance of help-seeking, consistent with prior empirical findings on help-seeking strategies.[17,30,31]

Taken together, the psychometric evidence indicates that the AHSBQ-NS is a reliable and valid measure of academic help-seeking behaviors among nursing students in the Ghanaian context. Methodologically, the study's integration of expert review, pretesting, EFA, and confirmatory factor analysis aligns with best practices for instrument adaptation and validation, providing convergent evidence supporting the measure's utility in both research and practice.[36]

Limitations of the Study

Despite the rigorous validation process, some limitations should be considered. First, recruiting participants from a single nursing school through convenience sampling may have introduced selection bias, thereby restricting the generalizability of the findings to a broader nursing student population. Second, the cross-sectional design and reliance on self-reported responses could have resulted in potential response biases. Additionally, although the adapted questionnaire was pretested, modifications from the original version may have introduced subtle cultural or contextual biases that were not extensively analyzed. Future research should consider employing multigroup comparisons across different institutions, contexts, or cultures to assess measurement invariance. This approach would ensure that the instrument is interpreted consistently across diverse populations, thereby enhancing its generalizability and applicability in various educational settings.

Conclusion

The finalized AHSBQ-NS demonstrated good psychometric properties and a well-supported factor structure. The questionnaire effectively captures three distinct aspects of academic help-seeking behavior among nursing students (instrumental, executive, and avoidance of help-seeking). The results also affirm that the instrument is a dependable and valid instrument that can offer valuable insights into students' approaches to academic challenges in high-pressure educational settings. By addressing a critical gap in the assessment of help-seeking behaviors within nursing education, this instrument will enable educators and researchers to better identify students who may require additional support or targeted interventions. Ultimately, the use of this instrument can foster a more supportive academic environment and contribute to improving nursing education outcomes.

Ethics Committee Approval: The study was approved by the Ethics Committee of Nurses' and Midwives' Training College, Tamale (Approval Number: MOH/NMTC/51/280-23, Date: 19.12.2023).

Informed Consent: All participants provided informed consent before taking part in the study. Written permission for publication was also obtained from each participant.

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Appendix 1. Description of items for the instrumental, executive, and avoidance of help-seeking scales: Results from exploratory factor analysis (EFA)

Item	Description of items of the academic help-seeking behavior questionnaire for nursing students (AHSBQ-NS)
	Instrumental help-seeking (IHS) (α=0.716)
IHS1	1. When I ask my nurse educator for help, I prefer to be given hints or clues rather than the answer.
IHS2	2. When I am having trouble and ask the nurse educator for help, I like to be given examples of similar problems we have done.
IHS3	3. When I ask the nurse educator for help with something I don't understand, I ask the nurse educator to explain it to me rather than just give me the answer.
IHS4	4. When I ask my nurse educator for help in this class, I only want as much help as necessary to complete the work myself.
IHS5	5. When I ask my nurse educator for help understanding the material in this class, I prefer that the nurse educator help me understand the general ideas rather than simply tell me the answer.
IHS6	6. When I ask a student for help with my work, I don't want that student to give away the whole answer.
IHS7	7. When I ask a student for help understanding the material in this class, I prefer that the student help me understand the general ideas rather than simply tell me the answer.
IHS8	8. When I ask a student for help in this class, I want to be helped to complete the work myself rather than have the work done for me.
IHS9	9. When I ask a student for help in this class, I prefer to be given hints or clues rather than the answer.
IHS10	10. When I ask a student for help with something I don't understand, I ask the student to explain it to me rather than just give me the answer.
	Executive help-seeking (EHS) (α=0.901)
EHS1	1. When I ask the nurse educator for help in this class, I prefer that the nurse educator do the work for me rather than explain to me how to do it.
EHS2	2. When I ask my nurse educator for help on something I don't understand, I prefer that the nurse educator do it for me.
EHS3	3. When I ask my nurse educator for help on something I don't understand, I prefer the nurse educator to just give me the answer rather than explain it.
EHS4	4. When I ask the nurse educator for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.
EHS5	5. When I ask my nurse educator for help, I want the nurse educator to do the work for me rather than help me be able to complete the work myself.
EHS6	6. When I ask a student for help on something I don't understand, I prefer that the student just give me the answer rather than explain it.
EHS7	7. When I ask a student for help with my work, I prefer that the student do the work for me rather than explain to me how to do it.
EHS8	8. When I ask another student for help on something I don't understand, I ask that student to do it for me.
EHS9	9. When I ask a student for help in this class, I want the work done for me rather than be helped to complete the work myself.
EHS10	10. When I ask a student for help with my work, I prefer to be given the answer rather than an explanation of how to do the work myself.
	Avoidance of help-seeking (AHS) (α=0.881)
AHS1	1. I don't ask for help in this class even when the work is too hard to solve on my own.
AHS2	2. If I need help to solve a problem, I prefer to skip it rather than ask for help.
AHS3	3. I don't ask for help in this class even if I don't understand the lesson.
AHS4	4. If I didn't understand something in this class, I would guess rather than ask someone for help.
AHS5	5. I would rather do worse on an assignment I couldn't finish than ask for help in this class.
AHS6	6. Even if the work was too hard to do on my own, I wouldn't ask for help in this class.
AHS7	7. I would put down any answer rather than ask for help in this class.
AHS8	8. I don't ask questions in this class even if I don't understand the lesson.
AHS9	9. If work in this class is too hard, I don't do it rather than ask for help.

IHS: Instrumental help-seeking, EHS: Executive help-seeking, AHS: Avoidance of help-seeking.

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Nursing Students' Healthy Living Skills and Disaster Preparedness: A Relationship Study After the Kahramanmaraş Earthquakes (Mw 7.7 and Mw 7.6) in Türkiye

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Abstract

Background: Deteriorated living conditions after earthquakes hinder individuals from adopting healthy lifestyle behaviors. During this process, nursing students' guidance to individuals and their role as role models for healthy lifestyle behaviors play an important role.

Aim: This study aimed to investigate the relationship between disaster preparedness and healthy lifestyle behaviors in nursing students who survived the Kahramanmaraş earthquakes (Mw 7.7 and Mw 7.6) in Türkiye on February 6, 2023.

Methods: An online cross-sectional study was conducted with 229 undergraduate nursing students who were earthquake survivors in Türkiye in June 2023. Data were collected using an individual information form, the Disaster Preparedness Scale, and the Healthy Living Skills Scale. Independent t-tests, one-way analysis of variance (ANOVA), Pearson correlation, and linear regression analyses were used for data analysis.

Results: Most nursing students had not experienced a disaster before and had not received disaster training prior to the earthquake. Higher income levels, maternal education, and prior disaster training were associated with better disaster preparedness. Disaster preparedness significantly influenced all dimensions of healthy lifestyle behaviors, including importance given to health, healthy nutrition, access to health-related resources, and health priority.

Conclusion: The findings of the present study indicate that higher levels of disaster preparedness were associated with nursing students' ability to maintain healthy lifestyles after the earthquake and to adapt during the recovery process. Accordingly, integrating comprehensive disaster preparedness training into nursing curricula and strengthening national nursing education policies in this area are recommended.

Keywords: Disaster, earthquakes, healthy lifestyles, nursing students, preparedness

Introduction

Disasters are defined as sudden events that result in significant damage, destruction, and loss of life.[1] Preparedness for disasters is crucial not only for protecting the health of individuals but also for minimizing the devastating effects that disasters can have.[2] Disaster preparedness involves planning, implementation, and evaluation processes designed to reduce destruction caused by various risks and hazards.[3] Türkiye, due to its geographical location, is particularly prone to natural disasters, with earthquakes being one of the leading causes of widespread loss of life and material damage. The Kahramanmaras earthquakes, referred to as the "disaster of the century," occurred on February 6, 2023, approximately 9 hours apart in the Pazarcık (Mw 7.7) and Elbistan (Mw 7.6) districts of Kahramanmaras, leading to extensive destruction across 11 provinces. According to the Disaster and Emergency Management Presidency of Türkiye, over 50,000 people lost their lives.[4]

Following natural disasters such as earthquakes, survivors often prioritize survival over health, leading to the neglect of healthy lifestyle behaviors. This neglect can result in a variety of health issues, such as malnutrition, limited physical activity, and weight gain.[5] Healthy living behaviors are actions that individuals adopt to protect and improve their health.[6] However, changes in living conditions after a disaster hinder individuals from practicing healthy living behaviors.[5] In the aftermath of the February 6, 2023 Kahramanmaras earthquakes, survivors experienced disruptions to their daily routines. As many earthquake survivors struggled to meet their basic physiological, psychological, and social needs, their ability to maintain healthy living behaviors was significantly affected.[7]

Nursing students, as future health professionals who will guide individuals in protecting and improving public health, must first integrate healthy living practices into their own lives. It is essential for students, particularly during their university years when life patterns are being shaped, to learn, develop, and adopt healthy lifestyles.[8,9] A review of the literature reveals that the post-earthquake healthy lifestyles of nursing students who are survivors have not been adequately explored. This study suggests that undergraduate nursing students with higher levels of disaster preparedness may be better equipped to adapt to changing living conditions and maintain healthy lifestyles despite post-earthquake challenges. Accordingly, the aim of this study is to deter-

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mine the relationship between disaster preparedness levels and healthy lifestyles among nursing students who survived the Kahramanmaraş earthquakes (Mw 7.7 and Mw 7.6) that occurred in Türkiye on February 6, 2023.

Research Questions

- Are nursing students' individual characteristics associated with their disaster preparedness and healthy lifestyle levels after the Kahramanmaraş earthquakes?
- Is disaster preparedness associated with healthy lifestyle levels among nursing students affected by the Kahramanmaraş earthquakes?

Materials and Methods

Study Design

This descriptive, cross-sectional study was conducted with 229 nursing students studying in the nursing departments of universities in Türkiye in June 2023. To ensure the quality of the research, the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist for cross-sectional studies was used.

Population and Sampling

In this study, it was aimed to reach the entire population using the snowball sampling method. The minimum sample size for the present study was calculated using the G*Power program (version 3.1.9.7, Heinrich Heine University, Düsseldorf, Germany). For the correlation analysis, the minimum sample size was calculated as 191, assuming a small effect size (0.2), a 5% margin of error (α=0.05), and a study power (1-β) of 0.80.[10] The inclusion criteria were determined as: voluntary participation; being enrolled in the nursing department of a university; living in one of the 11 provinces affected by the earthquake during the first 72 hours after the earthquake; having no diagnosis of any psychiatric disorder; and being 18 years of age or older. The study was completed with 229 nursing students.

Data Collection Tools

Data were collected using an individual information form, the Disaster Preparedness Scale (DPS), and the Healthy Living Skills Scale for University Students (HLSSUS).

The individual information form was prepared by the researchers based on a review of the literature.[11-14] This form collected information on participants' sociodemographic data, previous disaster experience, receipt of disaster-related training, and participation in disaster drills.

The DPS consists of 13 items and four subdimensions: disaster physical protection, disaster planning, disaster assistance, and disaster warning systems. Scores on the 4-point Likert scale range from 13 to 52, with higher scores indicating better disaster preparedness. The Cronbach's alpha coefficient for the entire scale was reported as 0.82.3. In the present study, the Cronbach's alpha coefficient for the overall scale was 0.74, indicating acceptable internal consistency for social science research.[15]

The HLSSUS consists of 21 items and four subdimensions: importance given to health, healthy nutrition, access to health-related resources, and health priority. As the scale is scored on a 4-point Likert type scale, the total score ranges from 21 to 84. Higher scores indicate better healthy lifestyle behaviors. The Cronbach's alpha coefficient of the scale has been reported as 0.90.[6] In the present study, the Cronbach's alpha coefficient was 0.70, reflecting acceptable internal consistency according to commonly used psychometric criteria.[15]

Data Collection

After the data collection forms were uploaded to the Google Forms application, the created access link was sent to students via the WhatsApp application. Each student who participated in the study was asked to share the study link with other students who met the inclusion criteria. Students were asked to complete the HLSSUS by considering their experiences during the first 72 hours following the Kahramanmaraş earthquake on February 6, 2023. Thus, the study aimed to evaluate the healthy lifestyle behaviors of survivor nursing students during the early post-earthquake period.

Data Analysis

The obtained data were evaluated using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp, Armonk, NY, USA). The one-sample Kolmogorov-Smirnov test was used to assess the normal distribution of the data. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize the data. Differences in scale scores according to categorical variables with a normal distribution were examined using independent t-tests and one-way analysis of variance (ANOVA). Post hoc tests were then used to determine differences between groups. Pearson correlation analysis was conducted to examine relationships between total scale scores and subdimensions. Linear regression analysis was employed to estimate the extent to which students' healthy living skills were influenced by their disaster preparedness levels. Statistical significance was set at $p<0.05$.

Ethical Considerations

Approval to conduct the study was obtained from Ethics Committee of Kilis 7 Aralık University (Approval Number: 2023/10, Date: 20.05.2023). Data were collected online because students transitioned to online education during the post-earthquake period. Since the study was not conducted within a specific institution, institutional permission was not required. Before the study commenced, participants received a message containing detailed information about the study, and informed consent was obtained. Individuals who accepted the terms of participation were included in the study. The study was conducted in accordance with the principles of the Declaration of Helsinki. Permission was obtained from the responsible authors via e-mail to use the Turkish versions of the scales.

Results

The majority of nursing students were female (68.6%), had an income equal to expenses (67.2%), and were first-year students (35.4%). In addition, most students' mothers (61.6%) and fathers (55.0%) had completed primary school education. When the change in disaster preparedness level according to the individual characteristics of survivor nursing students was examined, it was determined that those whose income was higher than their expenses ($p<0.01$) and those whose mothers had a high school education level and above ($p<0.05$) had higher disaster preparedness levels (Table 1).

It was determined that the majority of the students had not experienced a disaster before (47.6%), had not received disaster training before the earthquake (60.3%), and had participated in disaster drills before the earthquake (59.8%). It was found that students who received disaster training before the earthquake had higher disaster preparedness levels ($p<0.01$). It was also determined that students who received disaster training before the earthquake ($p<0.01$) and participated in disaster drills ($p<0.001$) had higher healthy living skills after the earthquake (Table 1).

When the relationship between the students' mean scores on the disaster preparedness and healthy living skills scales and their subdimensions was examined, a positive moderate relationship was found between disaster preparedness levels and healthy lifestyles after the earthquake ($r=0.445$, $p<0.001$) (Table 2).

Subsequently, a five-model linear regression analysis was conducted to determine the effect of disaster preparedness on the maintenance of healthy lifestyle behaviors among survivor nursing students after the earthquake. Each dimension of the HLSSUS was analyzed as a separate model. Students' DPS levels had a statistically significant effect on their overall HLSSUS scores ($\beta=0.257$, $p<0.001$). In addition, DPS levels had statistically significant effects on all HLSSUS subdimensions: importance given to health ($\beta=0.472$, $p<0.001$), healthy nutrition ($\beta=0.724$, $p<0.001$), access to health-related resources ($\beta=0.529$, $p<0.001$), and health priority ($\beta=0.423$, $p<0.05$) (Table 3).

Discussion

Previous earthquake disasters have shown that individuals with higher levels of disaster preparedness experience fewer earthquake-related losses.[16] However, in the post-disaster period, individuals often struggle to maintain healthy lifestyle behaviors due to disruptions in social life, reduced opportunities for physical activity, difficulties in accessing healthy foods, changes in dietary habits, and a tendency to prioritize survival.[5] A seismic event that disrupts established social structures leads to a noticeable decline in individuals' quality of life.[17] A study conducted after the Great East Japan Earthquake revealed that earthquake survivors may experience obesity, dyslipidemia, and significant weight changes (≥10 kg).[18] Additionally, the literature indicates that increases in waist circumference, fasting blood glucose

Table 1. Comparison of nursing students' DPS and HLSSUS scores according to individual characteristics (n=229)

Characteristics	n	%	DPS		HLSSUS	
			Mean±SD	p	Mean±SD	p
Age (years) (mean±SD)			21.03±1.67			
Gender						
Female	157	68.6	30.99±3.46	0.120	62.57±5.58	0.844
Male	72	31.4	31.79±3.95		62.75±7.62	
Perception of economic situation						
Income less than expenses	64	27.9	30.22±2.80	**0.003**	62.52±6.58	0.574
Income equal to expenses	154	67.2	31.53±3.69	**a<b=c***	62.63±6.13	
Income more than expenses	11	4.8	33.18±5.55		63.27±7.09	
Year of study						
1st year	81	35.4	30.79±3.80	0.334	62.44±7.13	0.962
2nd year	73	31.9	31.23±3.23		62.79±5.67	
3rd year	42	18.3	31.40±3.35		62.40±6.18	
4th year	33	14.4	32.15±4.31		63.00±5.63	
Mother's education level						
Not literate	53	23.1	30.77±3.65	**0.017**	62.55±5.36	0.967
Primary education	141	61.6	31.02±3.49	**c>a=b***	62.71±6.62	
High school and above	35	15.3	32.83±3.85		62.43±6.30	
Father's education level						
Not literate	9	3.9	29.33±3.39	0.063	61.44±3.21	0.665
Primary education	126	55.0	31.06±3.25		63.04±6.52	
High school and above	94	41.0	31.67±4.07		62.19±6.16	
Have you ever experienced a disaster?						
Never	109	47.6	31.18±3.68	0.647	61.96±6.20	0.121
Once	73	31.9	31.53±3.71		63.71±6.77	
Twice	31	13.5	31.29±3.83		63.16±5.73	
Three times or more	16	7.0	30.19±2.37		61.19±4.90	
Have you received disaster-related training?						
Yes	91	39.7	32.07±4.05	**0.005**	64.14±6.80	**0.003**
No	138	60.3	30.70±3.23		61.63±5.71	
Where was the disaster training received?						
Search and rescue organizations	29	31.9	31.79±3.72	0.599	62.34±4.53	0.298
During school-based education	62	68.1	32.08±4.31		64.55±7.55	
Have you ever participated in a disaster drill before?						
Yes	137	59.8	31.56±3.72	0.097	63.73±6.74	**0.001**
No	92	40.2	30.76±3.46		60.99±5.12	

*: Bonferroni test. DPS: Disaster preparedness scale, HLSSUS: Healthy living skills scale for university students, SD:Standard deviation.

Table 2. Correlation between DPS and post-earthquake HLSSUS scores among survivor nursing students (n=229)

Variables		1	2	3	4	5	6	7	8	9	10
1. Importance given to health	r	1									
2. Healthy nutrition	r	0.486[b]	1								
3. Access to health-related resources	r	0.445[b]	0.453[b]	1							
4. Health priority	r	0.392[b]	0.379[b]	0.076	1						
5. HLSSUS	r	0.831[b]	0.797[b]	0.711[b]	0.552[b]	1					
6. Disaster physical protection	r	0.246[b]	0.322[b]	0.300[b]	0.080	0.338[b]	1				
7. Disaster planning	r	0.287[b]	0.286[b]	0.201[b]	0.147[a]	0.323[b]	0.433[b]	1			
8. Disaster assistance	r	0.212[b]	0.335[b]	0.126	0.211[b]	0.298[b]	0.168[a]	0.175[b]	1		
9. Disaster warning systems	r	0.126	0.229[b]	0.221[b]	-0.008	0.208[b]	0.310[b]	0.251[b]	0.231[b]	1	
10. DPS	r	0.338[b]	0.438[b]	0.321[b]	0.168[a]	0.445[b]	0.783[b]	0.753[b]	0.534[b]	0.565[b]	1

[a]: p<0.05, [b]: p<0.01. r: Pearson correlation test, DPS: Disaster preparedness scale, HLSSUS: Healthy living skills scale for university students.

