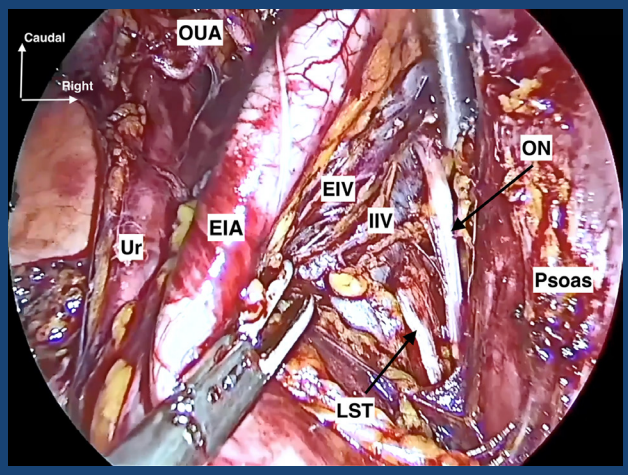
EISSN 1309-0380

TURKISH-GERMAN GYNECOLOGICAL EDUCATION and RESEARCH FOUNDATION

Journal of the Turkish-German Gynecological Association



Volume 26
Issue 4
December
2025

Cover Picture: Selçuk et al. Neuropelviology

galenos yayınevi

Official Journal of the Turkish-German Gynecological Education and Research Foundation
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Journal of the
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Published by Turkish German Gynecology Education, Research Foundation / Türk Alman Jinekoloji Eğitim Araştırma ve Hizmet Vakfı tarafından yayınlanmaktadır.
Abdi İpekçi Cad. 2/7 34367 Nişantaşı, İstanbul, Turkey

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Web: www.galenos.com.tr
Publisher Certificate Number: 14521

Online Publication Date: December 2025

E-ISSN: 1309-0380

International scientific journal published quarterly.

Journal of the
Turkish-German
Gynecological Association

Aims and Scope

Journal of the Turkish-German Gynecological Association is the official, open access publication of the Turkish-German Gynecological Education and Research Foundation and Turkish-German Gynecological Association and is published quarterly on March, June, September and December. The publication language of the journal is English. Manuscripts are reviewed in accordance with "double-blind peer review" process for both reviewers and authors.

The target audience of Journal of the Turkish-German Gynecological Association includes gynecologists and primary care physicians interested in gynecology practice. It publishes original works on all aspects of obstertrics and gynecology. The aim of Journal of the Turkish-German Gynecological Association is to publish high quality original research articles. In addition to research articles, reviews, editorials, letters to the editor, diagnostic puzzle are also published. Suggestions for new books are also welcomed. Journal of the Turkish-German Gynecological Association does not charge any fee for article submission or processing.

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The ''Journal of the Turkish-German Gynecological Association'' (EISSN 1309-0380; Abbreviated as "J Turk Ger Gynecol Assoc") is the official, open access publication of the Turkish-German Gynecological Education and Research Foundation and the Turkish-German Gynecological Association. Formerly named "ARTEMIS", the journal is published quarterly (March, June, September, December) in English and publishes original peer-reviewed articles, reviews, and commentaries in the fields of Gynecology, Gynecologic Oncology, Endocrinology & Reproductive Medicine and Obstetrics. Case reports are not accepted for publication. Reviews will be considered for publication only if they are prepared by authors who have at least three published manuscripts in international peer reviewed journals and these studies should be cited in the review. Otherwise only invited reviews will be considered for peer review from qualified experts in the area.

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PRISMA for preferred reporting items for systematic reviews and meta-analyses (Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 2009; 6(7): e1000097.) (http://www.prisma-statement.org/),

STARD checklist for the reporting of studies of diagnostic accuracy (Bossuyt PM, Reitsma JB, Bruns DE, Gatsonis CA, Glasziou PP, Irwig LM, et al, for the STARD Group. Towards complete and accurate reporting of studies of diagnostic accuracy: the STARD initiative. Ann Intern Med 2003;138:40-4.) (http://www.stard-statement.org/),

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All manuscripts should be accompanied by an abstract. A structured abstract is required with original articles and it should include the following subheadings: Objective, Material and Methods, Results and Conclusion. A structured abstract is not required with review articles. The abstract should be limited to 250 words for original articles and review articles.

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State concisely the purpose and rationale for the study and cite only the most pertinent references as background.

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Describe the plan, the patients, experimental animals, material and controls, the methods and procedures utilized, and the statistical method(s) employed. In addition to the normal peer review procedure, all randomized controlled trials (RCTs) submitted to the journal are sent to members of a team of professional medical statisticians for reviewing.

Address "Institutional Review Board" issues as stated above. State the generic names of the drugs with the name and country of the manufactures. Provide information on informed consent and ethics committee approval.

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Present the detailed findings supported with statistical methods. Figures and tables should supplement, not duplicate the text; presentation of data in either one or the other will suffice. Emphasize only your important observations; do not compare your observations with those of others. Such comparisons and comments are reserved for the discussion section.

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State the importance and significance of your findings but do not repeat the details given in the Results section. Limit your opinions to those strictly indicated by the facts in your report. Compare your finding with those of others. Provide information on the limitations and strengths of the study. No new data are to be presented in this section.

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Editorial

Dear Colleagues,

It is my great pleasure to introduce the last issue of the "Journal of the Turkish-German Gynecological Association (J Turk Ger Gynecol Assoc)" in the publishing year of 2025. This issue is consisted of seven articles, and one review that we hope you will read with interest. Also you may have the oppurtunity to read the quiz. Here we share some of our favorite articles that were published in this issue of the journal.

About 10% of women of reproductive age worldwide suffer with endometriosis, a chronic inflammatory disease that is estrogen-dependent and severely reduces quality of life with symptoms like infertility, dyspareunia, and persistent pelvic discomfort. For the purpose of directing treatment accurate endometriosis classification is essential. Deep infiltrating endometriosis, which is closely associated with deep dyspareunia, is not well covered by the commonly used revised American Society for Rerproductive Medicine staging system. The Enzian classification, on the other hand, offers more thorough anatomical mapping, especially in surgically relevant areas like the vagina and uterosacral ligaments. You will have the opportunity to read an article evaluating the diagnostic performance of the #Enzian ultrasound classification by systematically comparing preoperative imaging findings with surgical observations in patients with histologically confirmed endometriosis.

A new minimally invasive technique called natural orifice transluminal endoscopic surgery (NOTES) avoids abdominal incisions by accessing the peritoneal cavity through natural orifices. Because it offers scarless recovery, less discomfort after surgery, and quicker rehabilitation than traditional methods, its vaginal application, known as vNOTES, has drawn more attention in gynecological surgery. Procedures including hysterectomies, adnexectomies, and uterosacral ligament suspension are frequently carried out using it. You will also have the opportunity to read an article evaluating the feasibility and safety of vNOTES hysterectomy in patients with large uteri performed at a single center.

Dear Participants,

I would like to invite you to join us for our "Symposium on Current Approaches in Obstetrics and Gynecology", which will be held in Van on June 5-6, 2026. The scientific programme of the symposium includes many distinguished scientists and researchers from Turkey.

Dear Esteemed Readers, Authors and Reviewers,

J Turk Ger Gynecol Assoc (JTGGA) is currently indexed in: Emerging Science Citation Index (ESCI), Pubmed Central, Pubmed and Scopus. JTGGA expands your reach and discoverability by publishing robust, integrity-based, peer-reviewed research. Your researchs will reach the right audience with JTGGA. You may increase the impact of your research, reach a larger audience, and receive insightful feedback by sharing your work with JTGGA.

I would like to wish you a happy new year in 2026. We are looking forward to receiving your valuable submissions, thank you in advance for your contributions.

Sincerely,

Prof. Cihat Ünlü, M.D.
Editor in Chief of *J Turk Ger Gynecol Assoc*
President of TGGF

Awareness and use of emergency contraception among women attending antenatal clinic in a tertiary hospital in Nigeria

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Abstract

Objective: To evaluate the knowledge and use of emergency contraception (EC) amongst antenatal care attendees at the Federal Medical Center, Bida (FMCB), Nigeria.

Material and Methods: This was a cross-sectional, hospital-based, descriptive study involving women attending routine check-up at antenatal clinic of FMCB. Self-administered questionnaires were completed by the women after having obtained written informed consents. Data was analyzed using the Statistical Package for the Social Sciences (SPSS), version 23.0 (IBM Inc., Armonk, New York, USA). Descriptive statistical analysis was employed. Statistical significance was set at a p value of <0.05.

Results: This research involved 129 women and demonstrated that only 43 (33.3%) had any knowledge of EC. Eighteen of these (41.9%) had their source of information from health workers followed by friends and peers (n=12, 27.9%) and one (2.3%) from public health campaign. Only 17.5% had used EC, with the majority (65.2%) using levonorgestrel pills, 13.1% used an intrauterine contraceptive device and 3.3% used the combined oral contraceptive pills. About two-thirds (67.4%) had no idea when EC would be effective. Age, tertiary level of education, religion, ethnicity, and upper socioeconomic status were all significantly associated with awareness of EC.

Conclusion: The majority of the women in our cohort were not aware of EC and the proportion who had used EC was even lower. Therefore, there is a need to increase the awareness and effective use of EC through health education and advocacy. [J Turk Ger Gynecol Assoc. 2025; 26(4): 246-55]

Keywords: Emergency contraception, awareness, utilization, Nigeria

Received: 25 May, 2025 **Accepted:** 18 September, 2025 **Publication Date:** 03 December, 2025

Introduction

Emergency contraception (EC) refers to techniques that women are able to employ to avoid pregnancy following casual sexual interaction. It is also known as “back-up” or “post-coital” birth control. Circumstances of unguarded sexual interaction where EC can be employed as contraception include sexual violence, rape, failed withdrawal method, misuse of the condom or failure of barrier techniques, for example, slippage, breakage, ≥ two successive skipped oral contraceptive pills (OCP), or just because sexual interaction

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DOI: *10.4274/jtgga.galenos.2025.2025-5-3*

Cite this article as: *Adewale FB, Adekanye AO, Erinle SA, Nwosu IC, Nwosu AE. Awareness and use of emergency contraception among women attending antenatal clinic in a tertiary hospital in Nigeria. J Turk Ger Gynecol Assoc. 2025; 26(4): 246-55*

was unanticipated and so a regular contraceptive method was not used (1,2). No contraception method is 100% effective and not many people use their method flawlessly whenever they have intercourse, hence the necessity of an emergency backup method. EC gives these women practical choice and a vital last opportunity to prevent unwanted pregnancy and, for couples, unintended or unplanned hardship. EC when used within five days after unprotected intercourse may prevent up to over 95% of pregnancies (1,2).

It is estimated that 40% of the 210 million annual pregnancies worldwide are unintentional, and about 56 million of these pregnancies result in induced abortion (IA), of which 20 million are unsafe abortions (3,4). The problem is more worrisome in developing countries because of the very low level of modern contraceptive uptake. The most recent National Demographic and Household review in Nigeria, reported only a 17% contraceptive prevalence rate amongst married women of reproductive age, with only 12% using modern contraception (5). In Nigeria, out of the approximate 6.8 million pregnancies annually, it is estimated that one in five pregnancies is unplanned (6).

There are two types of EC in use, which are the intrauterine device (IUD) and hormonal EC (7,8). Hormonal EC include progesterone receptor modulator (ulipristal acetate), progesterone only pills, such as levonorgesterel (LNG) and combined OCP. The effectiveness of hormonal EC is optimal when initiated within 72 hours following a one-off mid-cycle act of unprotected sexual intercourse. They are less effective, if greater than one incident of sexual interaction has taken place or if treatment is commenced more than 72 hours after sexual intercourse. Nonetheless, they can still be offered and effective within 120 hours of casual sexual interaction (1,8-10). Research has shown that EC is largely underutilized globally (1,10).

The IUD used for EC is the copper-bearing IUD. It can be inserted up to a week following ovulation for EC purposes and is the most effective method of EC (about 99% effective) (1,7-10). While these IUDs have the advantage of being continued as ongoing long-term contraception after insertion, EC pills are not suitable for repeated use and a main method of contraception should be adopted if a woman does not intend to get pregnant soon.

The awareness of and use of EC as a means of preventing unintended pregnancy in our region is low (1,11). In a scoping review amongst women aged 15-49 years in sub-Saharan Africa (SSA), knowledge of EC ranged from 10.1% to 93.5%; while actual use of EC ranged from as low as 0% in DR Congo and Ethiopia to as high as 54.1% in Nigeria (10). In a study conducted with female college students in Ethiopia, the knowledge of EC was 93.5% while the percentage use was 38.8% (12). The corresponding proportions in a study among future healthcare providers in Ghana was 86.9% and 25.7%, respectively (13). In a study conducted amongst antenatal women in Addis Ababa, Ethiopia, of the 636 women included in the study, only 65 (10.2%) were aware of EC, while only 12 (1.9%) women had practiced EC (14). Local studies among undergraduates in Nigeria tertiary institutions have reported the level of awareness of EC ranged from 52.1-89.3.8% while that of utilization ranged from 19.3-68.7% (7,8).

Justification for the study

Nearly half of all pregnancies globally are unplanned, and more than half of unplanned pregnancies result in IA. Approximately 56 million IA occurred yearly in 2010-2014, which is equivalent to a yearly abortion rate of 35 for every 1,000 women aged 15-44 years (15). SSA accounts for nearly two thirds of global maternal mortality (16). Some of these deaths may have been prevented by adequate knowledge, accessibility and suitable use of EC while simultaneously preventing unnecessary straining of already fragile health facilities. In addition, no study on this topic has been previously carried out in this specific setting. It will therefore be helpful to evaluate awareness and practical use of EC in preventing unwanted pregnancy in SSA.

Aims and objectives

The general aim of this study was to determine the level of awareness of EC and to also investigate actual usage of EC among women attending antenatal clinic (ANC) at the Federal Medical Center, Bida (FMCB), Nigeria.

Specific objectives

1. To estimate the level of awareness of EC among clientele accessing healthcare at the ANC of FMCB.
2. To determine the prevalence of use of EC among the study group.
3. To evaluate the predictors of awareness of EC.
4. To evaluate the predictors of utilization of EC.

Material and Methods

Study design

The study was a cross-sectional, hospital-based, descriptive study.

Setting

The study was carried out at the ANC of FMCB. FMCB is a federal tertiary institution located in Bida town, a semi-urban settlement in Niger state, north central Nigeria. Beside Minna the state capital, Bida is the second largest city in the state (17), with a projected population of 266,008 for 2020 in the 2006 National Census. It is located in the southern Guinea Savannah Zone of Nigeria. The majority of the population are Muslims and farmers. FMCB receives referrals from primary and secondary

health facilities in the state, as well as the neighboring states. It has a capacity for 350 inpatients care and the obstetrics and gynecology department provides emergency obstetrics care, postnatal care and general gynecological services.

Study population

The study population consisted of clientele of reproductive age (15-49 years) who visited the ANC of FMCB for routine antenatal check-ups during the data collection period.

Sampling technique

A structured questionnaire was administered to consenting clientele attending ANC at FMCB over a period of three months, starting on March 4th 2024. A systematic sampling method was used to obtain information from the respondents.

Sample size

A standard statistical formula ($N=Z^2pq/d^2$) by Pourhoseingholi et al. (18) was employed to calculate the sample size where:

N is the sample size;

Z is the level of confidence (95%) which is =1.96;

p is the percentage of ANC clients who were aware of EC from a previous study (14) which was 10.2% or 0.102;

(q=1)-(p=1)-(0.0=0.9);

and d is the expected degree of correctness; taken to be 0.05.

Thus the sample size used in the present study was (n) = $(1.96)^2$x0.102 (1-0.102)/0.05^2

Which gave a value of n=140.76 ≈ 141

Given that N (the entire population of ANC attendees) is less than 10,000, the requisite sample size will be less. Therefore final sample calculation (nf)=n/(1+(n/N), where:

n is the expected sample size when population is >10,000=141.

N is the estimate of the total population, that is the population frame=660.

Thus the adjusted sample size calculation was n_f = 141/1+(141/660)=116.18

and n_f=116.18=116

Adjusting for an estimated non-response rate (NR) of 10%, therefore the minimum sample size: (N)= n_f/1-NR

n_f=116

Non-response rate =0.10

N=116/1-0.10=128.889

The final sample size figure after all adjustments was N=129.

Selection of participants

Approximately 200 patients book for ANC at FMCB every month, based on data from the preceding year. The study was designed to be carried out over a period of three months, giving a total of 600 clients expected to book for antenatal care. A systematic sampling method was employed. With a populace frame of 600, the sampling gap (K) used was 600/129=4.651 ≈ 5, to arrive at the requisite 10 women weekly.

The first client was selected by simple random sampling by ballot amongst the initial five clientele. The client who selected the number one and was eligible for inclusion was chosen as the first study participant. Subsequently, the other clientele were chosen via systematic sampling, at predetermined intervals of every fifth client. The participants were enlisted for our research following endorsement or thumb printing a written consent.

Exclusion criterion

Any patient that was too ill to respond to the questionnaire.

Clientele and data collection

The study questionnaire was adapted from the questionnaire used in a similar study in northern Nigeria (19) and it was pretested for comprehensibility, reduction of measurement error, and internal validity at FMCB, using a pilot of 30 questionnaires. The information obtained from the pre-test was incorporated into the main study. Four research assistants were recruited and trained by the researcher for a period of two weeks before commencement of the study. These research assistants were medical registrars in the department of obstetrics and gynecology. They were trained to assist in the selection of patients for the study and appropriate filling of information data sheets.

The questionnaire contained questions aimed at obtaining basic socio-demographic information and reproductive history of the women. Questions related to desirability of their current pregnancy, their awareness of EC and appropriate use were asked. The socio-economic classes of the pregnant women were determined using the educational and occupational hierarchy developed by Oyedeji (20). Socio-economic index score was adopted as a combination of the occupations and the educational attainment of the husband and the pregnant woman. The mean of four scores (two each for the husband and the pregnant woman) to the nearest whole number was the social class assigned to the woman.

The United States (US) model of social classification categorized into five main groups was adopted: I) upper class, II) upper-middle class, III) middle class, IV) working class, and V) lower class (21). This 5-class model was used to allow for a more granular breakdown and objectivity in assigning social classes for the study participants. The 3-class model is sometimes used. This is a simplification of the 5-class model, with the upper and upper-middle classes often grouped together as upper class,

and the lower and working classes sometimes merged as well into lower class while the middle class remains. The 5-class model was therefore collapsed into the 3-class model of: I) upper, II) middle and III) lower socioeconomic classes for ease of comparison with extant literature.

Statistical analysis

Data obtained through interviewer-administered questionnaires was analyzed using the Statistical Package for the Social Sciences, version 23.0 (IBM Inc., Armonk, NY, USA). Descriptive statistical analysis was employed. Statistical significance was set at a p value of <0.05.

Ethical issues

The research protocol was submitted for consideration and subsequent approval by the Health Research and Ethics Committee of FMCB before administering questionnaires (approval number: FMCB/HCS/HREC/APPR/VOL2/10/22, date: 23.11.2022). Questionnaires were administered after educating the clientele about the purpose of the research and after having obtained written informed consent.

Results

The study recruited 129 women and full response was obtained making a 100% response rate.

