

WOMEN'S HEALTH AND MULTIDISCIPLINARY RESEARCH

FEATURED ARTICLES

Does Uterine Length Affect TLH Outcomes?

Activity Levels in Postmenopausal Women by Osteoporosis Status

vNOTES in Ruptured Ectopic Pregnancy

Sociological Dimensions of Women's Pain

KARE



Vol 2
Issue 1
2026

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AIMS

Women's Health and Multidisciplinary Research is the official peer-reviewed, open-access scientific journal of the Turkish Gynecology and Obstetrics Foundation (TJOV). The journal is dedicated to advancing excellence in women's health through a comprehensive, integrative, and multidisciplinary perspective.

Its mission is to provide a global forum for clinicians, scientists, rehabilitation specialists, public health professionals, psychologists, policymakers, and allied health experts to disseminate high-quality research. By bridging medical, surgical, psychosocial, and rehabilitative sciences, the journal fosters innovation, informs best practices, and promotes equity in women's health across the entire lifespan.

SCOPE

The journal welcomes original research articles, systematic reviews, meta-analyses, case reports, study protocols, consensus statements, clinical guidelines, perspectives, and commentaries. Its scope covers the full continuum of women's health, emphasizing multidisciplinary collaboration and translational impact.

Core Areas of Interest

- **Gynecology and Obstetrics:** Reproductive endocrinology, infertility, maternal-fetal medicine, prenatal diagnosis, obstetric care, gynecological oncology, and minimally invasive surgery.
- **Clinical Medicine in Women's Health:** Cardiology, endocrinology, oncology, autoimmune diseases, and chronic non-communicable conditions affecting women.
- **Reproductive and Sexual Health:** Contraception, fertility preservation, pregnancy, menopause, sexual health, adolescent reproductive health, and gender-diverse populations.

- **Pelvic Health and Rehabilitation:** Urinary and anal incontinence, pelvic organ prolapse, chronic pelvic pain, sexual function, and interdisciplinary therapeutic strategies.
- **Mental and Behavioral Health:** Perinatal psychiatry, depression, anxiety, trauma, eating disorders, lifestyle medicine, and health promotion.
- **Public Health, Policy, and Equity:** Health systems, access and disparities, social determinants of health, global women's health, and policy-oriented research.
- **Lifespan and Aging:** Adolescent health, midlife transitions, menopause, osteoporosis, frailty, cognitive decline, and geriatric care.

EDITORIAL VISION

As the official publication of the Turkish Gynecology and Obstetrics Foundation, Women's Health and Multidisciplinary Research aspires to be a leading international reference for multidisciplinary scholarship in women's health. The journal:

- Publishes research of the highest scientific and ethical standards.
- Promotes collaboration across all relevant disciplines, from basic science to clinical care and policy.
- Champions diversity, inclusivity, and global equity in women's health research.
- Supports open science, methodological rigor, and translational innovation.

Through this vision, the journal seeks not only to advance scientific knowledge but also to improve clinical practice, influence policy, and enhance the health and quality of life of women worldwide.



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AIM & SCOPE

Women's Health and Multidisciplinary Research is an open access journal that publishes national and international manuscripts in the field of health sciences. The journal accepts original articles, review / meta-analysis, brief report, case report, letter to the editor, and manuscripts related to the history of medicine in different disciplines in the field of health sciences.

All manuscripts must be submitted electronically to <https://whmr.manuscriptmanager.net/>.

Women's Health and Multidisciplinary Research is a journal that publishes manuscripts in the field of medicine, pharmacy, dentistry, sports and health sciences (nursing, physical therapy and rehabilitation, nutrition and dietetics, midwifery, ergotherapy, audiology, speech and language therapy).

- The language of the journal is English
- It is an international electronic journal.
- Publishes scientific articles in general health sciences by evaluating them within the framework of the principles of refereeing.
- Women's Health and Multidisciplinary Research is an open access journal; that is published articles can be accessed on the journal's online page without any subscription or fee. LHU Open Access Policy is taken as basis for the journal to be open access.
- Article submission and access is free.
- Three issues are released every year in April, August and December.
- Starting from 2026, Women's Health and Multidisciplinary Research will be published four times a year, in March, June, September and December.

EDITORIAL POLICY

The editorial and publication processes of the journal are shaped in accordance with the international guidelines. Original manuscripts that have not been published before in an electronic or printed medium in any language, having high specific quality and citation potential will be accepted for publication. Manuscripts that have been presented in a meeting before should be submitted with detailed information of the event. Any question related to the editorial process should be forwarded to the secretariat, managing editor or the editor-in-chief and should be sent to kare@karepb.com.

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REVIEW PROCESS

All submitted manuscripts will undergo a double-blind peer-review process. At least two independent reviewers who are experts in their field will evaluate the publication potential of the manuscripts within four weeks. The editor-in-chief has the final decision-making opportunity for all submissions. For the evaluation process of manuscripts submitted by the editorial board members of the journal, an external and independent editor will be invited. If any revision is advised, the revised manuscript should precisely indicate every step taken in accordance with the reviewers' notes.

ETHICS

Studies using human or animal subjects should be approved by the appropriate institutional and local Ministry of Health ethics committees. Ethics approval of research protocols 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, as well as for some case reports. Ethics committee reports or an equivalent official document may be requested from the authors.

In all manuscripts, a statement regarding the patient consent, and the details of the ethical approval (name of the ethics committee, date and number) should be stated in the Materials and Methods section. For photographs that may reveal the identity of the patients, signed releases of the patient or of their legal representative should be enclosed.

AUTHORSHIP

Each individual 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 be based on the following 4 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.

For the manuscript submission, it is the responsibility of corresponding authors to submit a signed and scanned version of the authorship contribution form (available for download through <https://whmresearch.com/assets/pdfs/author-contribution-form.pdf>). All authors and the order of authors should be listed carefully at the time of the original submission. Any addition, removal or re-arrangement author names in the authorship list should be made only if approved by the journal Editor before the manuscript has been accepted. For such an alteration, corresponding author should define the reason for the change in author list in detail with a written confirmation from all authors that they agree this alteration.

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Women's Health and Multidisciplinary Research requires the authors of submitted manuscripts to disclose any existing or potential conflicts of interests, including financial, consultant, and institutional relationships, that might lead to potential bias or a conflict of interest. The ICMJE Potential Conflict of Interest Disclosure Form should be completed and submitted by all contributing authors to disclose any potential conflict of interest. Cases of a potential conflict of interest of the editors, authors, or reviewers are resolved by the journal's editorial board according to COPE and ICMJE guidelines.

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All submissions are screened using similarity detection software (iThenticate; Turnitin LLC, Oakland, CA, USA) at least two times: on submission and before publication. In the event of alleged or suspected research misconduct, the editorial board will follow and act in accordance with COPE guidelines.

Artificial Intelligence (AI)–Assisted Technology

At submission, the journal should require authors to disclose whether they used artificial intelligence (AI)–assisted tech-

nologies (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 AI-assisted 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.

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Women's Health and Multidisciplinary Research is an open access journal, which means that all content is freely available to read, download, copy, distribute, print, search, or link to the full texts of the articles, without charge to any user. There are no submission fees, publication fees, or page charges for this journal.

MANUSCRIPT PREPARATION

Manuscripts should be prepared in accordance with the international guidelines.

Manuscripts may only be submitted through the journal's online manuscript submission and evaluation system, <https://whmr.manuscriptmanager.net/>.

The first step in the evaluation is the technical evaluation process. In the technical evaluation, the editorial staff will ensure that the manuscript has been prepared and submitted in accordance with the journal's guidelines. Manuscripts that do not conform to the journal's guidelines will be returned to the author with requests for technical correction. The quality and clarity of the language used in a manuscript is very important. Please refer to specific formatting requirements noted in the submission checklist, not to cause any delays for your manuscript.

Authors are required to prepare manuscripts in accordance with the international guidelines* below

Randomized Controlled Trial **	CONSORT (Consolidated Standards of Reporting Trials)
Non-Randomized Trial **	TREND (Transparent Reporting of Evaluations with Non-randomised Designs) (https://www.cdc.gov/trendstatement/index.html)
Trial Protocol	SPIRIT (Standard Protocol Items Recommendations for Interventional Trials)
Observational Epidemiologic Studies (cohort, case-control, cross-sectional)	STROBE (the STrengthening the Reporting of Observational studies in Epidemiology)
Systematic Reviews and Meta-Analyses	PRISMA (the Preferred Reporting Items for Systematic Reviews and Meta-Analyses)
Systematic Reviews and Meta-Analyses Protocol	PRISMA-P (the Preferred Reporting Items for Systematic Reviews and Meta-Analyses - Protocol)
Experimental Animal Studies	ARRIVE (the Animal Research: Reporting of In Vivo Experiments)
Diagnostic Accuracy Studies	STARD (the Standards for Reporting Diagnostic Accuracy)
Qualitative Research	-SRQR (the Standards for Reporting Qualitative Research) -COREQ (Consolidated criteria for Reporting Qualitative research: interviews and focus groups)
Methodological Studies (Translating and Adapting Tests)	ITC (International Test Commission) Guidelines for Translating and Adapting Tests (https://www.intestcom.org/)
Methodological Studies (Developing Tests)	COSMIN (COnsensus based Standarts fort he selection of Health Measurement Instruments-Study Design for Patient-reported outcome measurement instruments)
Case Report	CARE (Case Reporting)

* Enhancing the QUALity and Transparency Of Health Research (equator network) (<https://www.equator-network.org/>)

**The Women's Health and Multidisciplinary Research encourages the registration of all clinical trials (randomized and non-randomized) via ClinicalTrials.gov (www.clinicaltrials.gov) or one of the registries of the WHO's International Clinical Trials Registry Platform (ICTRP: <http://www.who.int/ictRP/network/primary/en/index.html>). The name of the trial registry and the registration number together should be provided at the end of the abstract.

MANUSCRIPT FORMATTING AND TYPES

The manuscript should be typed in a Microsoft Word™ file, single-column format, double-spaced with 2.5 cm margins on each side, and 12-point type in Times New Roman font.

All abbreviations in the text must be defined the first time they are used (both in the abstract and the main text), and the abbreviations should be displayed in parentheses after the definition. Authors should avoid abbreviations in the title. Measurements should be reported using the metric system according to the International System of Units (SI). When a drug, product, hardware, or software mentioned within the main text product information, including the name of the product, producer of the product, city of the company and the country of the company should be provided in parenthesis.

Editorial comment: Editorial comments provide a brief critical commentary by an invited experienced author in the top-

ic of a research article previously published in the journal. The word count is limited to 1200 and 10 references may be included.

The submission should not include an abstract, keywords, tables, figures, and images.

Case report: Reports of rare cases or conditions that reflect challenges in diagnosis and treatment, or present something otherwise particularly interesting and educative will be accepted. It should contain an unstructured abstract of a maximum of 150 words and the text should be structured with subheadings of introduction, case report, and discussion. A case report is limited to 1200 words and 10 references.

Brief report: A brief report expresses a focused message in an interesting topic. It can include small case series, negative trials, the preliminary results and others that are not to be published as a full text paper. Brief report is restricted to a

maximum of 1500 words, no more than 1 table and 3 figures, and 15 references. It should contain an unstructured abstract of a maximum of 150 words.

Original Article: It provides new information based on an original and novel research. It should contain a structured abstract of a maximum of 250 words with the following subheadings: Background and Aims, Methods, Results, and Conclusion. The main text of an original article should be structured with Introduction, Methods, Results, Discussion, Conclusion, Acknowledgments, References, Tables, and Figure Legends subheadings. Original articles are limited to 3500 words and 30 references.

Review article: There are two types of review articles; Narrative reviews and Systematic reviews.

For the narrative reviews, the authors who have extensive knowledge and a scientific background of a particular field will be invited by the journal staff. This type of reviews evaluates the current level of knowledge of a topic in clinical practice and should guide future studies. All invited review articles will also undergo peer review prior to acceptance. The main text should contain introduction, clinical and research consequences, and conclusion sections. At the end of the introduction, a short description of how the articles

reviewed have been selected (keywords, time period of the search, etc.) should be included.

In systematic reviews, a direct question should be addressed. Data sources, study eligibility criteria, participants, interventions, and statistical analysis should be defined in detail. The main text of a systematic review should contain Introduction, Methods, Results, Discussion, and Conclusion subheadings.

History of medicine: The manuscripts related to the history of medicine, prepared by authors who have extensive knowledge of a particular historical field, invention, surgical procedure, or application are also welcomed. The text should include an unstructured abstract of a maximum 150 words, keywords, a short introduction, historical background of the subject, and a conclusion. An article on the history of medicine is limited to 3000 words and 40 references.

Letter to the editor: This type of manuscript discusses important observations, ignored aspects, or details lacking in a previously published article. The article that is the subject of commentary must be properly cited within the manuscript. No abstract, keywords, tables, figures, images, or other media should be included. The text should be unstructured and is limited to 500 words. No more than 5 references will be accepted.