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Table 3. Effect of disaster preparedness on post-earthquake healthy living skills among survivor nursing students (n=229)

Healthy living skills	Disaster preparedness[A]				
	Model 1 β	Model 2 β	Model 3 β	Model 4 β	Model 5 β
Importance given to health	0.472				
Healthy nutrition		0.724			
Access to health-related resources			0.529		
Health priority				0.423	
HLSSUS					0.257
R^2	0.114	0.192	0.103	0.028	0.198
F	29.333	53.817	26.047	6.595	55.918
p	**<0.001**	**<0.001**	**<0.001**	**0.011**	**<0.001**

[A]: Independent variable, β: Standardized β, F: ANOVA value, HLSSUS: Healthy living skills scale for university students, R^2: Proportion of variance in the dependent variable explained by the regression model.

levels, and alcohol consumption have been observed among earthquake survivors, contributing to a higher prevalence of metabolic syndrome.[19,20] These findings highlight that disaster preparedness is crucial not only for mitigating the immediate impact of disasters on individuals but also for protecting their overall health.[2] Since disasters often occur unexpectedly, all healthcare professionals, particularly nurses, must be equipped with the necessary knowledge, tools, and resources to respond effectively before, during, and after emergencies.[21]

In line with these findings, the present study identified a moderate positive relationship between students' levels of disaster preparedness and their healthy lifestyle behaviors after the earthquake. Moreover, disaster preparedness significantly influenced all subdimensions of healthy lifestyle behaviors, including the importance given to health, healthy nutrition, access to health-related resources, and health priority. According to a qualitative study conducted in three provinces affected by the Kahramanmaraş earthquake, organizational deficiencies were reported across all regions. Administrators noted challenges in ensuring adequate nutrition, food safety, and resource management, and problems related to food transportation, preparation, cooking, distribution, and hygiene were observed in each of the three provinces.[17] The literature similarly indicates that disruptions in daily routines after an earthquake can negatively affect metabolic health indicators, increase obesity risk, and contribute to nutritional irregularities.[18–20]

A study conducted four months after the earthquake in Ecuador found widespread food insecurity, insufficient dietary diversity, and poor nutritional status among mothers and children under five living in rural areas. The study further reported that commonly consumed foods were low in nutritional value, while consumption of whole grains, fruits, and vegetables was limited. Additionally, a high prevalence of overweight and obesity among mothers and a high prevalence of chronic undernutrition among children under five were documented.[22] Following a catastrophic seismic event, survivors who witness the destruction of their homes may experience challenges in accessing livelihoods, especially in countries lacking adequate disaster preparedness. Such circumstances can lead to suboptimal food sanitation practices, which may subsequently contribute to various health problems.[17] For nursing students, who will play a vital role in guiding individuals toward protecting and improving community health, adopting healthy lifestyle habits is of critical importance.[8,9] Although post-earthquake uncertainty, resource limitations, and psychological distress may predispose individuals to unhealthy behaviors, this study demonstrated that students with higher levels of disaster preparedness were less affected by these adverse conditions. These findings suggest that a high level of disaster preparedness is essential for enabling students to sustain healthier lifestyle behaviors even under challenging post-disaster circumstances.

In the present study, students who had received disaster training and participated in drills were found to have higher levels of both disaster preparedness and healthy lifestyle behaviors. A study conducted with nursing students reported that, following disaster training, students performed more successfully in complex tasks such as triage, identifying health problems, and providing first aid during disaster drills.[23] Another study conducted after the Kahramanmaraş earthquake described that a nurse, despite being an earthquake victim herself, continued to work in the hospital and assist other survivors.[24] To fulfill their expected roles in post-disaster care effectively, nurses must possess adequate disaster preparedness. However, previous studies indicate that nurses' disaster preparedness remains insufficient.[25] Research conducted with nursing and midwifery students also demonstrated that those who received disaster-related education had significantly higher levels of preparedness.[2] As nurses acquire most of their knowledge and skills during their student years,[9] examining the preparedness of nursing students who will be at the forefront of future disasters is essential.[21] In another study investigating nursing students' disaster preparedness knowledge and attitudes, the majority (86.4%) stated that identifying and managing risks that may lead to disasters is important and that training in this area is necessary.[21] Because nurses are indispensable members of the healthcare team, collaboration during the disaster preparedness process between nursing students and nurses is crucial.[21] Disaster education and drills conducted during training not only enhance nursing students' disaster preparedness but also strengthen their ability to provide higher-quality services to the community during future disasters. This emphasizes that, particularly for nursing students, practical drills as well as theoretical knowledge play a crucial role in reinforcing behavioral outcomes in the post-disaster period.

In this study, it was determined that students with higher income levels had higher disaster preparedness scores. The literature shows that individuals with higher income levels, better education, and prior disaster training tend to have higher levels of disaster preparedness.[26–28] In a study evaluating disaster preparedness levels among nursing and midwifery students, those whose income exceeded their expenses were found to have higher levels of disaster preparedness.[2] This finding indicates that disaster preparedness is shaped not only by individual motivation but also by economic and educational resources. It is also presumed that students with better socioeconomic status may have easier access to disaster preparedness training, drills, and educational materials. Therefore, it is important that disaster education programs be made accessible to, and prioritized for, students from lower socioeconomic backgrounds.

Study Limitations

The present study reflects only the data obtained from nursing students and does not provide information about the disaster preparedness level of the general population or post-earthquake healthy living skills. Since the data were collected online via Google Forms, nursing students who did not have access to smartphones, tablets, or computers could not be reached.

Conclusion

The findings of this study show a relationship between nursing students' disaster preparedness level and their ability to maintain healthy lifestyle behaviors after an earthquake. Furthermore, the study found that disaster preparedness level influenced the maintenance of healthy lifestyle behaviors among nursing students. This suggests that stronger preparedness contributes to more effective adaptation and continuation of healthy living practices during the post-disaster recovery period.

Based on these results, enhancing disaster preparedness among nursing students is essential to promote both individual well-being and professional readiness in dis aster contexts. Integrating structured disaster preparedness courses into nursing curricula, alongside regular disaster training focused on pre-disaster preparedness, emergency planning, and effective disaster management, is strongly recommended. Educational content should also emphasize the importance of maintaining healthy lifestyle behaviors following disasters. Furthermore, incorporating practical components such as disaster drills and sim ulations into nursing education programs is crucial to bridge the gap between theoretical knowledge and clinical practice. Evaluating the effectiveness of these educational interventions will help ensure their impact on students' preparedness and health-related behaviors. Strengthening disaster preparedness through com prehensive education and policy support can enhance nursing students' capacity to protect their own health and provide effective care to disaster-affected populations, thereby contributing to improved disaster response and public health outcomes.

Ethics Committee Approval: The study was approved by the Kilis 7 Aralık University Ethics Committee (Approval Number: 2023/10, Date: 20.05.2023).

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Enhancing Communication Skills and Self-compassion in Nursing Students: A Quasi-experimental Comparative Study of Online and Face-to-face Courses

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Abstract

Background: Communication and self-compassion skills are essential in nursing. While the effectiveness of face-to-face instruction is well documented, evidence on the impact of online formats remains limited.

Aim: The aim of this study was to assess and compare the impact of the online and face-to-face *Therapeutic Communication and Nurse-Patient Relationship* course on nursing students' communication skills and levels of self-compassion.

Methods: This quasi-experimental study was conducted with 331 first-year nursing students at a public university. The course was delivered online to one group (n=169), while the other group (n=162) attended the course face-to-face. Pre-test and post-test data were collected using the Communication Skills Scale, the Course Evaluation Questionnaire, and the Self-Compassion Scale. The chi-square test, independent samples t-test, paired samples t-tests, and Pearson correlation analysis were used to analyze the data.

Results: The mean age of participants was 19.08 years (standard deviation=1.05), and 87.3% were female. The groups did not differ significantly at baseline ($p>0.05$). After the 14-week course, both groups exhibited significant improvements in communication skills and levels of self-compassion ($p<0.05$). However, in the online group, no difference was found between pre-test and post-test scores in some sub-dimensions of the scales. The post-test scores of the two groups did not differ significantly ($p>0.05$).

Conclusion: This study highlights the potential of online learning while also identifying areas in which significant improvements in communication skills and self-compassion may not be achieved. The findings can inform the design of effective and sustainable communication courses in nursing education.

Keywords: *Communication skills, nursing education, nursing students, self-compassion, therapeutic communication*

Introduction

Patient-centered, compassionate care and effective communication are essential competencies in nursing.[1] These elements are well documented as being linked to care quality and positive health outcomes.[2] Communication is a powerful therapeutic tool and plays a vital role at every stage of the nursing process.[3] However, communication breakdowns remain a major source of patient dissatisfaction.[4,5] As future professionals, nursing students should be trained to be effective communicators.[6] According to both national and international nursing organizations, communication skills are typically included in undergraduate nursing curricula.[7,8]

Communication skills are considered teachable and learnable. Comprehensive reviews have demonstrated that educational interventions can enhance the communication competencies of both nursing students[6,9] and nurses.[10,11] However, these systematic reviews predominantly focus on face-to-face educational programs. In recent years, Coronavirus Disease 2019 (COVID-19) pandemic made in-person classes and direct patient interactions impossible, forcing nursing education to shift to online formats. This abrupt transition disrupted traditional approaches that support the development of communication skills.

Studies evaluating the impact of online communication skills education for nursing students are limited and have produced conflicting results.[12,13] A systematic review of digital education during the COVID-19 pandemic emphasized the need for research comparing online and face-to-face instructional methods.[14] This gap underscores the necessity of evaluating the effectiveness of different teaching modalities. Therefore, the main aim of the current study is to assess and compare the impact of face-to-face and online delivery of the *Therapeutic Communication and Nurse-Patient Relationship* course on nursing students' communication skills.

Another skill of growing importance in nursing education is self-compassion. To maintain emotional resilience, nurses must be able to support not only their patients but also themselves.[15] Self-compassion contributes to caring behaviors, emotional well-being, and compassion competence.[16] Studies have shown a strong association between empathy and self-compassion, suggesting that both can be enhanced through educational strategies such as mindfulness and reflection.[17–19] The COVID-19 pandemic further emphasized the importance of self-compassion among healthcare professionals. Nevertheless, the effects of online interventions on self-

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compassion remain underexplored.[20] Within this context, another goal of the study is to evaluate and compare the effects of online and face-to-face course delivery on nursing students' self-compassion. Finally, the study investigates the relationship between communication skills and self-compassion. This study contributes to the literature by providing empirical evidence from a quasi-experimental design involving first-year nursing students. Unlike previous research, it directly compares the outcomes of the same course delivered in two different formats and evaluates not only communication skills but also self-compassion.

Study Questions

- Does participation in the *Therapeutic Communication and Nurse-Patient Relationship* course, delivered either online or face-to-face, improve nursing students' communication skills and self-compassion?
- Is there a significant difference in outcomes between online and face-to-face course delivery?
- What is the correlation between communication skills and self-compassion levels?

Materials and Methods

Study Design and Participants

This quasi-experimental study employed a pretest-posttest intervention design. It was conducted during the second semesters of the 2020–2021 and 2021–2022 academic years in the Nursing Department of the Faculty of Health Sciences at a public university in Türkiye. The study population consisted of 377 first-year nursing students enrolled in the *Therapeutic Communication and Nurse-Patient Relationship* course, which is a required course in the undergraduate nursing curriculum. The required sample size was calculated using the formula for a known population (n=sample size, N=population size, e=margin of error, Z=z-score).[21] Based on a total population of 377 students (N=377), a 99% confidence level (Z=2.58), and a 3% margin of error (e=0.03), the estimated minimum sample size was approximately 314 students. All students enrolled in the course were invited to participate. Inclusion criteria were: (a) being enrolled in the course and (b) voluntarily agreeing to participate. Exclusion criteria included: (a) repeating the course or (b) failure to fully complete the questionnaire. A total of 331 students participated in the study. Of these, 169 students received the course online during the COVID-19 pandemic, while 162 students attended the course face-to-face after the pandemic.

Instruments

Data were collected using four instruments: A Personal Information Form, the Communication Skills Scale, the Course Evaluation Questionnaire, and the Self-Compassion Scale.

Personal Information Form

This researcher-prepared form consisted of demographic questions related to age, gender, type of high school graduated from, place of residence, and economic status. It also included questions about prior participation in communication training within the past year, whether students had read personal development books, and their rank-order preference for nursing as a career.

Communication Skills Scale

This scale, widely used in the field, is designed to assess individuals' communication skills. It consists of 25 items distributed across four sub-dimensions: "Communication Principles and Basic Skills," "Self-expression," "Effective Listening and Nonverbal Communication," and "Communication Willingness." Each item is rated on a 5-point Likert scale ranging from 1 (Never) to 5 (Always), with higher scores indicating better communication competencies. The original scale demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.81.[22] In the present study, Cronbach's alpha values were 0.83 for the pretest and 0.85 for the posttest.

Course Evaluation Questionnaire

This questionnaire was developed by the researcher based on the course's learning outcomes, with a specific focus on enhancing self-compassion and therapeutic communication skills. It comprises 25 statements rated on a 5-point Likert scale, ranging from 1 (Not competent at all) to 5 (Highly competent). Example statements include: "Awareness of myself," "Recognizing my strengths," "Identifying my emotions," "Saying no and maintaining my boundaries," "Expressing empathy," "Showing self-compassion," and "Collaborating effectively in a group task." Cronbach's alpha coefficients for the questionnaire were 0.93 for both the pretest and the posttest. Questionnaire scores were calculated by summing responses to all 25 statements.

Self-compassion Scale

This scale evaluates both positive and negative dimensions of self-compassion.[23,24] It consists of 26 items grouped into six subdimensions: "Self-kindness," "Self-judgment," "Common Humanity," "Isolation," "Mindfulness," and "Over-identification." Participants rate each item on a 5-point Likert scale ranging from 1 (Almost never) to 5 (Almost always). Each subdimension is scored separately, with higher scores indicating a stronger presence of the trait being measured. Cronbach's alpha values were reported to range from 0.72 to 0.80.[24] In this study, Cronbach's alpha values ranged from 0.76 to 0.86 in the pretest and from 0.76 to 0.88 in the posttest.

Data Collection

Data were collected from nursing students enrolled in the *Therapeutic Communication and Nurse-Patient Relationship* course, which was delivered online during the 2020–2021 academic year and face-to-face during the 2021–2022 academic year. Pretest and posttest data for both groups were obtained using an online survey platform (Survey.com). The pretest was administered during the first week of the course, immediately after students were informed about the study. The survey link was shared during the initial class session. The posttest was conducted at the end of the 14th week, following the final class session, using the same distribution method. To enable accurate matching of pretest and posttest responses, students were asked to use a pseudonym, phone number, or student ID when completing the forms. The estimated time required to complete the data collection tools ranged from 10 to 13 minutes.

Process of the Course

The *Therapeutic Communication and Nurse-Patient Relationship* course is a compulsory part of the nursing curriculum, delivered in the second semester of the first academic year. The online sessions were delivered live via the Microsoft Teams platform, while face-to-face sessions were held in an amphitheater. In accordance with the university's academic regulations, students were required to attend at least 70% of the classes, and this requirement was fulfilled. Further details about the course content and structure, including placement in the curriculum, duration, learning objectives, main topics covered, teaching methods, and films used, are provided in Table 1. Importantly, all of these components were kept identical across both course formats; the only variation was the delivery format. This approach ensured comparability between the online and face-to-face modalities.

The course was delivered by the same instructor in both formats to minimize instructor-related variability. The instructor is a professor of mental health and psychiatric nursing with extensive experience in consultation-liaison psychiatry, psychotherapy, and therapeutic communication training since 1997. This instructor has taught both undergraduate- and graduate-level courses and has led numerous training programs focused on therapeutic communication, nurse-patient interaction, and psychosocial care.

Data Analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize participant characteristics. Sociodemographic differences between the two groups were analyzed using chi-square tests and independent samples t-tests. Normality of the data was confirmed prior to further analysis. Within-group changes from pretest to posttest in communication skills and self-compassion were evaluated using paired samples t-tests. Between-group comparisons of scores were conducted using independent samples t-tests. The relationship between communication skills and self-compassion scores at posttest was examined using Pearson correlation analysis. All statistical analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY, USA), with statistical significance set at $p<0.05$.

Ethical Considerations

Ethical approval for this study was obtained from the Bolu Abant İzzet Baysal University Human Research Ethics Committee (Approval Number: 2020/77, Date: 15.04.2020). Written permission was also granted by the faculty administration where the study was conducted (2020-E.15577). Additionally, permission was ob-

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Table 1. Therapeutic communication and nurse-patient relationship course details

Component	Details
Placement in curriculum	Second semester of the first academic year
Duration	14 weeks; 2 hours per week
Delivery format	Online and face-to-face
Learning objectives	• Improve self-awareness and self-compassion • Set and maintain professional boundaries • Explain key concepts of therapeutic communication and relationships • Distinguish between therapeutic and non-therapeutic communication methods • Use therapeutic communication techniques effectively • Predict possible outcomes of different communication methods in nurse–patient interactions • Recognize the importance of teamwork
Main topics covered	• Self-awareness and self-compassion • Professional values and boundaries • Therapeutic communication (concepts, models,[25] skills) • Therapeutic relationship and Peplau's Interpersonal Relations Theory[26] • Nurse-patient interview • Breaking bad news • Teamwork and the SBAR (Situation-Background-Assessment-Recommendation) framework[27]
Teaching methods	Lectures, Q&A sessions, group work, film analysis, reflection, role-playing
Films used	*Patch Adams, The Diving Bell and the Butterfly, Wit*

Table 2. Descriptive characteristics of the participants

Characteristics	Total (N=331)		Online course group (n=169)		Face-to-face course group (n=162)		x^2	p
	n	%	n	%	n	%		
Gender							0.713	0.398
Female	289	87.3	145	85.8	144	88.9		
Male	42	12.7	24	14.2	18	11.1		
Type of High School graduated							9.237	0.055
Health Vocational High School	22	6.6	15	8.9	7	4.3		
Anatolian High School	260	78.5	133	78.7	127	78.4		
Science High School	21	6.3	5	3.0	16	9.9		
Imam Hatip High School	7	2.1	4	2.4	3	1.9		
Other	21	6.3	12	7.1	9	5.6		
Place of residence							1.964	0.580
Big city	153	46.2	84	49.7	69	42.6		
Small city	118	35.6	55	32.5	63	38.9		
Town	13	3.9	7	4.1	6	3.7		
Village	47	14.2	23	13.6	24	14.8		
Economic status							4.954	0.175
Low	25	7.6	9	5.3	16	9.9		
Medium	220	66.5	109	64.5	111	68.5		
Good	82	24.8	49	29.0	33	20.4		
Very good	4	1.2	2	1.2	2	1.2		
Participation in communication training in the last year							1.750	0.186
No	288	87.0	143	84.6	145	89.5		
Yes	43	13.0	26	15.4	17	10.5		
Reading personal development books							0.070	0.791
No	170	51.4	88	52.1	82	50.6		
Yes	161	48.6	81	47.9	80	49.4		
Characteristics	**Mean±SD**		**Mean±SD**		**Mean±SD**		**t**	**p**
Age (range: 18–25 years)	19.08±1.05		19.04±0.96		19.12±1.14		-0.705	0.481
Nursing preference order							0.057	0.954
No (range: 1–20)	3.11±4.04		3.12±4.21		3.10±3.87			

SD: Standard deviation, N/n: Frequency, %: Percentage, t: Independent samples test, x^2: Chi-square test.