Table 1 shows the demographics characteristics of the sample. One hundred and twenty-four (96.1%) of the respondents had formal education, while 5 (3.9%) had Quranic (informal) education. Among the study subjects 99 (76.7%) were Muslims, while 30 (23.3%) were Christians. Seventy-six (58.9%) were gainfully employed and 38 (29.4%) were housewives.

In the 5-class system, no subject was categorized as social class I. Equal proportions of 41.1% (n=53) each were seen in classes II and III, with 14.7% (n=19) and 3.1% (n=4) in classes IV and V, respectively (Figure 1).

Awareness of EC is summarized in Table 2. Of note, two-thirds of the participants (66.7%) had not heard of EC. Eighteen (41.9%) had their source of information from health workers followed by friends and peers-12 (27.9%) and 1 (2.3%) from outreaches. Of the women who were aware of EC, the type of EC included LNG pills (n=21, 48.8%), combined OCP (n=5, 11.6%), and IUD (n=4, 9.3%), while 8 (18.6%) had no knowledge of the types of EC available.

Only 23 (17.8%) of the participants had ever used EC. More than half (n=87, 67.4%) did not know the timescale in which EC is effective. Eighteen (14.0%) felt that EC was effective within 24 hrs after sex, 12 (9.3%) that EC should be taken before sex, 7 (5.4%) believed that EC was effective within 72 hrs after sex, while 3 (2.3%) thought that EC would be effective up to five days after sex.

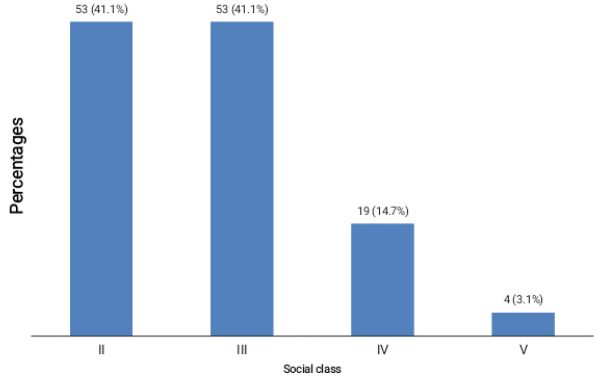

Figure 1. Graphical representation of the social class of study participants

Table 1. Socio-demographic characteristics of patients

Variable	Category	Frequency (%)
Age (years)	<25	48 (37.2)
	26-30	41 (31.8)
	>31	40 (31.0)
Mean ± SD (years)		28.47±5.14
Mode (years)		30.00
Parity	Nulliparous	44 (34.1)
	Para 1-2	36 (27.9)
	Para 3-4	35 (27.1)
	Para >5	14 (10.9)
Level of education (subjects)	Quranic	5 (3.9)
	Primary	13 (10.1)
	Secondary	30 (23.3)
	Tertiary	81 (62.8)
Level of education (partners)	Quranic	6 (4.7)
	Primary	5 (3.9)
	Secondary	17 (13.1)
	Tertiary	101 (78.3)
Ethnicity	Nupe	90 (69.8)
	Hausa	7 (5.4)
	Yoruba	13 (10.1)
	Igbo	11 (8.5)
	Others	8 (6.2)
Occupation	Civil servant	29 (22.5)
	Self-employed	47 (36.4)
	Housewife	38 (29.4)
	Teaching	10 (7.8)
	Farming	2 (1.6)
	Others	3 (2.3)
Husband's occupation	Civil servant	60 (46.5)
	Self-employed	47 (36.4)
	Teaching	8 (6.2)
	Farming	6 (4.7)
	Others	8 (6.2)

SD: Standard deviation

The most common form of EC used among the women who had used it was the LNG pills (n=15, 65.2%). Of those that had ever used EC, about a third of (n=7, 30.4%) took EC to prevent unwanted pregnancy, and equal numbers (n=5, 21.8%) took EC because of miscalculated sex timing or failed withdrawal method (Table 3).

Table 2. Awareness of emergency contraception (n=43)

Variable	Category	Frequency (%)
Have you heard of EC?	Yes	43 (33.3)
	No	86 (66.7)
Sources of information	Media	5 (11.6)
	Friends/peers	12 (27.9)
	Health worker	18 (41.9)
	Family/relatives	4 (9.3)
	Books/magazines	3 (7.0)
	Campaign outreach	1 (2.3)
Types of EC aware of	Levonorgestrel pills	21 (48.8)
	Combined OCP	5 (11.6)
	IUD	4 (9.3)
	Others	5 (11.6)
	I don't know	8 (18.6)

EC: Emergency contraception, OCP: Oral contraceptives pills, IUD: Intrauterine device

Determinants of awareness about EC

In Table 4, age, level of education, religion, ethnicity and social class have significant association with awareness of EC.

The logistic regression analysis of awareness of EC showed a significant higher odds of 3 times level of awareness among those aged 26-30 years compared to other age groups [confidence interval (CI): 1.228-8.351]. There were significantly higher odds of awareness of EC amongst participants with tertiary education and those whose husbands had attained tertiary level of education, respectively, in contrast to other levels of educations [(2.020-25.658), (1.023-21. 762)]. The odds of awareness of EC among Muslims was 2.3 times higher compared to the Christians (1.069-5.095). The odds of awareness of EC were twelve and seven times higher among the Igbo ethnicity compared to Nupe and Hausa ethnic groups respectively (1.019-141.336). Also, there were significantly higher odds of 2.2 and 5.3 times the chance of being aware of EC among women whose families were in upper and middle social classes, respectively, when compared to the lower class [(CI: 1.249-3.822) and (CI: 1.554-18.304)].

Table 3. Utilization of emergency contraception (n=129)

Variable	Category	Frequency (%)
Ever used EC	Yes	23 (17.8)
	No	106 (82.2)
When is EC effective?	Before sex	12 (9.3)
	Within 24 hrs after sex	18 (14.0)
	Within 72 hrs after sex	7 (5.4)
	Up to 5 days after sex	3 (2.3)
	Others	2 (1.6)
	I don't know	87 (67.4)
Where is EC obtained from?	Public hospital	30 (23.3)
	Private hospital	12 (9.3)
	Pharmacy/patent medicine store	22 (17.0)
	I don't know	65 (50.4)
Method of EC used (n=23)	Levonorgestrel pills	15 (65.2)
	Combined OCPs	1 (4.3)
	IUCD	3 (13.1)
	Others	4 (17.4)
Reasons for use (n=23)	Prevent unwanted pregnancy	7 (30.4)
	Miscalculated sex timing	5 (21.8)
	Failed withdrawal method	5 (21.8)
	Others	6 (26.0)

EC: Emergency contraception, OCP: Oral contraceptives pills, IUCD: Intrauterine contraceptive device

Table 4. Logistic regression of awareness of emergency contraception

Variable	Awareness of EC	OR (95% CI)	p-value
	Yes (n=33)	No (n=86)	
Age (years)			
≤25	9 (20.9)	39 (45.4)	1
26-30	17 (39.5)	24 (27.9)	3.20 (1.228-8.351)
≥31	17 (39.5)	23 (26.7)	1.04 (0.432-2.522)
Parity			
Nulliparous	12 (27.9)	32 (37.2)	1
Para 1-4	28 (65.1)	43 (50.0)	1.38 (0.326-5.796)
Para ≥5	3 (7.0)	11 (12.8)	2.388 (0.611-9.325)
Level of education (wife)			
Quranic	2 (4.7)	3 (3.5)	1
Primary	2 (4.7)	11 (12.8)	1.200 (0.190-7.572)
Secondary	3 (7.0)	27 (31.4)	4.400 (0.916-21.130)
Tertiary	36 (83.7)	45 (52.3)	7.200 (2.020-25.658)
Level of education (husband)			
Quranic	0 (0.0)	6 (7.0)	1
Primary	2 (4.7)	3 (3.5)	1.25 (0.201-7.796)
Secondary	2 (4.7)	15 (17.4)	0.944 (0.151-5.903)
Tertiary	39 (90.7)	62 (72.1)	4.718 (1.023-21.762)
Religion			
Islam	34 (79.1)	65 (75.6)	2.333 (1.069-5.095)
Christianity	9 (20.9)	21 (24.4)	1
Ethnicity			
Nupe	33 (76.7)	57 (66.3)	1
Hausa	1 (2.3)	6 (7.0)	1.727 (0.405-7.369)
Yoruba	1 (2.3)	12 (14.0)	0.000 (0.478-75.344)
Igbo	4 (9.3)	7 (8.1)	12.000 (1.019-141.336)
Others	4 (9.3)	4 (4.6)	1.750 (0.275-11.152)
Occupation (wife)			
Civil servant	12 (27.9)	17 (19.8)	1
Self-employed	13 (30.2)	34 (39.5)	0.708 (0.057-8.730)
Housewife	14 (32.6)	24 (27.9)	1.308 (0.109-15.679)
Schooling	2 (4.7)	8 (9.3)	0.857 (0.071-10.331)
Farming	1 (2.3)	1 (1.2)	2.000 (0.115-34.822)
Others	1 (2.3)	2 (2.3)	0.500 (0.013-19.562)
Occupation (husband)			
Civil servant	27 (62.8)	33 (38.4)	1
Self-employed	10 (23.3)	37 (43.0)	1.222 (0.279-5.349)
Schooling	0 (0.0)	8 (9.3)	3.700 (0.784-17.467)
Farming	3 (4.6)	4 (4.6)	1.615 (1.000-21.207)
Others	4 (9.3)	4 (6.5)	2.000 (0.224-17.894)
Social class			
Upper	24 (55.8)	29 (33.7)	2.185 (1.249-3.822)
Middle	16 (37.2)	37 (43.0)	5.333 (1.554-18.304)
Lower	3 (7.0)	20 (23.2)	1

EC: Emergency contraception, OR: Odds ratio, CI: Confidence interval

Determinants of using EC

As shown in Table 5, age, parity, level of education of the couples, religion, and social class of the respondents had significant associations with experience of personal use of EC.

The bivariate analysis on use of EC showed that the odds of this were two and three times higher among those aged 26-30 years compared to those of ≤25 and ≥31 years respectively (1.550-2.429). Equally, there were significantly higher odds, of 3.5 and 2.3 times, the level of EC use among para 1-4 and para ≥5, respectively, when compared to nulliparous women [(CI: 1.298-9.234) and (CI: 1.251-9.251)]. There were significant higher odds of EC use amongst participants with primary education and those whose husbands attained primary level of education respectively in comparison to women with only basic (quranic) levels of education; [(CI: 1.78-8.569), (CI: 1.871-5.387)]. The odds of EC use among Muslims was four times higher compared to Christians (1.635-9.785). Finally, the odds of personal use of EC were 3.8 times higher for both women in the upper and middle social classes compared to the lower class (CI: 1.966-7.416).

Discussion

In the present study, only one third of women knew of EC and only 17.8% had ever personally used EC. Two thirds of participants had no idea when EC was effective. The prevalence of unintended pregnancy in our cohort was 29.5%. The results of the current study revealed that age, ethnicity, religion, level of education and socioeconomic status had significant effects on level of awareness of EC. Equally, personal experience of using EC was significantly influenced by age and parity, as well as level of education, religion and socioeconomic status.

The finding that only one third of women knew of EC was similar to previous reports from Nepal (22), India (23) and northwest Nigeria (24). However, this proportion was higher than reported figures in similar cross-sectional, hospital-based studies from Ethiopia (14), India (25,26) and Ankara, Türkiye (27). Interestingly, one other hospital-based study from Ethiopia reported a higher rate of knowledge of EC (28). This rate of one-in-three women having awareness of EC is lower than reported figures from a study across 14 countries in Western, Central and Eastern Europe and Central Asia (29), among female high school students in Ethiopia (30,31), nursing students in Spain (32), first year medical students of an International University in Nicosia, Cyprus (33), undergraduates students in Northern Uganda (34), and local studies among undergraduates in Nigeria tertiary institutions (7,8). The differences may not be unconnected to the fact that our research was conducted in a semi-urban settlement. Also, a higher literacy level coupled with socio-cultural differences may account for greater level of awareness among Europeans. It is notable that many of the studies reporting higher levels of awareness of EC were conducted among college and undergraduate students or nursing and medical students, who were likely to be more enlightened on reproductive health issues.

In our cohort, most of the participants who knew about EC learnt about it through health workers, and the next most common source of information was friends and peers. This is in agreement with the report by Acen et al from Northern Uganda (33), but in contrast with report by Adavuruku et al. (8) from northwest Nigeria and Chaudhary (22) from Nepal, South Asia, where most of the respondents learnt about it through friends, then social media, followed by health workers.

The proportion of women in our cohort who had personal experience of using EC was very low (17.8%) with most having used LNG pills followed by much smaller numbers using IUDs or OCP. This finding is in consonance with Putchakayala et al. (25) from India and Adavuruku et al. (8) from northwest Nigeria. As only one third of our sample had actually heard of EC, it is unsurprising that only a few had personal experience of using it. However, the level of utilization from this study is similar to previous report from southwest Nigeria (7), Europe and Central Asia (29) as well as a report from the US (35). The level of EC usage in our cohort was still higher than some reports from India (25) and Ethiopia (30), but lower than other reports from other developing nations, including Brazil (36), Ethiopia (31), Ghana (13) and Nigeria (8). These observed differences in level of use may be due to the differences in level of awareness of the women towards EC among the various study populations, or cultural or demographic differences. Generally, the higher the awareness of EC, the higher the utilization rate. Furthermore, high rates of modern contraception use among women of reproductive age in developed countries, in contrast to what is obtainable in developing countries, may account for the lower levels of utilization of EC in developed countries, reported by some studies.

Determinants of awareness of EC

Age, ethnicity, religion, tertiary level of education and higher socioeconomic status of the respondents had significant association with awareness of EC.

In our study, the younger age group was associated with higher odds of awareness of EC. This is consistent with previous reports showing strong association between awareness of EC and younger age group (8,14,22,28,29,37). Also, the higher odds of awareness of EC among clientele with tertiary level of education and high socioeconomic status in this study, is also in agreement with previous reports from Nigeria (7,8), Nepal (22), Türkiye (27), and Ethiopia (14,38). However, our finding is in contrast to a report from India where low socioeconomic status was significantly associated with knowledge of EC (37). This may not be unconnected to the fact that higher educational status as well as good income widens the social interaction which in turn help them to obtain additional information regarding family planning services including emergency contraceptive methods.

Table 5. Logistic regression of experience of using emergency contraception

Variable	Use of EC	OR (95% CI)	p-value
	Yes (n=23)	No (n=106)	
Age (years)			
≤25	5 (21.7)	43 (40.6)	1
26–30	11 (47.8)	30 (28.3)	1.940 (1.550-2.429)
≥31	7 (30.4)	33 (31.1)	0.58 (0.199-1.685)
Parity			
Nulliparous	7 (30.4)	37 (34.9)	1
Para 1-4	16 (69.6)	55 (51.9)	3.46 (1.298-9.234)
Para ≥5	0 (0.0)	14 (13.2)	2.25 (1.251-9.251)
Level of education (wife)			
Quranic	0 (0.0)	5 (4.7)	1
Primary	1 (4.3)	12 (11.3)	2.78 (1.78-8.569)
Secondary	2 (8.7)	28 (26.4)	3.934 (0.481-32.180)
Tertiary	20 (87.0)	61 (57.6)	4.590 (1.003-21.005)
Level of education (husband)			
Quranic	0 (0.0)	6 (5.6)	1
Primary	1 (4.3)	4 (3.8)	2.58 (1.871-5.387)
Secondary	1 (4.3)	16 (15.1)	1.050 (0.111-9.896)
Tertiary	21 (91.3)	80 (75.5)	4.200 (0.526-33.506)
Religion			
Islam	34 (79.1)	65 (75.6)	4.000 (1.635-9.785)
Christianity	9 (20.9)	21 (24.4)	1
Ethnicity			
Nupe	13 (56.5)	77 (72.6)	1
Hausa	2 (8.7)	5 (4.7)	0.846 (0.096-7.457)
Yoruba	2 (8.7)	11 (10.4)	0.357 (0.025-5.109)
Igbo	5 (21.7)	6 (5.7)	0.786 (0.059-10.377)
Others	1 (4.4)	7 (6.6)	0.171 (0.015-1.905)
Occupation (subjects)			
Civil servant	4 (17.4)	25 (23.6)	1
Self-employed	9 (39.1)	38 (35.8)	3.125 (0.227-43.021)
Housewife	8 (34.8)	30 (28.3)	2.111 (0.172-25.925)
Schooling	1 (4.3)	9 (8.5)	1.875 (0.150-23.396)
Farming	0 (0.0)	2 (1.9)	4.500 (0.190-106.823)
Others	1 (4.3)	2 (1.9)	1.47 (0.297-7.253)
Occupation (partners)			
Civil servant	10 (43.5)	50 (47.2)	1
Self-employed	8 (34.8)	39 (36.8)	3.000 (0.615-14.626)
Schooling	1 (4.3)	7 (6.6)	2.925 (0.578-14.794)
Farming	1 (4.3)	5 (4.7)	4.200 (0.332-53.123)
Others	3 (13.0)	5 (4.7)	3.000 (0.227-39.608)
Social class			
Upper	11 (47.8)	42 (39.6)	3.818 (1.966-7.416)
Middle	11 (47.8)	42 (39.6)	3.818 (1.966-7.416)
Lower	1 (4.3)	22 (20.8)	1

EC: Emergency contraception, OR: Odds ratio, CI: Confidence interval

In this study, being a Muslim was associated with higher odds of awareness, as has previously been reported from northwest Nigeria (24,39) and India (37).

In our study Igbo ethnicity was associated with higher odds of awareness of EC, which again, is in agreement with other studies of this topic where ethnicity has been investigated as a determinant of EC awareness (38).

Determinants of use of EC

Once again, younger age, and high socioeconomic status, together with religion all had significant associations with personal experience of using EC. This finding is in agreement with previous reports where younger age, religion and high socioeconomic status were found to be associated with use of EC (24,34,35-37,39).

We also found a significant association between higher order parity and use of EC. This finding is not unusual as the nulliparous may be more eager to get pregnant as a way of securing and/or cementing her marriage, rather than preventing pregnancy. Especially in this cultural context where much premium is placed on child bearing!

Interestingly, a primary level of education was associated with personal use of EC. The reason for this finding may be because being a Muslim dominated community where young girls are married as teenagers, the majority had completed their family size at the age when their counterparts who went on to continue their education to tertiary level were just settling down for marital life. Consequently, the overriding consideration for the women with only primary level of education would be to limit and/or prevent further increase in their family size.

Study Limitations

The strength of this study is that no previous study has examined EC in Niger State, Nigeria. The majority of the studies about EC in northern Nigeria have focused on secondary and undergraduate students (8,24,39). This study was hospital-based. A further limitation, which may explain the increased variability observed within the data, was the small sample size. These may limit the generalizability of our findings to the general populace. Self-reporting was used as the only means of measuring awareness and personal history of using EC. This method has the drawback of recall bias and eliciting only socially acceptable responses and hence, may lead to inaccurate results. Finally, this study was carried out amongst women who were accessing care in a public health facility, and who were therefore disposed to having greater health-related awareness than women from a general populace.