Table 1. Limitations for each manuscript type

Type of manuscript	Word limit	Abstract word limit	Reference limit	Table or Figure limit
Editorial comments	1200	No abstract, keywords	10	No, tables, figures, images
Original article	3000-3500	250 (Structured)	30	6
Brief report	1500	150	15	1 table and 3 figures
Narrative review	4000	250	40	6
Systematic review	4000	250 (Structured)	Depends on review frame (60 maximum)	6
Case report	1200	150 (Structured)	10	1 table, 2 figures or images
Letter to the editor	500	No abstract, keywords	5	No tables, figures, images
History of medicine	3000	250	Depends on review frame (40 maximum)	6

MANUSCRIPT PREPERATION

The entire submission process for a manuscript is completed online through the self-explanatory online submission system through the following website: <https://whmr.manuscriptmanager.net/>. An appropriate preparation and submission process will prevent delays in the review process of the manuscripts.

Cover Letter: The cover letter should include the article name, article type, and the full name and address of the corresponding author. Corresponding author should declare the absence or presence of any conflict of interest in cover letter, and should affirm that the paper has not already been published, accepted, or is under simultaneous review

for publication elsewhere in any language. For manuscripts that have been presented orally or as a poster, this must be stated on the title page with the date and the place of the presentation.

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

The English full title of the manuscript no more than 150 characters and a English short title (running head) of no more than 50 characters

Name, affiliation, ORCID ID number, e-mails and highest academic degree of the author(s)

The statement of conflict of interest and funding information

Name, address, phone number(s), 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 English abstract is required with all submissions except editorial comments, images, and letters to the editor.

Keywords: Each submission must be accompanied by a minimum of three and a maximum of six keywords for subject indexing included at the end of the abstract. The keywords should be selected from the National Library of Medicine, Medical Subject Headings database (<https://www.nlm.nih.gov/mesh/MBrowser.html>).

Main Document: The main document should include the main text, the reference list, tables, and figure legends, respectively. Any information that may indicate an individual or institution should be excluded from the main document. Statistical analysis should be conducted in accordance with the guidelines on reporting statistical data in medical journals [Altman DG, Gore SM, Gardner MJ, Pocock SJ. Statistical guidelines for contributors to medical journals. *Br Med J* 1983; 7; 1489-93 and Lang T, Altman D. Basic statistical reporting for articles published in clinical medical journals: the SAMPL Guidelines. In: Smart P, Maisonneuve H, Polderman A (editors). *Science Editors' Handbook*, European Association of Science Editors, 2013.]. The software used for statistical analysis must be described. 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 and drawbacks of original articles should be mentioned in the Discussion section before the conclusion paragraph.

Tables

Tables should be uploaded as separate files in word format and not embedded in the main text. 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 table with footnotes, even if they are defined within the main text.

Figures and figure legends

Figures, graphics, and photographs should be submitted as separate files in TIFF or JPEG format through the article submission system. The files should not be embedded in a Word document or the main document. Thick and thin arrows, arrowheads, stars, asterisks, and similar marks can be used on the images to support figure legend. Any information within the images that may identify an individual or institution should be blinded. The minimum resolution of each submitted figure should be 300 DPI. Figure legends should be listed at the end of the main document.

References

The editorial team may further request that the authors cite relatively recently published articles (preferably within the last 5 years) in their manuscripts, with the exception of papers e.g., concentrating on the history of Medicine and Health Sciences. Reference listings must be in accordance with ICMJE standards and numbered consecutively at the very end of the manuscript in the order in which they are mentioned in the text. If an ahead of print publication is being cited the DOI number should be provided. Authors are responsible for the accuracy of the references. Journal titles should be abbreviated in accordance with the journal abbreviations in Index Medicus/ Medline/PubMed (for journal abbreviations please consult the List of Journals indexed for MEDLINE, published annually by NLM). provided there are 6 or less authors, all the authors should be enlisted. If there are 7 or more authors, the first 6 authors should be listed followed by "et al". In the main text of the manuscript, all the references should be cited using Arabic numbers in parentheses. Last, it is essential that all the references listed should be in English (subject titles and journal names should be in English). The subject titles in a language other than English and the journal names other than English need to be given in parentheses at the end. The reference styles for different types of publications are presented in the following examples in this regard:

Journal article: Wu CC, Econs MJ, DiMeglio LA, Insogna KL, Levine MA, Orchard PJ, et al. Diagnosis and management of osteopetrosis: Consensus guidelines from the Osteopetrosis Working Group. *J Clin Endocrinol Metab* 2017;102(9):3111–23.

Armstrong N, Ryder S, Forbes C, Ross J, Quek RGW. A systematic review of the international prevalence of BRCA mutation

in breast cancer. Cecconi M, Evans L, Levy M, Rhodes A. Sepsis and septic shock. *Lancet* 2018;392(10141):7587.

Aslan MH, Vural M. Gram Negative Bacteria Isolated from Blood Cultures and Their Antibiotic Susceptibility. *Trends Surg Sci* 2025;4(1):11-17. [In Turkish]

Epub ahead-of-print article: Huyut MA. Kidney Injury Molecule-1 Is Associated with Contrast-Induced Nephropathy in Elderly Patients with Non-STEMI. *Arq Bras Cardiol.* 2021 Mar 29:S0066-782X201005005201. Portuguese, English. doi: 10.36660/abc.20200172. Epub ahead of print. PMID: 33787767.

Manuscript published in electronic format: T.C. Ministry of Health, General Directorate of Public Health. COVID-19 (SARS-CoV2 Infection) Guide (Science Board Study) March 25, 2020. www.hsgm.saglik.gov.tr

Book section: Suh KN, Keystone JS. Malaria and babesiosis. Gorbach SL, Barlett JG, Blacklow NR, editors. *Infectious Diseases*. Philadelphia: Lippincott Williams; 2004.p.2290-308.

Conference proceedings: Bengissson S. Sothemin BG. Enforcement of data protection, privacy and security in medical informatics. In: Lun KC, Degoulet P, Piemme TE, Rienhoff O, editors. *MEDINFO 92. Proceedings of the 7th World Congress on Medical Informatics*; 1992 Sept 6-10; Geneva, Switzerland. Amsterdam: North-Holland; 1992. pp.1561-5.

Scientific or technical report: Cusick M, Chew EY, Hoogwerf B, Agrón E, Wu L, Lindley A, et al. Early Treatment Diabetic Retinopathy Study Research Group. Risk factors for renal replacement therapy in the Early Treatment Diabetic Retinopathy Study (ETDRS), Early Treatment Diabetic Retinopathy Study Kidney Int: 2004. Report No: 26.

REVISIONS

When submitting a revised version of a paper (include a clean copy and a highlighted copy), the author must submit a de-

tailed "Response to reviewers" that replies to each issue point by point raised by the reviewers and indicates where changes can be found (each reviewer's comment, followed by the author's reply and line number where changes have been made). 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 will be automatically withdrawn. If the submitting author(s) believe that additional time is required, they should request this extension within the initial 30-day period.

PUBLICATION PROCESS

Accepted manuscripts are copy edited for grammar, punctuation, format, and clarity. 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 the scheduled issue. A PDF proof of the manuscript is sent to the corresponding author and their publication approval is requested within 2 days of receipt of the proof.

Accepted manuscripts will be made available and citable online as rapidly as possible. The stages of publication are as follows;

Uncorrected publication: A PDF of the final, accepted (but unedited and uncorrected) paper will be published online on the journal web page under the "Accepted Articles" section. A DOI will be assigned to the article at this stage.

Ahead-of-print publication: After copy editing, typesetting, and review of the resulting proof, the final corrected version will be added online in the "Ahead-of-Print" section.

Final publication: The final corrected version will appear in an issue of the journal and added to the journal website. To ensure rapid publication, we ask authors to provide your publication approval during the proofreading process as quickly as possible, and return corrections within 48 hours of receiving the proof.

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All statements and opinions expressed in the manuscripts published in Women's Health and Multidisciplinary Research reflect the views of the author(s).

Each individual listed as an author should fulfill the authorship criteria recommended by the International Committee of Medical Journal Editors (ICMJE). The ICMJE recommends that authorship should be based on the following 4 criteria:

Substantial contributions to the conception or design of the work, or the acquisition, analysis, or interpretation of data for the work; AND

Drafting the work or revising it critically for important intellectual content; AND

Final approval of the version to be published; AND

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 their own work, authors should have confidence in the integrity of the contributions of their co-authors and each author should be able to identify which co-authors are responsible for other parts of the work.

All of 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 provided a contribution but do not meet all four criteria should be recognized separately on the title page and in the Acknowledgements section at the conclusion of the manuscript.

Women's Health and Multidisciplinary Research requires that corresponding authors submit a signed and scanned version

of the authorship contribution form (available for download through) during the initial submission process in order to appropriately indicate and observe authorship rights and to prevent ghost or honorary authorship. Please note that the list of authors on the final manuscript will be presented in the order provided on this form. 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 they accept all responsibility for authorship during the submission and review stages of the manuscript.

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Corrections Policy

If the editors or publisher learn from a third party that a published work contains a material error or inaccuracy, the authors must promptly correct or retract the article or provide the journal editors with evidence of the accuracy of the article.

Ethics Policy

The Editorial Board of the Women's Health and Multidisciplinary Research and the Publisher adheres to the principles of the International Council of Medical Journal Editors (ICMJE), the World Association of Medical Editors (WAME), the Council of Science Editors (CSE), the Committee on Publication Ethics (COPE), the US National Library of Medicine (NLM), the World Medical Association (WMA) and the European Association of Science Editors (EASE).

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Uterine Long-Axis Length Is Not Associated with Perioperative Outcomes in Total Laparoscopic Hysterectomy for Benign Disease: A Retrospective Cohort Study

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Cite this article as:

Coşkun ES, Bacak HB.
Uterine Long-Axis Length Is Not
Associated with Perioperative
Outcomes in Total Laparoscopic
Hysterectomy for Benign
Disease: A Retrospective Cohort
Study. Womens Health Multidisc
Res 2026;2(1):1–7.

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Submitted: 21.01.2026

Accepted: 09.02.2026

Online: 30.03.2026

Women's Health and Multidisciplinary
Research - Available online at
www.whmrsearch.com

ABSTRACT

Background and Aim: To assess whether pathology-measured uterine long-axis length is associated with short-term perioperative outcomes among patients undergoing total laparoscopic hysterectomy (TLH) for benign indications.

Methods: This single-center retrospective cohort study included women (≥ 18 years) who underwent TLH between January 2020 and January 2025 and had a documented uterine long-axis measurement in the final pathology report. Patients with malignancies or incomplete key data were excluded. Uterine long-axis length was categorized as < 8 cm, 8–12 cm, and > 12 cm. The primary outcome was perioperative hemoglobin change (defined as preoperative hemoglobin minus postoperative day 1 hemoglobin). Secondary outcomes included length of hospital stay, conversion to laparotomy, and perioperative complications (classified by Clavien–Dindo). Outcomes were compared using unadjusted between-group analyses, with effect sizes reported with 95% confidence intervals (CIs).

Results: Of 410 TLH cases, 406 were included: 116 (28.6%) had a uterine long-axis length < 8 cm, 256 (63.1%) were in the 8–12 cm range, and 34 (8.4%) were > 12 cm. The median hemoglobin decline did not differ across groups (1.5, 1.4, and 1.5 g/dL, respectively; $p=0.588$). Compared to the < 8 cm group, the median difference in hemoglobin drop was -0.1 g/dL (95% CI -0.2 to 0.1) for the 8–12 cm group and 0.0 g/dL (95% CI -0.4 to 0.3) for the > 12 cm group. Length of stay was similar (median 3 days in all groups; $p=0.241$). The mean differences in length of stay compared to the < 8 cm group were $+0.24$ days (95% CI -0.07 to 0.54) for the 8–12 cm group and $+0.11$ days (95% CI -0.39 to 0.66) for the > 12 cm group. Perioperative complications occurred in 30 of 406 patients (7.4%; $p=0.251$), and conversion to laparotomy was rare (1/406; 0.25%; $p=0.746$).

Conclusion: In this selected TLH cohort, pathology-measured uterine long-axis length categories were not associated with poorer short-term perioperative outcomes in unadjusted analyses. Given baseline differences between groups, the lack of multivariable adjustment, and the small > 12 cm subgroup, these findings should be interpreted cautiously.

Keywords: Hemoglobin drop, perioperative complications, total laparoscopic hysterectomy, uterine long-axis length, uterine size



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INTRODUCTION

Hysterectomy remains one of the most frequently performed major gynecologic surgeries for benign diseases. Multiple surgical approaches are available: abdominal, vaginal, and laparoscopic, each with distinct trade-offs in recovery time and perioperative morbidity. High-level evidence consistently demonstrates that minimally invasive approaches, when feasible, are associated with a faster return to normal activities and shorter hospital stays, with laparoscopy offering a valuable alternative when vaginal hysterectomy is not appropriate.^[1–3]

Despite these advantages, performing total laparoscopic hysterectomy (TLH) in patients with enlarged uteri is often considered technically challenging. Increased uterine size can reduce pelvic working space, distort anatomic landmarks, and complicate uterine artery control and specimen extraction. These factors may result in longer operative times, higher blood loss, an increased risk of conversion, and higher complication rates—concerns that continue to influence route selection in clinical practice.^[2,4]

The existing literature suggests that TLH can be feasible and safe even for large uteri, including studies with high uterine weight thresholds. However, the findings are heterogeneous and often confounded by mixed surgical approaches, differing definitions of “large uterus” (e.g., weight, gestational week equivalent, or imaging-based volume), and variability in surgical experience and extraction techniques.^[5–7] Moreover, while studies comparing TLH with other surgical routes in cases of enlarged uteri provide valuable insights for route selection, they do not fully isolate the effect of uterine size within a standardized TLH technique.^[8,9]

Given this gap, we conducted a single-center retrospective cohort study of patients undergoing TLH for benign indications, classifying uterine size based on the long-axis measurement in the final pathology report (<8 cm, 8–12 cm, and >12 cm). The primary outcome was perioperative hemoglobin change, while secondary outcomes included length of hospital stay and perioperative complications. Using this design, we aimed to evaluate whether increased uterine size is associated with clinically meaningful differences in perioperative outcomes in a consistent TLH setting.