Table 3. Comparison of online and face-to-face course score averages in terms of communication skills

Variables	Online course group (n=169) mean±SD	Face-to-face course group (n=162) mean±SD	t[a]	p
Communication principles and basic skills				
Pre-test	41.40±4.82	40.88±5.13	0.960	0.338
Post-test	41.95±5.09	42.23±4.82	-0.505	0.614
t[b]; p value	-1.534; 0.127	-3.464; 0.001		
Self-expression				
Pre-test	15.46±3.10	15.13±3.29	0.942	0.347
Post-test	16.03±2.78	15.98±2.62	0.141	0.888
t[b]; p value	-2.767; 0.006	-3.719; ≤0.001		
Effective listening and nonverbal communication				
Pre-test	24.68±3.34	24.21±3.39	1.271	0.205
Post-test	25.15±3.42	25.2±3.15	-0.392	0.695
t[b]; p value	-1.730; 0.085	-4.110; ≤0.001		
Willingness to communicate				
Pre-test	18.87±3.13	18.78±3.19	0.264	0.792
Post-test	19.94±3.25	19.96±2.96	-0.047	0.963
t[b]; p value	-5.088; ≤0.001	-5.708; ≤0.001		
Total score				
Pre-test	100.43±11.96	99.02±12.52	1.055	0.292
Post-test	103.07±12.58	103.46±11.56	-0.295	0.768
t[b]; p value	-3.144; 0.002	-5.020; ≤0.001		
Course evaluation questionnaire				
Pre-test	93.55±12.82	92.27±14.31	1.162	0.227
Post-test	102.17±12.65	101.11±13.18	0.747	0.456
t[b]; p value	-9.281; ≤0.001	-0.239; ≤0.001		

SD: Standard deviation, t[a]: Independent samples test, t[b]: Paired samples test.

tained from the original authors or the researchers responsible for the local adaptation of the scales. All participants provided written informed consent. Students were assured that their responses would be used solely for course evaluation purposes and that the data would not be reviewed or analyzed before the end of the semester. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

Data were collected from 331 first-year nursing students, with 169 in the online group and 162 in the face-to-face group. Descriptive characteristics of the total sample and subgroups are presented in Table 2. Participants ranged in age from 18 to 25 years, with a mean age of 19.08 years (standard deviation [SD]=1.05), and 87.3% were female. No statistically significant differences were found between the groups in terms of baseline characteristics, including age, gender, type of high school, place of residence, perceived economic status, prior communication training within the past year, reading personal development books, and nursing program preference ranking (p>0.05).

Regarding communication skills, students in the online group showed significant improvements in the total scale score (p=0.002), the Self-expression subscale (p=0.006), the Willingness to Communicate subscale (p<0.001), and Course Evaluation Questionnaire scores (p<0.001). Similarly, the face-to-face group demonstrated significant increases in the total score (p<0.001), all subscale scores (p≤0.001), and Course Evaluation Questionnaire scores (p<0.001). No significant differences were found between the two groups in posttest communication skills scores (p>0.05) (Table 3).

With respect to self-compassion, students in the online course group showed significant improvements in the Self-Kindness (p<0.001), Common Humanity (p<0.001), and Mindfulness (p<0.001) subscales. In the face-to-face group, significant increases were observed across all subscales (p≤0.008). No significant differences were found between the two groups in posttest self-compassion scores (p>0.05) (Table 4).

Statistically significant correlations were observed between posttest communication skills and self-compassion scores across both education formats, except for the Willingness to Communicate and Over-Identification subscales. Correlation coefficients ranged from −0.19 to 0.46 (p≤0.001). Positive correlations were found between total communication skills and the self-compassion subdimensions of Self-Kindness (r=0.42), Common Humanity (r=0.41), and Mindfulness (r=0.43). Negative correlations were observed with Self-Judgment (r=−0.29), Isolation (r=−0.29), and Over-Identification (r=−0.21) (p≤0.001).

Discussion

This study demonstrated that both online and face-to-face delivery of the *Therapeutic Communication and Nurse-Patient Relationship* course effectively enhanced nursing students' communication skills and self-compassion. The absence of statistically significant differences in posttest scores between the two groups suggests that both instructional formats can foster these competencies. However, some subdimensions showed less improvement in the online group, suggesting that certain interpersonal skills may be better developed through face-to-face learning.

These findings align with previous systematic reviews supporting the effectiveness of face-to-face educational interventions in improving nursing students' communication competencies.[6,9,10] While much of the existing literature is based on small-group formats, the present study shows that large classroom-based instruction can also be effective when well designed. Comparable outcomes between the online and face-to-face groups support the potential of online learning in communication training. Nevertheless, face-to-face instruction appears to be more advantageous for developing competencies that require real-time interaction, such as active lis-

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Table 4. Comparison of online and face-to-face course score averages in terms of self-compassion

Variables	Online course group (n=169) mean±SD	Face-to-face course group (n=162) mean±SD	t[a]	p
Self-kindness				
Pre-test	3.17±0.76	3.14±0.81	0.380	0.705
Post-test	3.49±0.74	3.49±0.73	0.057	0.954
t[b]; p value	-5.339; ≤0.001	-5.491; ≤0.001		
Self-judgement				
Pre-test	2.33±0.79	2.45±0.85	-1.273	0.204
Post-test	2.31±0.81	2.26±0.80	0.473	0.636
t[b]; p value	0.382; 0.703	2.954; 0.004		
Common humanity				
Pre-test	3.09±0.80	3.13±0.83	-0.438	0.662
Post-test	3.59±0.74	3.56±0.74	0.456	0.648
t[b]; p value	-8.155; ≤0.001	-6.799; ≤0.001		
Isolation				
Pre-test	2.56±0.85	2.75±0.94	-1.926	0.061
Post-test	2.53±0.89	2.58±0.83	-0.473	0.636
t[b]; p value	0.387; 0.700	2.677; 0.008		
Mindfulness				
Pre-test	3.25±0.72	3.18±0.74	0.894	0.372
Post-test	3.49±0.72	3.50±0.69	-0.173	0.863
t[b]; p value	-4.143; ≤0.001	-5.276; ≤0.001		
Over-identification				
Pre-test	2.79±0.93	2.93±0.97	-1.338	0.182
Post-test	2.66±0.90	2.68±0.91	-0.226	0.329
t[b]; p value	1.891; 0.060	3.513; 0.001		

SD: Standard deviation, t[a]: Independent samples test, t[b]: Paired samples test.

tening and nonverbal communication. This reinforces the idea that online formats may not fully substitute for in-person instruction. Combining the strengths of both methods may lead to more comprehensive educational outcomes.

In the online group, certain key communication competencies did not show significant improvement. This may help explain the inconsistent results in the literature regarding the effectiveness of online training.[12,13,28] Such inconsistencies may also reflect differences in course design, instructional duration, and levels of student engagement.[29] In contrast, a systematic review on empathy and compassion training reported that neither the length nor the complexity of interventions directly influenced outcomes.[17] Although the online sessions in the present study were recorded for later access, students' individual learning styles and study habits may have affected their performance. Moreover, the online group participated during the COVID-19 pandemic under mandatory conditions, which may have posed adaptation challenges and reduced learning effectiveness.

In the present study, in terms of self-compassion, participants in the face-to-face group showed significant improvements across all subdimensions. This included increased self-kindness, common humanity, and mindfulness, along with decreased self-judgment, isolation, and over-identification. These results are in consistent with Taylor et al.[30] in 2022, who found that mindfulness-based classroom interventions significantly enhanced self-compassion. Other studies also confirm that group-based interventions are more effective than individual formats in enhancing self-compassion-related attributes.[20,31] Integrating activities that support self-compassion into nursing education may foster this essential quality in future nurses.

In this study, in the online group, significant improvements were observed in self-kindness, common humanity, and mindfulness. However, changes in self-judgment, isolation, and over-identification were not statistically significant. This may be attributed to psychological strain and limited interaction opportunities during the pandemic. It is also worth noting that only one of the course objectives specifically targeted self-compassion. Prior studies have shown that online interventions lasting 6 to 10 weeks—when fully dedicated to self-compassion and applied to small groups—can produce significant improvements.[32,33] These findings suggest that online self-compassion programs may be a viable option, especially for learners with limited access to in-person education.

At the end of the course in the current study, the observed correlation between communication skills and self-compassion suggests that these qualities may reinforce each other. This relationship aligns with a narrative review emphasizing the role of mindfulness and compassion-based strategies in effective communication with patients.[18] A systematic review has emphasized the close links among empathy, self-awareness, and compassion, indicating that enhancing one may positively impact the others.[17] Educational strategies that integrate communication training with self-compassion practices may thus provide dual benefits. However, achieving a lasting impact requires continuity rather than one-time interventions.

In sum, the present findings offer valuable evidence on how to support nursing students in developing communication skills and self-compassion. While the study confirms the potential of online learning, it also highlights its limitations in fostering certain interpersonal skills. Future research should explore blended or hybrid models, evaluate the long-term retention of skills, and examine the influence of student characteristics and contextual variables on training outcomes.

Limitations

The first major limitation of this study, as highlighted in previous literature, is the difficulty of measuring the impact of communication training interventions.[9] Although a tool specifically developed in Türkiye for evaluating therapeutic communication skills exists, it could not be used in this study because it requires clinical practice experience, which the students had not yet undertaken. To partially address this limitation, a course evaluation questionnaire was developed and included alongside standard-

ized measurement tools. Reliance solely on self-report instruments presents another key limitation, as such measures can be subject to bias. Additionally, the fact that the study was conducted at only one institution restricts the extent to which the findings can be generalized. Future research should consider multicenter studies to enhance external validity and support broader application of the results. Another limitation arises from the study being conducted across different academic years. Potential variations in student profiles, such as changes in university entrance rankings, may have influenced the results. Furthermore, because the measurements were taken immediately after completion of the course, the study could not capture the long-term retention and sustainability of the skills gained. Future studies should incorporate follow-up assessments to better evaluate the durability of learning outcomes.

Conclusion

This study demonstrated that both online and face-to-face delivery of a therapeutic communication and nurse-patient relationship course significantly improved nursing students' communication skills and self-compassion. However, limited improvement in certain subdimensions among the online group suggests that virtual formats may not fully support all learning outcomes. When online education is preferred or necessitated by circumstances, it is important to incorporate diverse teaching strategies to ensure an effective learning experience. These results may provide valuable insights for nursing educators and academic institutions when designing sustainable programs focused on improving communication skills and self-compassion in nursing students. Based on these findings, it is important for institutional policies aimed at enhancing the quality of nursing education to support face-to-face instruction while integrating the advantages of both digital and in-person teaching methods. Furthermore, developing systematic guidelines for the implementation of such blended approaches is essential.

Ethics Committee Approval: The study was approved by the Bolu Abant İzzet Baysal University Human Research Ethics Committee (Approval Number: 2020/77, Date: 15.04.2020).

Informed Consent: Written informed consent was obtained from all participants.

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Original Article

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Examining the Relationship Between Kinesiophobia, Patient Mobility, and Activities of Daily Living in Patients with Chest Tubes After Thoracic Surgery: A Relational Study with Multiple Linear Regression Analyses

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Abstract

Background: Kinesiophobia, or the fear of movement due to anticipated pain or injury, is a significant psychological barrier that interferes with activities of daily living for many patients who have undergone thoracic surgery and had a chest tube placed.

Aim: This study aimed to examine the relationship between kinesiophobia, mobility, and activities of daily living in patients with chest tubes following thoracic surgery.

Methods: This study used a descriptive, correlational design. The research sample consisted of 110 patients with a chest tube following thoracic surgery. A patient identification form, the Katz Activities of Daily Living Scale (Katz ADL), the Tampa Scale of Kinesiophobia (TSK), and the Patient Mobility Scale (PMS) were used for data collection. Percentage distribution, arithmetic mean, multiple linear regression, and correlation analyses were used for data analysis.

Results: The study found that most patients (82.7%) were married, the majority were male (80.9%), and were unemployed (30.9%). In the study, the average total score of the Katz ADL was 13.30±2.33, the TSK score was 60.58±15.19, and the PMS score was 84.32±29.51. The study revealed that PMS and TSK were statistically significant predictors of Katz ADL ($p<0.001$). It was also shown that the total Katz ADL score showed a negative association with both PMS and TSK at a high level of statistical significance ($p<0.01$).

Conclusion: This study showed that patients who had a chest tube inserted after surgery experienced a negative impact on performing activities of daily living due to kinesiophobia and difficulty moving.

Keywords: Activities of daily living, chest tube, kinesiophobia, nursing, thoracic surgery

Introduction

Thoracic surgery is a surgical procedure commonly used to treat diseases of the lower respiratory system, such as the lungs, chest cavity, chest wall, and diaphragm.[1] After surgery, a chest tube is usually inserted and plays a critical role in the postoperative period to ensure adequate breathing and fluid management. A chest tube is used to drain air and fluid that have accumulated in the pleural space and to prevent fluid from flowing back into the pleural space. However, the insertion of a chest tube can cause a number of adverse effects in patients, including fear of movement (kinesiophobia), mobilization difficulties, and limitations in activities of daily living (ADL).[1-6]

Fear of movement is a psychological condition that has a negative impact on a patient's recovery after surgery. People undergoing chest tube placement may develop a reluctance to move due to fear of damaging the tube or increasing pain. This may limit the patient's ability to mobilize, increase the risk of postoperative complications, and prolong the recovery process.[5,7,8]

For patients who have had a chest tube inserted during thoracic surgery, this situation may limit their ability to perform certain movements related to the presence of the chest tube.[2] A study examining patients' experiences with chest tubes found that 72% of patients were unable to move comfortably.[9] Chest tubes that cause discomfort can also negatively affect patients' activities of daily living.[2,5] In reviewing the literature, it has been reported that the presence of chest tubes causes anxiety and discomfort in patients, and pain, especially during movement and coughing, leads to restricted movement.[10]

ADLs are generally considered in two dimensions: basic and instrumental ADLs. Basic ADLs include the care that a person must provide for himself/herself. Inadequacy in basic and instrumental activities of daily living, or dependence on others, are important factors that affect an individual's quality of life. It has been reported that quality of life deteriorates as physical disability increases. As an individual's level of dependency in performing ADLs increases, their emotional status and perception of health/illness may also be negatively affected. Patients who have a chest tube inserted after thoracic surgery may experience fear of movement and limitations in physical mobility due to the chest tube, and may have difficulty performing ADLs. In addition, restricted movement can negatively affect ADLs, causing patients to lose their independence.[5,11-13]

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Given the interrelationship between kinesiophobia, mobilization, and ADLs, a comprehensive nursing approach is required to address these challenges in patients with chest tubes. Nurses should focus on patients' care needs to help them overcome their fears, mobilize, and perform activities. This may include educating patients about the importance of exercise, providing coping strategies, and encouraging gradual exposure to activities that may cause anxiety.[5] A review of the literature found studies investigating levels of kinesiophobia, mobilization, and activities of daily living in patients with chest tubes after thoracic surgery. However, no studies were found that examined the relationship between kinesiophobia, mobilization, and ADLs in patients with chest tubes. There is a need to assess the levels of kinesiophobia, mobilization, and ADLs in patients with chest tubes after thoracic surgery. This study aimed to examine the relationship between kinesiophobia, activities of daily living, and mobility in patients with a chest tube following thoracic surgery.

Study Questions

1. What are the levels of kinesiophobia, mobility, and activities of daily living in patients with chest tubes following thoracic surgery?
2. What factors affect kinesiophobia, mobility, and activities of daily living in patients with chest tubes following thoracic surgery?
3. Is there a relationship between postoperative kinesiophobia, mobility, and activities of daily living in patients with chest tubes following thoracic surgery?

Materials and Methods

Sample and Study Design

This descriptive, correlational research was conducted in the thoracic surgery clinic of Dicle University Hospital between October 2024 and February 2025. All individuals who underwent thoracic surgery and chest tube thoracostomy during this period constituted the study population. Sample selection was performed using a haphazard non-probability method. To calculate the sample size, a power analysis using the G*Power 3.1 program (significance level of 0.05, medium effect size of 0.15, and representative power of 0.95) determined a target sample of at least 107 participants. A total of 123 patients were assessed for eligibility; 13 were excluded due to not meeting the inclusion criteria (n=8) or refusal to participate (n=5). A total of 110 patients completed the study. The flow diagram demonstrating participant eligibility and enrollment was created using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist (Fig. 1). At the end of the study, a post hoc power analysis using G*Power calculated the study power to be 1.00, with an effect size of 1.63, p=0.05, and a sample size of 110. These values indicate that the sample size was sufficient.[14]

The study included patients aged over 18 years who were oriented, had no hearing or vision problems, and had no difficulties with reading or writing in Turkish. Participants had undergone thoracic surgery and remained with a chest tube thoracostomy for 25–48 hours. Patients with neurological or psychiatric diagnoses affecting cognitive status and those who refused to participate were excluded.

Data Collection Tools

Data were collected by the researcher through two face-to-face interviews, one conducted 24 hours after surgery and the other after chest tube removal. A patient identification form, the Katz Activities of Daily Living Scale (Katz ADL), the Tampa Scale of Kinesiophobia (TSK), and the Patient Mobility Scale (PMS) were used for data collection.

Patient Identification Form

This form, developed by the researcher based on the literature, consists of 14 questions designed to collect data such as age, sex, education level, marital status, employment status, income level, smoking status, and surgical procedures performed.[2,13,15]

Katz Activities of Daily Living Scale

The scale was developed by Katz et al. to assess dependence and independence in basic ADLs. It consists of six basic ADLs: bathing, dressing, toileting, transferring, continence, and feeding. If ADLs are performed independently, three points are given; if they are performed with partial assistance, two points are given; and if they are not performed at all, one point is given. According to this scale, scores of 0–6 indicate dependence, 7–12 indicate semi-dependence, and 13-18 indicate independence. The Turkish validity and reliability study of the scale was conducted by Özkan Pehlivanoğlu et al.,[16] with a Cronbach's alpha reliability coefficient of 0.83.[2,13,16] In this study, the Cronbach alpha coefficient was 0.87.

Patient Mobility Scale

Developed to measure pain and difficulty after surgery, this scale asks patients to rate pain during four activities (turning in bed, sitting on the edge of the bed, standing at the bedside, and walking in the patient's room) using a visual scale (0–15 cm) and verbal expression. Scores increase in relation to the difficulty and pain experienced during each activity. Each item is scored from 0 to 15, and the total score ranges from 0 to 120. In the Turkish validity and reliability study, Cronbach's alpha coefficient of the PMS was found to be 0.90.[17] In this study, Cronbach's alpha coefficient was 0.95.

The Tampa Scale of Kinesiophobia

The TSK is a 17-item scale used to measure fear of movement/reinjury. It covers parameters related to injury and reinjury, as well as fear-avoidance in work-related activities. The scale uses a 4-point Likert format (1=strongly disagree, 4=strongly agree). Total scores range from 17 to 68 and are calculated by reversing items 4, 8, 12, and 16. Higher scores indicate greater levels of kinesiophobia. The original scale's intraclass correlation coefficient was 0.83, and Cronbach's α was 0.78; for the Turkish version, Cronbach's α was 0.75.[18] In this study, Cronbach's alpha coefficient was 0.91.