Conclusion

EC has the benefit of stopping accidental pregnancy and potential resultant IA after unprotected sexual intercourse. However, most of the participants in the present study had no knowledge of EC. The level of actual use of EC was even lower at not quite 20%. Women who are not well-informed about EC are unlikely to use it. We believe, therefore, that there is a need to increase public health knowledge and practice of EC through health education and advocacy in our population. Furthermore, motivating and training health workers to enlighten and educate clientele at the family planning service point about EC methods, their uses and where they are available will be important to achieve this aim. A multicenter, population-based study to bridge the limitations identified by the present study is recommended.

Ethic

Ethics Committee Approval: *The research protocol was submitted for consideration and subsequent approval by the Health Research and Ethics Committee of FMCB before administering questionnaires (approval number: FMCB/HCS/HREC/APPR/VOL2/10/22, date: 23.11.2022).*

Informed Consent: *Questionnaires were administered after educating the clientele about the purpose of the research and after having obtained written informed consent.*

Footnotes

Author Contributions: *Surgical and Medical Practices: F.B.A., Concept: A.O.A., Design: F.B.A., Data Collection or Processing: A.E.N., Analysis or Interpretation: A.O.A., Literature Search: I.C.N., Writing: S.A.E.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Preferred working time models and equal opportunities in gynecology and obstetrics: a sub-analysis of the trinational FARBEN survey focusing on German participants from Western and Eastern federal states

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Abstract

Objective: The aim of this study was a sub-analysis of the FARBEN survey to compare the preferences and responses of participants from the Eastern and Western German federal states and to identify potential differences.

Received: 04 July, 2025 **Accepted:** 01 August, 2025 **Epub:** 03 October, 2025 **Publication Date:** 03 December, 2025

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DOI: *10.4274/jtgga.galenos.2025.2025-5-13*

Cite this article as: *Tauber N, Banys-Paluchowski M, Becker C, Foessleitner P, Göpfert M, Hartmann S, et al. Preferred working time models and equal opportunities in gynecology and obstetrics: a sub-analysis of the trinational FARBEN survey focusing on German participants from Western and Eastern federal states. J Turk Ger Gynecol Assoc. 2025; 26(4): 256-67*

Material and Methods: The preferences of the German participants from the respondents in the tri-national FARBEN study were analyzed. Participation was voluntary and anonymous. The questionnaire consisted of 62 questions covering topics such as the workplace in general, work-time models, and professional goals. In the present study, only the data of the participants working in Germany were analyzed.

Results: The sub-group consisted of 1,021 out of the total of 1,364 (74.85%) respondents for the FARBEN survey. Of these, 855 (83.7%) responses were from participants from the Western federal states, and 166 (16.3%) from the Eastern federal states. Gynecologists in the East generally became parents at a younger age (29.3 vs. 30.8 years) and the rate of childlessness was higher among gynecologists in the West (54.8% vs. 37.0%). In the West, full-time work was both more frequently preferred (13.0% vs. 5.4%) and practiced (52.1% vs. 41.5%).

Conclusion: Many family policy aspects of the former German Democratic Republic facilitated and continues to facilitate the compatibility of work and family life for mothers in the East. Historical perspectives can be helpful in implementing improvements for women in terms of work-family balance in a female-dominated medical field such as gynecology. [J Turk Ger Gynecol Assoc. 2025; 26(4): 256-67]

Keywords: Career goals, equal opportunities, gender differences, working time models, Eastern Germany, Western Germany

Introduction

The "FARBEN" survey (German: "Colors"; FAvorisierte aRBEitszeitmodelle in der GyNäkologie = Preferred Working Time Models in Gynecology) examined preferences regarding working hours and other professional policy topics, such as gender equality, parental leave, and availability and capacity to attend sabbaticals (1). The first survey collected and compared country-specific aspects of medical training in each respective country (2,3). A total of 1,364 (trainee) gynecologists and students with a focus on gynecology participated in the FARBEN survey. There have been relatively few publications in this field to date and the FARBEN survey represents the largest collected database in gynecology on the topic (4-7).

The reunification of Germany in 1989 was driven by peaceful protests in East Germany, economic struggles, and political changes in the Soviet Union, leading to the fall of the Berlin Wall on November 9. This event paved the way for the official reunification on October 3, 1990, when East and West Germany became one country again: the Federal Republic of Germany. In the former German Democratic Republic (GDR; "East Germany"), employment of mothers and single parents was actively promoted due to both economic and ideological factors (8). This was reflected in the widespread availability of childcare facilities, as well as additional vacation days and reduced weekly working hours with full salary compensation for mothers with multiple children, in order to support women when balancing work and family life. The coverage rate for childcare facilities for children under the age of 3 years nationwide was 80% (at that time, the highest rate of early childhood care worldwide), while kindergarten places were provided for 94% of children until the end of the former GDR and after-school care was available for 82% of children. In comparison, in 1990, the Western federal states offered childcare facilities for younger children (≤3 year old) for 2%, kindergarten care for 78%, and after-school care for 4% of schoolchildren (9).

In 2017, a survey of female employment reported that 57% of mothers with young children living in the Western federal states were employed, compared to 72% in the Eastern (sometimes referred to as "new") federal states. Similarly, a significant difference in full-time employment among mothers with young children was observed, with 9% in the West compared to 24% in the East (10). These differences were attributed to persistent cultural, societal, and political influences (8).

The aim of the present study was to evaluate the data from the FARBEN survey, taking into account these historical aspects, with regard to the similarities and differences in preferences related to professional policy issues in the East and West of the Federal Republic of Germany.

Material and Methods

The following provides an overview of the questionnaire and the survey, in accordance with the Checklist for Reporting Results of Internet E-Surveys (11).

Participation was entirely anonymous. Multiple responses from the same participant were excluded through IP address verification. The survey was aimed at all gynecologists, including residents, specialists, senior physicians, chief physicians, gynecologists in private practice, and medical students pursuing a career in gynecology and obstetrics. By participating in the online survey, participants provided informed consent for their involvement in the study as well as for the anonymous publication of the resulting data. This study was approved by the University of Lübeck in Germany (approval number: 2023-644, date: 20.09.2023). The survey response period was between October 2023 and May 2024.

In this sub-analysis, only the data of participants from Germany were evaluated and divided into two groups: the Western federal states and the Eastern federal states of the Federal Republic of Germany. It is important to note that all participants from Berlin were classified as belonging to the Eastern federal states.

Recruitment and survey invitations

Participants were recruited through the social media channels of the young forums/young gynecology groups (e.g., Instagram),

print media (12), educational courses and conferences, newsletters of the respective national gynecological societies, and during lectures for medical students. Due to these recruitment methods, the participants constitute a convenience sample rather than a randomly selected, representative group of gynecologists. The completion rate, defined as the number of participants submitting the final page of the questionnaire divided by the number of participants who agreed to take part, was 87.8% (896 out of 1,021 participants). All questionnaires, including those from participants who terminated early, were included in the analysis.

Questionnaire

The questionnaire is described in detail elsewhere (1). The survey is a self-developed, non-validated instrument. It was designed by consensus amongst representatives of the Young Boards and Colleges of Obstetrics and Gynecology of Germany, Austria and Switzerland (NT, NA, PF, AK, CB, RK), under the mentorship of Prof. Dr. Maggie Banys-Paluchowski (University Hospital Schleswig-Holstein, Lübeck Campus) and the Equality Officer of the University of Lübeck (Dr. Solveig Simowitsch). In addition, advisory support was provided by Prof. Dr. Barbara Schmalfeldt, Past-President of the German Board and College of Obstetrics and Gynecology.

The questionnaire was created using the online platform "SurveyMonkey" as an "open survey", open for each visitor of a site, and was available in three languages, German, Italian, and French, allowing participants to respond in their preferred language. It comprised a total of 62 questions, 54 of which (Appendix 1) were presented to all respondents, regardless of nationality. Answering all questions was mandatory, preventing participants from skipping any items without providing a response (completeness check). Most questions included a non-response option, such as "not applicable" or "prefer not to say," allowing participants to refrain from committing to an answer when unsure. Respondents were able to change their answers up to the final submission of the questionnaire.

Statistical analysis

Data analysis was conducted using Excel 2311 and SPSS, version 29 (IBM Inc., Armonk, NY, USA). Multiple entries by the same individuals were excluded through anonymous IP address verification. Correlations between two factors were examined using the chi-square test, with p-values <0.05 considered statistically significant. All reported p-values are two-sided. A binary logistic regression was conducted to examine the influence of gender (male/female) and workplace region (Eastern/Western Germany) on the likelihood of pursuing a chief physician career or a habilitation (highest university degree in German-speaking countries). The model included gender, region, and their interaction term as independent variables, with the career goal (chief physician/habilitation vs. other) as the dependent variable. Odds ratios and predicted probabilities were analyzed to assess the statistical significance and effect sizes of each factor.

Results

Participant characteristics

Of the total of 1,364 FARBEN survey participants, 1,021 (74.85%) worked in Germany. In the Western federal states, the number of participants was 855 (83.7%), while 166 (16.2%) worked in the Eastern federal states. The federal state with the highest number of participants from the West was Bavaria, with 204 participants (20.0%). From the Eastern federal states, the majority of participants (63; 38.0%) were from the city-state of Berlin (Table 1, Figure 1). In the Eastern federal states, 159 women (95.8%), 6 men (3.6%), and one non-binary person (0.6%) participated. In the Western federal states, a total of 769 women (89.9%), 85 men (9.9%), and one non-binary person (0.1%) participated in the survey.

Career goals

Significant differences ($p=0.032$) were observed regarding professional goals in the East and West. In particular, there was a higher preference in employed positions for outpatient care in the East (23.5% vs. 14.6% in the West), while self-employed outpatient work was more favored in the West (24.8% vs. 19.9% in the East). A senior physician position was preferred more in the West (37.5%) than in the East (31.9%). Among those who did not pursue a hospital career, the reasons given for wishing to work in outpatient setting included night and weekend shifts (84.4%), insufficient compatibility of family and work (75.3%), and too little work-life balance (68.9%), irrespective of if the respondent was in the East or West. Regarding the goal of obtaining a scientific habilitation (i.e., the highest academic degree in German-speaking countries), there were no significant differences (East: 13.1%; West: 13.8%) (Table 2).

Regarding the analysis of the influence of both gender (male vs. female) and workplace region (Eastern vs. Western parts of Germany), no significant associations were found in the binary logistic regression for the career goal of attaining a chief physician position ($p=0.619$) or obtaining a habilitation ($p=0.654$). In East Germany, 12.8% of female participants reported wanting to attain habilitation, compared to 11.2% in West Germany ($p=0.698$). The proportion of male respondents wishing to obtain habilitation was 33.3% in the East and 43.3% in the West ($p=0.240$). Regarding clinical career goals, 3.1% of female respondents from Eastern federal states reported their professional goal to be the chief physician position, compared to 3.6% in the West ($p=0.758$). For male participants, the

Table 1. Participants of the FARBEN survey from the Western and Eastern federal states of the Federal Republic of Germany

Questions	Number of inhabitants (in millions)	Western part of Germany	Eastern part of Germany
Total		**1,021 (100%)**	
In which federal state do you work/study?		**855 (83.7)**	**166 (16.2)**
Baden-Wuerttemberg	11.2	120 (14.0)	
Bavaria (Bayern)	13.2	204 (23.9)	
Berlin	3.7		63 (38.0)
Brandenburg	2.6		24 (14.5)
Bremen	0.7	13 (1.5)	
Hamburg	1.9	72 (8.4)	
Hesse (Hessen)	6.3	63 (7.3)	
Mecklenburg Western Pomerania (Mecklenburg Vorpommern)	1.6		24 (14.5)
Lower Saxony (Niedersachsen)	8.0	56 (6.5)	
Northrhine-Westphalia (Nordrhein-Westfalen)	18.0	171 (20.0)	
Rhineland Palatinate (Rheinland-Pfalz)	4.1	32 (3.7)	
Saarland	1.0	5 (0.6)	
Saxony-Anhalt (Sachsen-Anhalt)	2.1		13 (7.8)
Saxony (Sachsen)	4.1		35 (21.1)
Schleswig-Holstein	3.0	119 (13.9)	
Thuringia (Thüringen)	2.1		7 (4.2)

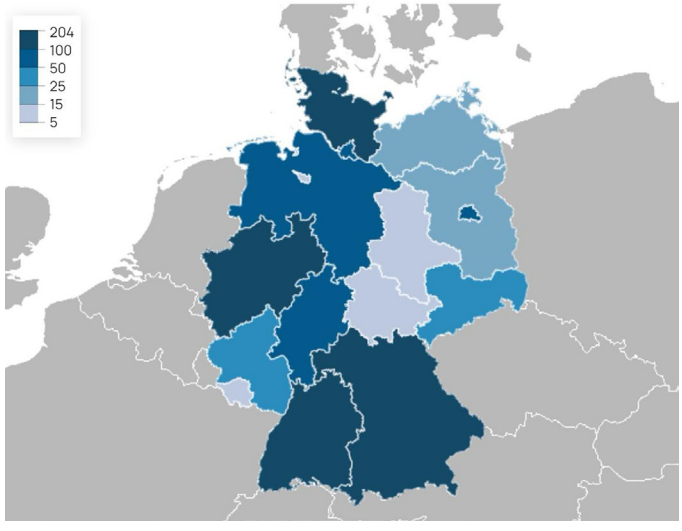

Figure 1. Choropleth map illustrating the distribution of German participants in the FARBEN survey by federal state

proportion was similar between East and West (33.3% and 25.9%, respectively, p=0.689).

Family time off and childcare

While the majority of participants from the East reported having children (63.0%), over 54.8% of participants from the West were childless (p<0.001). Parents from the West had a mean ± standard deviation of 1.9±0.86 children, while parents from the East had an average of 1.8±0.86 children. However, participants from the East became parents earlier (29.3±3.6 years) than those from the West (30.8±3.7 years). This is further illustrated by the fact that over 24.5% of parents from the East had children while still studying medicine (compared to 11.8% in the West). Overall, 71.6% of parents in the East had their first child by the end of their third year of specialty training, compared to only 42.5% of parents in the West (Figure 2). A total of 33 mothers (7.4%) took family leave for up to a maximum of five months per child, while 11 mothers (2.5%) did not take any family leave. Among fathers, 21 individuals (53.8%) did not take any family leave, while 12 (30.7%) took a short family leave of up to five months. While mothers in both the East and West claimed parental leave at similar rates, differences were observed in the parental leave taken by fathers with 10.1% of respondents from Western federal states reported that fathers did not take family leave compared to 16.5% from the East. However, the proportion of those stating that over 80% of fathers take family leave was similar (9.8% in the West and 10.5% in the East).

Although a nearby childcare facility is a factor in the choice of workplace for both East and West, the number of participants naming it an influencing factor was significantly higher in the West (80.4%) than in the East (69.0%; p=0.002) (Table 3).

Table 2. Professional objectives and career, categorized by federal state

Questions	Total*: n (%)	Western part of Germany	Eastern part of Germany	p-value
What is your current further education/professional position?	**1021 (100.0)**	**855 (83.7)**	**166 (16.2)**	**0.040**
Student	86 (8.5)	80 (9.4)	6 (3.6)	
Resident 1st year	77 (7.5)	65 (7.6)	12 (7.2)	
Resident 2nd year	78 (7.7)	60 (7.0)	18 (10.8)	
Resident 3rd year	131 (12.8)	109 (12.7)	22 (13.3)	
Resident 4th year	124 (12.1)	100 (11.7)	24 (14.5)	
Resident 5th year	137 (13.4)	118 (13.8)	19 (11.4)	
Resident 6th year	42 (4.1)	30 (3.5)	12 (7.2)	
Resident >6th year	18 (1.8)	14 (1.6)	4 (2.4)	
Specialist physician	154 (15.1)	124 (14.5)	30 (18.1)	
Senior physician	117 (11.5)	103 (12.0)	14 (8.4)	
Chief physician	11 (1.1)	11 (1.3)	0 (0.0)	
Gynaecologist in outpatient practice	46 (4.5)	41 (4.8)	5 (3.0)	
Your professional goal is this position	**1021 (100.0)**	**855 (83.7)**	**166 (16.2)**	**0.032**
Chief physician	57 (5.6)	50 (5.8)	7 (4.2)	
(Leading) senior physician	374 (5.2)	321 (37.5)	53 (31.9)	
Employed medical specialist in the hospital	119 (11.7)	94 (11.0)	25 (15.1)	
Employed in outpatient practice	164 (16.1)	125 (14.6)	39 (23.5)	
Self-employed in outpatient practice	245 (24.0)	212 (24.8)	33 (19.9)	
Other (please specify)	62 (6.1)	53 (6.2)	9 (5.4)	
Why would you not like to work in the hospital long-term? (1) (multiple answers possible)	**471 (100.0)**	**390 (82.8)**	**81 (17.2)**	**0.068**
Too much responsibility	53 (13.0)	46 (13.6)	7 (9.7)	
Too high workload	245 (59.9)	198 (58.8)	47 (65.3)	
Too little work/life balance	282 (68.9)	235 (69.7)	47 (65.3)	
Insufficient compatibility of family/work	308 (75.3)	255 (75.7)	53 (73.6)	
Night and weekend shifts	345 (84.4)	284 (84.3)	61 (84.7)	
Duties in the delivery room	115 (28.1)	97 (84.3)	18 (25.0)	
Financially unattractive	71 (17.4)	68 (20.2)	3 (4.2)	
Inflexible working hours	215 (52.6)	181 (84.2)	34 (47.2)	
Your workplace	**1008 (100.0)**	**847 (84.0)**	**161 (16.0)**	**0.003**
University hospital, department of gynecology	265 (26.3)	234 (27.6)	31 (19.3)	
Non-university women's department with a total of >25 physicians	176 (17.5)	146 (17.2)	30 (18.6)	
Non-university women's department with a total of 15-25 physicians	243 (24.1)	202 (23.8)	41 (25.5)	
Non-university women's department with a total of <15 physicians	139 (13.8)	104 (12.3)	35 (21.7)	
Outpatient practice** (employed)	73 (7.2)	57 (6.7)	16 (9.9)	
Outpatient practice** (self-employed)	36 (3.6)	33 (3.9)	3 (1.9)	
Student	60 (6.0)	57 (6.7)	3 (1.9)	
Other (combination of outpatient and hospital etc....)	16 (1.6)	14 (1.7)	2 (1.2)	
Your highest academic title is	**909 (100.0)**	**764 (84.0)**	**145 (16.0)**	**0.077**
Master's degree	55 (6.1)	51 (6.7)	4 (2.8)	
Doctorate	540 (59.4)	450 (58.9)	90 (62.1)	
Habilitation	11 (1.2)	11 (1.4)	0 (0.0)	

Table 2. Continued

Questions	Total*: n (%)	Western part of Germany	Eastern part of Germany	p-value
Professorship	13 (1.4)	13 (1.7)	0 (0.0)	
You do not have an academic title	290 (31.9)	239 (31.3)	51 (35.2)	
You would like to achieve habilitation (2)	**885 (100.0)**	**740 (83.6)**	**145 (16.4)**	**0.974**
Yes	121 (13.7)	102 (13.8)	19 (13.1)	
No	584 (66.0)	488 (65.9)	96 (66.2)	
You do not know yet	180 (20.3)	150 (20.3)	30 (20.7)	