MATERIALS AND METHODS

Study Design and Setting

This single-center retrospective cohort study was conducted in the Department of Obstetrics and Gynecology at our institution. It was based on a review of the hospital information system, operative records, and final pathology reports.

Study Population and Eligibility Criteria

Eligible patients were women aged ≥ 18 years who underwent total laparoscopic hysterectomy (TLH) between January 2020 and January 2025 and had complete perioperative clinical data, as well as a documented uterine long-axis measurement in the pathology report.

Patients were excluded if malignancy was suspected preoperatively, if surgery was performed for oncologic indications, if final pathology demonstrated malignancy, or if key clinical variables were missing.

Uterine Size Grouping

Uterine size, based on the long-axis measurement reported in the final pathology report, was classified into three predefined groups: <8 cm, 8–12 cm, and >12 cm. Uterine size was defined as the maximum uterine long-axis (largest dimension, in cm) recorded during gross examination in the final pathology report. Specimens were measured by the pathology team at the time of grossing; when available, measurements taken prior to formalin fixation were preferentially used to minimize shrinkage-related variation. The long axis was recorded as the largest uterine dimension.

Data Collection and Variables

Demographic variables and perioperative parameters were extracted from medical records, operative notes, and pathology reports. The dataset included, but was not limited to, age, parity, smoking status, comorbidity status, history of pelvic surgery, indication for hysterectomy, concomitant adnexal procedures, length of hospital stay, perioperative hemoglobin change, conversion, and perioperative complications.

Postoperative complications were classified using the Clavien–Dindo classification: Grade I, any deviation from the normal postoperative course without the need for pharmacologic treatment or procedural intervention; Grade II, requiring pharmacologic treatment; Grade III, requiring surgical/endoscopic/radiologic intervention (IIIa without general anesthesia, IIIb with general anesthesia); Grade IV, life-threatening complication requiring ICU management (IVa single-organ dysfunction, IVb multi-organ dysfunction); Grade V, death.

Data entry was cross-checked by the investigators, and incomplete or inconsistent records were handled prior to analysis according to predefined criteria.

Outcomes

The primary outcome was the perioperative hemoglobin difference. Secondary outcomes included the length of hospital stay and the presence of perioperative complications. Complications were assessed as intraoperative and postoperative

events, with postoperative complications evaluated within 30 days and, when available in the records, beyond 30 days.

Sample Size Considerations

This retrospective cohort study included all eligible cases during the study period, so no a priori sample size calculation was performed. We acknowledge that the relatively small >12 cm subgroup and the low frequency of some events may limit the power to detect modest between-group differences, thereby increasing the risk of a type II error. To support the interpretation of null findings, we report effect sizes with 95% confidence intervals for key outcomes.

Statistical Analysis

All statistical analyses were performed using IBM SPSS Statistics for Windows, Version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were assessed for distributional properties using visual methods and the Shapiro–Wilk test. Non-normally distributed continuous variables were summarized as the median (interquartile range [IQR]) and compared across uterine-size groups using the Kruskal–Wallis test. Categorical variables were summarized as numbers (%) and compared using the chi-square test or Fisher’s exact test, as appropriate. Where applicable, effect sizes are reported with 95% confidence intervals (Wilson 95% CIs for proportions; bootstrap 95% CIs for median and mean differences). A two-sided p -value <0.05 was considered statistically significant.

Ethics and Confidentiality

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Gaziosmanpaşa Training and Research Hospital Non-interventional Clinical Research Ethics Committee (Approval Number: 03, Date: 07.01.2026). Due to the retrospective nature of the study, informed consent was waived. Direct identifiers were removed prior to analyses, and only study codes were used for all analyses.

RESULTS

Study Population

A total of 410 patients underwent total laparoscopic hysterectomy (TLH) during the study period. After excluding 4 patients whose final pathology showed malignancy, 406 patients were included in the analysis. Based on the uterine long-axis measurement, 116 patients (28.6%) were classified as <8 cm, 256 (63.1%) as 8–12 cm, and 34 (8.4%) as >12 cm (Table 1).

Baseline Characteristics

Baseline characteristics differed among uterine size groups across several domains. Age differed significantly among the

groups (median [IQR]: 51.5 [47–61] years for <8 cm, 48 [44–51] years for 8–12 cm, and 49 [46–53] years for >12 cm; $p=2.6\times10^{-8}$). The proportion of patients with prior pelvic surgery also differed across the groups (31.0% in <8 cm, 42.2% in 8–12 cm, and 23.5% in >12 cm; $p=0.026$) (Table 1).

The distribution of surgical indications varied markedly by group ($p=7.8\times10^{-18}$). In the <8 cm group, endometriosis/chronic pelvic pain was common (42.2%), while in the 8–12 cm and >12 cm groups, abnormal uterine bleeding resistant to treatment predominated (57.0% and 55.9%, respectively), alongside symptomatic myoma (Table 1).

Comorbidity status, smoking, and parity were similar across groups (all $p>0.05$). Concomitant adnexal procedures differed between groups ($p=0.008$), and final pathology categories also showed significant between-group differences ($p=1.7\times10^{-7}$); leiomyoma was the most frequent diagnosis overall (Table 1).

Primary Outcome: Perioperative Hemoglobin Difference

The primary outcome, perioperative hemoglobin difference, was comparable between uterine-size groups (median [IQR]):

- <8 cm: 1.5 [1.1–1.8] g/dL
- 8–12 cm: 1.4 [1.0–1.8] g/dL
- >12 cm: 1.5 [1.0–1.8] g/dL

There was no significant difference across groups ($p=0.588$) (Table 2). Compared with the <8 cm group, the estimated median differences in hemoglobin drop were -0.1 g/dL (95% CI -0.2 to 0.1) for the 8–12 cm group and 0.0 g/dL (95% CI -0.4 to 0.3) for the >12 cm group.

Secondary Outcomes and Complications (Table 2)

The length of hospital stay was similar across groups (median [IQR]):

- <8 cm: 3.0 [2.0–3.0] days
- 8–12 cm: 3.0 [2.0–4.0] days
- >12 cm: 3.0 [2.0–3.0] days

There was no significant difference in length of stay across groups ($p=0.241$). Compared with the <8 cm group, the mean difference in length of stay was $+0.24$ days (95% CI -0.07 to 0.54) for the 8–12 cm group and $+0.11$ days (95% CI -0.39 to 0.66) for the >12 cm group.

At least one perioperative complication occurred in 30 of 406 patients (7.4%): 6 of 116 (5.2%; 95% CI 2.4–10.8) in the <8 cm group, 23 of 256 (9.0%; 95% CI 6.1–13.1) in the 8–12 cm group, and 1 of 34 (2.9%; 95% CI 0.5–14.9) in the >12 cm group ($p=0.251$) (Table 2).

Table 1. Baseline characteristics by uterine long-axis group (N=406)

Characteristic	<8 cm (n=116)	8–12 cm (n=256)	>12 cm (n=34)	P
Age (years)	51.5 (47.0–61.0)	48.0 (44.0–51.0)	49.0 (46.0–53.0)	<0.001
Parity	2.0 (2.0–3.0)	2.5 (2.0–4.0)	2.5 (2.0–4.0)	0.696
Any comorbidity	56/116 (48.3%)	100/256 (39.1%)	14/34 (41.2%)	0.248
Current smoking	31/116 (26.7%)	76/256 (29.7%)	7/34 (20.6%)	0.502
Prior pelvic surgery	36/116 (31.0%)	108/256 (42.2%)	8/34 (23.5%)	0.026
Indication for hysterectomy				<0.001
Symptomatic uterine myoma	23/116 (19.8%)	81/256 (31.6%)	14/34 (41.2%)	
Abnormal uterine bleeding refractory to medical therapy	29/116 (25.0%)	146/256 (57.0%)	19/34 (55.9%)	
Endometriosis / chronic pelvic pain	49/116 (42.2%)	22/256 (8.6%)	0/34 (0.0%)	
Non-atypical endometrial hyperplasia (refractory)	7/116 (6.0%)	5/256 (2.0%)	1/34 (2.9%)	
Pelvic organ prolapse (descent)	8/116 (6.9%)	2/256 (0.8%)	0/34 (0.0%)	
Concomitant adnexal procedure				0.008
None	1/116 (0.9%)	2/256 (0.8%)	0/34 (0.0%)	
Salpingo-oophorectomy	92/116 (79.3%)	154/256 (60.2%)	22/34 (64.7%)	
Salpingectomy	23/116 (19.8%)	100/256 (39.1%)	12/34 (35.3%)	
Final pathology				<0.001
Leiomyoma	46/116 (39.7%)	173/256 (67.6%)	28/34 (82.4%)	
Adenomyosis	18/116 (15.5%)	38/256 (14.8%)	4/34 (11.8%)	
Disordered proliferative endometrium	10/116 (8.6%)	15/256 (5.9%)	1/34 (2.9%)	
Atrophic endometrium	16/116 (13.8%)	6/256 (2.3%)	0/34 (0.0%)	
Chronic inflammation / endometriosis	21/116 (18.1%)	12/256 (4.7%)	1/34 (2.9%)	
Endometrial polyp	3/116 (2.6%)	9/256 (3.5%)	0/34 (0.0%)	
Simple non-atypical endometrial hyperplasia	1/116 (0.9%)	3/256 (1.2%)	0/34 (0.0%)	
Simple atypical endometrial hyperplasia	1/116 (0.9%)	0/256 (0.0%)	0/34 (0.0%)	

Data are presented as median (IQR) or n (%). P values were calculated using Kruskal-Wallis test for continuous variables and chi-square test (or Fisher exact test when appropriate) for categorical variables. IQR: Interquartile range.

Conversion to Laparotomy

Conversion to laparotomy was rare (1/406; 0.25%) and occurred only in the 8–12 cm group. Conversion rates were:

- 0/116 (0.0%; 95% CI 0.0–3.2) in the <8 cm group
- 1/256 (0.4%; 95% CI 0.07–2.2) in the 8–12 cm group
- 0/34 (0.0%; 95% CI 0.0–10.2) in the >12 cm group

There was no significant difference in conversion rates across the groups ($p=0.746$) (Table 2).

Intraoperative Complications

Intraoperative complications occurred in 10 of 406 (2.5%) patients and did not differ by uterine size ($p=0.973$). The types of intraoperative complications included:

- Ureteral injuries (n=4)
- Bladder injuries (n=4)
- Bowel injuries (n=2)

Postoperative Complications

Postoperative complications within 30 days occurred in 17/406 (4.2%) patients. These complications were numerically higher in the 8–12 cm group (5.9%) than in the <8 cm (1.7%) and >12 cm (0%) groups; however, this did not reach statistical significance ($p=0.081$) (Table 2). The most frequent early postoperative event was medical readmission for pain or ileus.

Late postoperative complications (>30 days) were uncommon (3/406, 0.7%) and did not differ between groups ($p=0.868$) (Table 2).

Clavien–Dindo Classification

When complications were summarized by the Clavien–Dindo classification, the distribution was similar across uterine-size groups ($p=0.69$), and the majority of patients had no complications (Table 2).

Table 2. Perioperative outcomes and complications by uterine long-axis group

Outcome	<8 cm (n=116)	8-12 cm (n=256)	>12 cm (n=34)	p
Hemoglobin drop (g/dL)	1.5 (1.1-1.8)	1.4 (1.0-1.8)	1.5 (1.0-1.8)	0.588
Length of hospital stay (days)	3.0 (2.0-3.0)	3.0 (2.0-4.0)	3.0 (2.0-3.0)	0.241
Conversion to laparotomy	0/116 (0.0%)	1/256 (0.4%)	0/34 (0.0%)	0.746
Intraoperative complication	3/116 (2.6%)	6/256 (2.3%)	1/34 (2.9%)	0.973
Postoperative complication within 30 days	2/116 (1.7%)	15/256 (5.9%)	0/34 (0.0%)	0.081
Postoperative complication after 30 days	1/116 (0.9%)	2/256 (0.8%)	0/34 (0.0%)	0.868
Any Clavien-Dindo complication (≥Grade I)	5/116 (4.3%)	21/256 (8.2%)	1/34 (2.9%)	0.25
Any complication (intra- or postoperative)	6/116 (5.2%)	23/256 (9.0%)	1/34 (2.9%)	0.251
Clavien-Dindo grade distribution				0.69
None	111/116 (95.7%)	235/256 (91.8%)	33/34 (97.1%)	
Grade I	0/116 (0.0%)	7/256 (2.7%)	0/34 (0.0%)	
Grade II	2/116 (1.7%)	5/256 (2.0%)	0/34 (0.0%)	
Grade IIIb	3/116 (2.6%)	8/256 (3.1%)	1/34 (2.9%)	

Data are presented as median(IQR) or n(%). P values were calculated using Kruskal-Wallis test for continuous variables and chi-square test (or Fisher exact test when appropriate) for categorical variables. Hemoglobin drop was defined as preoperative hemoglobin minus postoperative day 1 hemoglobin. IQR: Interquartile range.