Data Collection

Study data were collected by the researcher between 09/09/2024 and 27/12/2024. Data were collected on weekdays between 16:00 and 17:00, with an average of two patients per day. The forms were completed in the thoracic surgery patient rooms and took approximately 15 minutes. The patient identification form was completed, and kinesiophobia, mobility, and ADLs were assessed 24 hours after surgery. No measurements were taken the day after chest tube removal; only length of hospital stay and time to chest tube removal were recorded.

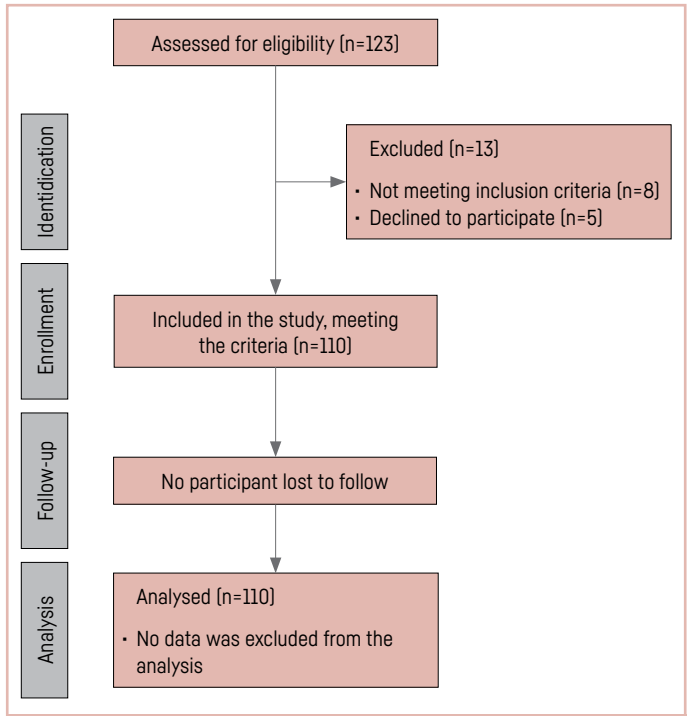

Figure 1. Flow diagram of study participants.

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Table 1. Sociodemographic and clinical characteristics of patients

Features	n=110	
	%	n
Marital status		
Single	17.3	19
Married	82.7	91
Gender		
Male	80.9	89
Female	19.1	21
Occupation		
Pensioner	21.8	24
Official	6.4	7
Farmer	2.7	3
Self-employed	23.6	26
Unemployed	30.9	34
Housewife	14.5	16
Income status		
Less than income	77.3	85
Equal to income	22.7	25
Over income	0	0
Education		
Illiterate	10.9	12
Literate	57.3	63
Elementary school	23.6	26
High school	8.2	9
Smoking status		
Yes	66.4	73
No	33.6	37
Presence of chronic disease		
Yes	37.3	41
No	62.7	69
Type of chronic disease		
Hypertension	11.8	13
Diabetes mellitus	4.5	5
Hypertension+diabetes mellitus	5.5	6
COPD	7.3	8
Heart disease	8.2	9

Features	n=110	
	%	n
Previous surgeries		
Yes	40.9	45
No	59.1	65
Clinic of previous surgery		
General surgery	10.0	11
Orthopedic surgery	6.4	7
Cardiovascular surgery	10.9	10
Eye surgery	5.5	6
Thoracic surgery	4.5	5
Urology surgery	5.5	6
Type of surgery performed		
Lobectomy	15.5	17
Wedge resection	9.1	10
Mass excision	18.2	20
Bullectomy	11.8	13
Pleurodesis	2.7	3
Pneumonectomy	10.9	12
Decortication	5.5	6
Cystidatic-capitonnage	7.3	8
Diaphragm repair	10.9	12
Segmentectomy	8.2	9

	Mean±SD (max-min)
Age	50.30±19.64 (18–76)
Cigarette use (years)	27.01±15.64 (2–50)
Daily mobilization	6.09±2.72 (2–15)
Length of hospital stay (days)	6.33±3.84 (3–16)
Time to chest tube removal (days)	6.17±2.44 (3–14)
Katz ADL score	13.30±2.33 (8–18)
TSK score	60.58±15.19 (17–68)
PMS score	84.32±29.51 (12–120)

Katz ADL: Katz activities of daily living scale, TSK: Tampa scale of kinesiophobia, PMS: Patient mobility scale, COPD: Chronic obstructive pulmonary disease.

Statistical Analysis of Data

The research data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Data distribution was assessed using the Kolmogorov–Smirnov test. Descriptive statistics (means, numbers, percentages, standard deviations) were used. The Student's t-test and one-way analysis of variance (ANOVA) were used to compare independent variables. The Pearson correlation test was used to analyze relationships. Multiple linear regression analyses were used to estimate associations between categorical or continuous variables. Statistical significance was accepted as $p<0.05$.

Ethical Considerations

To conduct the research, ethical approval was obtained from Mardin Artuklu University Non-interventional Clinical Research Ethics Committee (Approval Number: 2024/8-27, Date: 06.08.2024). Permission for the clinical study was also obtained from Dicle University Hospital (decision no. E-22040584-900-769981; 06/09/2024). Participants were informed about the study's purpose, duration, and scope, and written informed consent was obtained, with an explanation that participation was voluntary. The study was conducted in accordance with the Helsinki Declaration.

Results

The study found that most patients (82.7%) were married, male (80.9%), and unemployed (30.9%). Many patients reported an income below their expenses (77.3%), and a substantial proportion were elementary school graduates (66.4%). A large percentage of patients were smokers (66.4%), and over one-third had a chronic disease (37.3%). Many patients had a history of surgery (40.9%), with some having undergone general surgery (10.0%) and others having hypertension in addition to the disease for which they underwent surgery (11.8%). The average age of the patients was 50.30±19.64 years. The mean length of hospital stay was 6.33±3.84 days, the mean number of daily mobilizations was 6.09±2.72, and the mean time to chest tube removal was 6.17±2.44 days. The mean Katz ADL score was 13.30±2.33, the mean TSK score was 60.58±15.19, and the mean Patient Mobility Scale score was 84.32±29.51 (Table 1).

Multiple linear regression analysis was performed using daily mobilization, time to chest tube removal, total kinesiophobia scale score, and total Patient Mobility Scale score as independent variables to evaluate activities of daily living in patients who underwent thoracic surgery. The regression model was found to be statistically sig-

Table 2. Predictors of katz activities of daily living (ADL) in patients

Variables	B	SE	β	t	p
TSK score	-0.08	0.01	-0.55	-5.21	0.00**
PMS score	-0.02	0.00	-0.26	-2.50	0.01*
Daily mobilization	0.05	0.05	0.06	1.15	0.25
Time to chest tube removal (days)	0.03	0.05	0.03	0.57	0.56
	R=0.80	R^2=0.62	F=46.84	p=0.00***	Durbin-Watson=1.42

*: p<0.05, **: p<0.01, ***: p<0.001. Katz ADL: Katz activities of daily living scale, TSK: Tampa scale of kinesiophobia, PMS: Patient mobility scale, B: Regression coefficient, SE: Standard error.

nificant and appropriate for use (F=46.84, p<0.001). In the model, t-test results for the regression coefficients showed that as participants' kinesiophobia levels (t=-5.21, p<0.01) and PMS levels (t=-2.50, p<0.05) decreased, their ADL level increased. The scale scores and variables explained 6.2% of the total variance (Table 2).

Analysis of continuous variables and total scale scores revealed a strong, statistically significant negative relationship between ADL and TSK (r=-0.78, p<0.01), and a strong, statistically significant negative relationship between PMS and ADL (r=-0.73, p<0.01). PMS and TSK also showed a strong, statistically significant positive relationship (r=0.82, p<0.01). Daily mobilization demonstrated a very weak but statistically significant positive relationship (r=0.17, p<0.05) (Table 3).

Table 3. Relationships between kinesiophobia, patient mobility, and activities of daily living in patients (n=110)

Variables	1	2	3	4	5
Katz ADL score					
TSK score	-0.78**				
PMS score	-0.73**	0.82**			
Daily mobilization	0.17*	-0.14	-0.09		
Time to chest tube removal (days)	0.04	0.03	-0.09	0.06	

*: p<0.05, **: p<0.01. Katz ADL: Katz activities of daily living scale, TSK: Tampa scale of kinesiophobia, PMS: Patient mobility scale.

Discussion

Kinesiophobia, or fear of movement due to anticipated pain or injury, is a significant psychological barrier that interferes with activities of daily living for many patients who have undergone thoracic surgery and had a chest tube placed. These patients typically experience substantial physical discomfort and may be afraid to move for fear that movement will worsen their condition or cause pain. This fear can lead to reduced mobility, which is crucial for recovery.[5,7,8] Previous studies have reported that the presence of chest tubes causes anxiety and discomfort in patients, and that pain, especially during movement and coughing, leads to restricted movement.[10]

In this study kinesiophobia, patient mobility, activities of daily living, and influencing factors were examined in patients undergoing chest tube thoracotomy. The average TSK total score was 60.58±15.19, with scores above 37 indicating high levels of kinesiophobia.[18] Accordingly, our findings indicate that patients with chest tubes experience high levels of kinesiophobia. In the study by Tunca Yılmaz et al.[19] examining the test-retest reliability of the Turkish version of the TSK, the mean score was 41.54±6.96. Possible reasons for the high levels of kinesiophobia include the belief that pain will worsen with movement. In addition, anxiety and discomfort caused by chest tubes, as well as fear of damaging or re-injuring the surgical site, may cause patients to avoid movements that require muscle strength.

In the present study, patients demonstrated a relatively high level of mobility according to the mobility scale. Similarly, another study reported a mean postoperative Patient Mobility Scale score of 59.18.[20] Despite mobility levels being above average in both studies, it was concluded that patients experienced increased pain and difficulty with movement. Several studies in the literature have shown that patients experience varying levels of difficulty with movement in the early postoperative period.[17,21,22] In a study by Yolcu et al.[21] involving 80 individuals, the mean Patient Mobility Scale score was found to be 27.64±7.34. It is possible that this difference is due to the fact that the participants in the study belonged to multiple groups, including orthopedic, cardiovascular, and general surgery patients, as opposed to a single group of patients with chest tubes in this study. A study examining the effect of mobilization training on postoperative mobilization in patients undergoing lumbar disc surgery found median mobilization levels of 41 and 50 in the experimental and control groups, respectively.[17] Sivrikaya et al.[22] separately assessed patients undergoing open-heart surgery in terms of turning from side to side in bed, sitting at the edge of the bed, standing at the bedside, and walking in the patient room, and found that patients experienced moderate difficulty. Although these two studies did not examine total scale scores, their findings support the results of the present study.

In this study, patients were assessed as independent in terms of activities of daily living based on the total ADL score. Although no studies specifically examining thoracic surgery patients were found in the literature, one study reported that a large proportion of patients who underwent surgery experienced difficulties in performing activities of daily living in the postoperative period.[12] Yaman Çelik and Durmaz Edeer concluded that 100% of patients undergoing thoracostomy after thoracic surgery were able to perform continence-related ADLs independently, 89.2% feeding, 64.6% toileting, 48.5% transferring, and 49.2% bathing.[2] Their study evaluated patient independence based on the ADL scale. However, it did not report a mean score. Despite its percentage-based, proportional approach, the high level of independence in activities of daily living is similar to the findings of this study.

In a study of patients who had undergone total hip and total knee arthroplasty, the mean ADL score was 12.60±3.21, indicating that these patients were partially dependent on their activities.[23] In a study conducted by Koç et al.[24] in 2012, which investigated the level of independence of orthopedic patients, it was found that patients had a high level of dependence. Based on these results, it was observed that the mobilization status was impaired or insufficient in major surgeries that may affect activities of daily living.

Our findings indicate that the PMS was a significant predictor for ADLs in patients with chest tubes. A strong negative correlation was observed between total ADL scores and PMS scores, indicating a negative association between ADL and PMS. This finding suggests that pain and difficulty experienced during movement increase as patients reach a higher level of independence in ADLs. A review of the literature did not identify studies that assessed both mobility and activities of daily living in patients after thoracic surgery. However, studies involving chest tubes in thoracic surgery have shown that early postoperative mobilization, particularly within the Enhanced Recovery After Surgery (ERAS) protocol, and increased physical activity have significant positive effects on respiratory function and recovery speed. The findings of this study therefore support the importance of mobility in performing activities of daily living.[25,26] According to the ERAS protocol, thoracic surgery patients who receive effective pain management and begin mobilization within 24 hours experience fewer postoperative complications and recover more quickly.[8,27] Consequently, it is thought that the return to activities of daily living is faster because patients experience less pain after surgery and begin mobilizing earlier.

In addition, the findings revealed that in patients with chest tubes, kinesiophobia was the primary predictor of ADLs. A strong negative correlation was observed between total ADL scores and TSK, indicating a negative association between ADL and kinesiophobia. This study shows that increased kinesiophobia associated with the presence of chest tubes makes it more difficult for patients to perform activities of daily living during movement. This may be due to concerns about possible com-

plications, such as falling or dislocating the chest tube while performing activities or moving. Previous studies have shown that fear of movement and concern about damaging the surgical site after spinal surgery affect patients' fear of falling. Kinesiophobia has been found to increase fear of falling in patients who have undergone spinal surgery, and these patients are often reluctant to move during the early recovery period due to fear of falling.[20] This study is, to our knowledge, the first in the literature to investigate the relationship between levels of kinesiophobia and ADLs in postoperative patients with chest tubes.

Study Limitations

Despite the significant findings of the study, there are some limitations. Firstly, the study sample consisted of patients who underwent surgery in the thoracic surgery clinic of only one hospital. The results of this single-center study may have limited generalizability to the wider patient population. Second, the study focused only on early postoperative effects and did not evaluate long-term outcomes, such as rehospitalization, or examine relationships between variables. Third, data were collected through patient self-reports and researcher observations, which may have led to bias or incomplete information, potentially affecting the study's results. The study can account only for accurately measured variables or characteristics and cannot control for bias due to unmeasured confounding factors.

Conclusion

The findings of this study indicated that kinesiophobia and decreased mobility were significantly associated with reduced independence in ADLs in patients with chest tubes following thoracic surgery. These results suggest that fear of movement and functional mobility limitations should be considered important components of nursing assessment and care planning for this patient population. Although causal relationships cannot be established due to the correlational design of the study, the strong associations observed highlight the clinical relevance of systematically evaluating levels of kinesiophobia, mobility, and ADLs in the postoperative period. From a nursing perspective, these findings underscore the importance of closely monitoring patients' movement-related fears and functional status and integrating these factors into individualized care plans. Nurses may play a key role in identifying patients at risk for functional dependence and in supporting care strategies aimed at promoting safe mobilization and maintaining independence in ADLs. In this context, surgical nurses are encouraged to consider incorporating psychoeducational and supportive approaches targeting kinesiophobia and mobility into routine postoperative care and follow-up. Future longitudinal and multicenter studies with larger samples are recommended to further examine nursing approaches aimed at reducing kinesiophobia and enhancing mobility, and to investigate their associations with functional recovery, quality of life, and post-discharge outcomes. In addition, qualitative studies exploring patients' experiences of kinesiophobia related to chest tubes may provide deeper insight into their perceptions and needs and help guide the development of patient-centered nursing interventions.

Ethics Committee Approval: The study was approved by the Mardin Artuklu University Non-interventional Clinical Research Ethics Committee (Approval Number: 2024/8-27, Date: 06.08.2024).

Informed Consent: Written informed consent was obtained from the participants.

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The Relationship Between Nursing Students' Medical Error Tendencies and Their Evidence-based Nursing Competencies: An Analytical Cross-sectional Study

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Abstract

Background: Medical errors are a common problem in healthcare services and represent a risk that nursing students may encounter during their training. Evidence-based nursing may contribute to the prevention or reduction of medical errors by supporting clinical decisions based on the best available evidence.

Aim: The purpose of this study was to examine the relationship between nursing students' evidence-based practices and medical error tendencies.

Methods: This analytical cross-sectional study was conducted with 290 nursing students. Data were collected between February and April 2025 using the Sociodemographic Characteristics Form, the Medical Error Scale, and the Knowledge, Attitudes, and Behaviors Scale on Evidence-Based Nursing. Pearson correlation and multiple linear regression tests were used for data analysis.

Results: Most of the nursing students were female, in their fourth year, and had a GPA (Grade Point Average) between 3.00 and 3.50. The mean total Medical Error Scale score was 157.76±17.83. The mean scores for evidence-based nursing knowledge, attitude, future use, and practice were 24.60±3.65, 22.06±6.66, 39.99±5.28, and 14.73±5.10, respectively. Higher evidence-based practice scores (β=0.24, p<0.001), second-year student status (β=0.29, p=0.029), and having internship experience in surgical clinics (β=0.12, p=0.039) significantly predicted greater medical error awareness.

Conclusion: Nursing students were cautious about medical errors, and their knowledge, attitude, and future use levels regarding evidence-based nursing were good. Nursing students with higher evidence-based practice competencies, those in their second year of study, and those with internship experience in surgical clinics demonstrated greater awareness of medical errors.

Keywords: Evidence-based practice, medical errors, nursing education, nursing

Introduction

"Primum non nocere – first, do no harm" is the basis of all healthcare services. However, today, one in ten patients receiving healthcare is harmed for various reasons, and more than three million people die annually due to unsafe care practices.[1] The main types of medical errors include medication errors, surgical errors, diagnostic and treatment errors, falls, and nosocomial infections.[2] Nursing students, who will be responsible for patient care in the future, provide care to patients during their clinical practice. This responsibility carries the potential for nursing students to commit medical errors, which poses a significant risk to patient safety. The prevalence of medication errors made by nursing students during clinical practice ranges from 6% to 1.1%.[3]

With the vision of a world in which nobody is harmed in healthcare and every patient receives safe and respectful care at any time and in any place, the World Health Organization (WHO) aims to achieve the greatest possible reduction in preventable harm worldwide. However, WHO reports highlight many barriers to ensuring that patient safety is a key component of education and training programs.[4] These barriers include an inadequate curriculum, insufficient stakeholder involvement, weaknesses in educational coordination and planning, and limited leadership interest. The report also indicates that insufficient senior medical and nursing "champions" are among the barriers to preventing medical errors.[4] It is important that nursing students are equipped with nursing practices aimed at preventing medical errors. In this context, students are expected to demonstrate evidence-based nursing skills.[5] The literature indicates that nursing students' knowledge, attitudes, application, and future use of evidence-based nursing practices vary, ranging from good to low.[6–10]

In the literature, studies examining both nursing students' tendencies toward medical errors and their evidence-based nursing (EBN) competencies are quite limited. In a study conducted by Xu et al.,[11] it was determined that nursing students with a high level of competence in patient safety showed greater participation in evidence-based nursing education. Similarly, in a root cause analysis of maternal deaths conducted by Madzimbamuto et al.,[12] it was found that 67% of deaths were related to a lack of knowledge and 53% to failure to implement recommended practices. In light of these findings, it is emphasized that education for

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undergraduate and postgraduate medical, midwifery, and nursing students should be strengthened, and that compliance with evidence-based practices and clinical protocols should be prioritized.

In this context, it is important to examine the relationship between nursing students' knowledge of, attitudes toward, and behaviors regarding evidence-based practices and their potential to commit medical errors in order to identify areas of risk in terms of patient safety. Determining the relationship between nursing students' medical errors and their knowledge, attitudes, and behaviors regarding evidence-based nursing can reveal educational needs and risky areas, thereby reducing students' susceptibility to medical errors and improving patient safety and the provision of quality care. At the same time, this may contribute to the development of strategies to reduce the risk of medical errors through the adoption of evidence-based practices. Understanding this relationship may emphasize the importance of evidence-based practices in nursing education and improve students' ability to provide safe care. Therefore, this study aimed to determine the relationship between nursing students' evidence-based practice competencies and their medical error tendencies.