Only respondents whose professional goal was to work in an outpatient practice were asked this question
Habilitation = highest university degree in German-speaking countries; only respondents without habilitation/professorship were asked this question
*The differing number of total responses per question is due to the fact that participants were able to skip questions or prematurely end the survey
**And other similar outpatient areas for physicians

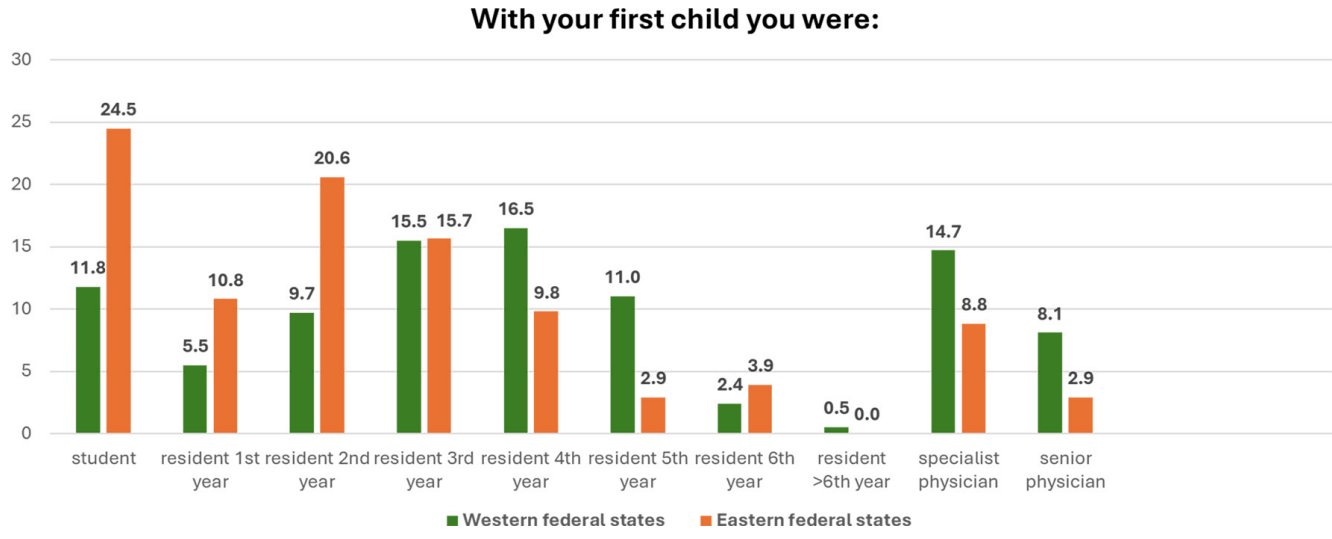

Figure 2. Participants' professional positions at the time of their first child, divided by East and West (p<0.001)

Preferred working time models

Significant differences were observed in both work-time preferences and current working hours between East and West. In the West, 13.0% of respondents preferred a full-time position, compared to only 5.4% in the East (p<0.001). Although an 80-89% work schedule is the most popular model in both the Western and Eastern federal states, the approval in the East was significantly higher at 54.4% compared to 38.9% in the Western federal states (Figure 3). In contrast, the proportion of those reporting part-time work with <70% of full-time hours as the preferred model was higher in the West than in the East (13.9% vs. 9.1%).

When divided by gender, significant differences persisted in both the preferred working time models and the current working time model. While 10.4% of female participants from the West prefer a full-time position, only 3.5% of female participants from the East favored this option. Conversely, 7.0% of female participants in the East and 14.6% of female participants from the West prefer a position with less than 70% of full-time hours (p<0.001). However, no significant differences were found among male participants regarding preferred working time models between East and West (p=0.530).

Significant differences were also found among female participants regarding their current working time models. While 48.1% of female participants in the West work full-time, only 40.8% do so in the East. However, significantly fewer female participants in the East hold a position with less than 70% of full-time hours (7.7% in the East vs. 16.1% in the West; p<0.001). Once again, no significant differences were observed among male participants (p=0.759).

Currently, 52.1% participants in the West work full-time, compared to 41.5% in the East. Consequently, the proportion of part-time workers was significantly higher in the East than in the West (p<0.001). Regarding solutions to avoid staffing burdens due to part-time work, the model "part-time employees work exclusively full days with fixed days off" was more popular in the West (56.9%), while job sharing with shift splitting (48.5%) was favored more in the East (p=0.007) (Table 4).

Table 3. Analysis of the questions on the topic: family time-off and childcare, categorized by federal state

Questions	Total*: n (%)	Western part of Germany	Eastern part of Germany	p-value
Do you have children?	**1019 (100.0)**	**854 (83.8)**	**165 (16.2)**	**<0.001**
Yes	490 (48.1)	386 (45.2)	104 (63.0)	
No	529 (51.9)	468 (54.8)	61 (37.0)	
With your first child you were (1)	**483 (100.0)**	**381 (78.9)**	**102 (21.1)**	**<0.001**
Student	86 (17.8)	61 (11.8)	25 (24.5)	
Resident 1st year	32 (6.6)	21 (5.5)	11 (10.8)	
Resident 2nd year	58 (12.0)	37 (9.7)	21 (20.6)	
Resident 3rd year	75 (15.5)	59 (15.5)	16 (15.7)	
Resident 4th year	73 (15.1)	63 (16.5)	10 (9.8)	
Resident 5th year	45 (9.3)	42 (11.0)	3 (2.9)	
Resident 6th year	13 (2.7)	9 (2.4)	4 (3.9)	
Resident >6th year	2 (0.2)	2 (0.5)	0 (0.0)	
Specialist physician	65 (13.5)	56 (14.7)	9 (8.8)	
Senior physician	34 (7.0)	31 (8.1)	3 (2.9)	
Chief physician	0 (0.0)			
Gynaecologist in outpatient practice	0 (0.0)			
How long did you not work after giving birth? (1) (for multiple children with different time off, please use multiple answers)	**483 (100.0)**	**381 (78.9)**	**102 (21.1)**	**0.028**
2 years per child	29 (6.0)	25 (6.6)	4 (3.9)	
1-2 years per child	175 (36.2)	133 (34.9)	42 (41.2)	
9-12 months per child	200 (41.4)	150 (39.4)	50 (49.0)	
6-8 months per child	50 (10.4)	45 (11.8)	5 (4.9)	
3-5 months per child	18 (3.7)	17 (4.5)	1 (1.0)	
<3 months per child	28 (5.8)	26 (6.8)	2 (2.0)	
You did not take any family leave	32 (6.6)	26 (6.8)	6 (5.9)	
Other option (please specify)	25 (5.2)	20 (5.2)	5 (4.9)	
Do you want to become a parent in the future? (2)	**529 (100.0)**	**468 (88.5)**	**61 (11.5)**	**0.06**
Yes	432 (81.7)	388 (82.9)	44 (72.1)	
No	33 (6.2)	29 (6.2)	4 (6.6)	
You are not sure yet	64 (12.1)	51 (10.9)	13 (21.3)	
How long would you like to pause work after the birth of your child as a parent? (2)	**496 (100.0)**	**439 (88.5)**	**57 (11.5)**	**0.483**
2 years per child	11 (2.2)	10 (2.3)	1 (1.8)	
1-2 years per child	127 (25.6)	114 (26.0)	13 (22.8)	
9-12 months per child	171 (34.5)	150 (34.2)	31 (36.8)	
6-8 months per child	79 (15.9)	69 (15.7)	10 (17.5)	
3-5 months per child	30 (6.0)	30 (6.8)	0 (0.0)	
<3 months per child	9 (1.8)	8 (1.8)	1 (1.8)	
You do not want to take any family leave	3 (0.6)	3 (0.7)	3 (0.7)	
You are not sure yet	66 (13.3)	55 (12.5)	11 (19.3)	
What percentage of mothers in your department take family leave? (3)	**816 (100.0)**	**683 (82.6)**	**133 (17.4)**	**0.244**
100->80%	598 (73.3)	500 (73.2)	98 (73.7)	
>60-80%	55 (6.7)	49 (7.2)	6 (4.5)	
>40-60%	31 (3.8)	28 (4.1)	3 (2.3)	
>20-40%	19 (2.3)	17 (2.5)	2 (1.5)	
1-20%	20 (2.5)	13 (1.9)	7 (5.3)	
Mothers don't take family leave at your department	9 (1.1)	7 (1.0)	2 (1.5)	
You do not know	80 (9.8)	65 (9.5)	15 (11.3)	

Table 3. Continued

Questions	Total*: n (%)	Western part of Germany	Eastern part of Germany	p-value
There are no mothers at your department	4 (0.5)	4 (0.6)	0 (0.0)	
What percentage of fathers in your department take family leave? (3)	**816 (100.0)**	**683 (83.7)**	**133 (16.3)**	**0.017**
100->80%	81 (9.9)	67 (9.8)	14 (10.5)	
>60-80%	68 (8.3)	59 (8.6)	9 (6.8)	
>40-60%	72 (8.8)	63 (9.2)	9 (6.8)	
>20-40%	82 (10.0)	78 (11.4)	4 (3.0)	
1- 20%	131 (16.1)	114 (16.7)	17 (12.8)	
Fathers don't take family leave at your hospital	91 (11.2)	69 (10.1)	22 (16.5)	
You do not know	175 (21.4)	140 (20.5)	35 (26.3)	
There are no fathers at your department	116 (14.2)	93 (13.6)	23 (17.3)	
Family leave at your workplace (university) is supported	**946 (100.0)**	**799 (84.5)**	**147 (15.5)**	**0.607**
Do not agree at all	57 (6.0)	50 (6.3)	7 (4.8)	
Largely disagree	70 (7.4)	55 (6.9)	15 (10.2)	
Rather disagree	145 (15.3)	125 (15.6)	20 (13.6)	
Neither	201 (21.2)	174 (21.8)	27 (18.4)	
Rather agree	194 (20.5)	165 (20.7)	29 (19.7)	
Largely agree	196 (20.7)	163 (20.4)	33 (22.4)	
Strongly agree	83 (8.8)	67 (8.4)	16 (10.9)	
In your opinion, after what period of time does a "career break" occur for parents on family leave?	**946 (100.0)**	**799 (84.5)**	**147 (15.5)**	**0.198**
From 3-6 months	70 (7.4)	64 (8.0)	6 (4.1)	
From 6-9 months	180 (19.0)	157 (19.6)	23 (15.6)	
From 9-12 months	167 (17.7)	143 (17.9)	24 (16.3)	
From 1-2 years	217 (22.8)	176 (22.0)	41 (27.9)	
From >2 years	81 (8.6)	63 (7.9)	18 (12.2)	
Family leave does not cause a career break	31 (3.3)	27 (3.4)	4 (2.7)	
Family leave causes a career break regardless of the duration	200 (21.1)	169 (21.2)	31 (21.1)	
The optimal time to become a parent is for you	**916 (100.0)**	**771 (84.2)**	**145 (15.8)**	**0.589**
During medical school	65 (7.1)	55 (7.1)	10 (6.9)	
During specialty training	190 (20.7)	155 (20.1)	35 (24.1)	
As a medical specialist	198 (21.6)	166 (21.5)	32 (22.1)	
As a senior (leading) physician	34 (3.7)	32 (4.2)	2 (1.4)	
As a chief physician	1 (0.1)	1 (0.1)	0 (0.0)	
As a physician in outpatient practice	5 (0.5)	5 (0.6)	0 (0.0)	
There is no optimal time	423 (46.2)	357 (46.3)	66 (45.5)	
Does your place of work/university provide childcare with flexible hours and sufficient capacity?	**909 (100.0)**	**764 (84.0)**	**145 (16.0)**	**0.056**
Yes	115 (12.7)	90 (11.8)	25 (17.2)	
No	639 (70.3)	536 (70.2)	103 (71.0)	
You do not know	155 (17.1)	138 (18.1)	17 (11.7)	
Would childcare close to the workplace be a factor when choosing an employer?	**909 (100.0)**	**764 (84.0)**	**145 (16.0)**	**0.002**
Yes, this would influence my choice of employer	714 (78.5)	614 (80.4)	100 (69.0)	
No, it does not matter	195 (21.5)	150 (19.6)	45 (31.0)	

Only respondents with children were asked this question
Only respondents without children were asked this question
Only respondents who work in hospitals were asked this question
*The differing number of total responses per question is due to the fact that participants were able to skip questions or prematurely end the survey

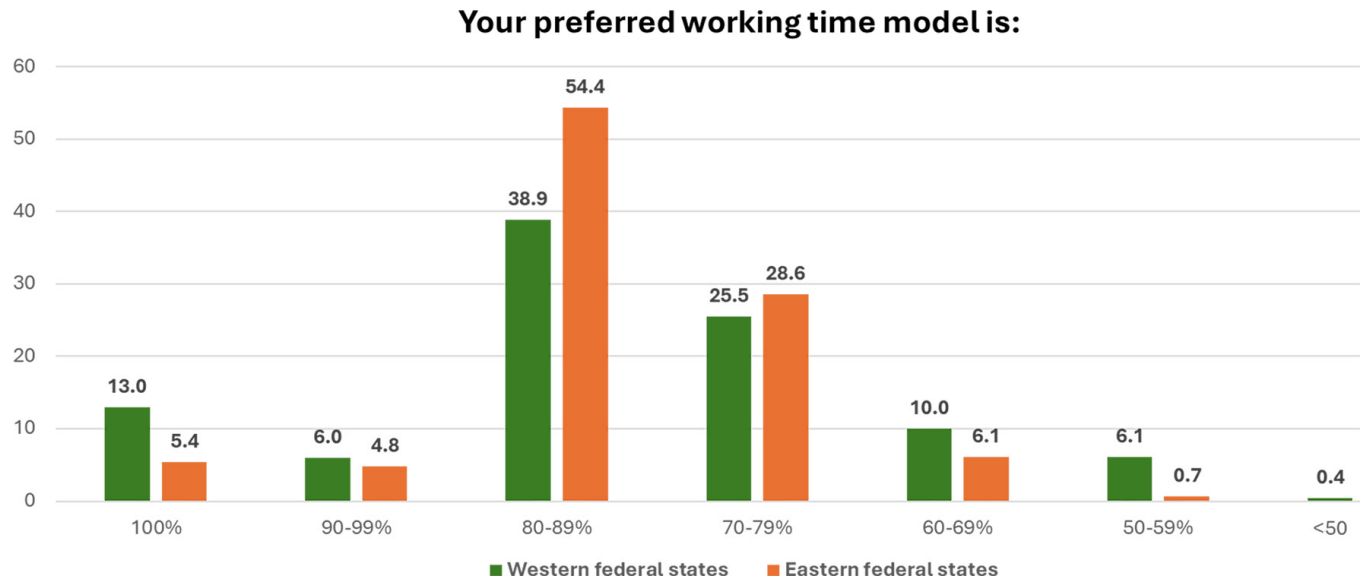

Figure 3. Participants' preferences for different working time models, divided by East and West (p<0.001)

Discussion

Regarding childcare and the compatibility of career and family, the data presented here indicate that gynecology physicians employed in the Eastern part of Germany become parents earlier than those in the West. This is further reflected in a higher proportion of those becoming parents during medical school and/or early medical training positions in the East. In addition, the childlessness rate among gynecologists is lower in the East than in the West. Overall, these findings correlate with current general population data from Germany, which show that women in the East become mothers earlier and that childlessness is more common in the West. Among women from the Western federal states, the childlessness rate is approximately eight percentage points higher both at the end and during the fertile phase (13). The fact that absolute birth rates ultimately differ little between East and West is primarily due to the higher rate of mothers with only one child in the East, whereas in the West, women are more often mothers of multiple children.

Notably, significant differences in decision-making regarding having children among highly qualified women were reported. Overall, the childlessness rate among highly qualified academics (31.3%) is significantly higher than among women with lower educational qualifications (17.4%). While the average number of children among women in the West differs significantly by professional qualification (1.3 children for academics; 1.6 children for non-academics), no education-specific trend is observed in the East (14).

Based on the data presented here, no significant differences were found in the frequency of parental leave taken by gynecologist mothers. However, significant differences were observed among gynecologist fathers with more fathers claiming parental leave in the West. In the general population, however, fathers from Eastern federal states take parental leave more frequently than those in the West (15).

Contrary to general population data, preferences and actual working time models also differed between East and West. According to the present analysis, a full-time position is not only preferred more often in the West than in the East, but overall, more gynecologists in the West also work full-time compared to those in the East. A report from the Economic and Social Science Institute from 2023 stated that only 33.2% of women in the East worked part-time, while in the West, nearly half of all women (47.8%) were employed part-time. Among men, the proportion of part-time workers was significantly lower (11.7%) with no differences between East and West (16).

However, it is worth noting that participants of the FARBEN survey from the East were more frequently employed in non-university hospitals, where physicians in general are more likely to work part-time (17).

While not significantly different, more participants from the East reported that their workplace offers sufficient and flexible childcare facilities (17.2% vs. 11.8% in the West). Regarding career choices, a childcare close to the workplace remains an important factor in the choice of employer, particularly in the West (80.4%) but less so in the East (69.0%). Although Germany has been reunified for over 30 years, childcare structures in the East still generally surpass those in the West. In the East, 73% of children aged three to six receive full-day care outside their home, compared to only 41% in the West (16).

Despite these differences, it is important to acknowledge the progress made in expanding childcare facilities in the West.