DISCUSSION

In this single-center cohort of women undergoing total laparoscopic hysterectomy (TLH) for benign indications, uterine size, defined by long-axis length, was not associated with greater perioperative changes in hemoglobin, longer length of stay, higher overall perioperative complication rates, or higher conversion rates. These findings reinforce the broader consensus that minimally invasive hysterectomy should be preferred whenever feasible due to well-documented recovery advantages over open surgery.^[1] Importantly, our data suggest that within a consistent TLH practice, uterine enlargement—at least when categorized by long-axis measurement—does not inevitably lead to worse short-term clinical outcomes.

The literature on “large uterus” hysterectomy is heterogeneous, largely because the term “large” is variably defined (e.g., by uterine weight thresholds, gestational-week equivalents, or imaging-based metrics), and because extraction strategies and surgeon experience vary substantially across studies. Still, multiple reports evaluating laparoscopic hysterectomy in enlarged uteri indicate that, although technical complexity and operative time can increase, major complication rates may remain comparable to those for smaller uteri in experienced hands.^[10–12] In contrast, some series have reported higher blood loss and higher conversion rates as uterine weight increases, even when postoperative complication rates are similar, highlighting that “difficulty” may be more related to resource use and intraoperative decision-making than postoperative morbidity.^[11] In our cohort, conversion was exceptionally uncommon, a finding that differs from pooled estimates for laparoscopic hysterecto-

my overall (around 6% across mixed indications and settings), suggesting that local practice patterns, selection, and cumulative experience can strongly influence real-world outcomes.^[3,13]

Several observations from our baseline data are clinically relevant when interpreting these results. Age, prior pelvic surgery, indications, adnexal procedures, and distributions of final pathology differed across uterine-size groups. These variables plausibly influence surgical difficulty and complication risk independently of size. The absence of a size–outcome gradient despite these differences may indicate that uterine length alone is an imperfect surrogate for operative challenge and that other factors (adhesions, anatomy, uterine shape, concomitant pathologies, and surgeon strategy) may dominate the risk profile in routine TLH. This aligns with recent emphases in the field on structured case complexity assessment rather than using uterine size as a single binary threshold.^[3,7,11,13]

Baseline differences across uterine-size groups likely reflect distinct underlying disease patterns rather than size alone. In our cohort, smaller uteri were more frequently associated with endometriosis/chronic pelvic pain and atrophic endometrium, whereas larger uteri were predominantly linked to abnormal uterine bleeding and leiomyoma on final pathology.^[14–16] These patterns are clinically plausible and may influence perioperative risk through different mechanisms (e.g., adhesions and altered planes in endometriosis versus bulk-related exposure and extraction issues in leiomyomatous uteri).^[14,17] Therefore, the uterine long-axis length should be interpreted as one element of a broader “case complexity” phenotype rather than as a standalone marker.

Because age, prior pelvic surgery, indication, concomitant adnexal procedures, and final pathology differed between groups, confounding is an important consideration (Table 1). In these unadjusted comparisons, we did not observe statistically significant differences in hemoglobin decline, length of stay, or overall complication rates across categories of uterine long-axis length. Therefore, within this standardized TLH cohort, pathology-measured uterine long-axis length was not associated with worse short-term perioperative outcomes. However, residual confounding cannot be excluded. These findings underscore that perioperative outcomes in TLH are multifactorial; accordingly, uterine size should be interpreted alongside other clinical factors rather than as the sole criterion.^[17] Since the long-axis length was obtained from pathology, it should not be interpreted as a preoperative decision parameter.

This study has limitations inherent to retrospective analyses. First, analyses were limited to unadjusted between-group comparisons, and no multivariable adjustment was performed to account for baseline differences across uterine-size groups. Therefore, residual confounding may have influenced the observed associations. Second, uterine size was measured as the pathology-measured long-axis length rather than by weight or volume; this pragmatic approach may misclassify cases where bulk or shape (rather than length) drives difficulty. Third, the >12 cm subgroup was relatively small, limiting the power to detect modest differences. Fourth, outcomes such as operative time, estimated blood loss, specimen-extraction method, and surgeon-level factors were not the primary focus; these variables are important mediators and could explain why some studies detect size-related increases in conversion or blood loss.^[10,18] Finally, selection bias is possible: extremely complex cases may have been preferentially assigned to alternative routes, which would have attenuated size-related differences among TLH cases.

Despite these constraints, the strengths of our study include a uniform surgical approach (TLH only), predefined uterine-size strata, and clinically meaningful endpoints centered on hemoglobin change, hospitalization, and complications. From a practical standpoint, our findings support counseling patients that uterine enlargement, when assessed by long-axis length, does not necessarily indicate increased short-term morbidity following TLH. Prospective, multicenter studies that incorporate standardized metrics of uterine size (length, volume, and weight) and operative complexity (adhesions, extraction technique, and surgeon experience) would help clarify which components of “large uterus” truly drive risk and resource utilization.

CONCLUSION

In this single-center cohort of total laparoscopic hysterectomies performed for benign indications, increasing uterine

long-axis length (<8 cm, 8–12 cm, and >12 cm) was not associated with a greater perioperative decrease in hemoglobin, a longer hospital stay, higher perioperative complication rates, or an increased likelihood of conversion to laparotomy. These findings suggest that, within this selected TLH cohort and in unadjusted analyses, pathology-measured uterine long-axis length was not associated with worse short-term perioperative outcomes. However, baseline imbalances between groups, the absence of multivariable adjustment, and the small size of the >12 cm subgroup warrant cautious interpretation.

Ethics Committee Approval: The study was approved by the Gaziosmanpaşa Training and Research Hospital Non-interventional Clinical Research Ethics Committee (Approval Number: 03 Date: 07.01.2026).

Informed Consent: Informed consent was waived due to the retrospective nature of the study and the use of anonymized data.

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

Funding: The authors declared that this study received no financial support.

Use of AI for Writing Assistance: No use of AI-assisted technologies was declared by the authors.

Author Contributions: Concept – E.S.C.; Design – E.S.C.; Supervision – E.S.C.; Resource – E.S.C.; Materials – E.S.C.; Data Collection and/or Processing – E.S.C., H.B.B.; Analysis and/or Interpretation – E.S.C.; Literature Review – E.S.C., H.B.B.; Writing – E.S.C.; Critical Review – E.S.C.

Peer-review: Externally peer-reviewed.

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Physical Activity Levels in Postmenopausal Women with and Without Osteoporosis: A Comparative Study

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ABSTRACT

Background and Aim: Physical activity is an important modifiable factor influencing bone health and osteoporosis risk. However, it remains unclear whether postmenopausal women with osteoporosis are less physically active than those without osteoporosis in clinical populations. This study aimed to compare physical activity levels between postmenopausal women with osteoporosis and age-matched postmenopausal women without osteoporosis.

Methods: This prospective cross-sectional study included 105 postmenopausal women attending a physical medicine and rehabilitation outpatient clinic. Participants were classified into two groups according to lumbar bone mineral density measured by dual-energy X-ray absorptiometry: osteoporosis (n=57) and non-osteoporosis controls (n=48). Physical activity levels were assessed using the International Physical Activity Questionnaire–Short Form (IPAQ–SF), and metabolic equivalent minutes per week (MET–min/week) were calculated. Physical activity categories (low, moderate, high) and MET values were compared between groups.

Results: The mean age of participants was 59.0 ± 6.2 years, and the mean body mass index was 30.1 ± 4.1 kg/m². Overall, physical activity levels tended to be low in this cohort. According to the IPAQ classification, low physical activity levels were observed in 66.7% of women with osteoporosis and 70.8% of controls. The distribution of physical activity categories did not differ significantly between groups (p=0.894). Similarly, vigorous, moderate, walking, and total MET values were comparable between osteoporotic and non-osteoporotic women (p>0.05). Additional analyses based on BMI categories and lumbar T-score groups also showed no significant differences in physical activity levels.

Conclusion: Physical activity levels were similarly low in postmenopausal women with and without osteoporosis. The low physical activity levels observed in this study may reflect a common pattern within the studied clinical population; however, caution is warranted when generalizing these findings to the broader postmenopausal population. Population-level strategies promoting habitual physical activity may therefore be important for improving bone health in postmenopausal women.

Keywords: Bone density, exercise, osteoporosis, physical activity, postmenopause



Cite this article as:

Sali Çakır H, Dağcı S, Basat S.
Physical Activity Levels in
Postmenopausal Women with
and Without Osteoporosis:
A Comparative Study.
Womens Health Multidisc Res
2026;2(1):8–12.

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Submitted: 01.04.2026

Accepted: 26.04.2026

Online: 30.04.2026

Women's Health and Multidisciplinary
Research - Available online at
www.whmrsearch.com

INTRODUCTION

Osteoporosis is a systemic skeletal disorder characterized by reduced bone strength and increased fracture risk. It is a major health concern in aging populations.^[1,2] Its prevalence rises markedly after menopause due to estrogen deficiency–related acceleration of bone loss, making postmenopausal women the group at greatest risk for osteoporotic fractures.^[3,4]

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Physical activity is a key modifiable determinant of bone health. Mechanical loading during regular activity stimulates bone formation, enhances bone mineral density, and contributes to skeletal integrity.^[5,6] In contrast, low physical activity levels and sedentary behavior are associated with bone loss and increased osteoporosis risk.^[7]

With increasing urbanization and technological advancement, daily physical activity levels have declined in the general population, particularly among middle-aged and older women.^[8] A sedentary lifestyle has therefore emerged as an important behavioral risk factor for osteoporosis and osteoporotic fractures.^[5,7] Although low physical activity levels are recognized as a risk factor for osteoporosis, it remains unclear whether postmenopausal women with osteoporosis are less physically active than those without osteoporosis in clinical populations.^[9] Clarifying this relationship may help guide preventive strategies aimed at improving postmenopausal bone health.

However, existing studies have largely focused on general associations between physical activity and bone mineral density, while data directly comparing short-term self-reported physical activity with objectively measured bone mineral density in clinical populations remain limited. Additionally, evidence from rehabilitation clinic settings is scarce. Therefore, this study aims to address this gap by comparing physical activity levels assessed by the IPAQ-SF with DXA-derived bone mineral density in postmenopausal women.

This study therefore aimed to compare physical activity levels between postmenopausal women with osteoporosis and age-matched postmenopausal women without osteoporosis.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at the Physical Medicine and Rehabilitation outpatient clinic of Ümraniye Training and Research Hospital between April 1 and December 15, 2014. Postmenopausal women aged ≥ 45 years who attended the clinic during the study period were screened for eligibility. Menopause was defined as the absence of menstruation for at least 12 consecutive months. Participants with secondary causes of osteoporosis, metabolic bone disease, or conditions affecting mobility or physical activity were excluded. Eligible participants were classified into two groups according to lumbar bone mineral density (BMD): postmenopausal women with osteoporosis and postmenopausal women without osteoporosis. A total of 57 postmenopausal women with osteoporosis and 48 postmenopausal women without osteoporosis were included in the final analysis. The study protocol was approved by Ethics Committee of Ümraniye Training and Research Hospital (Approval Number: 4798, Date: 25.03.2014). The Helsinki Declaration of Human

Rights was followed. Written informed consent was obtained from all participants prior to enrollment.

Lumbar BMD was measured using dual-energy X-ray absorptiometry (DXA), and osteoporosis was defined as an L1–L4 T-score ≤ -2.5 in accordance with current international diagnostic criteria.^[10] All DXA measurements were performed using the same device and by the same experienced technician to ensure measurement consistency. Anthropometric data, including height and body weight, were recorded, and body mass index (BMI) was calculated as weight (kg)/height (m^2).

Physical activity levels were assessed using the International Physical Activity Questionnaire–Short Form (IPAQ-SF).^[11,12] The questionnaire was administered in a face-to-face interview by the same physician for all participants to ensure standardization. Participants were asked about walking, moderate-intensity, and vigorous-intensity activities performed during the previous 7 days. Activity duration and frequency were converted into metabolic equivalent minutes per week (MET-min/week) according to IPAQ scoring protocols. Participants were categorized into low, moderate, or high physical activity levels based on standard IPAQ classification.

Statistical Analysis

Statistical analyses were performed using SPSS software (IBM SPSS Statistics, version 22.0; IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean $\pm$ standard deviation, and categorical variables were presented as number and percentage. The normality of data distribution was assessed using visual (histogram and probability plots) and analytical methods (Kolmogorov–Smirnov and Shapiro–Wilk tests).

MET values demonstrated a markedly skewed distribution, as reflected by disproportionately large standard deviations relative to mean values. We acknowledge that non-parametric methods and alternative data presentation (e.g., median and interquartile range) may be more appropriate under such conditions. However, parametric analyses were retained to maintain consistency with the study design and existing literature, and because preliminary assessments indicated that the overall interpretation of results did not materially change. Nevertheless, this methodological consideration should be taken into account when interpreting the findings.

Between-group comparisons of categorical variables, including physical activity categories, were performed using the chi-square test. Continuous variables, including total MET scores and anthropometric measurements, were compared between groups using the independent-samples t-test. A two-tailed p-value < 0.05 was considered statistically significant.