Study Questions

1. What are nursing students' tendencies to make medical errors?
2. What are the levels of nursing students' knowledge, attitudes, and behaviors regarding evidence-based nursing?
3. What factors predict nursing students' tendencies to make medical errors?

Materials and Methods

Design and Setting

The present study employed an analytical cross-sectional study design. The study was reported according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) checklist.[13] Data were collected from second-, third-, and fourth-year nursing students enrolled in the Faculty of Health Sciences at a state university.

Population and Sample

The study population consisted of 452 students. Using a sampling method for a known population, a minimum sample size of 208 was determined with a 95% confidence interval. The study was completed with 290 participants, representing 64.16% of the total population. The inclusion criteria were: (1) being second-, third-, and fourth-year nursing students and (2) willingness to participate voluntarily. First-year students were excluded from the study because they do not yet have any clinical practice experience.

Data Collection Tools

The Sociodemographic Characteristics Form, the Medical Error Scale, and the Scale of Knowledge, Attitudes, and Behaviors in Evidence-Based Nursing were used to collect the research data.

Sociodemographic Characteristics Form

This form was prepared by the researchers in accordance with the relevant literature.[14–16] The form includes 13 questions related to students' gender, age, class, academic average, medical error encounter status, and experiences related to evidence-based practices.

Medical Error Scale

The scale was developed by Kahriman and Ozturk[17] to determine whether student nurses perform patient care safely during clinical practice, whether they commit malpractice or medical errors, and whether they exercise caution regarding medical errors. The scale consists of 36 items and seven subscales: Falls, Blood and Blood Transfusion, Patient Transfer, Drug Administration, Communication, Infections, and Care Practices. The scale is a 5-point Likert-type scale, rated as always (5), usually (4), sometimes (3), rarely (2), and never (1). The total score range of the scale is 36–180. Scores closer to 180 than to 108 indicate that student nurses are controlled or cautious regarding medical errors, while scores closer to 36 than to 108 indicate that student nurses may not be controlled regarding medical errors. The total Cronbach's alpha value of the scale was 0.94, and Cronbach's alpha values for the subscales ranged between 0.71 and 0.91. In this study, the total Cronbach's alpha value was 0.94, and Cronbach's alpha values for the subscales ranged between 0.77 and 0.92.

Knowledge, Attitudes, and Behaviors in Evidence-based Nursing

This scale was developed by Johnston et al.[18] to determine the knowledge, attitudes, and behaviors of medical students at the University of Hong Kong regarding evidence-based practice. In the USA, Brown et al.[19] adapted the scale for nursing students. The reliability and validity study of the scale in our country was conducted by Karayağız Muslu et al.[16] The Likert-type scale consists of 26 items and four subdimensions: "knowledge," "attitude," "future use," and "practice." The "knowledge" and "attitude" sub-dimensions are scored on a six-point Likert scale ranging from Strongly Agree (6) to Strongly Disagree (1). The "practice" sub-dimension is scored on a five-point Likert scale ranging from never (1) to every day (5). Cronbach's alpha values of the "knowledge," "attitude," "future use," and "practice" sub-dimensions of the scale were found to be 0.70, 0.60, 0.80, and 0.77, respectively. In this study, Cronbach's alpha values for the "knowledge," "attitude," "future use," and "practice" sub-dimensions were 0.84, 0.82, 0.76, and 0.86, respectively.

Data Collection

Data were collected between February and April 2025 by the researchers through face-to-face interactions with participants who met the inclusion criteria. The researchers first visited classrooms to provide information about the study. Questionnaire forms were distributed to students who consented to participate, and the completed forms were subsequently collected from the students. Data collection from one participant took approximately 15–20 minutes.

Data Analysis

The data were analyzed using SPSS 22.0 (IBM Corp., Armonk, New York, USA). Descriptive statistics, including number, percentage, mean, and standard deviation, were calculated. Relationships between scale scores were evaluated using Pearson correlation analysis. Multiple linear regression analysis was employed to explore associations between independent and dependent variables. Assessment of multicollinearity among independent variables revealed variance inflation factor (VIF) values ranging from 1.05 to 5.41, indicating the absence of multicollinearity. A significance level of $p<0.05$ was considered statistically significant.

Ethical Consideration

Before starting the study, ethical approval was obtained from the Burdur Mehmet Akif Ersoy University Non-interventional Clinical Research Ethics Committee (Approval Number: GO 2025/992, Date: 08.01.2025). Institutional permission was obtained from the university where the research was conducted. Consent was obtained from students who agreed to participate in the study. The study was conducted in full compliance with the ethical principles set forth in the Declaration of Helsinki.

Results

The mean age of the nursing students was 21.46 years (standard deviation [SD]=2.09). Most were female (73.4%), in their fourth year (35.5%), and had a GPA (Grade Point Average) between 3.00 and 3.50 (46.6%). When asked about medical error encounters, 68.6% of the nursing students reported no experience, while 31.4% had encountered at least one medical error. The most commonly encountered medical error types were communication (14.8%), medication (14.5%), and infection-related errors (11.7%). Among the nursing students, 45.5% stated that they had received EBN training, and 72.8% believed that EBN could reduce medical errors. In terms of educational resources, lecture notes (82.1%), textbooks (66.2%), and research articles (55.2%) were the most frequently used. Interestingly, 52.8% of the nursing students reported using artificial intelligence as a resource, followed by internet resources (44.5%) and social media (38.3%). Scientific databases such as PubMed (12.4%) and Cochrane (1.0%) were less commonly used. The primary purposes for using evidence were patient care (74.8%), research (62.8%), and assignments (55.9%) (Table 1).

The mean Medical Error Scale (MES) total score of the nursing students was 157.76±17.83 (min-max: 106–180). The mean scores for Care Practices, Medication Administration, Blood and Blood Product Transfusion, Patient Transfer, Falls, Infection, and Communication were 13.89±1.54, 20.69±3.57, 27.66±3.92, 20.79±4.13,

Table 1. Characteristics of nursing students (n=290)

Variables	n	%	Variables	n	%
Age, years (mean±SD)	21.46±2.09		Surgery	8	2.8
Gender			Transfer	6	2.1
Female	213	73.4	Falls	6	2.1
Male	77	26.6	Transfusion	5	1.7
Academic year			Other interventions**	4	1.4
Second	90	31.0	Received training on evidence-based nursing		
Third	97	33.5	Yes	132	45.5
Fourth	103	35.5	No	158	54.5
Grade point average			Do you think evidence-based nursing can reduce medical errors?		
<3.00	88	30.3	Yes	211	72.8
3.00–3.50	135	46.6	No	6	2.1
≥3.50	67	23.1	Unsure	73	25.1
Clinic where internship was completed			Resources used in nursing education*		
Internal medicine	230	79.3	Lecture notes	238	82.1
Surgery	240	82.8	Textbooks	192	66.2
Pediatrics	122	42.1	Research articles	160	55.2
Operating room	77	26.6	Artificial intelligence	153	52.8
Intensive care unit	147	50.7	Internet resources	129	44.5
Emergency department	150	51.7	Social media	111	38.3
Number of medical error encounters			PubMed	36	12.4
0	199	68.6	Cochrane	3	1.0
1	28	9.7	Difficulty accessing evidence		
2	29	10.0	Yes	37	12.8
3	34	11.7	No	253	87.2
Type of medical error encountered*			Purpose of using evidence*		
Communication	43	14.8	Patient care	217	74.8
Medication	42	14.5	Research	182	62.8
Infection	34	11.7	Assignments	162	55.9
Documentation	10	3.4			

*: Percentages were calculated based on the total sample (n). Participants were allowed to provide multiple responses; therefore, the total percentage does not necessarily sum to 100%, **: Laryngoscope use, electrocardiogram (ECG) measurement, and invasive procedures. SD: Standard deviation.

34.05±5.24, 18.54±2.20, 22.14±3.55, and 157.76±17.83, respectively. In addition, the mean scores for EBN Knowledge, Attitude, Future Use, and Practice were 24.60±3.65, 22.06±6.66, 39.99±5.28, and 14.73±5.10, respectively (Table 2).

Upon examining the correlation between EBN and MES scores, a positive correlation was found between EBN Knowledge (r=0.20, p=0.001) and EBN Future Use (r=0.21, p<0.001) and MES total scores (Table 3).

A multiple linear regression analysis was conducted to identify predictors of nursing students' tendency to make medical errors. The model was statistically significant (F=2.36, p=0.002) and explained 13% of the variance. The results indicated that being a second-year student (β=0.32, p=0.029), having an internship in a surgical clinic (β=0.12, p=0.046), and having a higher level of evidence-based knowledge (β=0.14, p=0.047) were positive predictors of awareness of medical errors. As nursing students progress to the second year of their education, their awareness of medical errors increases considerably compared to those in the third and fourth years. Having experience in surgical clinics and higher levels of evidence-based nursing knowledge are also associated with a significant positive increase in awareness of medical errors (Table 4).

Discussion

Medical errors are a critical issue in healthcare services, as they can compromise patient safety and have serious consequences. It is crucial to understand the circumstances in which nursing students encounter these errors in order to develop effective prevention and education strategies. In this study, nearly one-third of nursing students

Table 2. Mean scores of the evidence-based nursing scale and medical error scale (n=290)

	Min	Max	Available min-max	Mean±SD
Medical error scale				
Care practices	8	15	3-15	13.89±1.54
Medication administration	8	25	5–25	20.69±3.57
Blood and blood product transfusion	6	30	6–30	27.66±3.92
Patient transfer	5	25	5–25	20.79±4.13
Falls	14	40	8–40	34.05±5.24
Infection	8	20	4–20	18.54±2.20
Communication	7	25	5–25	22.14±3.55
Total	106	180	36–180	157.76±17.83
Evidence-based nursing scale				
Knowledge	10	30	5–30	24.60±3.65
Attitude	6	36	6–36	22.06±6.66
Future use	24	54	9–54	39.99±5.28
Practice	4	30	6–30	14.73±5.10

Min: Minimum, Max: Maximum, SD: Standard deviation

Table 3. Correlations between total and subscale scores of the evidence-based nursing scale and medical error scale (n=290)

	EBN knowledge	EBN attitude	EBN future use	EBN practice	MES care practices	MES medication administration	MES blood and blood product transfusion	MES patient transfer	MES falls	MES infection	MES communication	MES total
EBN knowledge	–											
EBN attitude	r=-0.03	–										
	p=0.654											
EBN future use	**r=0.56**	r=-0.09	–									
	p<0.001	p=0.109										
EBN practice	r=0.01	**r=-0.40**	**r=0.17**	–								
	p=0.852	**p<0.001**	**p=0.004**									
MES care practices	**r=0.23**	r=0.05	**r=0.23**	r=0.05	–							
	p<0.001	p=0.419	**p<0.001**	p=0.420								
MES medication administration	r=0.10	r=-0.06	**r=0.14**	**r=0.19**	**r=0.53**	–						
	p=0.095	p=0.287	**p=0.020**	**p=0.001**	**p<0.001**							
MES blood and blood product transfusion	**r=0.19**	r=0.03	**r=0.13**	r=0.00	**r=0.47**	**r=0.43**	–					
	p=0.001	p=0.594	**p=0.034**	p=0.949	**p<0.001**	**p<0.001**						
MES patient transfer	**r=0.16**	r=-0.05	**r=0.14**	**r=0.17**	**r=0.43**	**r=0.49**	**r=0.42**	–				
	p=0.006	p=0.397	**p=0.020**	**p=0.003**	**p<0.001**	**p<0.001**	**p<0.001**					
MES falls	r=0.09	r=-0.07	**r=0.17**	**r=0.13**	**r=0.42**	**r=0.51**	**r=0.38**	**r=0.53**	–			
	p=0.141	p=0.234	**p=0.004**	**p=0.031**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**				
MES infection	**r=0.18**	**r=0.17**	**r=0.20**	r=-0.08	**r=0.43**	**r=0.42**	**r=0.48**	**r=0.28**	**r=0.46**	–		
	p=0.002	**p=0.004**	**p=0.001**	p=0.161	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**			
MES communication	**r=0.18**	r=0.08	**r=0.15**	r=0.02	**r=0.45**	**r=0.39**	**r=0.49**	**r=0.52**	**r=0.56**	**r=0.42**	–	
	p=0.003	p=0.156	**p=0.013**	p=0.715	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**		
MES total	**r=0.20**	r=0.00	**r=0.21**	r=0.12	**r=0.66**	**r=0.74**	**r=0.71**	**r=0.75**	**r=0.81**	**r=0.63**	**r=0.76**	–
	p=0.001	p=0.948	**p<0.001**	p=0.050	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	**p<0.001**	

r: Pearson correlation coefficient, MES: Medical error scale, EBN: Evidence-based nursing scale.

Table 4. Multiple linear regression analysis results for the medical error scale (n=290)

Variables	B	SE	β	t	p	VIF
Constant	82.550	18.931		4.361	0.000	
Age, years	0.353	0.541	0.041	0.653	0.514	1.258
Grade point average	1.030	2.457	0.026	0.419	0.675	1.186
EBN scale						
Knowledge	0.700	0.350	0.143	1.999	**0.047**	1.604
Attitude	0.107	0.171	0.040	0.628	0.531	1.274
Future use	0.460	0.242	0.136	1.902	0.058	1.600
Practice	0.422	0.229	0.120	1.840	0.067	1.333
Gender						
Female	4.690	2.485	0.116	1.887	0.060	1.190
Academic year						
Second year	12.305	5.110	0.319	2.408	**0.017**	5.489
Third year	7.113	4.219	0.189	1.686	0.093	3.916
Internship in internal medicine clinic						
Yes	3.484	2.805	0.079	1.242	0.215	1.277
Internship in surgical clinic						
Yes	5.592	2.790	0.120	2.004	**0.046**	1.116
Internship in pediatrics						
Yes	5.637	3.274	0.156	1.722	0.086	2.579
Internship in operating room						
Yes	-4.420	3.246	-0.110	-1.362	0.174	2.032
Internship in intensive care unit						
Yes	-1.779	2.534	-0.050	-0.702	0.483	1.583
Internship in emergency department						
Yes	4.116	2.942	0.116	1.399	0.163	2.132
Encountered a medical error						
Yes	-2.211	2.260	-0.058	-0.978	0.329	1.087
Received training on evidence-based nursing						
Yes	2.806	2.115	0.079	1.327	0.186	1.095
Difficulty accessing evidence						
Yes	0.774	3.072	0.015	0.252	0.801	1.039

B: Unstandardized beta coefficients, SE: Standard error, β: Standardized beta coefficients, R^2=0.13, Adjusted R^2=0.08, F=2.365, p=0.002, Durbin-Watson test=1.601.

reported encountering medical errors. The most frequently encountered medical errors were communication, medication administration, and infection-related errors. In Türkiye, the rate of medical errors encountered by nursing students during clinical practice ranges from 33.3% to 63.6%.[20–25] The most common types of medical errors encountered during clinical practice were nosocomial infections, medication administration, communication errors, and needle-stick injuries.[20–24] These findings indicate that nursing students are at high risk of encountering medical errors during clinical practice, and that preventive education and supervision should be strengthened, particularly in the areas of communication, medication administration, and infection control.

This study found that nursing students were cautious about medical errors. Similarly, other studies in the literature have reported that nursing students generally have a low tendency to commit medical errors.[23,25–27] In contrast, Sakallı,[21] found that nursing students had low levels of attention to medical errors and were more prone to making mistakes. In this context, the findings of our study are largely consistent with the existing literature. Our results suggest that the students in our sample have a high level of awareness regarding patient safety.

In the present study, being a second-year student was found to be a significant predictor of higher awareness of medical errors. Although Yeşilyurt et al.'s study[23] showed that fourth-year nursing students were more attentive, the majority of studies in the literature indicate that second-year nursing students are more aware of medical errors.[28–30] This supports our findings. This can be explained by the fact that, in the early stages of clinical practice, second-year nursing students approach patient safety issues with greater care and sensitivity. However, as nursing students progress to the third and fourth years, their clinical training intensifies and they begin to specialize in their chosen fields, spending more time in healthcare settings. During this period, nursing students interact closely with clinical nurses and become increasingly influenced by the norms and routines of clinical practice. Indeed, it has been reported that nursing students perceive clinical nurses as stronger role models than academic nurses.[31,32] A study conducted in Türkiye showed that nurses have low levels of patient safety culture.[33] Therefore, as nursing students begin to adopt the attitudes and behaviors of their professional role models in clinical settings, their perceptions of medical errors may change over time. During this transition period, sensitivity to potential errors may decrease, or risky practices observed in routine care may become normalized. Consequently, these findings emphasize the importance of continuously reinforcing patient safety and medical error awareness education in the later stages of nursing education.

Another important predictor of higher awareness of medical errors is nursing students' placement in surgical clinics. The high-risk and fast-paced nature of these environments, where mistakes can lead to immediate and serious consequences, helps explain this finding.[34] Nursing students in surgical settings face complex procedures, multidisciplinary teamwork, and strict aseptic techniques, which increase their sensitivity to patient safety issues.[35] Surgical clinics also emphasize precision, communication, and responsibility, further strengthening nursing students' awareness of potential errors.[34] Therefore, internship experiences in surgical clinics may help nursing students better understand safe care principles and reinforce the importance of preventing medical errors.

This study revealed that higher levels of evidence-based knowledge were also significant predictors of greater awareness of medical errors. Additionally, nursing students who received education on evidence-based nursing demonstrated significantly higher awareness of medical errors. A positive correlation was also found between students' overall EBN knowledge and future use scores and their total Medical Error Scale score. Evidence-based practice aims to use the most current and strong evidence carefully in patient care.[36] Similarly, Azami et al.[37] reported a positive relationship between evidence-based nursing and nurses' knowledge and attitudes toward medical errors; however, since their study was conducted with practicing nurses rather than students, the findings may differ slightly from those of the present study. These results highlight the importance of strengthening nursing students' evidence-based practice competencies to help minimize the occurrence of medical errors.

In the current study, students' knowledge, attitude, and future use of EBN were found to be at a good level on average, while EBN practice was at a moderate level. Previous studies have similarly reported that nursing students' knowledge and future use scores for EBN were high,[6,10,38] attitude scores were medium to high,[6,10,38] and practice scores were medium to low.[6,10,38] While our findings are generally consistent with the literature, they also suggest that although nursing students have sufficient knowledge and positive attitudes toward EBN, they face difficulties in translating this knowledge into practice. In addition, Taş Arslan et al.[39] reported that most undergraduate nursing curricula do not include EBN courses. This finding is concerning, especially since the Nursing Regulation states that nursing care should be planned, implemented, evaluated, and supervised based on evidence.[40] Therefore, to ensure patient safety and deliver quality care, it is essential to implement evidence-based practices in clinical settings and to structure nursing education programs that incorporate evidence-based approaches.

Strengthens and Limitations

The data in this study were collected using validated and reliable instruments. The analytical cross-sectional design enabled the identification of relationships between key factors associated with students' tendencies toward medical errors. Despite these strengths, several limitations should be considered. First, the use of self-reported questionnaires may have introduced response bias, as students might have over- or underreported their medical error tendencies and evidence-based nursing competencies. Second, the study was conducted in a single nursing department, which may limit the generalizability of the findings to other nursing schools or regions.