Table 4. Analysis of the questions on the topic: working time models/part-time employment, categorized by federal state

Questions	Total*: n (%)	Western part of Germany	Eastern part of Germany	p-value
Your preferred working time model is	**946 (100.0)**	**799 (84.5)**	**147 (15.5)**	**<0.001**
100%	112 (11.8)	104 (13.0)	8 (5.4)	
90-99%	55 (5.8)	48 (6.0)	7 (4.8)	
80-89%	391 (41.3)	311 (38.9)	80 (54.4)	
70-79%	246 (26.0)	204 (25.5)	42 (28.6)	
60-69%	89 (9.4)	80 (10.0)	9 (6.1)	
50-59%	50 (5.3)	49 (6.1)	1 (0.7)	
<50%	3 (0.3)	3 (0.4)	0 (0.0)	
Your current working time model is	**946 (100.0)**	**799 (84.5)**	**147 (15.5)**	**<0.001**
100%	477 (50.4)	416 (52.1)	61 (41.5)	
90-99%	23 (2.4)	14 (1.8)	9 (6.1)	
80-89%	134 (14.2)	96 (12.0)	38 (25.9)	
70-79%	69 (7.3)	58 (7.3)	11 (7.5)	
60-69%	62 (6.6)	58 (7.3)	4 (2.7)	
50-59%	51 (5.4)	44 (5.5)	7 (4.8)	
<50%	15 (1.9)	0 (0.0)	15 (1.6)	
You are currently on maternity leave	24 (2.5)	20 (2.5)	4 (2.7)	
You are currently on family leave as a parent	36 (3.8)	29 (3.6)	7 (4.8)	
You are currently looking for work/not yet employed	55 (5.8)	49 (6.1)	6 (4.1)	
Your reasons for working part-time are (1): (multiple answers possible)	**732 (100.0)**	**582 (79.5)**	**150 (20.5)**	**0.116**
Caring for children	264 (75.9)	218 (78.1)	46 (66.7)	
Caring for relatives	12 (3.4)	10 (3.6)	2 (2.9)	
Desire for a better work-life balance	210 (60.3)	161 (57.7)	49 (71.0)	
Too extensive workload	172 (49.4)	133 (47.7)	39 (56.5)	
Time needed for academic work	31 (1.4)	26 (9.3)	5 (7.2)	
Other: (please specify)	43 (2.6)	34 (12.2)	9 (13.0)	
What solutions would you propose for avoiding a possible personnel burden due to part-time workers? (2) (multiple answers possible)	**447 (100.0)**	**399 (89.3)**	**48 (10.7)**	**0.007**
Fixed job sharing (2 physicians each 50% with duty splitting)	158 (49.2)	142 (49.3)	16 (48.5)	
Part-time employees work exclusively full days with fixed days off	177 (55.1)	164 (56.9)	13 (39.4)	
I do not know	81 (25.2)	65 (22.6)	16 (48.5)	
Other (please specify)	31 (9.7)	28 (9.7)	3 (9.1)	

Only part-time workers were asked this question
Only full-time workers were asked this question
*The differing number of total responses per question is due to the fact that participants were able to skip questions or prematurely end the survey

For example, the availability of full-day childcare in the West has doubled over the past 15 years (16). The attitude of the German population toward non-family childcare for preschool-aged children has also significantly changed in recent years. While in 2005, 41% of people aged 18 to 50 years believed that young children suffer when their mothers are employed, this figure dropped to 23% in 2021 (18). In comparison, in 1991 57% of women and 59% of men in East Germany shared this belief, compared to 73% and 79% in West Germany. In 2004 the approval rating declined for both men and women (23% of

women and 35% of men in East Germany; 56% and 70% in West Germany, respectively) (18).

Study limitations

To the best of our knowledge, the FARBEN survey is the largest survey regarding working time models and gender equality in gynecology. However, in this analysis, the Western part of Germany is overrepresented, with 855 participants (83.7%) compared to 166 participants from the East (16.2%). Participants from the city-state of Berlin (n=63; 38.0%) were counted among the Eastern participants. This categorization was controversially discussed within the project team and ultimately justified, as the most renowned hospital in Berlin, the Charité University Hospital, is located in the former East Berlin. In addition, the city-state of Berlin is either analyzed separately or attributed to the former East in other statistical analyses and publications concerning East vs. West, based on which distribution we were able to align ourselves with (19).

Another important point to consider is that the survey in question focused solely on respondents' current place of residence, without accounting for their place of upbringing. Following German reunification, population movements occurred in both directions between East and West, which are not reflected in the survey data but likely continue to exert a significant influence on individuals' preferences.

In addition to assessing the availability of sufficient capacities for flexible childcare, it is important to critically evaluate and ensure the quality of childcare services. Accordingly, the implications of this paper should not be limited to considerations of quantity, but must also address the quality of childcare provision, situating both dimensions within a broader socio-historical context.

The reasons for the significantly higher number of participants from the Western federal states remain unclear. Generally, the FARBEN survey in Germany was conducted and promoted by a research team that operates mainly in the Western federal states (Schleswig-Holstein and Bavaria). At the time of the survey, only one physician in Berlin was involved in the working group, while all other members were working in the Western federal states, which may have influenced recruitment. Whether the absence of gynecologists from other Eastern federal states in the working group may have affected recruitment remains speculative.

Looking ahead, future studies could benefit from a longitudinal or repeated-measures design to better understand causal relationships between regional background, career preferences, and work-life balance. To improve generalizability, future surveys should aim for a more balanced or stratified sample across all federal states, possibly by involving a broader network of collaborators from Eastern regions. Furthermore, these findings can inform the development of more sustainable and regionally tailored working time models and childcare strategies, supporting gender equality and long-term career satisfaction in gynecology and obstetrics.

Conclusion

This study highlighted persistent regional differences in family planning, career preferences, and working time models among gynecologists in Germany, shaped by historical policy legacies. The findings underscore the importance of regionally tailored, flexible work structures and reliable childcare solutions to support work-family balance. To promote gender equality and long-term retention in gynecology, future efforts should prioritize sustainable, family-friendly workplace policies informed by both historical context and current needs.

The fundamentally different family policies in the former GDR and West Germany have lasting effects that are still felt today in both parts of the Federal Republic of Germany. The younger age of motherhood and lower rate of childlessness among female gynecologists in the East, as observed in our analysis, correspond to current birth rates in the population and the generally higher rate of childlessness among Western female academics.

Ethic

Ethics Committee Approval: *This study was approved by the University of Lübeck in Germany (approval number: 2023-644, date: 20.09.2023).*

Informed Consent: *By participating in the online survey, participants provided informed consent for their involvement in the study as well as for the anonymous publication of the resulting data.*

Footnotes

Author Contributions: Concept: N.T., N.A., P.F., A.K., C.B., R.K., S.S., B.S., A.R., M.B.P., Design: N.T., N.A., P.F., A.K., C.B., R.K., B.S., A.R., M.B.P., Data Collection or Processing: N.T., N.A., P.F., A.K., C.B., R.K., M.B.P., Analysis or Interpretation: N.T., N.A., M.B.P., Literature Search: N.T., N.A., M.B.P., Writing: N.T., M.B.P., P.F., M.G., S.H., R.K., N.Kİ., A.K., N.K., L.D.M., G.N., A.R., H.S., L.S., B.S., S.S., M.WA., M.W., N.A.

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Outcome of trial of labour after one previous cesarean section at Federal Medical Centre, Bida, north central, Nigeria

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Abstract

Objective: To determine the success rate and feto-maternal outcomes following trial of labor among women with one previous cesarean section (C/S) seen at the Federal Medical Centre, Bida, Nigeria.

Material and Methods: This was a prospective cohort study among selected women with a previous C/S admitted for trial of labor after C/S over a 15 month period. Demographic and medical history data was collected by questionnaire. Women achieving vaginal birth after cesarean (VBAC) and those undergoing emergency repeat C/S (ERCS) were compared statistically for differences and associations based on a range of variables.

Results: A total of 150 women with one previous C/S were included. Out of 150 study participants, 105 (70.0%) achieved VBAC while 45 (30.0%) had ERCS. Women with previous vaginal delivery had higher odds of achieving VBAC. Poor progress of labor was the most common indication for ERCS (17/45; 37.8%). The most frequent maternal complication following abdominal delivery was post-partum hemorrhage (n=15; 33.3%) while perineal laceration (n=26;24.8%) was the commonest among women who achieved VBAC. The ERCS cohort suffered significantly more complications in comparison to those who had VBAC. Comparison of fetal outcomes by mode of delivery were comparable, except that neonates admitted into special care baby unit were more likely to have been born via ERCS (odds ratio 5.231; 95% confidence interval 1.247-21.950) compared to those born via VBAC. There was no perinatal or maternal mortality. However, one case of ruptured uterus was recorded.

Conclusion: These results demonstrated that good outcome following trial of labour is achievable among well selected women, even in low resource settings. [J Turk Ger Gynecol Assoc. 2025; 26(4): 268-75]

Keywords: Cesarean delivery, TOLAC, fetal outcome, Nigeria

Received: 25 May, 2025 **Accepted:** 28 August, 2025 **Epub:** 14 October, 2025 **Publication Date:** 03 December, 2025

Introduction

Cesarean section (C/S) is an important surgical procedure that is commonly performed in modern obstetrics. The World Health Organization advocated that operative delivery was important to reduce rates of death and permanent damage (1). It was estimated that assistance with delivery by C/S was necessary in at least 10% of pregnancies (1). The overall global C/S rate in 2018 was 21.1%, in Europe it was 25.7%, in Asia it was 23.1%, in Latin America and the Caribbean 42.8%, while it was 9.2% in Africa (1). In sub-Saharan Africa, the overall C/S rate is reported to be 5% (1-3) while it is 2.1% in Nigeria (4). Repeat C/S is a major contributor to this persistently increasing rate (1-6).

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DOI: *10.4274/jtgga.galenos.2025.2025-4-12*

Cite this article as: *Adewale FB, Adefemi AS, Ashimi AO, Musa AO. Outcome of trial of labour after one previous cesarean section at Federal Medical Centre, Bida, north central, Nigeria. J Turk Ger Gynecol Assoc. 2025; 26(4): 268-75*

To avoid many of the impediments associated with repeat C/S, trial of labor after C/S (TOLAC) is acknowledged as a safe alternative and which has contributed to a decrease in the overall C/S rate (6,7). Vaginal birth is associated with lesser complications, necessitates less anaesthesia, causes a lesser likelihood for postnatal morbidity. In addition, it is more affordable, enhances faster and improved bonding between mother and child, and entails a shorter hospital stay (1,6). These advantages are noteworthy, particularly in resource poor locales where socio-cultural aversion to cesarean birth is common (1,6-8).

To address the increasing cesarean birth rate, the American College of Gynecologists (ACOG) recommended that women with a previous lower segment C/S (LSCS) should be allowed TOL, after excluding contraindications (9). Analysis of the outcome of labor in these patients demonstrated vaginal delivery to be safe (6,7,9). A vaginal birth after cesarean success rate of 3.4%-85% was reported in a meta-analysis performed among countries in Sub-Saharan Africa (10), while in Nigeria this rate ranged between 24.3-72.5% (5,11-13). Nevertheless, wide disparities in TOLAC rates still persist between hospitals and practitioners.

Generally, one of the reasons why obstetricians hesitate to employ TOLAC is the risk of ruptured uterus and associated complications, such as the need for hysterectomy and poorer fetal outcome-but this can be circumvented by swift diagnosis and quick intervention (12-15). However, evidence showing the safety of TOLAC when used in consideration of appropriate guiding principles has been accessible since the early eighties (8,9). TOLAC offers clear-cut benefits over a repeat C/S since the operative morbidity, and mortality are totally eradicated, the duration of hospital admission is much shorter, and it is relatively cheaper (12,16,17). Apart from these benefits, TOLAC also provides an opportunity to reduce the rate of abdominal delivery. This can be addressed to some extent by eschewing primary C/S done without clear-cut indications, but more significantly by resorting to TOLAC.

Justification for the study

According to the recent Nigeria demography health survey, only 49.7% of pregnant women (including those with previous C/S) in north central Nigeria delivered within health facilities and one of the reasons for this include the fear of C/S. Women may resort to traditional birth attendants and this may be to their detriment. Hence the need to evaluate the efficacy and safety of TOLAC. In addition, this specific research topic has not been investigated in Nigeria previously. The outcomes of this study will help when counselling this cohort in the future.

Aim and objectives

Th aim of the present study was to determine the efficacy of TOLAC and to assess feto-maternal outcomes of TOLAC among patients with a previous C/S admitted for intrapartum care at the Federal Medical Centre, Bida (FMCB).

Specific objectives:

To determine the success rate of VBAC following TOL at FMCB.

To evaluate the various indications for repeat C/S following failed TOLAC at FMCB.

To determine the influence of history of previous vaginal delivery on the success rate of VBAC following TOL at FMCB.

To compare maternal complications between women who achieved VBAC and those who had emergency C/S following failed TOL in order to identify risk factors associated with failed TOL.

To compare fetal outcome among babies who were delivered vaginally and those via emergency repeat C/S (ERCS) with the intention of identifying factors associated with fetal morbidity associated with failed TOL.

Material and Methods

Study design

This was a prospective cohort study carried out amongst women with a history of previous C/S admitted for intrapartum care at FMCB, over a 15-month period in 2023-2024.

Setting

This study was carried out at the obstetrics and gynecology department among women with one previous LSCS scar who were admitted for TOLAC. FMCB is a federal tertiary institution located in the town of Bida, a semi-urban settlement in Niger state, north central Nigeria. Beside Minna, the state capital, Bida is the second largest city in the state, with a projected population of 266,008 by 2020 as reported in the 2006 National Census. Bida is located within the southern Guinea Savannah Zone of Nigeria. The majority of the populace are Muslim and the most common occupation is farming. This community is 240 km from Abuja and about 90 km from the state capital. FMCB receives referrals from primary and secondary health facilities in the state as well as from neighboring states. It has a capacity for 350 inpatients and the obstetrics and gynecology department provides emergency obstetrics care, postnatal care and general gynecological services.

Study population

The study population were pregnant women with one previous C/S at term, admitted in the active phase of labor at FMCB during the data collection period.

Sampling technique

A systematic sampling method was employed. A structured, piloted questionnaire was administered to consenting women from 1st October 2023 through 31st December 2024.

Sample size

A standard statistical formula [$n = (z)^2 p (1–p)/d^2$] was employed to calculate the sample size. The final sample size for the study was n=193.

Selection of participants

Around 30 patients with previous C/S scar were managed monthly in the labor ward in the year preceding the study. The study was planned to take 15 months. Thus, there was a combined total of 450 patients expected over the study period. Systematic sampling was used. Using this estimated population of 450, the sampling interval (K) employed was 450/193=2.331 ≈ 2. Every other patient was selected to make up to the required three patients per week.

The first woman was picked by simple random sampling. Thereafter, the remaining subjects were selected through systematic sampling, at a fixed interval of every other number. The participants were recruited for the study after signing or thumb printing a written consent.

Inclusion criteria

The inclusion criteria were: women in spontaneous onset of labour; with a prior C/S; adequate pelvis and average-sized singleton babies in vertex presentation (as determined by clinical and ultrasonic examination); who had no other uterine scars, medical conditions, obstetrics complications or any condition that contradicted vaginal delivery.

Exclusion criteria

All women with classical C/S, ≥2 previous LSCS, previous ruptured uterus, hysterotomy, myomectomy, intrauterine fetal death, or placental or fotal aberrations were excluded. Recruitment of patients for TOLAC was based on the 2019 ACOG recommendation (9).

Procedure

An in-depth sociodemographic characteristics and medical history that comprised age, educational status, occupation, parity, number and sequence of vaginal deliveries, reason(s) for previous LSCS, intra- and post-operative findings and impediments were documented. LMP was noted to determine the gestational age.

A detailed general physical examination, and systemic as well as obstetric examination was documented. Abdomen examination was carried out to confirm gestational age and identify fetal position, rule out any malpresentation and estimate fetal weight. Digital vaginal examination was also performed to determine cervical dilatation, effacement, position, consistency and fetal station in addition to the suitability of each pelvis for vaginal delivery.

Routine investigations were performed for all participants. Ultrasonography was performed to ascertain fetal maturity, size, lie and presentation, adequacy of liquor volume, localization of placenta and to exclude fetal abnormalities.

Having documented the findings from history and physical examination, patents were admitted for intrapartum care and consequently managed as high-risk pregnancies. An intravenous (IV) line was placed to obtain blood samples for full blood count, cross-matching and collection of two units of blood per patient and to test random blood sugar. Five percent dextrose saline infusion was given to supply energy and maintain IV access patency. The anesthetiologist and neonatologist were notified and the labor ward theatre was prepared for any emergency C/S. During intrapartum care, parturients were meticulously monitored for signs of threatening uterine rupture. Fetal surveillance was carried out using a Pinard stethoscope and cardiotocogrpahy was deployed when necessary. Progress of labor was carefully monitored by intermittent abdominal and vaginal examination as per departmental protocol. Ventouse was used when needed. Patients who had unsuccessful TOL, had repeat emergency C/S. Blood loss at C/S or vaginal birth was objectively assessed to quantify the amount of loss to identifyprimary postpartum hemorrhage (PPH). The cut-off point used was 1000 mL at C/S and 500 mL after vaginal birth.

Following delivery, newborn characteristics, including time of delivery, birth weight, Apgar scores at first and fifth minutes and special care baby unit (SCBU) admission as well as indication(s) for the admission were documented. All parturients were monitored through delivery and for at least seven days postpartum.

Statistical analysis

Study data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 23.0 (IBM Inc., Armonk, NY, USA). The major outcome measured was the delivery outcome in the index pregnancy. Descriptive statistical analysis was used; data was analyzed using percentage, mean, standard deviation, and bivariate analysis. A p value <0.05 was considered statistically significant.

Ethical aspects

The research protocol was submitted for review and this study was approved by the FMCB Health Research Ethics Committee (approval number: 2/7/25, date: 16.04.24). The patients were informed about the reason for the study; prospective

participants were informed of the voluntary nature of the study and the respondents were free to withdraw from participating at any time without giving any reason. The participants were assured that this action will not affect the services they were to receive.

Results

Two thousand four hundred and seventy seven patients delivered at FMCB over the study period. Of the 2,477 deliveries, 763 (30.8%) women had C/S for various indications while 1,714 (69.2%) women delivered vaginally, giving a C/S rate of 30.8%. Out of 193 women with one previous C/S who were recruited for TOLAC, only 150 (150/193=77.7%) questionnaires were correctly completed and were included in the final analysis. All the patients were married (100%).

Within the study cohort, 105 (70.0%) achieved vaginal delivery while 45 (30.0%) had ERCS. Out of the 105 patients who achieved VBAC, 79 (75.2%) had previous history of vaginal delivery, while 26 (24.8%) had no history of vaginal delivery. Of these 79, 44 (55.7%) were before C/S, while 35 (44.3%) were previous VBAC. In contrast, of the 45 patients that had ERCS, 11 (24.4%) had previous SVD before C/S, 5 (11.1%) had previous VBAC, while the remaining 29 (64.4%) had never delivered vaginally (Figure 1).

The mean age of the parturients was 30.4±4.91 years, ranging from 20-48 years. The parity of the patients ranged from 2-9, with a mean of 3.5±1.6. One hundred and twenty-one patients (80.7%) were Muslim, while 29 (19.3%) were Christian. Seventy (46.7%) were housewives, 30 (20.0%) were traders, while 25 (16.6%) were civil servants (Table 1).

Figure 2 shows the various indications for the ERCS. The leading indications for the ERCS were poor progress of labor in 17 women (37.8%), cephalopelvic disproportion (CPD) in 8 (17.8%), and fetal distress in 6 (13.3%). The eight cases of CPD were incidental findings in parturients with adjudged adequate pelvis; however, the clinical and ultrasound estimation of average sized fetuses turned out to be underestimation as the mean birth weight in this cohort was 3.85±0.04 kg, and this accounted for lack of descent of the babies through the birth canal.

Among the 95 women with a history of vaginal delivery (group I), 79 of them (83.2%) achieved a successful VBAC while 16 (16.8%) had ERCS. The remaining 55 women with no history of vaginal delivery (group II), 26 of them had successful VBAC (47.3%), while 29 (52.7%) had ERCS. Logistic regression analysis identified that a history of previous vaginal delivery was an independent determinant of successful outcome of TOLAC. Furthermore, mothers with a history of previous vaginal delivery had nearly six times higher odds of having successful VBAC compared to mothers without history of vaginal delivery [odds ratio (OR) 5.507; 95% confidence interval (CI) 2.590-11.709] (Table 2).