Table 1. Demographic and anthropometric characteristics

Variable	Osteoporosis (n=57)	Control (n=48)	p
Age (years)	60.1±5.5	57.7±6.7	>0.05
Height (cm)	154.9±5.8	158.0±5.8	0.009
Weight (kg)	71.3±9.8	76.0±9.4	0.016
BMI (kg/m ²)	29.8±4.3	30.4±4.0	>0.05

Data are presented as mean±standard deviation. Between-group comparisons were performed using the independent-samples t-test. BMI: Body mass index.

Table 2. Physical Activity Categories (IPAQ)

Activity level	Osteoporosis n (%)	Control n (%)	p
Low	38 (66.7)	34 (70.8)	0.894
Moderate	16 (28.1)	12 (25.0)	
High	3 (5.3)	2 (4.2)	

Data are presented as number (%). Between-group comparisons were performed using the chi-square test. IPAQ: International Physical Activity Questionnaire.

RESULTS

A total of 105 postmenopausal women were included in the study, comprising 57 women with osteoporosis and 48 women without osteoporosis. The mean age of the entire cohort was 59.0±6.2 years (range: 44–69), and the mean body mass index (BMI) was 30.1±4.1 kg/m². Comorbid conditions in the overall population included diabetes mellitus in 20%, hypertension in 43.8%, hyperlipidemia in 23.8%, congestive heart failure in 4.8%, and coronary artery disease in 6.7%. The prevalence of these comorbidities did not differ significantly between osteoporotic and non-osteoporotic groups ($p>0.05$).

The demographic and anthropometric characteristics of the study groups were comparable. There were no statistically significant differences between osteoporotic and non-osteoporotic women in age, height, weight, or BMI ($p>0.05$) (Table 1).

Overall, physical activity levels tended to be low in this cohort. According to IPAQ classification, low physical activity levels were observed in 38 women (66.7%) in the osteoporosis group and 34 women (70.8%) in the control group. Moderate activity levels were present in 16 women (28.1%) in the osteoporosis group and 12 women (25.0%) in the control group, while high activity levels were observed in only 3 women (5.3%) and 2 women (4.2%), respectively. The distribution of physical activity categories did not differ significantly between groups ($p=0.894$) (Table 2).

A comparison of activity intensity components also showed similar values between groups. Vigorous-intensity MET values were 14.4±105.4 in osteoporotic women and 23.1±111.0 in

Table 3. Physical activity components and total MET

Variable (MET-min/week)	Osteoporosis	Control	p
Vigorous	14.4±105.4	23.1±111.0	>0.05
Moderate	68.1±56.6	120.3±243.5	>0.05
Walking	229.8±277.2	205.4±280.7	>0.05
Total MET	282.6±309.3	271.2±312.1	>0.05

Data are presented as mean±standard deviation (MET-min/week). Between-group comparisons were performed using the independent-samples t-test or Mann–Whitney U test, as appropriate. MET: Metabolic equivalent of task.

controls. Moderate-intensity MET values were 68.1±56.6 and 120.3±243.5, respectively. Walking MET values were 229.8±277.2 in the osteoporosis group and 205.4±280.7 in the control group. Total physical activity (MET-min/week) was 282.6±309.3 in osteoporotic women and 271.2±312.1 in non-osteoporotic women. None of these differences reached statistical significance ($p>0.05$) (Table 3). The large standard deviations relative to mean MET values indicate substantial inter-individual variability and a non-normal distribution, which may have reduced the sensitivity of statistical comparisons.

Additional analyses according to BMI categories (<30 vs ≥30 kg/m²) and lumbar T-score groups (normal, osteopenia, osteoporosis) demonstrated no significant differences in total MET values or physical activity categories ($p>0.05$). Overall, physical activity levels were uniformly low across the postmenopausal cohort, irrespective of osteoporosis status.

DISCUSSION

In the present study, we compared postmenopausal women with osteoporosis and age-matched postmenopausal controls and observed similarly low levels of physical activity in both groups. According to the IPAQ classification, 66.7% of women in the osteoporosis group and 70.8% of controls had low physical activity levels, and the distribution of low, moderate, and high activity categories did not differ significantly between groups ($p=0.894$). Similarly, vigorous, moderate, walking, and total MET values were comparable between groups, and total physical activity (MET-min/week) did not differ significantly ($p>0.05$). In additional analyses stratified by lumbar spine status (normal, osteopenia, osteoporosis), neither total MET values ($p=0.350$) nor physical activity categories ($p=0.896$) differed significantly across groups. These findings indicate that low physical activity levels are prevalent in this clinical sample.^[5,6,13,14]

Although statistically significant differences in height and weight were observed between groups, these differences were not considered clinically meaningful and did not appear to influence physical activity outcomes.

The relationship between physical activity and bone health is biologically plausible and supported by substantial evidence. Mechanical loading stimulates osteogenesis and improves neuromuscular function, thereby contributing to fracture prevention through both skeletal and fall-related mechanisms.^[5,6,9,13] However, the absence of differences in physical activity between osteoporotic and non-osteoporotic women in our cohort may reflect the uniformly low activity levels observed in both groups. In such settings, cross-sectional comparisons may fail to detect group differences because the overall exposure to osteogenic activity is insufficient.^[5,9,13,15] Moreover, physical activity was assessed based on the previous 7 days using the IPAQ-SF, which may not reflect long-term habitual activity patterns relevant to bone metabolism and osteoporosis development. Since bone mineral density is influenced by cumulative lifetime mechanical loading, short-term assessments may underestimate the true relationship between physical activity and osteoporosis risk. Therefore, long-term and longitudinal evaluations of physical activity may provide more accurate insights into osteoporosis prevention and outcomes. From a clinical perspective, regular weight-bearing and resistance exercises are known to play a key role in the prevention of osteoporosis and reduction of fracture risk. The uniformly low physical activity levels observed in both groups in our study highlight the need for population-based interventions promoting physical activity among postmenopausal women, regardless of osteoporosis status. In addition, current physical activity, assessed over a short recall period, may not adequately capture long-term activity patterns that contribute to peak bone mass and lifetime bone loss.^[1,3,16,17]

We also evaluated common comorbidities in postmenopausal women, including diabetes mellitus, hypertension, and hyperlipidemia, and found no significant differences between osteoporotic and non-osteoporotic participants. Previous studies have reported inconsistent associations between these metabolic conditions and bone mineral density, likely due to differences in study design, glycemic control, body composition, medication use, and fracture outcomes.^[1,3,10,18] Although our findings align with reports showing no clear between-group differences, the high overall burden of cardiometabolic comorbidity in postmenopausal women underscores the need for integrated preventive strategies addressing both bone and cardiovascular health.^[2,19]

Regarding age and bone density, our results demonstrated a significant negative correlation between age and lumbar (L1–L4) T-score ($r=-0.259$, $p=0.008$) as well as total femur T-score ($r=-0.224$, $p=0.021$), which is consistent with the expected age-related decline in bone mineral density after menopause.^[1,3,4,20] BMI showed a significant positive correla-

tion with total femur T-score in the overall cohort ($r=0.257$, $p=0.008$) and in the osteoporotic subgroup ($r=0.421$, $p=0.001$), supporting prior observations that higher body mass may be associated with higher femoral bone density, potentially through increased mechanical loading.^[3,21,22] Nevertheless, BMI categories (<30 vs ≥ 30 kg/m²) were not associated with differences in total MET values or IPAQ activity levels in our sample.

This study has limitations. Physical activity was assessed using a self-reported questionnaire, specifically the IPAQ-SF, which may be affected by recall bias and may overestimate actual physical activity levels. However, the questionnaire was administered face-to-face by the same physician, improving standardization, and all DXA measurements were performed using the same device by the same technician, reducing measurement variability. The cross-sectional design also precludes causal inference, and the sample was drawn from a single physical medicine and rehabilitation outpatient clinic, which may limit the generalizability of the findings to the broader population. An important limitation of this study is the skewed distribution of MET values, which may have affected the robustness of parametric statistical analyses and reduced the ability to detect subtle between-group differences. Although alternative approaches, such as non-parametric testing or transformation of variables, could be considered, these were not implemented in the current analysis and should be explored in future studies. Another limitation is the absence of multivariate analyses adjusting for potential confounding variables such as age, BMI, and comorbidities, which may influence both physical activity levels and bone mineral density. Furthermore, the time interval between data collection (2014) and manuscript preparation may affect the contemporaneity of the findings. Despite these limitations, the study provides clinically relevant data demonstrating that physical activity levels are low among postmenopausal women, regardless of osteoporosis status.^[8,14]

CONCLUSION

In this study, physical activity levels were similarly low in postmenopausal women with and without osteoporosis, and no significant differences were observed in IPAQ categories or MET values between groups. These findings suggest that low levels of physical activity are a widespread lifestyle issue in this study population, rather than a condition-specific behavior.

Strategies aimed at increasing habitual physical activity in postmenopausal women as a whole may be more appropriate than interventions targeted only at women with established osteoporosis. Further longitudinal and multi-center studies are needed to better clarify these relationships.

Ethics Committee Approval: The study was approved by the Umraniye Training and Research Hospital Ethics Committee (Approval Number: 4798 Date: 25.03.2014).

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

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

Funding: The authors declared that this study received no financial support.

Use of AI for Writing Assistance: No use of AI-assisted technologies was declared by the authors.

Author Contributions: Concept – H.S.Ç.; Design – H.S.Ç., S.B.; Supervision – S.B.; Analysis and/or Interpretation – H.S.Ç.; Literature Review – H.S.Ç., S.D.; Writing – H.S.Ç., S.D.; Critical Review – H.S.Ç., S.D., S.B.

Peer-review: Externally peer-reviewed.

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vNOTES vs Laparoscopy vs Laparotomy in Ruptured Ectopic Pregnancy with High Shock Index

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Cite this article as:

Kızıldemir YZ, Karslı SE, Okuyan II, Civelek M, Akşar M. vNOTES vs Laparoscopy vs Laparotomy in Ruptured Ectopic Pregnancy with High Shock Index. Womens Health Multidisc Res 2026;2(1):13–21.

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Submitted: 02.04.2026

Accepted: 28.04.2026

Online: 29.04.2026

Women's Health and Multidisciplinary Research - Available online at www.whmrresearch.com



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ABSTRACT

Background and Aim: Ruptured ectopic pregnancy is a life-threatening emergency that requires rapid surgical intervention. While laparoscopy and laparotomy are standard approaches, Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) has emerged as a scarless alternative. This study aims to compare the efficacy and safety profiles of vNOTES, laparoscopy, and laparotomy in the surgical management of patients with ruptured ectopic pregnancy presenting with a high shock index (SI).

Methods: We retrospectively analyzed data from 108 patients who underwent surgery for ruptured ectopic pregnancy with an SI > 0.7 between January 2021 and August 2025. Patients were categorized into three groups based on the surgical route: vNOTES (n=18), laparoscopy (n=40), and laparotomy (n=50). Demographic characteristics, preoperative hemoperitoneum volume, operative time, estimated blood loss, and postoperative recovery parameters were compared.

Results: Although the demographic profiles were similar, the laparotomy group had significantly higher preoperative hemoperitoneum volumes ($p < 0.001$), indicating a baseline selection bias. The vNOTES group demonstrated the shortest median operative time (47.0 min), the lowest median intraoperative blood loss (158 mL), and the shortest median hospital stay (1.4 days) compared to both laparoscopy and laparotomy (all $p < 0.001$). Blood transfusion requirements peaked in the laparotomy group (32.0%) and were lowest in the vNOTES group (5.6%) ($p = 0.034$). No major complications (Clavien-Dindo Grade $\geq$ III) were observed in any group.

Conclusion: In patients with ruptured ectopic pregnancy and a high shock index, vNOTES is a feasible and efficient minimally invasive option, associated with shorter operative duration and accelerated postoperative recovery. While these findings are influenced by the selection bias inherent in the retrospective design, vNOTES represents a promising approach for hemodynamically stabilized patients in experienced centers.

Keywords: Ectopic pregnancy, laparoscopy, laparotomy, rupture, shock index, vNOTES

INTRODUCTION

Ectopic pregnancy (EP) is defined as the implantation of the gestational sac outside the uterine cavity, accounting for approximately 1–2% of all pregnancies. Despite advancements in diagnostic and therapeutic approaches, ruptured ectopic pregnancy remains a leading cause of maternal mortality in the first trimester. Rupture often leads to massive intra-abdominal hemorrhage, resulting in hemodynamic instability and hypovolemic shock, which necessitates emergency surgical intervention.^[1]

Objective evaluation of the severity of hemodynamic instability and acute hemorrhage is crucial in managing these critically ill patients. The Shock Index (SI), a composite of heart rate and systolic blood pressure ($SI = \text{Heart Rate} / \text{Systolic Blood Pressure}$), is considered a valuable indicator for detecting acute hemorrhage and assessing the severity of the patient's physiological compromise. An SI above the normal range of 0.5–0.7 has been associated with an increased risk of morbidity. This index can reveal occult shock, especially in young patients with high physiological reserve whose vital signs may otherwise appear normal.^[2]

The traditional approach to the surgical management of ruptured ectopic pregnancy has been laparotomy, aiming to achieve rapid hemorrhage control. However, technological advancements in minimally invasive surgery have established laparoscopy as the standard of care for hemodynamically stable patients. The advantages of laparoscopy, such as shorter hospital stays, less postoperative pain, and better cosmetic outcomes, are well-documented. In contrast, the safety and efficacy of laparoscopy in patients with a high SI—that is, those who are hemodynamically unstable or in a borderline state—remain a topic of debate.^[3]

In recent years, Vaginal Natural Orifice Transluminal Endoscopic Surgery (vNOTES) has gained popularity in gynecologic surgery, aligning with the trend toward scarless procedures. vNOTES is a technique that accesses the pelvic cavity via a transvaginal route, eliminating the need for abdominal incisions. Although the feasibility and efficacy of vNOTES have been demonstrated in various studies for hemodynamically stable tubal pregnancies,^[4,5] the literature lacks a comprehensive comparative study evaluating vNOTES against laparoscopy and laparotomy in patients with ruptured ectopic pregnancy and a high shock index. Current evidence is primarily limited to case reports or small case series.^[6] This study aims to address this significant scientific gap by comparing the results of different surgical approaches in this critical patient population.