Conclusion

The findings of this study indicate that nursing students generally exhibit controlled and cautious behaviors regarding medical errors. Although students demonstrated good levels of EBN knowledge, attitude, and future use, their practice levels remained moderate. Higher evidence-based practice knowledge, being a second-year student, and having internship experience in surgical settings significantly predicted greater awareness of medical errors. Therefore, it is essential to strengthen the integration of evidence-based practices within nursing education, particularly by enhancing educational strategies that foster the translation of evidence into clinical decision-making and practice.

Ethics Committee Approval: The study was approved by the Burdur Mehmet Akif Ersoy University Non-interventional Clinical Research Ethics Committee (Approval Number: 2025/992, Date: 08.01.2025).

Informed Consent: Participants were informed about the study's purpose, and verbal consent was obtained.

Conflict of Interest: The authors have no conflicts of interest to declare.

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Psychometric Evaluation of the Turkish Version of the Student Perception of Effective Teaching in Clinical Simulation Scale

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Abstract

Background: Clinical simulation is essential in nursing education for enhancing students' clinical reasoning and decision-making, and reliable, culturally adapted tools are needed to assess their perceptions.

Aim: This study examined the validity and reliability of the Turkish version of the Student Perception of Effective Teaching in Clinical Simulation Scale (SPETCS), which evaluates nursing students' views on effective teaching in clinical simulations.

Methods: A cross-sectional study was conducted in a single institution with 173 nursing students. Analyses included content and construct validity, reliability, and stability. Construct validity was examined using Confirmatory Factor Analysis (CFA), and model fit was evaluated using conventional thresholds (χ^2/df<3, Root Mean Square Error of Approximation [RMSEA]≤0.08, Comparative Fit Index [CFI]≥0.90, Standardized Root Mean Square Residual [SRMR]≤0.08).

Results: The scale achieved a Content Validity Index (CVI) of 1.00. Confirmatory Factor Analysis confirmed the original two-factor structure of the Importance subscale (33 items), with factor loadings ranging from 0.462 to 0.800, while the Extent of Agreement subscale retained its unidimensional structure, consistent with the original scale. Model fit indices included χ^2/df=2.736, RMSEA=0.10, CFI=0.770, and SRMR=0.061, indicating a moderate model fit. Although RMSEA and CFI suggested a marginally acceptable fit, SRMR and χ^2/df values were within acceptable limits. Internal consistency was high, with Cronbach's alpha coefficients of 0.957 for the Extent of Agreement subscale and 0.960 for the Importance subscale.

Conclusion: The Turkish adaptation of the SPETCS has proven to be a psychometrically sound tool for evaluating nursing students' views on effective instructional practices in simulation-based education.

Keywords: Nursing, reproducibility of results, simulation training, teaching, validation studies as topic

Introduction

With technological developments in today's healthcare environment, healthcare team members must make rapid and accurate decisions and deliver safe care in high-risk settings. In nursing education, where nurses play an active role within the team, it is essential to prepare graduates who can effectively translate the science and technology of the future into safe and versatile healthcare practice.[1-4]

Clinical simulation offers an experiential learning platform that bridges theory and practice.[5-7] It provides students with a safe environment in which to develop clinical competencies and make decisions without compromising patient safety.[3,8,9] In clinical simulation, effective teaching involves the implementation of instructional approaches tailored to students' observed behaviors and learning responses. This approach contributes to richer learning experiences and increases students' achievement of learning outcomes.[10,11] However, individuals demonstrate distinct characteristics in how they acquire and process information, as well as in the learning strategies they prefer.[12]

Simulation-based education emphasizes learner-centered strategies that enhance engagement and support the achievement of intended learning outcomes.[10,11] Designing and evaluating simulation-based learning (SBL) experiences requires adherence to evidence-informed principles. Several tools have been developed to assess teaching effectiveness in these environments;[13,14] however, although some Turkish instruments assess general teaching effectiveness in nursing education, no tool specifically evaluates students' perceptions of effective teaching in SBL. In particular, there is a lack of instruments that capture both the frequency of observed teaching behaviors (Extent of Agreement) and their perceived importance (Importance subscale). Therefore, this methodological study was conducted to evaluate the validity and reliability of the Turkish version of the Students' Perception of Effective Teaching in Clinical Simulation Scale (SPETCS).

Research Question

Is the Turkish version of the Students' Perception of Effective Teaching in Clinical Simulation Scale (SPETCS) a valid and reliable instrument for use with nursing students?

This study was presented as an oral presentation at the 6th National 2nd International Basic Nursing Care Congress.

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Materials and Methods

This cross-sectional methodological study examined the psychometric properties of the Turkish adaptation of the SPETCS, aiming to establish its validity and reliability for assessing nursing students' perceptions of teaching effectiveness in SBL.

Participants and Setting

The study sample consisted of undergraduate nursing students from a foundation university in Istanbul, where institutional approval was obtained. Inclusion criteria included enrollment in the nursing program, full participation in simulation activities designed in accordance with Jeffries' framework and the International Nursing Association for Clinical Simulation and Learning (INACSL)[1] standards, and voluntary consent to participate. Based on standard recommendations, a sample size of 5 to 20 participants per scale item was used to estimate the required sample size[15,16] As the scale consists of 33 items, the final sample comprised 173 students.

Instruments

Data were collected using a sociodemographic form and the SPETCS. The sociodemographic form included six items addressing age, gender, year of study, prior exposure to simulation, number of simulation sessions attended, and academic level.

SPETCS

The SPETCS was developed by Pamela R. Jeffries[1] and Cynthia E. Reese in 2009 to assess teaching effectiveness in simulation-based nursing education.[17] The instrument consists of two subscales, 'Extent of Agreement' and 'Importance,' each comprising 33 items rated on a 5-point Likert scale. The Extent of Agreement subscale evaluates how frequently students observe specific teaching behaviors, whereas the Importance subscale assesses how important students perceive these behaviors to be for their learning.

In the original version of the SPETCS, factor analysis indicated that the Extent of Agreement subscale is unidimensional, while the Importance subscale comprises two distinct factors: Learner Support and Real-World Application. The Learner Support dimension reflects students' ratings of how often they encountered particular teaching behaviors during simulation activities. The Real-World Application dimension captures students' perceptions of the importance of these behaviors for achieving educational objectives. Higher scores on the Extent of Agreement subscale indicate more frequent use of these strategies, whereas higher scores on the Importance subscale reflect the degree to which students consider these strategies essential for learning outcomes.

The Translation of the SPETCS into Turkish

The initial translation of the SPETCS into Turkish was performed independently by two bilingual translators. To enhance linguistic clarity, four language specialists reviewed the preliminary Turkish version. Subsequently, two different translators who had no prior knowledge of the original scale conducted a back-translation into English. The translated version was then compared with the original to ensure consistency in meaning. Lastly, a Turkish language expert examined the items to ensure they were both grammatically accurate and conceptually appropriate.

Content Validity

For content validity, Davis' method was applied to evaluate the appropriateness and clarity of each item. Ten experts in nursing simulation rated each statement on a 4-point scale ("not appropriate," "slightly appropriate," "quite appropriate," "highly appropriate"). The expert panel (n=10) consisted of professionals from diverse fields, including nursing education (n=6), measurement and evaluation (n=2), and language and linguistics (n=2), ensuring both content and linguistic accuracy of the Turkish version.

Seven expert evaluations were included in the final analysis. Items rated as "quite appropriate" or "highly appropriate" were considered valid for calculation. The Item-Level Content Validity Index (I-CVI) and the Scale-Level Average (S-CVI/Ave) were both calculated as 1.00, indicating perfect agreement among experts and excellent content validity. This 4-point rating system was selected because it allows evaluation of both linguistic clarity and cultural appropriateness, which are essential criteria in scale adaptation studies.

Data Collection

Data were collected during simulation sessions at a foundation university in Istanbul between October 2021 and January 2022. After confirming content and language validity, the Turkish version was pilot-tested with 15 students from various academic levels to assess clarity and comprehension. Based on student feedback, minor wording adjustments were made to improve clarity and cultural adaptation. For example, the item "The instructor provides me enough autonomy in the simulation to promote my learning" was revised to "In order to support my learning, the instructor provides me with sufficient autonomy in the simulation." Similarly, "An instructor-led debriefing is an important aspect of my simulation experience" was revised to "An analysis administered by the instructor is a crucial aspect of my simulation practice." These modifications enhanced linguistic fluency while maintaining the original meaning of the items. Written informed consent was obtained from students who completed all simulation phases and agreed to participate in the test-retest. Completing the questionnaire required approximately ten minutes. Test-retest is recommended to be conducted within a 15–30-day interval.[18] For test–retest reliability, the scale was re-administered three weeks after the initial data collection. This interval was determined in accordance with the COSMIN (Consensus-based Standards for the selection of health Measurement Instruments) guidelines,[19] which recommend a time frame long enough to prevent recall bias but short enough to avoid real change in the construct being measured. Given the relative stability of students' perceptions of teaching effectiveness, a three-week period was considered appropriate. Although 103 students participated in the retest, complete paired data were obtained from 99 students, which were included in the final analysis.

Statistical Analysis

The study adhered to the COSMIN guidelines for evaluating the methodological quality of patient-reported outcome measures. All statistical analyses were conducted using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY, USA) and AMOS version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics, including means, standard deviations, frequencies, and percentages, were calculated to summarize the data.

To assess construct validity, Exploratory Factor Analysis (EFA) with Varimax rotation was conducted, followed by Confirmatory Factor Analysis (CFA) to verify the factor structure.

Content validity was evaluated by calculating the Content Validity Index (CVI). To assess measurement error, the Intraclass Correlation Coefficient (ICC) was calculated using a two-way mixed-effects model with absolute agreement, in accordance with the COSMIN guidelines. ICC values were interpreted as follows: 0.40–0.59=moderate, 0.60–0.74=good, and ≥0.75=excellent reliability.[19]

Ethical Approval

Permission to use the SPETCS was secured through email communication with the original developers. The research received Acıbadem Mehmet Ali Aydınlar University Medical Research Ethics Committee (Approval Number: 2019-19/12, Date: 05.12.2019), in accordance with the Declaration of Helsinki. Students participated voluntarily and provided written informed consent prior to the commencement of data collection.

Results

Participant Characteristics

The study was conducted with a total of 173 students. Of the participants, 11.6% (n=20) were male and 88.4% (n=153) were female. The mean age of the participants was 20.49±1.19 years. In terms of academic standing, 44.5% of the students (n=77) were in their second year, 42.8% (n=74) in their third year, and 12.7% (n=22) were fourth-year students. Students participated in clinical simulation as part of the Internal Medicine Nursing (44.5%), Gynecology and Obstetrics Nursing (42.8%), and Geriatric Nursing (12.7%) courses. Approximately 93.1% (n=161) reported previous simulation scenario experience, with most having participated in two simulations.

Psychometric Measurements

Evaluation of Content Validity Index

The content validity of the scale was assessed according to Davis' technique. Based on expert evaluations, the CVI was calculated for both individual items and the overall scale, with both values found to be 1.00, indicating excellent agreement among reviewers.

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Table 1. Item analysis and internal consistency

Extent of agreement				Importance				
Item	**r**	**α***	**α**	**Learner support/item**	**r**	**α***	**α**	**α**
Item 1	0.569	0.957	0.957	Item 2	0.727	0.958	0.933	0.960
Item 2	0.746	0.956		Item 4	0.643	0.959		
Item 3	0.590	0.957		Item 5	0.453	0.960		
Item 4	0.674	0.957		Item 6	0.722	0.958		
Item 5	0.710	0.956		Item 7	0.614	0.959		
Item 6	0.646	0.957		Item 8	0.522	0.960		
Item 7	0.614	0.957		Item 9	0.552	0.960		
Item 8	0.664	0.957		Item 10	0.737	0.958		
Item 9	0.549	0.957		Item 14	0.601	0.959		
Item 10	0.672	0.957		Item 16	0.654	0.959		
Item 11	0.439	0.958		Item 17	0.630	0.959		
Item 12	0.685	0.957		Item 18	0.701	0.958		
Item 13	0.561	0.957		Item 19	0.571	0.959		
Item 14	0.587	0.957		Item 21	0.649	0.959		
Item 15	0.659	0.957		Item 22	0.694	0.958		
Item 16	0.618	0.957		Item 24	0.664	0.959		
Item 17	0.553	0.958		Item 25	0.654	0.959		
Item 18	0.701	0.956		Item 26	0.716	0.958		
Item 19	0.680	0.956		Item 28	0.576	0.959		
Item 20	0.697	0.956		Item 30	0.725	0.958		
Item 21	0.613	0.957						
				Real-world application/item	**r**	**α***		
				Item 1	0.530	0.959		0.907
Item 22	0.578	0.957		Item 3	0.520	0.959		
Item 23	0.634	0.957		Item 11	0.591	0.959		
Item 24	0.518	0.958		Item 12	0.797	0.958		
Item 25	0.713	0.956		Item 13	0.665	0.958		
Item 26	0.554	0.957		Item 15	0.602	0.959		
Item 27	0.663	0.957		Item 20	0.733	0.958		
Item 28	0.677	0.957		Item 23	0.714	0.958		
Item 29	0.766	0.956		Item 27	0.718	0.958		
Item 30	0.680	0.956		Item 29	0.728	0.958		
Item 31	0.725	0.956		Item 31	0.760	0.958		
Item 32	0.678	0.957		Item 32	0.689	0.958		
Item 33	0.755	0.956		Item 33	0.694	0.958		

r: Corrected item-total correlation, *Cronbach's alpha if item deleted, α: Cronbach's alpha for subscales and total scale.

Evaluating Items and Internal Consistency

To determine the internal consistency of each subscale, item analysis involved the calculation of Cronbach's alpha values. When individual items were excluded, the reliability coefficients for the Extent of Agreement scale ranged between 0.956 and 0.958, and between 0.958 and 0.960 for the Importance scale. These results demonstrate that the items exhibit a consistently high degree of internal reliability. Internal consistency was high, with alpha scores of 0.933 and 0.907 for Learner Support and Real-World Application, respectively (Table 1).

Evaluating Construct Validity

An EFA was conducted to assess the structural validity of the scale. Varimax rotation revealed a two-factor structure consistent with the original version. The first factor had an eigenvalue of 15.36 and explained 46.55% of the variance, while the second factor had an eigenvalue of 2.15 and explained 6.50% of the variance. Together, these two factors accounted for 53.05% of the total variance. Factor analysis showed that no items had factor loadings below 0.40 or cross-loadings exceeding 0.10 across multiple factors. The adequacy of the sample for factor analysis was assessed using the Kaiser-Meyer-Olkin (KMO) statistic, and Bartlett's Test of Sphericity was used to determine whether the correlation matrix was suitable for exploratory factor analysis. A KMO value approaching 1 indicates strong sampling adequacy.[20] In this study, the KMO measure was 0.893, indicating good sampling adequacy. Bartlett's test yielded a significant result ($p<0.001$), confirming the factorability of the correlation matrix. Once the dataset was confirmed to be suitable for factor analysis, eigenvalues and the scree plot were examined to identify the factor structure and assess the proportion of variance explained by each factor. The results accounted for 53.1% of the variance. Figure 1 illustrates the number of dimensions to which the factors were assigned based on the eigenvalues.

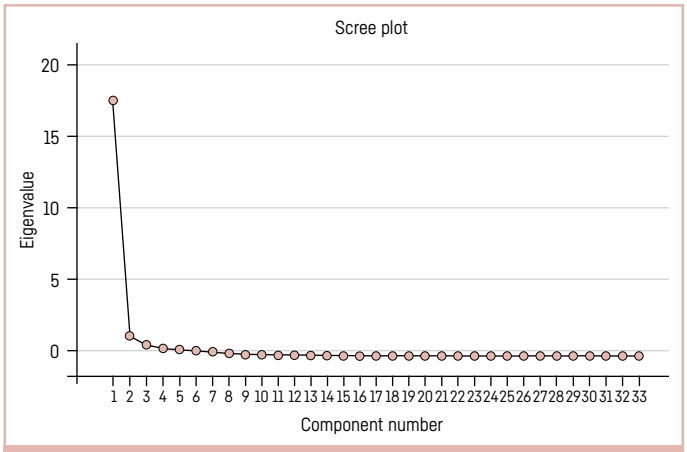

Figure 1. Scree plot of the SPETCS importance scale.

The factor loadings from the SPETCS factor analysis are presented in Table 2, with values ranging from 0.462 to 0.752 for Factor 1 and from 0.497 to 0.800 for Factor 2.

The standardized factor loadings for each item within the Importance scale's two subscales are illustrated in Figure 2, based on the CFA findings.

Confirmatory factor analysis model fit was evaluated using several indices, as outlined in Table 3, including the adjusted chi-square to degrees of freedom ratio (χ^2/df), the Root Mean Square Error of Approximation (RMSEA), the Comparative Fit Index (CFI), and the Standardized Root Mean Square Residual (SRMR). The analysis yielded a χ^2/df value of 2.736 ($p<0.01$), RMSEA=0.100, CFI=0.770, and SRMR=0.061, indicating a borderline acceptable fit. While the RMSEA and CFI values suggest a marginal fit, the SRMR and χ^2/df values fall within acceptable limits, supporting the overall adequacy of the model (Table 3). In addition, test–retest reliability was examined to assess the stability of the scale scores over time. The Intraclass Correlation Coefficient values were 0.54 for the Participation Rating and 0.58 for the Importance Rating, indicating moderate test–retest reliability in accordance with COSMIN standards.[19]

Stability (Test-Retest Reliability)

A test–retest application was conducted with 99 participants, representing the students who completed both the test and retest administrations three weeks apart. The SPETCS Extent of Agreement scores ranged from 63 to 165 points in the test; the test mean score was 150.87±15.55, and the retest mean score was 151.57±16.74. The SPETCS Importance scores ranged from 110 to 165 points in the test; the test mean score was 159.57±9.47, and the retest mean score was 160.67±8.72.

Paired t-test results showed no significant differences between the two assessments for either subscale ($p>0.05$ for both subscales). Cronbach's alpha values for test-retest reliability were 0.957 (Extent of Agreement) and 0.960 (Importance) at baseline, and 0.966 and 0.961 at retest, confirming the scale's temporal stability (Table 4).