The patients who had ERCS suffered more complications than those who achieved successful vaginal delivery. Whereas maternal complication rate was 73.2.1% in ERCS, it was 28.6% among those that had vaginal delivery. The commonest maternal complication following abdominal delivery was PPH

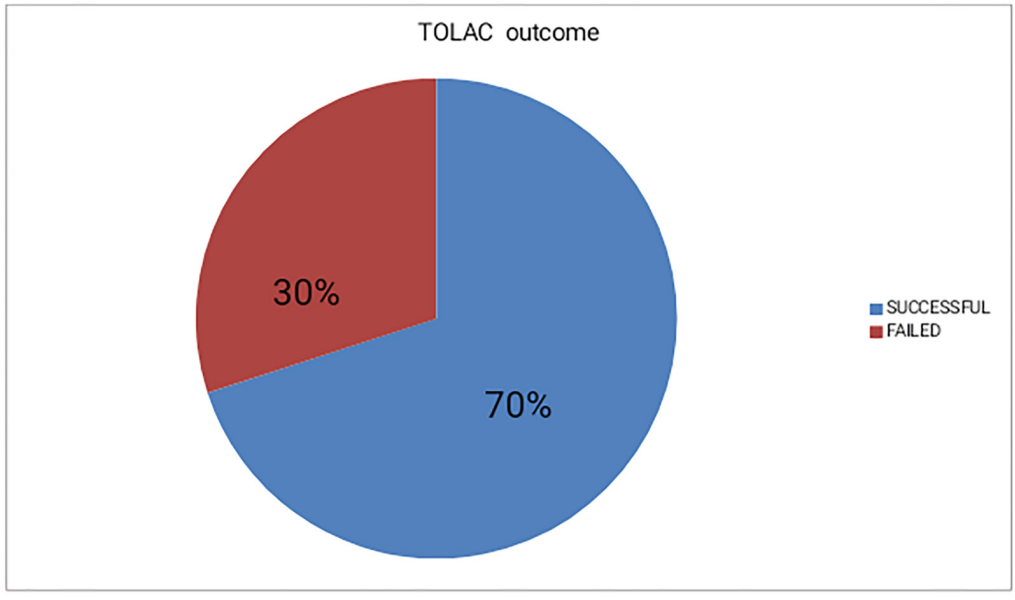

Figure 1. Outcome of TOLAC
TOLAC: Trial of labor after cesarean section

Table 1. Socio-demographic characteristics of women who underwent TOLAC

Variables	n (%)
Age group (years)	
20-24	16 (10.7)
25-29	51 (34.0)
30-34	53 (35.3)
35-39	25 (16.7)
≥40	5 (3.3)
Parity	
Para 2	56 (37.3)
Para 3-4	60 (40.0)
Para ≥5	34 (22.7)
Religion	
Islam	121 (80.7)
Christanity	29 (19.3)
Ethnicity	
Nupe	117 (78.0)
Yoruba	10 (6.7)
Igbo	14 (9.3)
Hausa	4 (2.7)
Others	5 (3.3)
Level of education	
Quarniic	27 (18.0)
Primary	21 (14.0)
Secondary	45 (30.0)
Tertiary	57 (38.0)
Occupation	
Housewife	70 (46.7)
Trader	30 (20.0)
Civil servant	25 (16.6)
Artisan	9 (6.0)
Schooling	13 (8.7)
Applicant	2 (1.3)
Others	1 (0.7)

TOLAC: Trial of labor after cesarean section

(n=15; 33.3%) while perineal laceration [first degree 19 (18.1%) and second degree 7 (6.7%)] was the commonest complication among women who achieved VBAC. Furthermore, women who underwent ERCS also exhibited other complications, including bladder injury, scar dehiscence, respiratory tract infection as a complication of general anaesthesia and abnormally adherent placenta. All the patients that suffered PPH following VBAC were managed conservatively, while 5 out of the 15 among the women who had ERCS, received blood transfusion. The difference in maternal complications attained statistical significance (Table 3).

Table 4 shows comparison of fetal outcome between participants who achieved vaginal delivery following TOLAC and those who required ERCS. The outcomes amongst infants of parturients who attained successful TOL and those who had repeat C/S were comparable except for the SCBU admission rate. Neonates admitted into SCBU were more than fivetimes more likely to have been born via ERCS after TOL (OR 5.231; 95% CI 1.247-21.950) compared to those born via VBAC.

The overall mean birth weight of infants in the present study was 3.1±0.4 kg. While the mean birth weight of neonates delivered vaginally was 3.18±0.42 kg, those delivered via ERCS was 3.21±0.29 kg. Though the babies in ERCS group tended to be bigger, the difference was not significant.

Discussion

The results of the present study demonstrated that TOLAC at FMCB had a success rate of 70.0%, while 30.0% had ERCS. Notably, the study identified a history of previous vaginal delivery as an independent determinant of successful vaginal birth following TOLAC. This study clearly demonstrated that TOLAC at FMCB has good outcome and is associated with minimal feto-maternal morbidity. However, ERCS arising from failed TOLAC was significantly associated with increased maternal complications and neonatal SCBU admission.

The VBAC success rate of 70.0% was consistent with results obtained in a study from Addis Ababa (18), but higher than reported figures from previous studies in Nigeria (11-13). The reason for the observed difference may be due to this being a prospective study in which patients were selected based on department protocol for TOLAC coupled with thorough intrapartum fetal monitoring. Generally, TOLAC success rates vary depending on the indications for the previous C/S, patient selection, and patient's obstetric history, as well as availability of facilities for intrapartum fetal monitoring that facilitate prompt diagnosis of fetal distress (2,8,13). Overall, our findings are in agreement with the generally reported VBAC range of 54-75%. (13,14).

As illustrated in the present study, a history of previous vaginal delivery was an independent determinant of successful outcome of TOL. Mothers with a history of previous vaginal delivery were more than five times more likely to have VBAC compared to mothers without a history of vaginal delivery. This finding is again in agreement with results reported from previous studies (7,19).

TOLAC failure rate of 30.0% recorded in this study is similar to the rate of 33.1% reported from Sokoto (13), but lower than reported figures from other previous studies in Nigeria (11,19). Nevertheless, the failure rate we found is in the middle of this rate reported previously of 20-40% of those that attempted TOLAC will fail (3,10,12,13,16).

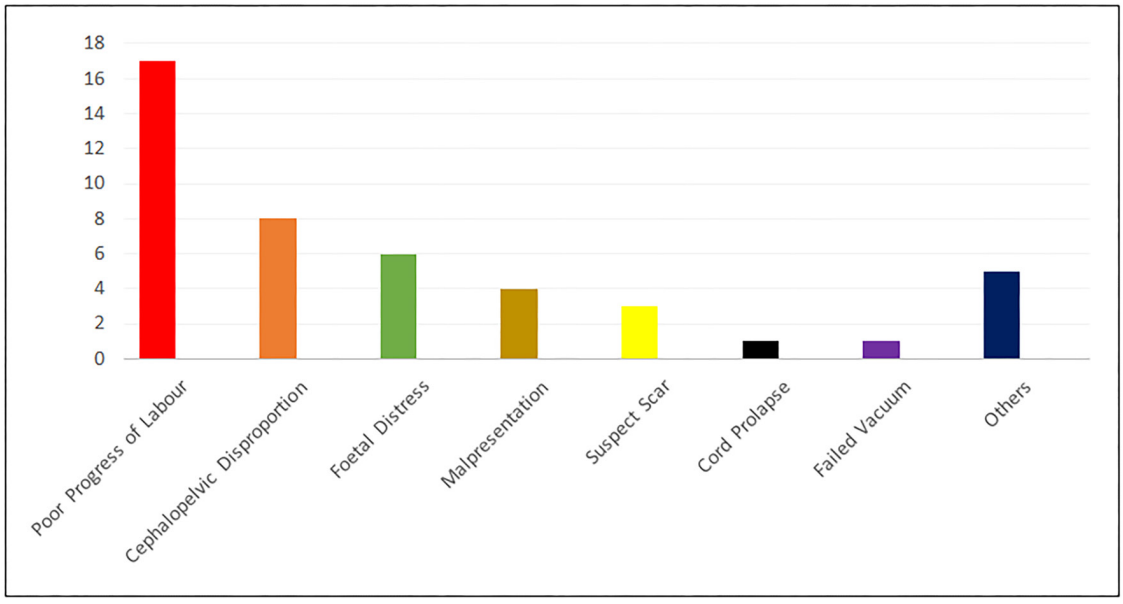

Figure 2. Indications for emergency repeat cesarean section
C/S: Cesarean section

Table 2. Bivariate logistic regression analysis of history of previous vaginal delivery among women who underwent TOLAC

Outcome of TOLAC	Group I (previous VD)		Group II (no previous VD)		OR (95% CI)	p-value
	95 (%)	95 (%)	55 (%)	55 (%)		
Successful VBAC	79	83.2	26	47.3	5.507 (2.590-11.709)	0.000
Failed TOL-LSCS	16	16.8	29	52.7	1	
VD: Vaginal delivery, CI: Confidence interval, OR: Odds ratio, VBAC: Vaginal birth after cesarean, TOLAC: Trial of labor after cesarean section, LSCS: Lower segment cesarean section						

Table 3. Comparison of maternal complication between women who had VBAC and those who had emergency C/S (failed VBAC)

Complication	VBAC (n=105) n (%)	Emergency C/S (n=45) n (%)	p values
PPH	4 (3.8)	15 (33.3)	<0.001
Perineal laceration	26 (24.8)		<0.001
First degree	19 (18.1)	0 (0)	
Second degree	7 (6.7)	0 (0)	
Bladder injury	0 (0)	4 (8.9)	0.002
Abdominal wound sepsis	0 (0)	1 (2.2)	0.125
Scar dehiscence	0 (0)	4 (8.9)	0.002
Uterine rupture	0 (0)	1 (2.2)	0.125
Respiratory tract infection	0 (0)	4 (8.9)	0.002
Endometritis	0 (0)	1 (2.2)	0.125
Urinary tract infection	0 (0)	1 (2.2)	0.125
Abnormally adherent placenta	0 (0)	2 (4.4)	0.030
C/S: Cesarean section, VBAC: Vaginal birth after cesarean, PPH: Postpartum hemorrhage			

Table 4. Bivariate logistic regression analysis of fetal characteristics among women who underwent TOLAC

Variable	Outcome of TOLAC		OR (95% CI)	p-values
	Successful 105 (%)	Failed 45 (%)		
Apgar scores at 1 minute				
0-3	2 (1.9)	1 (2.2)	1	
4-6	6 (5.7)	8 (17.8)	0.742 (0.065-8.438)	0.810
≥7	97 (92.4)	36(80.0)	2.667 (0.193-36.756)	0.464
Apgar at 5 minutes				
≤6	2 (1.9)	3 (6.7)	1	
≥7	103 (98.1)	42 (93.3)	0.272 (0.044-1.686)	0.612
SCBU admission**				
No	102 (97.1)	38 (84.4)	1	
Yes	3 (2.9)	7 (15.6)	5 231 (1.247-21.950)	0.024*
Birth weight (kg)				
≥4.0	1 (1.0)	0 (0)	1	
2.5-3.9	100 (95.2)	44 (87.8)	0.482 (0.100-2.318)	0.363
<2.5	4 (3.8)	1 (2.2)	0.289 (0.051-1.646)	0.162

*Statistically significant
**All were admitted on account of birth asphyxia save one in ERCS group that was admitted for observation
OR: Odds ratio, CI: Confidence interval, TOLAC: Trial of labor after cesarean section, ERCS: Emergency repeat C/S, SCBU: Special care baby unit

In a similar prospective study carried out in south-east Nigeria, the most common indication for ERCS after failed TOL was fetal distress, suspected macrosomia and malpresentation (19). In our study, poor progress of labor was the most common indication for ERCS, followed by CPD and fetal distress.

Patients who had ERCS in the present study had significantly more complications than women who achieved VBAC. The commonest complication following vaginal delivery was perineal laceration followed by PPH, while the commonest complication in ERCS group was PPH, followed by bladder injury and scar dehiscence. This result supports findings that failed TOLAC leading to repeat C/S is linked to higher maternal morbidity (1,3,9,20). A study from Port Harcourt, Nigeria reported that the most common complication was perineal laceration (21). However, the perineal laceration rate these authors reported of 31.4% was higher than 24.8% recorded in the present study. The scar dehiscence rate of 8.9% recorded in the present study was higher than the 4.6% reported from Beirut, Lebanon (22). However, the uterine rupture rate of 0.67% was similar to the 0.6% reported from Sokoto, also in Nigeria (13).

Neonatal outcomes in the VBAC group and in the ERCS group were similar except for the rate of SCBU admission. Following TOL, neonates admitted to SCBU were more than five times more likely to have been born by ERCS. Nine babies (6.0%) suffered birth asphyxia in our study which was lower than the 8.55% reported in the Port Harcourt study (21). Unlike the study from Port Harcourt where there were varied indications for SCBU admission, birth asphyxia was almost the only indication for SCBU admission in our study.

Good feto-maternal outcomes were recorded following TOL among the participants of the present study, and there was no case of perinatal or maternal mortality. However, there was one case of ruptured uterus, similar to the reported outcomes in previous studies (5,8,11). Quick intervention and prompt management of labor cases deviating from normal progress greatly contributed to this. This suggests that in well selected cases, good outcome is a possibility for TOL even in low resource settings.

Studt limitations

The strength of this study lies in its prospective nature. The main limitations of our study was that it was underpowered and single center which will compromise the generalizability of the key findings.

Conclusion

This study demonstrated a high success rate of VBAC following TOL with good maternal and fetal outcomes. Of note, women with a personal history of previous vaginal delivery had significantly higher odds of achieving VBAC. However, a failed TOLAC leading to ERCS was significantly associated with SCBU admission. A second key finding of our study was that good outcome following TOL is achievable, even in low

resource settings. It is recommended that in low resource settings carefully selected women with a history of C/S may be encouraged to attempt TOLAC, especially those who had achieved a previous vaginal delivery. Though there appears to be a very low risk of uterine rupture, good case selection and prompt management of poorly progressing labor will help to minimize this risk. Larger, multicenter, population-based studies are necessary to alleviate the limitations of the present study and validate our findings.

Ethic

Ethics Committee Approval: *This study was approved by the Federal Medical Centre, Bida Health Research Ethics Committee (approval number: 2/7/25, date: 16.04.24).*

Informed Consent: *The patients were informed about the reason for the study; prospective participants were informed of the voluntary nature of the study and the respondents were free to withdraw from participating at any time without giving any reason.*

Footnotes

Author Contributions: *Surgical and Medical Practices: F.B.A., Concept: A.O.A., Design: F.B.A., Data Collection or Processing: A.S.A., Analysis or Interpretation: A.S.A., Literature Search: A.O.A., Writing: A.O.M.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Diagnostic performance of the #Enzian classification via ultrasound compared to laparoscopic findings in endometriosis: a retrospective cohort study

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Abstract

Objective: To assess the diagnostic performance of the ultrasound-based #Enzian classification in comparison with laparoscopic surgical findings in patients with endometriosis.

Material and Methods: This retrospective cohort study included patients who underwent laparoscopic excisional surgery for endometriosis between September 2023 and October 2024. Preoperative transvaginal ultrasound assessments were performed using the International Deep Endometriosis Analysis protocol, with findings recorded according to the updated #Enzian classification. Diagnostic performance was evaluated through sensitivity, specificity, positive predictive value, negative predictive value, and overall accuracy. Statistical analyses were conducted using SPSS version 26.0.0.0, with statistical significance set at $p<0.05$.

Results: The study included 66 patients. The #Enzian classification demonstrated the highest diagnostic accuracy in compartments FA and FB (98.82% and 98.59%, respectively), both with perfect sensitivity and minimal false positives. The left ovary (O left) also showed strong performance (92.87% accuracy). In contrast, compartment A had low sensitivity (12.12%) despite a low false-positive rate. Compartments B left and C exhibited good accuracy (86.82% and 91.88%), with minimal false positives and moderate sensitivity. Variable results were observed in compartments O right and T. Although sensitivity was incomplete for FU, FI, and FO, specificity remained high across these subgroups.

Conclusion: The #Enzian ultrasound classification provides a reliable diagnostic framework, demonstrating high accuracy across multiple compartments. It is recommended that future studies include larger sample sizes and longitudinal design to further validate these findings. [J Turk Ger Gynecol Assoc. 2025; 26(4): 276-83]

Keywords: #Enzian, ultrasound, endometriosis, deep infiltrative endometriosis, laparoscopic surgery

Received: 08 July, 2025 **Accepted:** 22 October, 2025 **Publication Date:** 03 December, 2025

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DOI: *10.4274/jtgga.galenos.2025.2025-7-2*

Cite this article as: *Asgari Z, Boostan A, Hosseini R, Ghavami B, Khakifirooz B, Bayani L, et al. Diagnostic performance of the #Enzian classification via ultrasound compared to laparoscopic findings in endometriosis: a retrospective cohort study. J Turk Ger Gynecol Assoc. 2025; 26(4): 276-83*

Introduction

Endometriosis is a chronic inflammatory disorder characterized by the presence of ectopic endometrial-like tissue. It affects an estimated 10% of women of reproductive age, corresponding to approximately 190 million individuals worldwide (1,2). Clinically, the condition manifests with a spectrum of symptoms, such as severe dysmenorrhea, deep dyspareunia, persistent pelvic pain, gastrointestinal and urinary disturbances, and fatigue. Importantly, there is often a poor correlation between symptom severity and the extent of disease involvement (3). Furthermore, endometriosis can impair fertility by disrupting the peritoneal environment or causing anatomical distortion of the pelvic organs. Approximately 30% of individuals with endometriosis experience infertility, with this impact being more pronounced in advanced stages of the disease, akin to other pathologies that necessitate considerations for fertility preservation (4-6).

Given its significant prevalence and impact on quality of life, there is a clinical need to improve approaches for predicting and diagnosing endometriosis (7-9). However, the diagnostic process remains inherently challenging because of the broad spectrum of often non-specific symptoms experienced by patients and the diverse anatomical locations in which endometriotic lesions may develop (7,10).

Historically, the diagnosis and classification of endometriosis have relied predominantly on surgical evaluation. The American Society for Reproductive Medicine (ASRM) introduced an initial classification system in 1979 (11), with the most recent revision released in 1997 (12). This system is based on intraoperative visual assessment of lesion location, size, and extent. As a result, invasive surgical procedures remain the primary method for staging endometriosis in both clinical practice and academic research (12). However, the revised ASRM classification has several limitations; it is complex, does not adequately capture deep infiltrating endometriosis (DIE), and shows poor correlation with symptom severity, surgical complexity, and postoperative outcome. Large-scale studies have further highlighted its limitations in characterizing DIE, with a substantial proportion of patients classified as early-stage exhibiting uterosacral or rectal involvement. These shortcomings have prompted the development of alternative systems, such as the #Enzian classification, which provides greater anatomical granularity and more accurately reflects lesion severity (13,14).