This study aimed to retrospectively compare the efficacy and safety profiles of vNOTES, laparoscopy, and laparotomy in managing ruptured ectopic pregnancy with a high shock index, thereby providing evidence-based data for this challenging clinical scenario. We hypothesized that, in cases of ruptured ectopic pregnancy with a high shock index, vNOTES would be associated with a shorter operative time, less intraoperative blood loss, and a shorter hospital stay compared to both laparoscopy and laparotomy. To our knowledge, this is the first study to comparatively analyze the results of vNOTES, laparoscopy, and laparotomy specifically in the high-risk population of ruptured ectopic pregnancy with an elevated shock index.

MATERIALS AND METHODS

Study Design and Ethical Approval

This study was designed as a retrospective cohort study. We reviewed data from patients who underwent surgical treatment for ruptured ectopic pregnancy at a tertiary university hospital between January 2021 and August 2025. The study was approved by the Harran University Clinical Research Ethics Committee (Approval Date: August 1, 2025; Approval Number: HRÜ/25.08.02) and conducted in accordance with the principles of the Declaration of Helsinki. Due to the retrospective nature of the study, the requirement for individual informed consent was waived by the ethics committee.

Patient Selection and Grouping

To identify the study population, the hospital's information management system (HIMS) and surgical logbooks were reviewed for the relevant period, using diagnosis codes for “ectopic pregnancy,” “tubal rupture,” and “hemoperitoneum.”

In this study, ectopic pregnancy was specifically defined as tubal ectopic pregnancy, including ampullary, isthmic, and fimbrial implantations. To ensure a homogeneous study population, non-tubal forms, such as cornual, interstitial, and cervical pregnancies, were excluded. These presentations often require distinct surgical strategies (e.g., cornuostomy or wedge resection) and present unique vascular risks that could confound the comparison of surgical routes.

Patients who underwent surgical treatment with a Shock Index (SI) >0.7 at presentation (emergency department or initial evaluation) were included. The SI was calculated by dividing the heart rate (beats per minute) by the systolic blood pressure (mmHg).^[2] This specific cutoff was selected as a sensitive threshold for identifying ‘occult shock,’ particularly in young obstetric patients with high physiological reserves who may maintain normotension despite significant internal hemorrhage. While higher thresholds (e.g., ≥ 0.9) are associated with overt hemodynamic collapse, an SI >0.7 serves as an early predictor of increased morbidity and the need for urgent intervention in ruptured ectopic pregnancy.^[2,7]

Due to the retrospective nature of the study, the surgical approach was not governed by a rigid protocol but was chosen at the discretion of the attending surgeon. This decision was based on the patient's hemodynamic status at presentation, the ultrasonographic estimation of hemoperitoneum, the surgeon's expertise with specific techniques (particularly vNOTES), and the immediate availability of operating room resources.

Inclusion and Exclusion Criteria

Patients were assessed for eligibility based on the following criteria:

Inclusion Criteria:

- Surgically confirmed ruptured tubal ectopic pregnancy.
- Shock Index (SI) >0.7 at initial presentation.
- Surgical management via one of the following routes: vNOTES, laparoscopy, or laparotomy.

Exclusion Criteria:

- Patients managed non-surgically (medical treatment with methotrexate or expectant management).
- Patients with an SI ≤ 0.7 at presentation.
- Non-tubal ectopic pregnancies (e.g., cornual, interstitial, or cervical).
- Presence of severe systemic comorbidities (e.g., decompensated heart failure, end-stage renal disease) that could confound data analysis.
- Requirement for concurrent major surgical procedures (e.g., hysterectomy or myomectomy).
- Cases with incomplete preoperative, intraoperative, or postoperative records.

Following these criteria, eligible patients were categorized into three groups based on the primary surgical approach performed: vNOTES, laparoscopy, or laparotomy.

Data Collection and Variables

Patient data were retrospectively retrieved from the Hospital Information Management System (HIMS), physical patient files, surgical reports, and anesthesia records. All data were entered into a standardized collection form, encompassing the following variables:

Demographic and Preoperative Data:

- **Baseline Characteristics:** Age, gravidity, parity, body mass index (BMI), and history of previous ectopic pregnancy.
- **Hemodynamic Indicators:** Systolic blood pressure (SBP), heart rate (HR), and the calculated Shock Index (SI) at presentation.
- **Hemoperitoneum Assessment:** The preoperative amount of hemoperitoneum was assessed via ultrasound using the deepest vertical pocket (mm) in the Douglas pouch. Although this method is acknowledged as a semi-quantitative proxy rather than a validated volumetric tool, it was used for its practicality and speed in the emergency setting, where complex volumetric calculations are clinically unfeasible.
- **Laboratory Values:** Preoperative hemoglobin (Hb) and hematocrit (Hct) levels.

Intraoperative and Safety Data:

- **Surgical Outcomes:** Operative time (from initial incision to skin closure), type of procedure (salpingectomy/salpingostomy), and conversion rates.
- **Blood Loss Estimation:** Intraoperative blood loss was estimated using a standardized visual and volumetric approach. This involved calculating the total suction container volume after subtracting the irrigation fluid, combined with a visual assessment of soaked swabs (where a fully soaked 10×10 cm swab represented approximately 10–15 mL of blood). To ensure intra-study comparability, this consistent estimation principle was applied across all groups.
- **Conversion Definition:** Conversion was defined as an unplanned switch to laparotomy due to technical difficulties, extensive adhesions, or inability to achieve definitive hemostasis via the initial minimally invasive route (vNOTES or laparoscopy).

Postoperative and Complication Data:

- **Recovery Parameters:** Hb and Hct levels 24 hours postoperatively, blood transfusion requirements (total units of packed red blood cells), and length of hospital stay (days).
- **Complication Definitions:** A complication was defined as any unintended deviation from the normal perioperative course affecting recovery. Intraoperative complications included visceral (bladder, bowel, or ureter) or significant vascular injuries and anesthesia-related adverse events. Postoperative complications were classified using the Clavien-Dindo system,^[8] where Grades I–II were considered “minor” and Grades $\geq$ III were classified as “major.”
- **Study Constraints:** Due to the retrospective and emergency nature of the cases, certain potential confounders—specifically the exact volume of preoperative fluid resuscitation and the administration of tranexamic acid or vasopressors—were not systematically recorded and, therefore, were excluded from the multivariate analysis.

Study Endpoints

The primary endpoints of this study, representing surgical efficacy and immediate safety, were operative time (minutes) and estimated intraoperative blood loss (mL).

Secondary endpoints included parameters related to postoperative recovery and clinical outcomes:

- **Hematological Changes:** Postoperative drop in hemoglobin (Hb) and hematocrit (Hct) levels 24 hours after surgery.
- **Clinical Resource Utilization:** Requirement for blood transfusions and total length of hospital stay (days).

- **Safety and Technical Success:** Rates of conversion to laparotomy and the incidence of minor and major perioperative complications (categorized by the Clavien-Dindo system).

Surgical Techniques

All procedures were performed by specialist surgeons with a minimum of five years of experience in their respective modalities (open surgery or conventional laparoscopy). Surgeons performing vNOTES had completed a minimum of 20 successful cases (e.g., vNOTES hysterectomy or adnexal surgery) prior to the study, ensuring they had surpassed the learning curve for the technique.^[9] A total of seven specialist surgeons within the department participated, ensuring a consistent standard of care across all study groups.

vNOTES: Under general anesthesia, patients were placed in the dorsal lithotomy position. Peritoneal access was achieved via a vertical posterior colpotomy incision, followed by the placement of a V-Port® Mini Advanced Access Platform to establish pneumoperitoneum. Ectopic pregnancy management was performed using standard laparoscopic instruments and a 30-degree telescope. Regarding the management of active bleeding during access, initial hemostasis was facilitated by the rapid manual evacuation of blood clots upon entering the Douglas pouch, followed by immediate identification and bipolar cauterization of the bleeding site or the mesosalpinx. The decision between salpingectomy and salpingostomy was based on the extent of tubal damage and the patient's desire for future fertility; salpingectomy was preferentially performed in cases of extensive tubal rupture or uncontrolled hemorrhage. Following the aspiration of residual intra-abdominal blood and clots, the colpotomy incision was closed.

Laparoscopy: Procedures were performed under general anesthesia using a standard three-port technique (10 mm umbilical, 5 mm suprapubic, and 5 mm lateral). After the establishment of pneumoperitoneum, the ectopic pregnancy was addressed, and hemostasis was secured with bipolar cauterization.

Laparotomy: Under general anesthesia, the abdominal cavity was accessed via a Pfannenstiel incision. The ectopic pregnancy was managed using conventional surgical techniques, ensuring definitive hemostasis before abdominal closure.

Statistical Analysis

Statistical analysis was performed using SPSS (Statistical Package for the Social Sciences) version 22.0 software (IBM Corp., Armonk, NY, USA). The normality of the distribution for continuous variables was assessed using the Shapiro-Wilk test. Descriptive statistics were presented as mean±standard deviation (SD) for normally distributed variables and as median (interquartile range, IQR) for non-normally distributed continuous variables. Categorical variables were expressed as numbers (n) and percentages (%).

For comparisons among the three surgical groups, the One-Way Analysis of Variance (ANOVA) was used for normally distributed continuous variables, while the Kruskal-Wallis test was used for non-normally distributed variables. When a significant difference was detected, post-hoc multiple comparisons were performed using the Tukey HSD test after ANOVA or Dunn's test with Bonferroni correction after the Kruskal-Wallis test to control for Type I error. The Chi-Square (χ^2) test, or Fisher's Exact Test for expected cell counts below 5, was used to compare categorical variables. A formal a priori sample size calculation or power analysis was not performed due to the retrospective nature of the study. A p-value of <0.05 was considered statistically significant for all analyses.

RESULTS

During the study period, a total of 108 patients who underwent surgery for ruptured ectopic pregnancy and met the inclusion criteria were included in the analysis. Of these patients, 18 (16.7%) underwent vNOTES, 40 (37.0%) underwent laparoscopy, and 50 (46.3%) underwent laparotomy. The study flowchart illustrating patient selection and grouping is presented in Figure 1.

Demographic and Preoperative Characteristics

The demographic and preoperative clinical characteristics of the patients are summarized in Table 1. There were no statistically significant differences between the groups in demographic features such as age, gravidity, parity, BMI, and history of previous ectopic pregnancy (all $p>0.05$). However, the estimated amount of hemoperitoneum, measured by ultrasound during preoperative evaluation, was significantly different between the groups ($p<0.001$). The largest volume of hemoperitoneum was detected in the laparotomy group, while the smallest volume was observed in the vNOTES group. This finding suggests a selection bias, indicating that patients with more severe initial hemorrhage may have been preferentially directed to laparotomy.