Discussion

In recent years, clinical simulation has been widely used in nursing education. To assess the effectiveness of this teaching method, numerous assessment tools have been developed.[9,21,22] However, no Turkish-language tool exists to assess the effectiveness of clinical simulation. Moreover, no prior research has focused on adapting the SPETCS, developed by Jeffries[1] and Reese,[17] into Turkish. Therefore, this effective assessment tool was culturally adapted for use in Türkiye, and its validity and reliability were subsequently evaluated. To use assessment tools in a language other than the original, the adaptation process requires multiple analyses. The procedures necessary to confirm the reliability of data collected through adapted scales have been described similarly in the existing literature.[23] The World Health Organization has outlined specific steps to be followed during the adaptation process, and the findings of this study were discussed in alignment with these guidelines. The confirmatory factor analysis revealed a borderline but acceptable model fit (CFI=0.77;

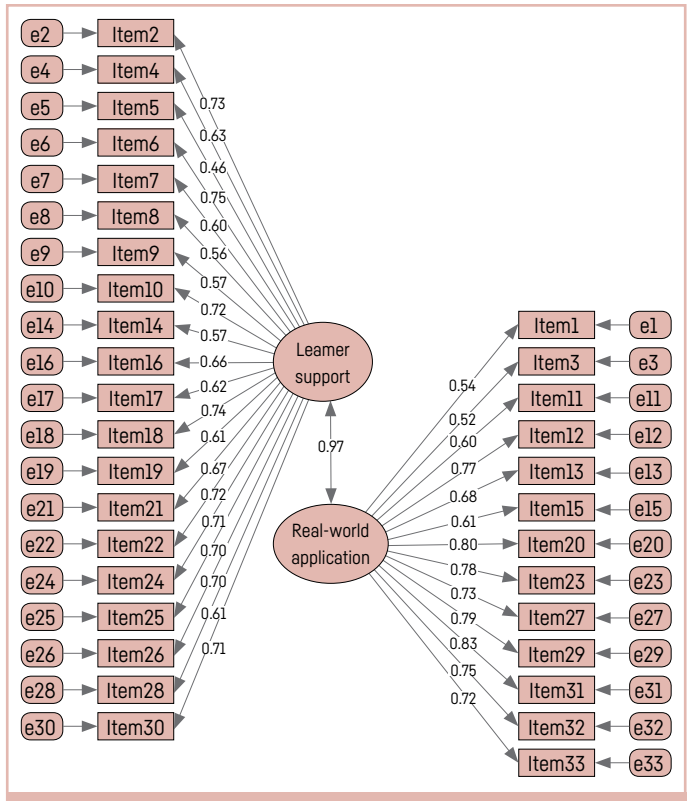

Figure 2. Confirmatory factor analysis model of the SPETCS importance scale.

RMSEA=0.10), which is comparable to other adaptation studies of complex educational scales. Despite the moderate fit indices, the theoretical two-factor model remained conceptually consistent. Although the CFI value was slightly below the ideal threshold, this may be attributed to cultural and linguistic nuances affecting students' interpretation of the items or to sample-specific characteristics. Future research may explore potential model modifications or test alternative models to improve model fit while maintaining theoretical coherence. Furthermore, test–retest analysis demonstrated moderate stability, with ICC values of 0.54 for the Participation Rating and 0.58 for the Importance Rating, supporting the temporal reliability of the Turkish version in accordance with COSMIN standards.

Content validity refers to the suitability of an assessment tool for its intended purpose, whether the items measure the area under investigation, and whether they assess the targeted domain.[23] In this study, Davis' method was used, in which each item is rated as "appropriate," "needs minor changes," "needs major changes," or "not suitable."[24] The items were revised to conform to Turkish language and spelling rules. CVI values were calculated by determining the proportion of experts who rated the items as either "appropriate" or in need of "minor changes" relative to the total expert panel. Scores equal to or above 0.80 indicate satisfactory content validity.[25] The original SPETCS reported a CVI of 0.91, whereas this study achieved ideal scores of 1.00 for both individual items and the overall scale, indicating strong validity and cultural suitability for Turkish use.

Cronbach's alpha is commonly used to assess internal consistency, with values equal to or exceeding 0.70 generally considered acceptable.[26] The minimum Cronbach's alpha value observed after deleting any item from the scale was 0.95, indicating that removing individual items did not affect overall reliability. Cronbach's alpha coefficients between 0.60 and 0.79 indicate acceptable reliability, whereas values ranging from 0.80 to 1.00 suggest high reliability.[16,26] In the original SPETCS, Jeffries[1] and Reese[17] reported Cronbach's alpha values of 0.95 for the Extent of Agreement scale and 0.96 for the Importance scale. Consistent with these findings, the Turkish adaptation in this study demonstrated comparable reliability, with Cronbach's alpha coefficients of 0.95 and 0.96, respectively, confirming the instrument's strong reliability.

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Table 2. Factor analysis of the SPETCS importance response scale

Items	Item no	Factor 1	Factor 2
Questions asked by the instructor after the simulation helped guide my thinking about the simulation experience.	2	0.692	
The instructor provided useful feedback after the simulation.	4	0.619	
The instructor facilitated my learning in this simulation.	5	0.462	
Discussing the simulation during debriefing supports my understanding and reasoning.	6	0.749	
An instructor-led debriefing is an important aspect of my simulation experience.	7	0.639	
The instructor was comfortable with the simulation experience.	8	0.547	
The simulation was interesting.	9	0.528	
Appropriate questions were asked during the debriefing of the simulation experience.	10	0.737	
Questioning by the instructor helps me to better understand the clinical situation experienced, even though it is a simulated environment.	14	0.618	
Cues were used in the simulation to help me progress through the experience.	16	0.707	
The instructor served as a role model during the simulation.	17	0.662	
The instructor demonstrated clinical expertise during this simulation experience.	18	0.728	
The instructor was receptive to feedback.	19	0.614	
The instructor encouraged helpful collaboration among participants during debriefing.	21	0.678	
The difficulty of the simulation was appropriate.	22	0.697	
Cues were provided at appropriate times during the simulation.	24	0.696	
Participation in this simulation helped me understand classroom theory.	25	0.712	
The instructor encouraged helpful collaboration among simulation participants during the simulation.	26	0.708	
The instructor used a variety of questions during the debriefing.	28	0.622	
The instructor was enthusiastic during the simulation.	30	0.752	
The instructor allowed me time to think through challenging areas of the simulation.	2		0.497
The instructor provides me with enough autonomy in the simulation to promote my learning.	3		0.526
The simulation was realistic.	11		0.577
The simulation fit with the objectives of this course.	12		0.740
I will be better able to care for a patient with this type of problem in clinical practice because I participated in this simulation.	13		0.665
This simulation helped develop my critical thinking skills.	15		0.608
Participation in this simulation was a valuable learning activity.	20		0.708
Participation in clinical simulations helps me meet clinical expectations when caring for real patients.	23		0.773
Clinical simulations are an effective learning strategy for me to problem-solve and make decisions.	27		0.769
The clinical simulation experience was well organized.	29		0.783
My learning expectations were met in this clinical simulation.	31		0.800
The simulation experience allows me to model a professional role in a realistic manner.	32		0.744
Questions asked after the simulation helped me understand the clinical decision-making necessary for this experience.	33		0.728
Kaiser-Meyer-Olkin	0.893		
Bartlett's Test	4600.26		
p	<0.001		
Eigenvalue		15.362	2.145
Variance %		46.551	6.500
Cumulative variance %		46.551	53.051

Table 3. Goodness-of-fit indices of the Turkish SPETCS (N=173)

Fit indices	Good fit	Acceptable fit	Model results	Fit evaluation
RMSEA	0<RMSEA<0.05	0.05≤ RMSEA≤0.10	0.100	Borderline acceptable/needs improvement
NFI	0.95≤NFI≤1	0.90≤NFI≤0.95	0.770	Below acceptable/poor fit
CFI	0.97≤CFI≤1	0.95≤CFI≤0.97	0.770	Borderline acceptable
IFI	0.97≤IFI≤1	0.95≤IFI≤0.97	0.840	Borderline acceptable
RFI	0.90≤RFI≤1	0.85≤RFI≤0.90	0.708	Borderline acceptable
SRMR	0≤SRMR≤0.05	0.05≤SRMR≤0.10	0.061	Acceptable
χ^2/df	0≤ χ^2/df≤2	2≤ χ^2/df≤3	2.736	Acceptable

RMSEA: Root mean square error of approximation, NFI: Normed fix index, CFI: Comparative fit index, IFI: Incremental fit index, RFI: Relative fit index, SRMR: Standardized root mean square residual, χ^2/df: Chi-square/degrees of freedom.

Table 4. SPETCS test-retest internal consistency values (N=99)

	Mean±SD	Min-max (Median)	Cronbach's Alpha	Paired t-test
Extent of agreement				
Test	150.87±15.55	156 (63–165)	0.957	
Retest	151.57±16.74	158 (83–165)	0.966	0.606
Importance				
Test	159.57±9.47	164 (110–165)	0.960	
Retest	160.67±8.72	165 (113–165)	0.961	0.231

Adequate sampling for factor analysis requires a KMO value above 0.60 and a significant Bartlett's test of sphericity.[27] In this study, EFA with Varimax rotation revealed a two-factor structure for the Importance scale, consistent with the original research, explaining 53.1% of the variance, which falls within the acceptable range of 40–60% in the social sciences. With a KMO value of 0.89 and a significant Bartlett's test result ($p<0.01$), the data were deemed suitable for factor analysis due to sufficient sample size and appropriate item interrelations.

Factor loadings ranged from 0.462 to 0.752 for Factor 1 and from 0.497 to 0.800 for Factor 2, all exceeding the commonly accepted threshold of 0.30 for item retention.[27] Accordingly, none of the original items were excluded from the scale. Regarding model fit, the Normed Fit Index (NFI), Incremental Fit Index (IFI), and Relative Fit Index (RFI) values were below acceptable levels, whereas RMSEA (0.100), CFI, SRMR, and χ^2/df demonstrated acceptable or good fit.15 These results suggest that the model is statistically valid and adequately fits the data.

The reliability of the Turkish SPETCS was assessed through test-retest analysis involving 99 students, yielding consistent Cronbach's alpha coefficients over time. This approach aligns with recommendations in the literature, which suggest evaluating stability using approximately 25% of the total sample.[18]

In summary, the Turkish SPETCS demonstrates strong construct validity, internal consistency, temporal stability, and adequate psychometric properties for use with nursing students. The validated Turkish version of the SPETCS can serve as a valuable tool for nursing educators and curriculum developers. By systematically evaluating the effectiveness of simulation-based education, it may guide improvements in instructional design, student engagement strategies, and feedback mechanisms in clinical education. In this way, the tool contributes to the standardization and quality assurance of simulation practices in Turkish nursing curricula. Further studies involving larger and more diverse samples across different nursing schools are recommended to confirm the scale's generalizability. Moreover, examining the relationship between SPETCS scores and learning outcomes, such as clinical performance or critical thinking, could provide additional evidence of its practical utility in simulation-based education.

Limitations

As participants were recruited from a single university, the findings may not be representative of nursing students in other academic settings across the country. In addition, the sample was relatively homogeneous, consisting predominantly of female students, which may limit the generalizability of the results to more gender-diverse nursing populations. Additionally, the scale's design requires participants to evaluate both the extent of agreement and the importance of items simultaneously, which may increase cognitive load during completion. Another limitation is that psychometric testing was conducted within a single simulation context, focusing on one type of clinical simulation scenario. Therefore, the validity and reliability of the scale across different simulation modalities remain to be examined. Furthermore, some model fit indices (such as RMSEA and RFI) were close to the recommended cutoff thresholds. These borderline values should be interpreted with caution and considered a limitation of the study, as they may reflect sample size characteristics or the multidimensional structure of the instrument.

Conclusion

This study, demonstrates that the Turkish version of the SPETCS is a valid and reliable instrument. It serves as an effective tool for evaluating teaching methods and behaviors within SBL settings. The scale supports the evaluation and enhancement of simulation design while contributing to the development of a more effective learning experience. It is recommended that this scale be used to evaluate simulation applications that contribute to program outcomes and are integrated into the curriculum. It can also be used to assess simulation experiences of different types and designs within the curriculum. In addition, the SPETCS can be applied across various SBL environments to evaluate teaching effectiveness. It is suitable for use in formative assessments conducted during simulation-based training as well as in summative evaluations at the end of courses or clinical rotations. Regular use of the scale can help educators monitor improvements in teaching quality and learning outcomes over time. Future studies are recommended to examine the psychometric properties of the Turkish SPETCS in different nursing populations and educational contexts to ensure broader generalizability. Further research could also explore criterion validity by correlating SPETCS scores with objective performance measures or student learning outcomes. Longitudinal studies may provide additional insight into how simulation-based teaching effectiveness evolves over time.

Ethics Committee Approval: The study was approved by the Acıbadem Mehmet Ali Aydınlar University Medical Research Ethics Committee (Approval Number: 2019-19/12, Date: 05.12.2019).

Informed Consent: Written informed consent was obtained from students.

Conflict of Interest: The authors declare that there are no conflicts of interest associated with this research or its publication.

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Ethics Through Metaphors: A Qualitative Inquiry into Nursing Students' Perceptions

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Abstract

Background: Ethical knowledge and values play a critical role in nursing practice, guiding professional behavior and decision-making in patient care. As the importance of ethics in nursing continues to grow, it is essential to introduce these concepts during undergraduate education, a formative period for professional identity development.

Aim: This study aimed to explore nursing students' metaphorical perceptions of ethics and ethical values.

Methods: This qualitative study was conducted with 100 third-year nursing students at a university in Türkiye between March and June 2025. To explore their perceptions of ethics and ethical values, students were asked to complete the sentence: "Ethics/ethical values is like ....., because ....." The data were analyzed using qualitative content analysis, which involved coding, theme identification, and categorization based on emergent themes.

Results: The mean age of the students in the sample was 20.93±1.37, and 76% of the students were female. Students produced 74 distinct metaphors for ethics and 80 for ethical values. The ethics-related metaphors were grouped into eight categories: guiding, balancing right and wrong, basic necessity, rule-setting, universal, organizing, ensuring transparency, and difficult to attain. Ethical values metaphors were classified into nine categories: sociality, individuality, guidance, importance, meaning-giving, limiting, fundamental, reciprocity, and time-related.

Conclusion: The findings revealed that students held largely positive perceptions of ethics and ethical values, often linking them to personal beliefs. Further research with diverse student groups and healthcare professionals is recommended to enhance understanding of ethical development.

Keywords: Ethical values, ethics, metaphor, nursing

Introduction

Human beings and human life are at the center of healthcare services. Nurses, who play a key role in the provision of these services, are responsible not only for their clinical functions but also for ensuring appropriate, ethical, and safe care for patients and clients. It is expected that nurses act ethically, maintain awareness of moral values, and reflect these values in their practice.[1-3] Awareness of ethical principles and the integration of moral values into care form an essential component of humanistic nursing.[4] In today's complex and changing healthcare environment, nurses require ethical knowledge to manage situations and provide care that is safe, appropriate, lawful, and morally sound. Within the context of care, while continuously seeking answers to the question "What can I do?", nurses must also aim to answer "What should be done?" in alignment with ethical principles and professional values.[5]

The concept of ethics refers to the systematic study of moral values and rules by addressing what is ideal and abstract in a particular situation.[6] Ethics is defined as "the science of morality" and as "the set of behaviors that a professional group is obliged to adhere to".[7] In nursing, an inherently moral profession, the primary purpose of ethics is not only to ensure effective and competent practice but also to determine the best possible approach to caring for patients. Therefore, it is essential for nurses to act in accordance with both professional ethics and ethical values while fulfilling their responsibilities. This is because nursing as a profession is grounded in core professional values, and ethics represents the practical application of these values.[7-9]

Professional values are defined as standards that guide professional behavior, influence moral reasoning, and give meaning and direction to clinical practice.[10] Professional ethical values, which constitute an integral part of the nursing discipline, serve as an ethical framework for evaluating nurses' goals, strategies, and actions. Furthermore, these values act as a resource for addressing nurses' ethical competence in clinical settings and responding to emerging moral concerns in modern healthcare.[7,11] Given the crucial role of ethical knowledge and moral values in patient care, the teaching of ethical concepts and the development of ethical awareness have gained significant importance in nursing education.[4] This awareness should be cultivated during the formative stages of professional education, when professional identity and ethical consciousness begin to take shape. The enhancement of ethical awareness and the ability to handle ethical issues among nursing students can be supported through structured ethics education.[12-15] In Türkiye, regulations published in the Official Gazette, which define the minimum standards for nursing education, emphasize the inclusion of pro-

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fessional ethics as a core subject to ensure that students acquire essential ethical competencies. Accordingly, the aim of professional ethics education is to prepare nursing students to act ethically and responsibly in their future professional roles and to make sound ethical decisions.[16]

Ethical education plays a critical role in enabling nurses and nursing students to recognize ethical issues that may arise in healthcare practice and to strengthen their ability to address these challenges appropriately. Ethical knowledge and moral values serve as guiding tools for nurses when facing ethical issues and contribute to the development of their professional identity.[17] Moreover, possessing ethical awareness supports nurses in fulfilling their professional and social responsibilities. Therefore, it is imperative to educate nurses, starting from the early stages of their professional training, who are capable of identifying ethical problems, developing appropriate solutions, and maintaining accountability in their practice.[13,18] Despite the recognized importance of ethics education, studies indicate that nursing students preparing to enter the profession often lack a comprehensive and deeply internalized understanding of ethical concepts and values.[19,20]

A review of the national and international literature reveals numerous quantitative and qualitative studies examining nursing students' ethical sensitivity, ethical decision-making abilities, approaches to moral issues, and levels of ethical knowledge.[21-27] However, these studies have predominantly focused on measuring outcomes and competencies, providing limited insight into how students conceptualize or perceive the notions of ethics and ethical values themselves.[28] A closer examination of metaphor-based studies in the nursing literature reveals that such research has predominantly focused on concepts such as care, being a nurse, and the nursing profession itself. While metaphors have been widely used to explore professional identity and perceptions of care in nursing, there appears to be no study specifically examining nursing students' metaphoric perceptions of ethics and ethical values.[28-32] This absence is noteworthy, given the central role of ethics and values in nursing practice and education, and indicates a clear gap in the literature that the present study aims to address. Given the increasing significance attributed to ethics education, it is essential to investigate these perceptions in greater depth. In this context, the metaphor method, a qualitative research approach, offers a distinctive opportunity to explore students' implicit understanding and perceptions of abstract concepts such as ethics and values. Qualitative research seeks to examine phenomena that individuals are aware of but do not fully comprehend in depth.[33] Studies employing metaphors aim to describe the various ways in which individuals experience, interpret, and conceptualize a particular aspect of reality.[33,34] Metaphors can reveal insights into unseen dimensions of thought and influence individuals' perceptions, beliefs, and attitudes, thereby shaping their actions in real-world contexts. Accordingly, this study aimed to describe the metaphoric perceptions of nursing students toward ethics and ethical values through the use of metaphors.

Study Questions

1. Which metaphors do nursing students use to express their perceptions of the concept of ethics?
2. Which metaphors do nursing students use to express their perceptions of ethical values?

Materials and Methods

Type of Research

Using the unique power of metaphors to explore complex and abstract concepts, this study employed a qualitative approach to reveal how nursing students conceptualize ethics and ethical values. As a qualitative research method, metaphor analysis records, interprets, and analyzes non-numerical data to uncover deeper meanings in human experiences.[33,34]

Population and Sample of the Study

This study was conducted between March and June 2024 using a purposive sampling method. The population consisted of 187 third-year nursing students enrolled in the Nursing Department of the Faculty of Health Sciences at a university in Türkiye, all of whom were taking the Nursing Philosophy and Ethics course in the second semester. Inclusion criteria were being an undergraduate nursing student, being enrolled in the Nursing Philosophy and Ethics course, and volunteering to participate in the study. Exclusion criteria included unwillingness to continue participation, repeating the course, or failing to complete the data collection tools. Of the 187 students, 141 met the inclusion criteria. Nine students were excluded due to the absence of metaphors in the semi-structured form, 20 were absent during data collection, and 12 declined participation. The study was completed with a final sample of 100 students.

Data Collection

Data were collected using a researcher-developed form containing two descriptive questions about participants' age and gender and two metaphor-completion sentences. Participants were asked to complete the sentences "Ethics is like..., because..." and "Ethical values are like..., because..." with appropriate metaphoric expressions. Students were informed about metaphors and given an example before completing the form. They were then asked to express a metaphor reflecting their understanding of ethics and explain its rationale. Completing the form took approximately 5–10 minutes. Metaphors are frequently used in qualitative research to analyze complex data, establish connections among themes, and present findings in a meaningful and comprehensible manner to the reader.