The #Enzian classification, initially introduced in 2003, was developed to address the limitations of existing systems by offering a more precise description of the location and severity of DIE (15). Recognizing the need for a more comprehensive and standardized framework, the updated #Enzian classification was introduced in January 2021 (16). This revised system extends beyond DIE to include the evaluation of peritoneal and ovarian endometriosis, as well as adhesions involving the ovaries and fallopian tubes. Notably, the #Enzian classification facilitates preoperative assessment through imaging modalities, including transvaginal sonography (TVS) and magnetic resonance imaging (MRI), with the exception of compartment P (peritoneal lesions), which remains challenging to detect via imaging (16). Emerging evidence has highlighted the utility of the #Enzian classification as a valuable tool for mapping endometriotic lesions in both radiological and surgical settings (17,18). However, published evidence concerning the diagnostic accuracy of the #Enzian ultrasound classification remains limited, particularly as most studies evaluating its reliability and generalizability in routine clinical practice have been conducted in Europe. Therefore, to the best of our knowledge, this is the first study conducted in Iran that aimed to evaluate the diagnostic performance of the #Enzian ultrasound classification by systematically comparing preoperative imaging findings with surgical observations in patients with histologically confirmed endometriosis, thereby contributing to the geographic generalization of the findings.

Material and Methods

Design and participants

This retrospective cohort study included patients with a confirmed diagnosis of endometriosis who underwent laparoscopic excisional surgery between September 2023 and October 2024. The cohort was composed of individuals who had undergone a standardized TVS examination using the #Enzian classification protocol within the three months preceding surgery. The primary aim was to assess the diagnostic performance of the #Enzian classification by evaluating its ability to predict intraoperative findings. All patients were followed from the time of preoperative imaging (exposure) to the point of surgical diagnosis (outcome), enabling a comparison of preoperative and intraoperative assessments. Patients were excluded if the TVS was not performed using the #Enzian protocol, if they were referred for MRI due to inconclusive ultrasound results, if malignancy was suspected, or if they had a history of colorectal surgery. The present study followed the Standards for Reporting of Diagnostic Accuracy Studies checklist to ensure methodological quality and consistency throughout (Supplementary 1) (19). This study was approved by the Tehran University Medical Sciences Research Ethics Committee (approval number: IR.TUMS.MEDICINE.REC.1403.581, date: 11.02.2025).

Measures

Data collection

Clinical data were retrospectively collected for all eligible patients, including preoperative baseline characteristics, such as age, body mass index, reproductive history, duration and type of endometriosis-related symptoms, and history of infertility and/or previous surgical intervention. Preoperative evaluation of endometriotic lesions was performed by an experienced gynecology radiologist (L.B.) with substantial experience in diagnosis of endometriosis. The imaging assessments were conducted using the International Deep Endometriosis Analysis protocol (20), supplemented by the #Enzian classification (16) system to ensure standardized lesion characterization. TVS was the primary imaging modality, complemented by transabdominal and transanal sonographic examinations, when indicated.

Surgical procedures were conducted by three experienced gynecologic surgeons (Z.A., R.H., and B.G.), all of whom have substantial expertise in minimally invasive techniques for the management of endometriosis. The surgical team was not blinded to the preoperative TVS findings, as integration of imaging results into surgical planning is standard clinical practice and is intended to improve lesion identification, surgical safety, and patient outcomes. Any disagreements were resolved via discussion. Intraoperative findings were systematically documented in operative reports, from which relevant data were extracted. The diagnosis and anatomical mapping of deep endometriosis were classified according to the #Enzian criteria (16), ensuring consistency between preoperative imaging and surgical staging.

#Enzian classification

The #Enzian classification system categorizes and describes the spread of deep endometriosis by dividing the affected areas into distinct compartments. These compartments include A (vagina, rectovaginal space), B (uterosacral ligaments, cardinal ligaments, pelvic sidewall), and C (rectum). The system also accounts for distant or extragenital locations, referred to as F, which includes the urinary bladder (FB), ureters (FU), and other atypical sites (FO), as well as peritoneal involvement (P). Furthermore, this classification system incorporates the involvement of the ovaries (O), other intestinal regions, such as the sigmoid colon and small bowel (FI), and adhesions affecting the tubo-ovarian unit (T). Each compartment or organ affected is designated by capital letters (P, O, T, A, B, C, F), which are arranged in a specific order. The extent of endometriosis within each compartment is quantified using a scale of 1 to 3, indicating the severity of involvement (Figure 1) (16).

Statistical analysis

Patient demographics, as well as radiologic and surgical findings, were systematically recorded and subjected to analysis. Descriptive statistics were calculated for each group, with continuous variables reported as mean ± standard deviation, and categorical variables expressed as frequencies and percentages.

The diagnostic performance of the #Enzian classification was evaluated in relation to both ultrasound and laparoscopic findings. For each Enzian compartment, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy were calculated together with 95% confidence intervals using the Wilson method. In compartments without any positive reference cases, sensitivity and PPV could not be estimated and have therefore been reported as “not applicable” (N/A). Similarly, in compartments without negative reference cases, specificity and NPV were also reported as N/A. Comparisons between diagnostic methods were performed using chi-square tests to evaluate differences in categorical variables. All statistical analyses were conducted using SPSS version 26.0.0.0 (IBM Inc., Armonk, NY, USA). Statistical significance was determined at a threshold of $p<0.05$ for all tests.

Results

A total of 66 patients were enrolled in the study, with no instances of withdrawal or loss to follow-up. The demographic and clinical characteristics of the study population are presented in Table 1.

All patients underwent laparoscopic surgery. Among the reported clinical symptoms, dysmenorrhea was the most common, affecting 49.5% of the cohort. A history of prior surgery was documented in 67.7%, with cesarean section being the most commonly reported type.

The diagnostic performance of the #Enzian ultrasound classification system is summarized in Table 2. Among all categories, the highest diagnostic accuracy was observed for #Enzian FA and FB, with accuracy rates of 98.82% and 98.59%, respectively. Both demonstrated perfect sensitivity (100%) and minimal false positives (98.72% for FA and 98.44% for FB). The left ovarian compartment (#Enzian O left) also showed high accuracy (92.87%), with a sensitivity of 78.72% and specificity of 94.44%. In contrast, #Enzian A exhibited a markedly low sensitivity (12.12%) despite minimal false positives (93.75%), suggesting limited ability to detect lesions in this compartment, though its specificity may still aid in ruling out false positives. Other compartments, such as #Enzian B left (accuracy 86.82%) and #Enzian C (accuracy 91.88%), also demonstrated solid diagnostic performance, with high specificities and moderate sensitivities. Categories #Enzian T and O right showed variable

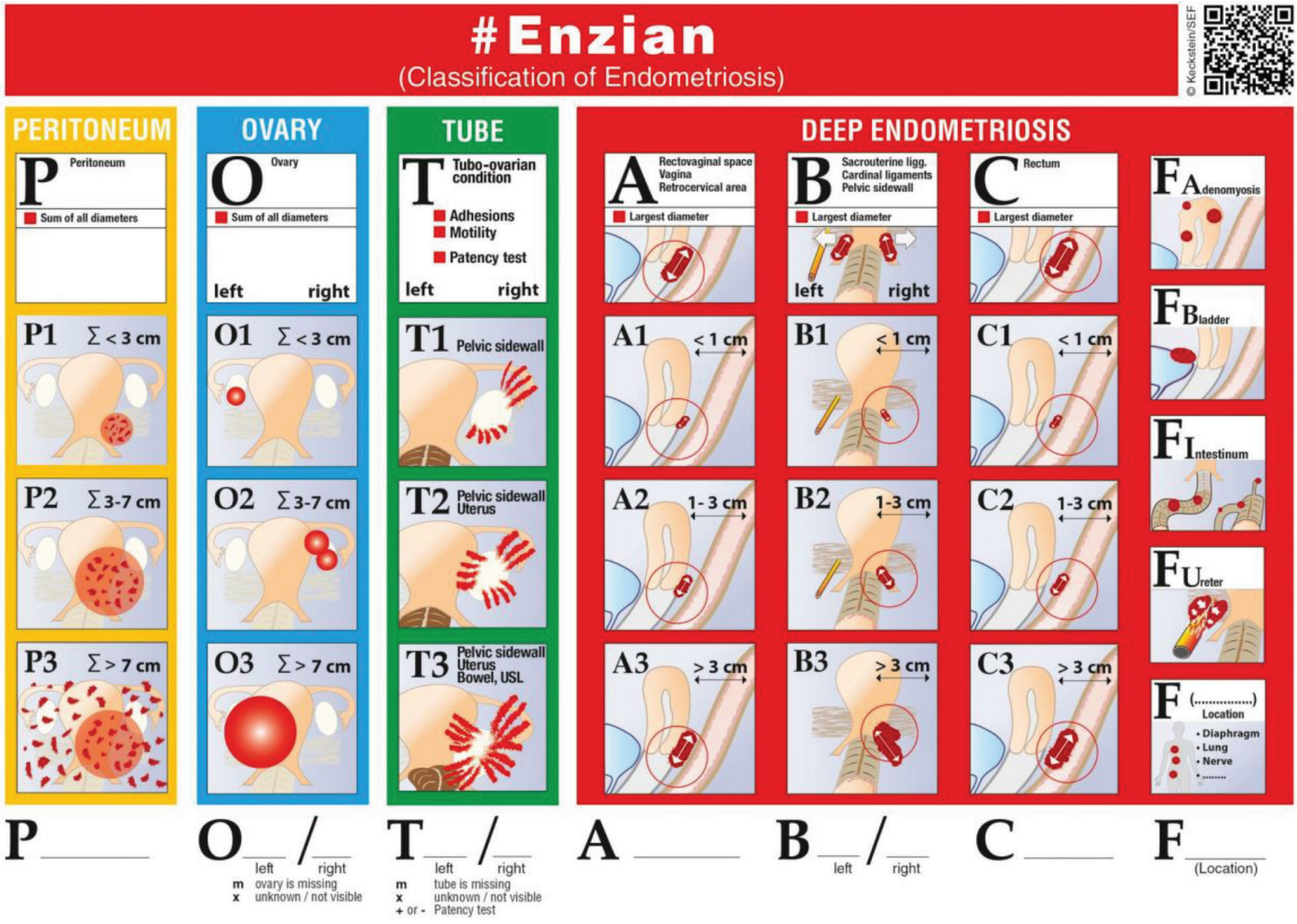

Figure 1. The revised #Enzian classification system for endometriosis[16]

Table 1. Demographic and clinical characteristics of the study population

Demographic characteristic	Summary
Age; y	37.75±6.1
BMI; kg/m²	25.42±2.9
Gravidity	1.10±1.2
Parity	0.81±0.8
Prior surgery	44 (67.7)
Duration of symptoms	34.41 (36.9)
Gastrointestinal symptoms	0 (0.0)
Dysmenorrhea	32 (49.5)
Dyspareunia	23 (29.8)
Infertility	24 (31.2)

All the data in this table are expressed as mean ± standard deviation or number (percentage)
BMI: Body mass index, y: Year

results, with #Enzian O right yielding high sensitivity (95.12%) but lower specificity (81.82%), and #Enzian T compartments exhibiting modest accuracy due to lower PPVs.

Discussion

This study evaluated the diagnostic performance of ultrasonography (US) using the updated #Enzian classification for detecting endometriotic lesions, with imaging findings compared against laparoscopic results. Overall, the diagnostic accuracy of this combination of US with #Enzian classification was high, ranging from 80% to 100% across most compartments, except for the T compartment, the tubo-ovarian unit. Notably, compartments such as #Enzian FB, FA, and the left ovarian (O) compartment demonstrated high sensitivity and specificity, underscoring their reliability as diagnostic targets. Among these, #Enzian FB exhibited the highest diagnostic accuracy,

Table 2. Diagnostic performance of #Enzian ultrasound classification

#Enzian category	Sensitivity	Specificity	PPV	NPV	Accuracy	p value
#Enzian O left	78.72 (68.23-86.49)	94.44 (85.29-98.16)	61.16 (48.16-72.91)	97.56 (90.88-99.46)	92.87 (85.38-96.71)	0.001
#Enzian O Right	95.12 (83.54-98.74)	81.82 (67.33-90.67)	36.76 (25.44-49.91)	99.34 (88.50-99.90)	83.15 (72.45-90.23)	0.001
#Enzian T left	93.33 (70.18-98.81)	50.00 (30.04-69.96)	17.18 (8.61-31.14)	98.54 (79.83-99.87)	54.33 (36.73-71.06)	0.001
#Enzian T right	71.74 (52.36-85.44)	68.42 (52.13-81.36)	20.15 (11.08-33.69)	95.61 (82.54-99.08)	68.75 (54.78-80.14)	0.001
#Enzian A	12.12 (6.71-20.93)	93.75 (86.47-97.33)	17.73 (9.38-30.99)	90.57 (82.89-95.00)	85.59 (77.13-91.41)	0.001
#Enzian B left	24.49 (15.20-37.08)	93.75 (85.59-97.64)	30.33 (18.52-45.45)	91.79 (84.15-96.10)	86.82 (77.78-92.65)	0.001
#Enzian B right	21.43 (8.50-45.16)	91.30 (81.02-96.33)	21.50 (8.53-44.68)	91.27 (80.97-96.33)	84.32 (73.36-91.34)	0.001
#Enzian C	57.89 (37.22-76.03)	95.65 (86.57-98.85)	59.67 (38.79-77.57)	95.34 (85.78-98.68)	91.88 (82.13-96.62)	0.001
#Enzian FA	100.00 (77.54-100.00)	98.72 (92.38-99.84)	90.12 (69.32-97.38)	100.00 (93.12-100.00)	98.82 (92.66-99.68)	0.001
#Enzian FB	100.00 (79.62-100.00)	98.44 (91.61-99.74)	87.67 (65.91-96.53)	100.00 (92.89-100.00)	98.59 (92.20-99.78)	0.001
#Enzian FU	N/A	96.92 (84.11-99.46)	N/A	89.72 (74.28-96.36)	N/A	N/A
#Enzian FI	N/A	100.00 (71.51-100.00)	N/A	90.00 (59.58-98.21)	N/A	N/A
#Enzian FO	0.00 (0.00-56.10)	100.00 (71.51-100.00)	N/A	90.00 (59.58-98.21)	90.00 (59.58-98.21)	0.001

All the data in this table are expressed as percentage and (95% confidence intervals)
N/A indicates that the metric or p value could not be calculated due to insufficient cases or lack of variation in that compartment
N/A: Not applicable, NPV: Negative predictive value, PPV: Positive predictive value

reliably identifying pathology while minimizing false positives. In contrast, compartment A demonstrated the lowest sensitivity (12.12%), indicating limited diagnostic utility in detecting subtle or superficial lesions, particularly in anatomical regions where overlapping superficial disease may obscure deeper involvement. This low sensitivity likely reflects several factors, including anatomical complexity, limited sonographic windows, and imaging limitations, such as probe angulation, depth penetration, and operator-dependent interpretation. These challenges underscore the need for careful imaging technique and, when necessary, complementary diagnostic strategies to ensure comprehensive lesion mapping in this compartment. While specificity exceeded 80% in most compartments, tubal involvement posed diagnostic challenges, with relatively low specificities of 50% and 68.42% for the left and right tubes, respectively.

Numerous studies have examined the utility of US in conjunction with the #Enzian classification for assessing endometriosis, providing important context for our findings. In a retrospective study of 50 patients, Bindra et al. (21) reported high diagnostic reliability of structured US using the #Enzian classification, with sensitivities of 86% for peritoneal lesions and 100% for rectovaginal, adenomyosis, and ureteric involvement. NPVs were similarly high, reaching 97% for rectal and 100% for rectovaginal and ureteric lesions. Strong concordance was also observed for ovarian and uterosacral ligament involvement, aligning with intraoperative findings. These results are consistent with the diagnostic trends observed in our study, particularly the strong performance of posterior compartments. Similarly, a prospective diagnostic accuracy study involving 195 women reported TVS sensitivities ranging from 84% to 92% and specificities between 73% and 99% across compartments, with the highest concordance in compartment C (rectosigmoid) (22). Our findings corroborate this pattern, particularly for compartments FB and FA, although we observed significantly lower sensitivity in compartment A. A large multicenter study involving 745 patients using both TVS and transabdominal sonography further validated the #Enzian classification as a standard diagnostic tool. Concordance rates ranged from 86% to 99% for lesion detection and 71% to 92% for severity grading. This study, like ours, found improved diagnostic performance for compartments O, A, B, and C compared to tubal and peritubal adhesions, a pattern mirrored by our findings, of low specificity in tubal compartments (18). Di Giovanni et al. (17) also assessed 93 women and found that compartment C had the highest ultrasound-to-surgical concordance (74%), increasing to 87% when allowing a 3 mm margin of error. Their reported high specificities across compartments are consistent with our results, particularly for FB, where our study found 100% specificity. However, our markedly lower sensitivity in compartment A may reflect differences in lesion size, operator technique, or anatomical variability.

Although most studies have focused on diagnostic accuracy, the prognostic implications of the #Enzian classification have also been explored. Fruscalzo et al. (23) retrospectively evaluated 58 infertile patients and found no significant correlation between #Enzian stage and pregnancy outcomes, whether spontaneous or assisted. This suggests that while

the classification provides excellent anatomic delineation, its prognostic relevance for fertility remains uncertain. In terms of surgical planning, a retrospective analysis involving 151 patients demonstrated that the #Enzian classification could be used to predict laparoscopic operating time, with a mean predictive error of 35.35 minutes (24). Although our study did not assess surgical duration, the strong correlation between US and laparoscopic #Enzian scores implies that structured preoperative imaging may support surgical planning and improve resource allocation, echoing the utility highlighted in that study.

Our findings reinforce the critical role of US, when interpreted through the lens of the #Enzian classification, in the comprehensive preoperative mapping of endometriosis. One major clinical implication is the enhancement of standardization and improvement in communication between imaging specialists and gynecologic surgeons. The broader implementation of structured #Enzian-based reporting may streamline diagnostic pathways, support multidisciplinary collaboration, and potentially reduce the diagnostic delays that frequently complicate endometriosis management (13,25). Early and precise lesion mapping may enable personalized surgical planning, facilitate informed patient counseling, and help minimize intraoperative complications (13,25). However, our study identified low diagnostic accuracy for tubal lesions, which carries significant clinical consequences. Inaccurate or missed tubal involvement may result in underestimation of disease severity, potentially leading to incomplete excision during surgery. This could increase the risk of persistent symptoms, recurrence, or suboptimal fertility outcomes in patients seeking reproductive assistance (26). Moreover, unexpected tubal pathology identified intraoperatively may prolong surgery, increase procedural complexity, or necessitate intraoperative modifications that could have been anticipated with more accurate preoperative imaging. These findings underscore the need for integrated diagnostic strategies, for example combining US with MRI or intraoperative assessment, to ensure comprehensive mapping of all endometriotic compartments. Awareness of this potential limitation for tubal assessment would also allow surgeons to plan adjunctive evaluations, counsel patients regarding possible intraoperative findings, and tailor surgical approaches to minimize complications and improve outcomes.