Intraoperative and Postoperative Outcomes

Comparison data on primary and secondary endpoints for surgical groups are presented in Table 2. Operative time showed a statistically significant difference among the three groups ($p<0.001$). The median operative time was shortest in the vNOTES group (47.0 minutes), followed by the laparoscopy group (64.0 minutes), and longest in the laparotomy group (82.5 minutes). The estimated intraoperative blood loss was also significantly different between the groups ($p<0.001$). The median blood loss was lowest in the vNOTES group (158.0 mL), followed by the laparoscopy group (398.5 mL), and highest in the laparotomy group (749.5 mL). Postoperative Hb and Hct levels showed statistically significant

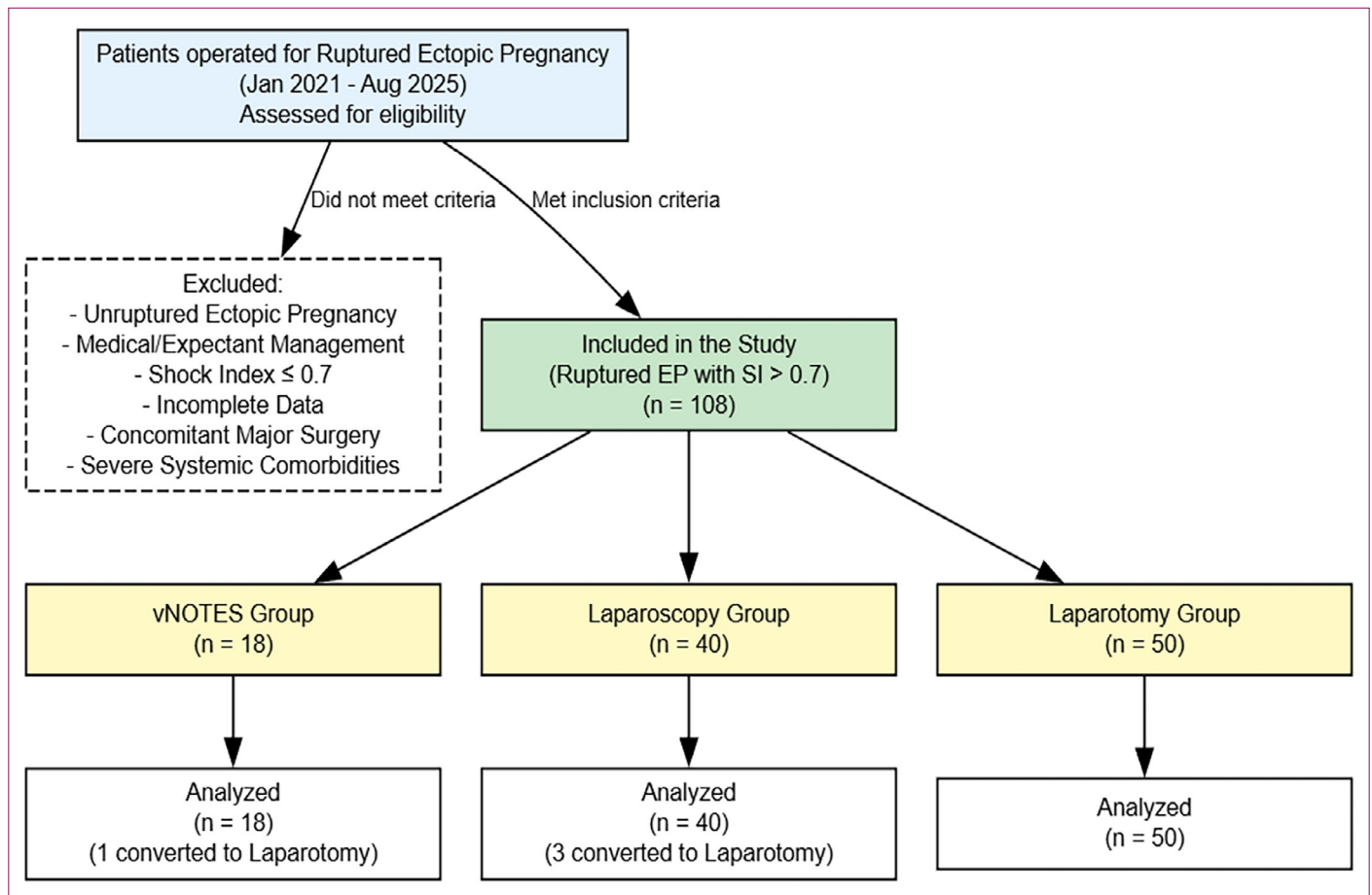


Figure 1. Flowchart of patient selection and study groups.

EP: Ectopic pregnancy.

differences between the groups ($p < 0.001$ for both). The highest postoperative Hb and Hct levels were measured in the vNOTES group, while the lowest were in the laparotomy group. The duration of postoperative hospital stay was signifi-

cantly different between the groups ($p < 0.001$). Patients in the vNOTES group had the shortest hospital stay, with a median of 1.4 days, compared to 2.4 days in the laparoscopy group and 3.8 days in the laparotomy group.

Table 1. Demographic and preoperative characteristics of the groups

Variable	vNOTES (n=18)	Laparoscopy (n=40)	Laparotomy (n=50)	p
Age (years), mean±SD	30.1±4.7	29.3±4.6	30.4±4.6	0.392
BMI (kg/m ²), mean±SD	26.9±4.6	25.8±3.6	26.9±4.1	0.481
History of EP, n (%)	2 (11.1)	5 (12.5)	7 (14.0)	0.955
Hemoperitoneum on USG (mm), median (IQR)	31 (20–45)	45 (32–60)	68 (50–85)	<0.001
Ectopic mass size (mm), median (IQR)	34 (25–42)	36 (28–45)	38 (29–48)	0.763
β-hCG (IU/L), median (IQR)	4850 (2100–7300)	5500 (2800–8500)	5100 (2500–7900)	0.910
Preoperative Hb (g/dL), median (IQR)	10.2 (9.5–10.8)	10.0 (9.2–10.9)	9.7 (8.5–10.5)	0.622
Preoperative Hct (%), median (IQR)	30.5 (28.5–32.4)	30.1 (27.6–32.7)	29.1 (25.5–31.5)	0.619
Shock Index, median (IQR)	0.88 (0.8–0.95)	0.90 (0.8–1.0)	0.92 (0.82–1.05)	0.225

The Kruskal-Wallis test was used for non-normally distributed variables, while the One-Way ANOVA test was used for normally distributed variables. vNOTES: Vaginal Natural Orifice Transluminal Endoscopic Surger, SD: Standard deviation, BMI: Body mass index, EP: Ectopic pregnancy, USG: Ultrasonography, IQR: interquartile range, Hb: Hemoglobin, Hct: Hematocrit.

Table 2. Intraoperative and postoperative outcomes of the groups

Variable	vNOTES (n=18)	Laparoscopy (n=40)	Laparotomy (n=50)	p
Operative time (minutes), median (IQR)	47.0 (40–55)	64.0 (55–75)	82.5 (70–98)	<0.001
Estimated blood loss (mL), median (IQR)	158 (120–190)	398 (250–500)	749 (500–950)	<0.001
Conversion to laparotomy, n (%)	1 (5.6)	3 (7.5)	N/A	1.000
Postoperative Hb (g/dL), median (IQR)	9.9 (9.2–10.5)	9.4 (8.5–10.1)	8.1 (7.0–9.2)	<0.001
Postoperative Hct (%), median (IQR)	29.7 (27.6–31.5)	28.2 (25.5–30.3)	24.3 (21.0–27.6)	<0.001
Blood transfusion need, n (%)	1 (5.6)	5 (12.5)	16 (32.0)	0.034
Length of hospital stay (days), median (IQR)	1.4 (1.0–1.8)	2.4 (2.0–3.0)	3.8 (3.0–4.5)	<0.001

The Kruskal-Wallis test was used for all continuous variables. The Chi-Square or Fisher's Exact Test was used for categorical variables. In post-hoc analysis, pairwise comparisons for operative time revealed significant differences (vNOTES vs. Laparoscopy, $p=0.008$; vNOTES vs. Laparotomy, $p<0.001$; Laparoscopy vs. Laparotomy, $p<0.001$). For estimated blood loss, each comparison was statistically significant (vNOTES vs. Laparoscopy, $p<0.001$; vNOTES vs. Laparotomy, $p<0.001$; Laparoscopy vs. Laparotomy, $p<0.001$). Similarly, length of hospital stay differed significantly between all groups (all pairwise $p<0.001$). For postoperative Hb and Hct, significant differences were found between vNOTES and Laparotomy ($p<0.001$) and between Laparoscopy and Laparotomy ($p<0.001$), while no significant difference was observed between vNOTES and Laparoscopy ($p=0.342$). No major complications (Clavien-Dindo Grade $\geq$ III) occurred in any of the study groups. vNOTES: Vaginal Natural Orifice Transluminal Endoscopic Surge; IQR: interquartile range, Hb: Hemoglobin, Hct: Hematocrit.

Table 3. Distribution of postoperative complications by surgical group (Clavien-Dindo Classification)

Complication (Clavien-Dindo)	vNOTES (n=18)	Laparoscopy (n=40)	Laparotomy (n=50)	p
No complications	17 (94.4)	37 (92.5)	42 (84.0)	0.275
Total complications	1 (5.6)	3 (7.5)	8 (16.0)	
Grade I (Minor, without pharmacological treatment)	1 (5.6)	2 (5.0)	5 (10.0)	
Wound seroma	0 (0.0)	1 (2.5)	3 (6.0)	
Subfebrile fever	1 (5.6)	1 (2.5)	2 (4.0)	
Grade II (Requiring pharmacological treatment)	0 (0.0)	1 (2.5)	3 (6.0)	
Wound infection (antibiotics)	0 (0.0)	1 (2.5)	2 (4.0)	
Urinary tract infection (antibiotics)	0 (0.0)	0 (0.0)	1 (2.0)	
Grade $\geq$ III (Requiring intervention)	0 (0.0)	0 (0.0)	0 (0.0)	

In pairwise group comparisons for significant variables (post-hoc analysis), it was found that operative time, estimated blood loss, and length of hospital stay were statistically significantly different between all three groups (all pairwise comparisons $p<0.05$). Regarding postoperative Hb and Hct levels, the vNOTES and laparoscopy groups were found to be significantly higher than the laparotomy group (both comparisons $p<0.001$), while there were no statistically significant differences between the vNOTES and laparoscopy groups ($p>0.05$).

Regarding conversion rates from laparoscopy or vNOTES to laparotomy, one patient in the vNOTES group (5.6%) and three patients in the laparoscopy group (7.5%) were converted to laparotomy. There was no statistically significant difference in conversion rates between these two groups ($p=1.000$). In the vNOTES group, the reason for conversion was limited visualization due to extensive pelvic adhesions and the inability to achieve adequate hemostasis after initial clot evacuation. In the laparoscopy group, conversions were necessitated by massive, uncontrolled hemorrhage that required a more rapid expansion of the surgical field. Notably, no conversion from vNOTES to laparoscopy was performed; in all

instances where the initial minimally invasive approach failed, the surgeons opted for a direct transition to laparotomy to ensure the most rapid and definitive control of hemorrhage in the presence of a high Shock Index.

The requirement for blood transfusion was significantly different between the three groups ($p=0.034$), with varying rates observed in the laparotomy group (32.0%), the vNOTES group (5.6%), and the laparoscopy group (12.5%). Post-hoc analyses showed that the need for transfusion in the laparotomy group was significantly higher than in the vNOTES group.

Postoperative Complications

Regarding intraoperative safety, no visceral injuries (bladder or bowel) or major vascular accidents were recorded in any of the three surgical groups. All conversions to laparotomy, as detailed above, were driven by the need for better visualization or hemorrhage control rather than an intraoperative surgical injury. Postoperative complications in the study groups were assessed according to the Clavien-Dindo classification and are presented in Table 3. The overall complication rate was numerically higher in the laparotomy group (16.0%) compared

to the vNOTES (5.6%) and laparoscopy (7.5%) groups, but this difference did not reach statistical significance ($p=0.275$).

DISCUSSION

In this study, we evaluated the feasibility of vNOTES, laparoscopy, and laparotomy in patients with ruptured ectopic pregnancy and a high shock index. While favorable outcomes, such as shorter operative times and less blood loss, were observed in the vNOTES group, these findings must be interpreted with caution, as they represent a clinical association rather than definitive evidence of superiority. Due to the retrospective nature of this study, the choice of surgical route was not governed by a predefined, rigid protocol but was determined by the attending surgeon's clinical assessment of each case. However, several objective factors emerged as key drivers in this decision-making process. Patients directed to vNOTES were generally those who showed a prompt response to initial fluid resuscitation (maintaining an SI <0.9) and had ultrasound findings suggesting manageable hemoperitoneum levels. In contrast, laparotomy was strictly reserved for patients with signs of massive intra-abdominal hemorrhage or those who remained hemodynamically unstable despite resuscitation. This pragmatic, safety-first approach reflects real-world clinical practice in emergency settings, where the primary objective is rapid stabilization. While this introduces an inherent selection bias, it also defines a clinical phenotype—the “hemodynamically stabilized but high-risk patient”—for whom vNOTES may offer a particularly efficient alternative to conventional methods.

Indeed, the fact that the amount of preoperative hemoperitoneum was significantly higher in the laparotomy group (Table 1) objectively demonstrates that this group initially consisted of more severe and hemodynamically riskier cases. Therefore, the results presented reflect not only the efficacy of the surgical technique but also the surgeons' patient selection decisions. It is highly probable that the significantly longer operative times and higher blood loss observed in the laparotomy group are at least partially attributable to the greater severity of baseline hemorrhage, rather than the surgical route alone. This imbalance precludes a direct head-to-head comparison of the intrinsic efficiency of these techniques in identical clinical conditions. However, despite the statistically similar preoperative hemoglobin levels between the groups (Table 1), the observed lower blood loss and shorter operative time in the vNOTES group suggest that the technique itself may also have inherent advantages. This result is consistent with the literature.^[10,11]

The comparison of the laparoscopy and laparotomy groups in our study is consistent with existing data in the literature. Previous studies in gynecological operations have reported that the laparoscopic approach offers advantages such as shorter hospital stays, less intraoperative blood loss, and shorter op-

erative times.^[12] Our findings, in line with the literature, support the notion that with increasing surgical experience and advanced technological equipment, laparoscopy is a preferred method over laparotomy in selected cases of ruptured ectopic pregnancy.^[3] The vNOTES group demonstrated a median reduction of approximately 17 minutes in operative time compared to laparoscopy. This efficiency likely stems from direct vaginal access to the Douglas pouch, enabling rapid manual evacuation of clots and eliminating the time required for abdominal port placement. Our findings align with previous studies that reported shorter surgical durations with vNOTES compared to laparoscopy in various gynecologic procedures.^[11,13–15] By showing similar time efficiency in ruptured cases, this study extends the known advantages of vNOTES from elective or stable cases, as described by Liu et al.^[11] and Zhang et al.,^[4] to the critical emergency setting.