Data Analysis

The sociodemographic characteristics of the participants were analyzed using SPSS software version 23.0 (SPSS, Inc., Chicago, IL, USA). Descriptive statistics, including numbers and percentages, were used to present the quantitative data. The metaphors described by the participants were analyzed and interpreted in five stages: naming, classification, categorization, validity–reliability, and quantification of data.

Step 1. Naming

A temporary list of metaphors developed by the students was created in alphabetical order. During this process, six students who did not produce a metaphor were excluded from the study.

Step 2. Classification

The metaphors generated from the phrases "Ethics is like..." and "Ethical values are like..." were examined, and all expressions were systematically listed and analyzed according to their linguistic and conceptual characteristics.

Step 3. Categorization

The metaphorical expressions obtained were grouped into 17 conceptual categories based on thematic similarities and interpretative consistency. The grouping of metaphors was determined by analyzing each participant's explanation in the sentence beginning with "because...". Selected metaphor examples were used as reference points for thematic coding. Each metaphor was examined in terms of the roles and meanings attributed to nurses, and corresponding codes were created. These codes were then articulated in relation to social perceptions of nursing and converted into conceptual category titles.

Step 4. Validity–Reliability

For validity and reliability, the metaphors and categories were independently reviewed by two experts, who assigned each metaphor to a category. The level of agreement between researchers and experts was determined by counting the number of agreements and disagreements. The internal reliability of the study was calculated using Huberman's formula: Reliability = Agreement / (Agreement + Disagreement). According to Miles and Huberman (2002), a compatibility rate of 90% or above indicates acceptable reliability. In this study, the reliability coefficient was calculated as 96%, confirming the consistency of the categorization process[31]

Step 5. Data Analysis

All qualitative and quantitative data were transferred to SPSS for further analysis. Qualitative data were analyzed using content analysis, while quantitative data were evaluated using chi-squared tests.

Ethical Considerations

Ethics committee approval was obtained from Social Research Ethics Committee of Izmir Katip Celebi University prior to the conduct of the study (Approval Number: 2023/18-02, Date: 01.11.2023). Written permission was obtained from the institution where the study was conducted. Furthermore, written informed consent was obtained from the students who volunteered to participate in the study, and the principles of the Declaration of Helsinki were adhered to throughout the study.

Table 1. Distribution of the metaphors developed by the students for the concept of ethics according to categories

Categories	Metaphors	Number of participants	Number of metaphors
Guiding	Teacher (2), Compass (7), Sun, Pole Star, Angel, Lighthouse, Light (4), Book, Close Friends, Lantern, Pen, Guide (2), Kite with Wings, Light Suddenly Appearing on a Dark Road, Flashlight, Key That Opens the Right Door, Love, Tree, Living Life, Being Reborn and Growing, An Integral Part of Our Life, Destination Board	33	22 (29.7%)
Balance between right and wrong	Morality (4), Inner Happiness and Restlessness, Key-Lock, Predicate, Scales (3), Devil and Angel, Life, Crossroads, Mother, Answer Key, Bridge, Integration of the Heart and Brain, Mature Person, Palace of Justice, Recipe, Mother, Weapon Used in War	22	17 (23.0%)
Basic necessity	Breathing, Water (4), Sun, Organ, Heart, Body, Food, Refrigerator	11	8 (10.8%)
Rule	Traffic Sign (6), Car, Act, Owl, Rules Surrounding Life, Statute	11	7 (9.5%)
Order	Empty Glass, Flower, Painting, God, Family, Matryoshka Doll, Salary, Tree	8	8 (10.8%)
Universality	Oxygen, Life, A Portrait Painted by an Artist, A Language That Everyone Should Know, A Lesson That Every Person Must Take in School, A Single Straight Road Without Ups and Downs	6	6 (8.1%)
Transparency	Water (3), White Color, Light, Glasses	6	4 (5.4%)
Difficult to attain	Stars in the Universe (2), Universe	3	2 (2.7%)
Total		100	74 (100%)

Results

The mean age of the students in the sample was 20.93±1.37, and 76% of the students were female.

Ethics Metaphors and Categories

According to students' statements, 74 different metaphors and eight categories emerged from the analysis of ethics metaphors (Table 1).

Category 1: Guiding

The category of "ethics as a guide" consisted of a total of 22 metaphors (29.7%), developed by 33 students (33.0%). The most frequently mentioned metaphors in this category were compass, light, teacher, sun, and guide (Table 1). Sample metaphor expressions related to this category are given below:

> "*Ethics is like the pole star, because it becomes our guide when we are lost. Morally, in every situation where you find yourself in trouble, it shows you the right path and acts as a guide.*" (S22, Female)

> "*Ethics is like light, because it illuminates our path to find the right way.*" (S55, Female)

Category 2: Balance Between Right and Wrong

This category had the second-highest number of metaphors after the guiding category. As shown in Table 1, the balance between right and wrong category consisted of 17 metaphors (23.0%) generated by 22 participants. The most frequently mentioned metaphors in this category were morality and scales (Table 1). Sample metaphor expressions related to this category are given below:

> "*Ethics is like scales, because it allows us to balance good and bad, right and wrong.*" (S76, Female)

> "*Ethics is like an answer key, because it guides a person to the right path and enables them to choose what is right even amidst internal conflicts.*" (S74, Female)

Category 3: Basic Necessity

The category of "ethics as a basic necessity" consisted of a total of eight metaphors (10.8%), developed by 11 students. The most frequently mentioned metaphor in this category was water (Table 1). The students' statements are as follows:

> "*Ethics is like water, because it is the essential element of life. Without it, everything is incomplete and abnormal.*" (S14, Female)

> "*Ethics is like the heart, because we cannot live without ethics just as we cannot live without a heart.*" (S67, Male)

Category 4: Rule

The category of "ethics as a rule" consisted of seven metaphors (9.5%), developed by 11 individuals (11.0%). The traffic sign metaphor in this category was the second most frequently mentioned among all ethics-related metaphors (Table 1). A sample metaphor expression related to the traffic sign is given below:

> "*Ethics is like a traffic sign, because it teaches us in our daily lives, just like traffic lights: to stop where necessary like a red light, to wait and reflect like a yellow light, and to take action like a green light.*" (S72, Male)

> "*Ethics is like an owl, because owls represent wisdom, nobility, attentiveness, goodness, and diligence. In ethics, these are obligations that should be applied equally and fairly in accordance with the legal responsibilities of virtuous, moral, and honorable individuals.*" (S35, Female)

Category 5: Order

The category of "ethics as order" covered a total of eight metaphors (10.8%), developed by eight individuals (4.07%) (Table 1). Two of the students made the following statements:

> "*Ethics is like a painting, because colors are a harmonious blend of organized and suitable arrangements.*" (S97, Male)

> "*Ethics is like God, because existence or absence depends on one's belief. Some believe it should exist and behave accordingly, while others deny it and determine their own values.*" (S7, Female)

Category 6: Universality

The category of "ethics as universality" included a total of six metaphors (8.1%), produced by six individuals (2.4%) (Table 1). Sample metaphor expressions related to this category are given below:

> "*Ethics is like oxygen, because it is the same in every language and is universal.*" (S6, Female)

> "*Ethics is like a single, straight road with no ups and downs, because ethics cannot be changed; it is what it should be, and it is one.*" (S70, Female)

Category 7: Transparency

As shown in Table 1, the transparency category consisted of four metaphors (5.4%) generated by six participants. The water metaphor was the most frequently cited in this category (Table 1). Two of the students made the following statements:

> "*Ethics is like water, because it cleanses and leads to absolute goodness and transparency.*" (S19, Female)

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Table 2. Distribution of the metaphors developed by the students for the concept of ethical values according to categories

Categories	Value metaphors	Number of participants	Number of metaphors
Individualism	Respect (2), Conscience, Taste in Music, Mortality, Belief, Fingerprint (3), Emotion, Kindliness, Hairstyle, Bag, Canvas, A Member of Our Body, Surrealist Painting, Book (2), Notebook, Half-Full Glass, Tree, Mirror, Inner Voice	23	19 (23.8%)
Guiding	Junction, Bend, Map (2), Compass, Roadmap, Navigation (2), Guide, Father, Order, Childhood, A Road with Inclines and Detours, Sunrise, Light, Eye, Life, Mother, Judge	19	17 (21.3%)
Sociality	Culture (6), Moral Norms, Society, Public, Something That Embodies Our Societal Riches, Homeland, Economy, Rainbow, Forest, Natural Stone, Choosing a Sport Based on Individuals' Body Types and Engaging in That Sport	16	11 (13.8%)
Importance	Jewel, Treasure (2), Diamond, Gold (3), Turkish Lira, Gift, An Item We Cherish, A Scale Found in a Jeweler's Shop	12	8 (10.0%)
Reciprocity	Mirror of the Soul, Iron, Stock Market, Book, Flower (2), Sunflower Changing Its Direction Toward the Sun	7	6 (7.5%)
Limiting	Family (3), House, Politics, Dartboard, Boundary Line	7	5 (6.6%)
Fundamental	Foundation of a Building, Skeleton (2), Heartbeat, Element, Breath	6	5 (6.6%)
Giving meaning to life	Accessory, Women, Honey, Water (2), Art	6	5 (6.6%)
Relational to Time	Time, Tradition Changing Over Time, Lifespan of a Butterfly, Moon	4	4 (5.0%)
Total		100	80 (100%)

> "*Ethics is like the color white, because it remains immaculate while containing all colors (good and bad) within*." (S79, Female)

Category 8: Difficult to Attain

As shown in Table 1, the difficult-to-attain category consisted of two metaphors (2.7%) generated by three participants. The most frequently mentioned metaphor in this category was the "stars in the universe" metaphor (Table 1).

> "*Ethics is like stars in the universe, because reaching and adhering to ethics fully is as challenging as reaching the stars*." (S47, Male)

> "*Ethics is like the universe, because it is infinite*." (S68, Male)

Ethical Values Metaphors and Categories

According to students' statements, 80 different metaphors and nine categories emerged from the analysis of ethical values (Table 2).

Category 1: Individualism

The category of "ethical values as individualism" consisted of a total of 19 metaphors (23.8%), developed by 23 students. The most frequently mentioned metaphors in this category were fingerprint, book, and respect (Table 2). Sample metaphor expressions related to this category are given below:

> "*Ethical values are like fingerprints, because they are different for each person and unique to her*." (S52, Female)

> "*Ethical values are like a bag, because the reason for everyone's combination is different. It takes on a form according to each shape and person*." (S14, Female)

Category 2: Guiding

The category of "ethical values as guiding" included a total of 17 metaphors (21.3%), produced by 19 individuals. The most frequently mentioned metaphors in this category were map and navigation (Table 2). The students' statements are as follows:

> "*Ethical values are like a map, because it directs us toward our goal and serves as a guide regarding where things are located*." (S40, Female)

> "*Ethical values are like navigation, because it determines the course of our lives*." (S100, Male)

Category 3: Sociality

As shown in Table 2, the transparency category consisted of 11 metaphors (13.8%) generated by 16 students. The culture metaphor was the most frequently cited in this category (Table 1). Sample metaphor expressions related to this category are given below:

> "*Ethical values are like culture, because cultures vary for everyone and every society, and everyone maintains what they believe to be right (their culture). They originate from the past but are also influenced by the future*." (S7, Female)

> "*Ethical values are like the public, because they reflect society*." (S57, Male)

Category 4: Importance

The category of "ethical values as importance" included a total of eight metaphors (10.0%), produced by 12 individuals. The treasure and gold metaphors were the most frequently cited in this category (Table 2). Some examples of metaphors created by nursing students are as follows:

> "*Ethical values are like treasure, because it is hard to find*." (S62, Female)

> "*Ethical values are like gold, because gold is worthless without being processed; it gains value when it comes to light*." (S41, Female)

Category 5: Reciprocity

The category of "ethical values as reciprocity" covered a total of six metaphors (7.5%), developed by seven participants (Table 2). Two of the students made the following statements:

> "*Ethical values are like a flower, because as it is loved, watered, and cared for, it grows, develops, and emits a pleasant fragrance*." (S17, Female)

> "*Ethical values are like iron, because when values are upheld, that iron shines; if values are not upheld, that iron rusts*." (S87, Male)

Category 6: Limiting

As shown in Table 2, the limiting category consisted of five metaphors (6.6%) generated by seven students. The family metaphor was the most frequently cited in this category (Table 2). Sample metaphor expressions related to this category are given below:

> "*Ethical values are like family, because they involve acting within certain boundaries*." (S16, Female)

> "*Ethical values are like a house, because it is a whole in which you define your own boundaries and contain the things you love and find meaningful*." (S12, Female)

Category 7: Fundamental

The category of "ethical values as fundamental" consisted of a total of five metaphors (6.6%), developed by six students. The skeleton metaphor was the most frequently cited in this category (Table 2). Sample metaphor expressions related to this category are given below:

> "*Ethical values are like a skeleton, because it keeps us standing*." (S81, Female)

"*Ethical values are like the foundation of a building, because just as a building with an unstable foundation is doomed to collapse, so are people with unstable values*." (S22, Female)

Category 8: Giving Meaning to Life

The giving meaning to life category consisted of five metaphors (6.6%) generated by six students. The water metaphor was the most frequently cited in this category (Table 2). Two of the students made the following statements:

"*Ethical values are like women, because in their absence, life's meaning does not resonate*." (S92, Male)

"*Ethical values are like accessories, because they add color and meaning to our simple lives*." (S76, Female)

Category 9: Relational to Time

The category that generated the fewest metaphors regarding ethical values was the relational-to-time category. In this category, the metaphors of time, tradition changing over time, the lifespan of a butterfly, and the moon were produced by four students (Table 2).

"*Ethical values are like tradition changing over time, because they vary with time*." (S65, Male)

"*Ethical values are like the moon, because just as the moon transitions between crescent and full phases, values also exhibit variability*." (S77, Female)

Discussion

The use of metaphors to make sense of and concretize abstract and complex concepts is a widely employed and powerful research method in the literature.[30] As in every field, ethics and ethical values are two indispensable fundamental concepts in the nursing profession; however, due to their abstract nature, they are often difficult to articulate and comprehend. Therefore, understanding how these abstract concepts are perceived, expressed, and concretized by students forms the starting point of this research.

In our study, the students used 74 different metaphors related to ethics and 80 different metaphors related to ethical values, which were analyzed into eight and nine categories, respectively. The findings were discussed in light of the relevant literature on the concepts of ethics and ethical values. Our study revealed that the majority of the participants used positive metaphors. Thus, it can be stated that students who hold positive mental images of ethics during their education may develop stronger professional ethical values, in line with their statements. Central to understanding how nurses might approach their practice ethically is the idea that nursing education has the potential to foster ethically aware practice that addresses the inevitable uncertainties in complex situations.[33] It has been demonstrated that nurses' practice behaviors are influenced by their professional beliefs and moral values.[18] Therefore, it is critical to understand the ethical beliefs and professional values of nursing students, as this knowledge may be used to guide curricular decisions and instructional practices that build students' professional reflective competencies.

When the metaphors developed by the students about ethics in our study were divided into categories, the "guiding" category, emphasized by approximately one-third of the students, was the most prominent. Students highlighted the guiding role of ethics through metaphors such as teacher, compass, sun, pole star, lighthouse, and lantern, indicating positive and strong perceptions of ethics. Students substantially associated ethics with "guidance," suggesting that they perceived ethics as leading the way in their lives. Additionally, approximately one-fifth of the students used "guiding" metaphors for ethical values as well. These findings also illustrate how students position ethics in their lives. The results are consistent with previous metaphor-based studies conducted with students from different disciplines. In a study conducted with undergraduate child development students, metaphoric perceptions of the concept of ethics were mainly grouped under the categories of protection and strengthening of fundamental rights and complementary–supportive. Within these categories, ethics was conceptualized through metaphors emphasizing regulation, adherence to rules, setting boundaries, protection, and unchangeable principles, as well as through expressions highlighting its strengthening, foundational, and supportive role. Together, these metaphors indicate that students perceive ethics both as a normative framework that regulates behavior and safeguards rights, and as a guiding structure that supports and reinforces professional practice and moral decision-making.[35] In a study examining education faculty students' perceptions of ethics, the majority of metaphors were grouped under the category of social order regulation, with ethics described in terms of rule compliance, maintaining order, and imposing limitations.[36] Similarly, a study involving medical students reported that ethics was primarily conceptualized as a problem-solving and order-regulating phenomenon, with most metaphors emphasizing its role as a social regulatory mechanism.[37] The convergence of these findings across different academic fields suggests that students tend to perceive ethics predominantly as a structure that ensures order, regulates behavior, and protects rights at both individual and societal levels. This perception aligns with the broader literature, which defines ethics as a system of values, principles, norms, and standards essential for maintaining harmony, well-being, and social welfare in individual and collective life. From this perspective, the metaphoric expressions identified in the present study reflect a shared understanding of ethics as both a regulatory and supportive force shaping moral conduct and professional responsibility.

In addition, one-fourth of the students used metaphors such as inner happiness and restlessness, key-lock, devil and angel, heart, and brain, which express opposing elements, to convey that ethics functions as a two-way process. For instance, the "angel" represents all that is good in humans, whereas the "devil," a fallen angel, represents all that is bad. Nursing students are constantly confronted with decision-making that is moral in nature. Thus, we consider that nursing ethics education for these students might be best achieved through a supportive approach that takes their religious viewpoints into account to improve beliefs, values, and attitudes.

Almost one-fourth of the students who developed individualism-related metaphors likened ethical values to respect, conscience, belief, emotion, kindness, and an inner voice. The development of ethical values in nursing students, influenced by their personal values and attitudes toward ethical behaviors, was associated with their perceptions.9 Through key metaphors such as culture, moral norms, society, country, and economy, students highlighted the sociality of ethics ideals, indicating their understanding of the importance of cultural and societal competence in nursing care. There are several ethnic and religious groups in Türkiye. In the context of such cultural diversity, the existence of these groups calls for a cross-cultural perspective. Many studies suggest that, because nursing is a profession with a high likelihood of caring for patients with diverse cultural and health beliefs, this competency should be specifically promoted in nursing ethics education. Additionally, ethical case examples or simulation scenarios involving culturally diverse populations and ethical dilemmas can be emphasized to better prepare students for the profession.

Limitations

The results of this study are limited to the time of data collection and the study population. Thematic analysis was used to gather a wide range of metaphors, and the research team's interpretations were used to determine the themes. As a result, it is possible that different team members may interpret metaphors differently based on their sociocultural background, individual experiences, professional training, and other characteristics. However, this subjectivity is inherent in qualitative research and reflects the richness of individual human experiences.

Conclusion

Many metaphors related to ethics and ethical values were identified in this study. The present findings may enable educators and researchers to gain a deeper understanding of ethics and ethical values in nursing from a different perspective. Furthermore, this study provides information that may be used to assess nursing students' perceptions of ethics and ethical values at the onset of their professional education and to monitor how these perceptions develop throughout the educational process in relation to the quality of nursing care and curriculum content.

Based on the findings of this study, future research may further explore nursing students' metaphoric perceptions of ethics and ethical values across different educational levels, cultural contexts, or clinical experiences. Longitudinal studies could examine how these metaphoric perceptions evolve throughout nursing education and professional socialization. In addition, comparative studies involving students from different health disciplines may contribute to a broader understanding of how ethics and ethical values are conceptualized within healthcare professions. Finally, metaphor analysis may be used as a complementary qualitative approach in ethics-related research to support the exploration of abstract and value-laden concepts.

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