The most original contribution of this study is the evidence it provides on the efficacy of the vNOTES technique in this high-risk patient group. Previous studies have shown the efficacy, safety, and potential advantages of vNOTES, such as faster recovery, in stable tubal pregnancy cases. While Liu et al.^[11] reported that vNOTES provides shorter surgical durations and hospital stays, Zhang et al.^[4] emphasized that it results in less postoperative pain. Our study extends these findings to a more clinically critical population of ruptured cases with a high shock index, making it one of the first studies to suggest that this technique is feasible in emergency situations. The observed reduction in operative time is of vital clinical importance, potentially reflecting more direct access to the bleeding source via the vaginal route. This direct route may allow for more efficient identification and management of the ruptured tube. Unlike small case series in the existing literature, our study contributes by presenting a comparative analysis of three different methods.^[16]

Our intraoperative and postoperative findings clearly reveal the differences between the surgical approaches. The significantly higher need for blood transfusion in the laparotomy group ($p=0.034$) is directly related to the greater intraoperative blood loss in this group. The low and statistically insignificant conversion rates in the vNOTES and laparoscopy groups ($p=1.000$) demonstrate that both minimally invasive techniques have a high success rate in experienced hands.^[10,17]

A notable finding of our study is that, despite the statistical superiority of vNOTES over laparoscopy in terms of operative time and blood loss, no significant differences were detected in postoperative hemoglobin and hematocrit levels ($p>0.05$). In cases with significant hemoperitoneum, such as ruptured ectopic pregnancy, one of the key advantages of vNOTES in reducing surgical time is the method of evacuating blood and clots from the abdomen. Although the laparoscopic ap-

proach uses a suction device that can be easily clogged with blood clots, the vNOTES approach allows for the manual and rapid evacuation of blood with a swab by entering through the Douglas pouch and placing the patient in an anti-Trendelenburg position. This effective evacuation provides a clearer surgical field, thus speeding up the operation.

Regarding safety, no statistically significant differences in postoperative complication rates were observed between the three groups, consistent with previous literature. Although the postoperative complication rate was numerically higher in the laparotomy group, no statistically significant differences were found between the groups (Table 3). This finding has also been observed in previous studies.^[11,18,19] The fact that no major complications requiring surgical intervention (Clavien-Dindo Grade $\geq$ III) occurred in any group indicates that all three techniques have an acceptable safety profile in experienced hands.

An important aspect of the surgical decision-making process in our study was the transition strategy when a minimally invasive approach was deemed insufficient. While a stepwise conversion from vNOTES to laparoscopy is technically possible, in our cohort of high-SI patients, any failed initial approach was converted directly to laparotomy. This decision was driven by the “safety-first” principle; in an emergency setting with ongoing hemorrhage, we prioritized the fastest possible access to the bleeding source. Transitioning from vNOTES to laparoscopy involves repositioning the patient and redraping, which could cause a critical delay in achieving definitive hemostasis. Therefore, direct laparotomy was considered the most prudent backup for these high-risk cases.

Limitations

The findings of this study should be evaluated within the framework of several important limitations.

First, the retrospective design and inherent selection bias constitute a primary weakness. As noted, patients with greater baseline hemoperitoneum were more frequently directed to laparotomy, potentially biasing the results against that procedure. The lack of statistical adjustments, such as propensity score matching or multivariable regression, was not feasible due to the emergency nature of the study and the small sample size of the vNOTES group ($n=18$). Consequently, our findings establish a clinical association rather than a direct causal relationship, serving as preliminary evidence that necessitates further validation through matched-pair analyses or prospective trials.

Second, the small and unbalanced sample size reduces statistical power for rare outcomes, such as major complications, increasing the risk of a Type II error. Furthermore, as a single-center study, the results reflect our specific institutional

expertise and the learning curve associated with vNOTES, which may limit generalizability to less experienced centers.

Third, several measurement and perioperative variables represent potential uncontrolled confounders. Due to the emergency setting, variables such as the exact volume of fluid resuscitation, the timing of vasopressor support, and the administration of tranexamic acid were not systematically recorded or standardized. While more aggressive resuscitation in the laparotomy group may have contributed to lower postoperative hemoglobin levels via hemodilution, the comparable preoperative Shock Index (SI) and hemoglobin (Hb) levels across groups suggest a similar baseline physiological reserve at the time of surgical decision-making. Additionally, our reliance on the deepest vertical pocket as a proxy for hemoperitoneum and visual/volumetric blood loss estimation (rather than gravimetric methods) introduces a degree of subjectivity. However, since consistent estimation principles were applied across all groups, the relative differences observed remain clinically significant.

Fourth, this study lacks long-term results. Important outcomes, such as future fertility, adhesion formation, and chronic pelvic pain, remain beyond the scope of this study. However, theoretical concerns regarding posterior colpotomy, such as scar rupture in future deliveries or postoperative dyspareunia, have shown promising results in recent literature, suggesting that vNOTES is safe with regard to long-term obstetric and functional outcomes.^[20,21]

Regarding terminology and clinical context, it is important to clarify that a “high Shock Index” was used as a risk marker and is not synonymous with irreversible shock. Our choice of $SI > 0.7$ allowed for the inclusion of patients in early physiological compensation. While some literature suggests higher thresholds, utilizing a 0.7 cutoff in emergency settings prevents missing the window for early minimally invasive intervention. Our data demonstrate that even at this threshold, vNOTES provided efficient hemorrhage control before total hemodynamic collapse occurred.

CLINICAL IMPLICATIONS AND CONCLUSION

Despite these limitations, our results offer significant implications for emergency obstetric care. The reduction in operative time and intraoperative blood loss observed with vNOTES facilitates overall surgical efficiency and may help prevent the need for transfusions in borderline cases. The significantly shorter hospital stay further contributes to patient comfort and resource management.

Our findings suggest that vNOTES represents a promising and feasible alternative to laparoscopy and laparotomy in selected emergency cases where patients can be hemodynamically stabilized. However, the patient’s immediate status and the surgeon’s expertise must remain the priority. To definitively

confirm these preliminary findings, future prospective multi-center randomized controlled trials are warranted to evaluate vNOTES across a broader range of clinical settings.

In conclusion, in experienced hands, vNOTES is a highly efficient minimally invasive advancement for managing ruptured ectopic pregnancy in patients with a high shock index, offering faster recovery and significant perioperative advantages.

Ethics Committee Approval: The study was approved by the Harran University Clinical Research Ethics Committee (Approval Number: HRÜ/25.08.02, Date: 01.08.2025).

Informed Consent: The requirement for individual informed consent was waived by the ethics committee.

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

Funding: The authors declared that this study received no financial support.

Use of AI for Writing Assistance: During the preparation of this work, the authors used Gemini in order to improve the language, flow, and grammatical accuracy of the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Author Contributions: Concept – Y.Z.K.; Design – Y.Z.K., S.E.K., I.I.O., M.C., M.A.; Supervision – Y.Z.K.; Materials – S.E.K.; Data Collection and/or Processing – S.E.K.; Analysis and/or Interpretation – I.I.O., M.C., M.A.; Literature Review – I.I.O., M.C., M.A.; Writing – Y.Z.K.; Critical Review – M.A.

Peer-review: Externally peer-reviewed.

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Interpreting Women's Pain: A Sociological Perspective on Clinical Practice at the Intersection of Biology and Meaning

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Cite this article as:

Başar G, Özgül Gümüş E.
Interpreting Women's Pain:
A Sociological Perspective on
Clinical Practice at the
Intersection of Biology and
Meaning. Womens Health
Multidisc Res 2026;2(1):22–24.

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Submitted: 16.04.2026

Accepted: 24.04.2026

Online: 30.04.2026

Women's Health and Multidisciplinary
Research - Available online at
www.whmrresearch.com



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Dear Editor,

In gynecological practice, pain is not simply an objectively measurable finding but an experience that acquires meaning within specific clinical and cultural frameworks. Therefore, both the assessment of pain and the assumptions underlying its interpretation require critical reflection. In this context, current approaches to pain evaluation in gynecological care should be considered not only in terms of biological data but also in terms of how such data are interpreted.

In clinical settings, pain occupies a paradoxical position: it is both central to patient presentation and inherently difficult to objectify. Conditions such as chronic pelvic pain and endometriosis are often characterized by fluctuating symptoms and diagnostic ambiguity.^[1–3] The inconsistent correlation between symptoms and objective findings has also been widely reported.^[2,4] Under these circumstances, clinical reasoning extends beyond measurable pathology and inevitably involves interpretative processes.^[5]

From this perspective, it becomes essential to recognize that pain is not solely a biological phenomenon but also a socially constructed experience. Women's narratives of pain are often interpreted through cultural expectations regarding gender and emotional expression.^[6,7] The normalization of pain, particularly in reproductive health contexts, may further reduce its clinical visibility.^[8]

These dynamics do not typically emerge as explicit bias but operate through implicit assumptions embedded within everyday clinical practice. The perception that pain is “expected,” “manageable,” or “self-limiting” may shape both the depth of clinical investigation and the urgency of intervention. Similarly, when objective findings are inconclusive, symptoms may be more readily framed within functional or psychological categories.^[7,8] While such interpretations can be clinically appropriate in selected cases, their premature or disproportionate use may inadvertently narrow diagnostic possibilities.

Importantly, these patterns should not be attributed solely to individual clinicians but should be understood within a broader medical culture shaped by training, clinical norms, and systemic pressures. In this sense, the interpretation of pain is not merely a clinical act but also a culturally situated practice.^[7]

The prolonged diagnostic delay associated with endometriosis—often spanning several years—has been well documented.^[1,3] Similarly, individuals with chronic pelvic pain frequently experience fragmented care pathways and repeated consultations before receiving a coherent diagnosis.^[4] While biological heterogeneity undoubtedly plays a role, these patterns also suggest that certain types of pain may struggle to achieve immediate clinical legitimacy.

This observation highlights a potential hierarchy in symptom validation. Symptoms that can be directly visualized, quantified, or linked to clear pathology tend to be more readily validated. In contrast, symptoms that rely heavily on subjective reporting may be more vulnerable to reinterpretation or minimization. This hierarchy is rarely made explicit, yet it meaningfully influences diagnostic processes.^[8,9] Gender-related biases in pain perception, particularly the tendency to underestimate or reinterpret women's pain, may further reinforce this imbalance.^[9,10]

This editorial does not seek to challenge the foundational importance of biomedical evaluation. Rather, it aims to highlight that biomedical knowledge alone may not fully account for the complexity of pain as it is lived and expressed. Expanding the interpretative framework to include sociocultural dimensions does not undermine clinical rigor; instead, it enriches it by acknowledging additional layers of meaning that shape patient experience.

In practical terms, integrating this perspective into clinical care does not require fundamental restructuring. Instead, it may involve a recalibration of attention. Approaching patient narratives not solely as diagnostic clues but as meaningful accounts in their own right can shift the clinical encounter. Maintaining openness in situations of uncertainty, rather than defaulting to early categorization, may allow for more nuanced assessment. Likewise, recognizing that the normalization of persistent symptoms can delay intervention may prompt more careful evaluation.^[9] This approach may help clinicians avoid premature diagnostic closure and improve recognition of complex pain presentations.

Another important dimension is the relational aspect of clinical care. Patients who feel heard and validated are more likely to engage in shared decision-making and adhere to management plans.^[9] Conversely, experiences of dismissal or minimization may erode trust and contribute to fragmented care-seeking behaviors. Thus, the way pain is interpreted has implications not only for diagnosis but also for the therapeutic relationship.

Interdisciplinary dialogue between clinical medicine and the social sciences offers a valuable opportunity to deepen this understanding. Sociological perspectives can illuminate patterns that remain implicit within biomedical frameworks, including how norms, expectations, and institutional structures shape clinical encounters. Such dialogue does not aim to replace clinical expertise but to complement it with additional analytical tools.

Ultimately, advancing the evaluation of pain in gynecological care requires a dual movement: the continued refinement of biological knowledge alongside a more critical engagement

with the interpretative frameworks through which that knowledge is applied. Recognizing pain as both a physiological signal and a socially mediated experience enables a more comprehensive understanding of patient presentations.

In conclusion, rethinking women's pain is not an effort to complicate clinical practice but to render it more attentive, reflective, and responsive. By acknowledging the interplay between biological and sociocultural dimensions, clinicians may be better equipped to address the complexity of pain in a way that is both scientifically grounded and meaningfully patient-centered. Greater awareness of these dimensions may contribute to more accurate diagnosis, improved patient–physician communication, and more effective clinical care.

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

Funding: The authors declared that this study received no financial support.

Use of AI for Writing Assistance: The authors used an artificial intelligence–based language tool to assist with language editing and improvement of clarity. All scientific content, interpretations, and conclusions are the responsibility of the authors.

Author Contributions: Concept – G.B., E.Ö.G.; Design – G.B., E.Ö.G.; Supervision – G.B.; Resource – G.B., E.Ö.G.; Materials – G.B., E.Ö.G.; Analysis and/or Interpretation – G.B., E.Ö.G.; Literature Review – G.B., E.Ö.G.; Writing – G.B., E.Ö.G.; Critical Review – G.B., E.Ö.G.

Peer-review: Externally peer-reviewed.

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