Study limitations

This study has several strengths. All surgeries were performed by experienced minimally invasive gynecologic surgeons, ensuring procedural consistency and high intraoperative diagnostic accuracy. Moreover, all US was conducted and interpreted by a single expert radiologist, minimizing inter-operator variability and strengthening internal consistency. Importantly, this is the first study of its kind conducted in Iran, thereby extending the generalizability of the #Enzian classification beyond the predominantly European populations studied to date (14,17,18,22-24). However, several limitations must be acknowledged. The retrospective design introduces potential selection and reporting biases. The small sample size limits statistical power and generalizability. Moreover, the single-center nature of the study may not reflect variations in imaging or surgical expertise encountered in broader clinical settings. Patient demographics and disease characteristics in our cohort may differ from those in other regions or healthcare systems, potentially affecting the diagnostic performance of the #Enzian ultrasound classification. This is particularly relevant for compartments with low sensitivity (e.g., #Enzian A), where anatomical complexity or subtle lesions make detection more challenging and more susceptible to variability across populations. The diagnostic accuracy of US is inherently operator-dependent, which could affect reproducibility in routine practice. Finally, in the clinical context of this study, the operating surgeons were not blinded to preoperative TVS results, as their use in surgical planning is part of routine practice. This lack of blinding could have introduced observational bias, as prior knowledge of sonographically suspected lesions may have influenced intraoperative detection, particularly in specific #Enzian compartments where subtle findings might otherwise have been overlooked.

Future research should aim for prospective, multicenter study designs with larger sample sizes to validate these findings further. Moreover, comparative studies integrating different imaging modalities under a unified classification framework, such as the #Enzian system, could help optimize diagnostic workflows and improve the comprehensive management of endometriosis.

Conclusion

The present retrospective cohort study provided further evidence supporting the diagnostic utility of US structured by the updated #Enzian classification in the preoperative assessment of endometriosis. Diagnostic accuracy was high across most anatomical regions except for the T compartment. Notably, compartments FB and FA demonstrated particularly robust performance, affirming the reliability of US for evaluating posterior pelvic disease. In contrast, the low sensitivity in compartment A and reduced specificity for tubal assessments highlight persistent challenges in identifying certain lesion types and support the need for multimodal imaging approaches. As the first study of its kind conducted in

Iran, these findings expand the international applicability of the #Enzian classification and demonstrate practical integration into diverse clinical settings. Future research should aim to validate these findings through prospective, multicenter studies with larger patient populations, while also evaluating the comparative benefits of integrating additional imaging modalities under a unified classification system. Such efforts could lead to more comprehensive diagnostic strategies, improved surgical planning, and ultimately, enhanced clinical outcomes for patients with endometriosis.

Ethic

Ethics Committee Approval: *This study was approved by the Tehran University Medical Sciences Research Ethics Committee (approval number: IR.TUMS.MEDICINE.REC.1403.581, date: 11.02.2025).*

Informed Consent: *Retrospective study.*

Footnotes

Author Contributions: *Surgical and Medical Practices: Z.A., A.B., R.H., B.G., L.B., Concept: Z.A., P.R., Design: Z.A., P.R., Data Collection or Processing: Z.A., A.B., R.H., B.G., L.B., R.M., Analysis or Interpretation: A.H., Literature Search: Z.A., A.B., R.H., B.G., B.K., L.B., R.M., A.H., P.R., Writing: Z.A., A.B., R.H., B.G., B.K., L.B., R.M., A.H., P.R.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Feasibility of vNOTES hysterectomy in patients with enlarged uteri: a single-center experience

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Abstract

Objective: To evaluate the feasibility, safety, and surgical outcomes of vaginal natural orifice transluminal endoscopic surgery (vNOTES) hysterectomy in patients with enlarged uteri due to benign, premalignant, and malignant conditions.

Material and Methods: Patients who underwent vNOTES hysterectomy at a tertiary gynecologic oncology center were included. Patients with large uteri (>280 g or equivalent to >12-week size) were included regardless of prior cesarean delivery, obesity, nulliparity, or the presence of premalignant or malignant pathology. Demographic data, surgical outcomes, and complication details were analyzed. Complications were classified as minor or major.

Results: The cohort consisted of 46 women with a median age of 54 (40-74) years, and median body mass index 31 (21-51) kg/m^2. A history of previous abdominal surgery was present in 58.7%, and 21.7% (10/46) had previously undergone cesarean section. The median operative time was 56 (35-95) minutes, and the median uterine weight was 410 (280-1036) grams. The overall conversion and complication rates were both 4.3% (n=2). No major complications were observed. Minor complications included intraoperative bleeding controlled without transfusion and postoperative vaginal bleeding managed conservatively. The median hospital stay was 30 (16-72) hours. All patients were discharged without requiring reoperation during the postoperative period.

Conclusion: vNOTES hysterectomy was a feasible and safe, minimally invasive approach for patients with enlarged uteri, including those with obesity, prior abdominal surgery, and premalignant or malignant indications. It provides favorable surgical outcomes with low complication and conversion rates. This study supports the use of the vNOTES technique with a broader adoption in patients with large uteri. [J Turk Ger Gynecol Assoc.2025; 26(4): 284-8]

Keywords: Hysterectomy, vNOTES, natural orifice endoscopic surgery

Received: 13 May, 2025 **Accepted:** 30 July, 2025 **Epub:** 22.09.2025 **Publication Date:** 03 December, 2025

Introduction

Vaginal natural orifice transluminal endoscopic surgery (vNOTES) has recently emerged as a popular surgical approach that combines the advantages of both laparoscopic and vaginal surgery, offering patients a minimally invasive alternative (1). Hysterectomy via vNOTES is performed transvaginally without the need for an abdominal incision, and is associated with reduced postoperative pain, shorter operative times, faster recovery, and improved cosmetic outcomes (2-4).

However, large uteri present surgical challenges and may complicate the vaginal approach. In such cases, the limited mobility of surgical instruments, suboptimal visualization of pelvic organs, increased risk of bleeding, and prolonged uterine morcellation and operative times make both vaginal

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DOI: *10.4274/jtgga.galenos.2025.2025-4-3*

Cite this article as: *Hanedan C, Öncü HN, Öztürk N, Ege G, Köksal OK, Korkmaz V. Feasibility of vNOTES hysterectomy in patients with enlarged uteri: a single-center experience. J Turk Ger Gynecol Assoc. J Turk Ger Gynecol Assoc. 2025; 26(4): 284-8*

hysterectomy (VH) and laparoscopic hysterectomy (LH) more difficult (5,6). vNOTES combines the benefits of VH with the magnified visualization provided by endoscopic surgery. It is considered a safe and effective method that expands the traditional indications for VH (7). In the management of patients with large uteri, vNOTES provides easier access to the uterine vasculature and enables the separation of uterine ligaments under direct optical guidance, offering a significant advantage for safe surgery (8,9).

The literature on the feasibility of vNOTES in patients with large uteri is limited, although clinical experience in this area is steadily increasing. In the present study, the aim was to evaluate the feasibility and safety of vNOTES hysterectomy in patients with large uteri performed at a single center.

Material and Methods

This study was approved by the Scientific Research Ethics Committee of University of Health Sciences Türkiye, Ankara Etlik City Training and Research Hospital (approval number: AEŞH-BADEK-2025/0266, date: 12.03.2025), patients scheduled for hysterectomy in the gynecologic oncology clinic and who underwent vNOTES hysterectomy were included in the study. Written informed consent was obtained from all patients prior to the procedure. Uterine weight was measured intraoperatively using a precision scale in the operating room, and only patients with uterine weights ≥280 grams were included. Patients with uterine weights <280 grams or who did not provide consent were excluded.

All surgeries were performed by two gynecologic oncologists with more than 10 years of experience in laparoscopic and vaginal surgery. Prior to surgery, pap smear and endometrial biopsy samples were obtained from all patients. The vNOTES port system (Alexis® retractor and GelPOINT® V-Path, Applied Medical) was used in all patients. No other port systems were used. All patients underwent bilateral salpingectomy in addition to vNOTES hysterectomy, and oophorectomy was performed when indicated. Pathological evaluations were conducted by histopathologists specialized in gynecologic pathology.

The International Society for Gynecologic Endoscopy guidelines, define a uterus weighing ≥280 grams as a large uterus (10). The median operative time refers to the total duration from the initial incision (beginning of colpotomy and port placement) to the final closure of the vaginal cuff, commonly defined as “skin-to-skin” time.

Patient characteristics including age, body mass index (BMI reported in kg/m^2), parity, history of previous abdominal surgery, history of cesarean delivery, operative time (in minutes), uterine weight (in g), length of hospital stay (in hours), preoperative and postoperative hemoglobin (Hb) levels (g/dL), surgical indications, sentinel lymph node procedures, conversions to laparoscopy, and complications were recorded. Complications were classified as minor or major.

Statistical analysis

Statistical analyses were performed using SPSS for Mac, Version 22.0 (IBM INC., Armonk, NY, USA). The normality of data distribution was assessed using normality tests. Parametric variables are presented as mean ± standard deviation, while non-parametric variables were reported as median (minimum and maximum values).

Results

The study included 46 patients with a median age of 54 (40-74) years, BMI of 31 (21-51) kg/m^2, and parity of 3 (0-6). Of the cohort, 58.7% (27/46) had a history of abdominal surgery, and 21.7% (10/46) had previously delivered via cesarean section. The demographic characteristics of the patients are presented in Table 1.

The median operative time was 56 (35-95) minutes, median uterine weight was 410 (280-1036) grams, preoperative Hb level was 13.1 (8.6-15.9) g/dL with postoperative Hb level of 11.7 (8.8-14.4) g/dL, and median hospital stay was 30 (16-72) hours. The maximum uterine weight recorded was 1036 grams (Figure 1). The most common surgical indications were myomatous uterus (30.4%) and adnexal mass (17.4%). Sentinel lymph node mapping was performed in 4 (8.7%). Conversion to laparoscopy was required in 2 (4.3%).

One intraoperative complication (2.2%) and one postoperative complication (2.2%) were observed. There were no bladder or bowel perforations. Intraoperatively, insufficient coagulation of the right uterine artery led to an approximately 500 cc blood loss, which did not require transfusion. After identification of the ureter in the retroperitoneal space, the artery was proximally re-ligated to achieve hemostasis. However, one patient in our series experienced postoperative bleeding that

Table 1. The demographic characteristics of patients

Variables	
Number of patients	46
Age (years), median (min-max)	54 (40-74)
BMI (kg/m^2), median (min-max)	31 (21-51)
Parity, median (min-max)	3 (0-6)
Prior surgery, n (%)	27 (58.7)
Prior caesarean section, n (%)	10 (21.7)

Data are expressed as median, minimum, maximum or number (%)
BMI: body mass index, Min: Minimum, Max: Maximum

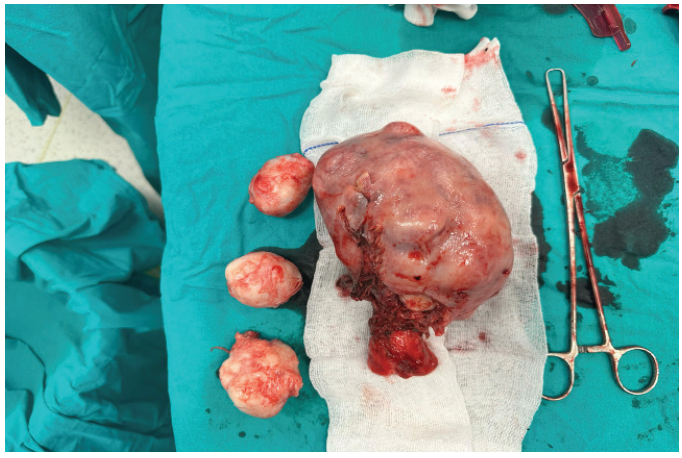

Figure 1. vNOTES hysterectomy specimen with a uterine weight of 1036 g
vNOTES: Vaginal natural orifice transluminal endoscopic surgery

required blood transfusion. The source of the bleeding was identified as the posterior aspect of the vaginal cuff. This was managed conservatively with medical treatment, including hemodynamic support and hemostatic agents, without the need for surgical reintervention. We believe the bleeding was most likely venous in origin, arising from small vessels in the vaginal cuff area, and not related to any significant vascular injury. All patients were discharged without requiring further surgical intervention. Operative and histopathological data of the patients are summarized in Table 2.

Table 2. Operation and histopathological characteristics of the 46 patients

Variables	
Operation time (min)	56 (35-95)
Uterine weight (g)	410 (280-1036)
Length of hospital stay (hour)	30 (16-72)
Hemoglobin before surgery (g/dL)	13.1 (8.6-15.9)
Hemoglobin after surgery (g/dL)	11.7 (8.8-14.4)
Indication for surgery, n (%)	
Myomatous uterus	20 (43.4)
Adenomyosis	1 (2.2)
Prolapse	2 (4.4)
Adnexal mass	8 (17.4)
Treatment-resistant DUB	5 (10.9)
Atypical endometrial hyperplasia	4 (8.7)
Endometrial intraepitelial neoplasia	3 (6.5)
Endometrial adenocarcinoma	3 (6.5)
Sentinel lymph node mapping, n (%)	4 (8.7)
Conversions, n (%)	2 (4.3)
Complications	
Intra-operative, n (%)	1 (2.2)
Post-operative, n (%)	1 (2.2)

Data are expressed as median, minimum, maximum or number (%)
DUB: dysfunctional uterine bleeding, Min: Minimum, Max: Maximum

Discussion

In the United States, approximately 600,000 hysterectomies are performed annually, making it the most common non-obstetric surgical procedure among women (11). Hysterectomy may be indicated for various conditions, including fibroids, adenomyosis, abnormal uterine bleeding, adnexal masses, endometrial intraepithelial neoplasia, and low-risk endometrial cancer.

Hysterectomy can be performed via abdominal hysterectomy (AH), laparoscopic surgery, VH, or robotic-assisted laparoscopy (RH). Vaginal and laparoscopic procedures (LAVH/LH/RH) are considered "minimally invasive" approaches as they avoid large abdominal incisions. Consequently, these methods are associated with shorter hospital stays and faster postoperative recovery than open AH (12). Current evidence supports using minimally invasive techniques as the preferred method for hysterectomy whenever feasible (10,13).

The vNOTES hysterectomy technique was introduced by Su et al. (14) in 2012 as a novel minimally invasive approach utilizing the transvaginal route to access the peritoneal cavity. This technique merges elements of traditional vaginal surgery with single-port laparoscopy, allowing for comprehensive intra-abdominal evaluation. It has proven to be safe, even in patients without uterine prolapse or those with intra-abdominal adhesions.

Over the past five years, the adoption of vNOTES for both gynecologic and oncologic surgeries has notably increased. The growing body of randomized controlled trials has helped to overcome early skepticism, establishing vNOTES as an increasingly popular and promising surgical approach among gynecological surgeons (15-17).

The choice of hysterectomy method often depends on the surgeon's training and experience. Many authors emphasize the declining use of VH due to insufficient training, leading gynecologists to favor abdominal or laparoscopic routes (10,18). This tendency is more pronounced in specific patient populations, such as those with previous cesarean sections, nulliparous women, obese patients, cases involving large uteri large uteri (defined as >280 g or >12-week gestational size equivalent), and those with premalignant or malignant pathologies. Although the definition of a "large uterus" remains debatable, many studies consider uteri exceeding 280 g or measuring more than 12 weeks in size as large (10,19). A large uterus can obstruct the pelvic space, making mobilization

and manipulation difficult. This limitation can hinder the identification of critical anatomic landmarks, delay bleeding control, and complicate surgical procedures, especially in cases involving cervical myomas.

To date, there is a lack of published data on the use of vNOTES hysterectomy in cases involving large uteri with benign, premalignant, or malignant pathologies. In such scenarios, surgeons must pay particular attention to structures like the ureters, especially given the reduced opportunity for uterine manipulation, restricted visualization, and potential challenges during posterior colpotomy in large uteri (>1000 g).

In the present study, the median BMI was in the obese range (31 kg/m^2), with previous abdominal surgery and cesarean section rates of nearly 60% and just over one fifth, respectively. In a cross-sectional study, Kaya et al. (20) compared total LH (TLH) (n=35) and vNOTES (n=48) in obese patients. The mean BMI values were similar (31.6 vs. 31.9), but the vNOTES group had shorter operative times (80 vs. 135 minutes) and significantly lower postoperative visual analog scale pain scores at both 6 and 24 hours.

In our series, the conversion and complication rates were both 4.3% (n=2), while the 30-day readmission rate was 2.17% (n=1). The discharge rate within 24 hours was 30% (n=14). One patient requiring conversion had a BMI of 48 kg/m^2 and a history of cesarean section; the other had deep infiltrating endometriosis initially mistaken for an adnexal mass. In both cases, conversion to multiport laparoscopy allowed for safe completion of the procedure. Two patients experienced intra- or post-operative bleeding, both successfully managed with medical treatment alone. One patient developed a cuff hematoma within 30 days, which resolved with conservative antibiotic management.

These outcomes are consistent with the existing literature. For example, Baron et al. (21) and Lee et al. (22) reported vNOTES conversion rates of 2.8% and 5.1%, respectively. In a randomized controlled trial by Baekelandt et al. (23), the 6-week readmission rate was 3%, and the study confirmed that vNOTES is non-inferior to TLH in terms of surgical success and conversion rates. The findings also suggest that vNOTES may allow more patients to undergo hysterectomy in a day-care setting.

In the present study, no cases of bladder or bowel perforation were observed. This rate was notably lower than the complication rates reported in the literature. For instance, in a study by Stuart et al. (24), intraoperative complications occurred in 3.2% of cases (n=144), with cystotomy being the most common among less experienced surgeons (1.3%). In addition, bowel or other intra-abdominal organ injuries were reported in 20 cases (0.44%). The absence of such complications in our series may be attributed to the surgeons' extensive experience, strict adherence to surgical protocols, careful patient selection and small group size. These factors likely contributed to the lower complication rates observed and suggest that outcomes may vary significantly depending on the surgical team's expertise.

Study limitations

One of the main strengths of our study was its focus on large uteri, including challenging patient groups, such as those with a history of cesarean section, nulliparity, obesity, and premalignant or malignant pathology. We believe this adds to the current limited literature on vNOTES. All procedures were performed by two experienced gynecologic oncologists, which may have contributed to the low complication rates observed in this study. However, the study has several limitations. The relatively small sample size limits the generalizability of our findings. Moreover, the procedures being performed by only two highly experienced surgeons may affect reproducibility in different clinical settings. Another limitation of this study was the lack of a control group of patients with uteri <280 g, which limits the ability to directly compare outcomes across different uterine sizes. Future prospective studies with appropriate control groups are necessary to validate and build on our findings.

Conclusion

A vNOTES hysterectomy was a feasible and safe, minimally invasive approach for patients with enlarged uteri, including those with obesity, prior abdominal surgery, and premalignant or malignant indications. It provides favorable surgical outcomes with low complication and conversion rates. This study supports the use of the vNOTES technique with a broader adoption in patients with large uteri.

Ethic

Ethics Committee Approval: *This study was approved by the Scientific Research Ethics Committee of University of Health Sciences Türkiye, Ankara Etlik City Training and Research Hospital (approval number: AEŞH-BADEK-2025/0266, date: 12.03.2025).*

Informed Consent: *Written informed consent was obtained from all patients prior to the procedure.*

Footnotes

Author Contributions: *Surgical and Medical Practices: C.H., V.K., Concept: C.H.,V.K., Design: C.H., V.K., Data Collection or Processing: H.N.Ö.,N.Ö., G.E., Analysis or Interpretation: C.H., V.K., Literature Search: N.Ö.,O.K.K., C.H., Writing: C.H., H.N.Ö., N.Ö.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Multi-site HPV infection in women with cervical intraepithelial neoplasia: an exploratory analysis

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Abstract

Objective: Human papillomavirus (HPV) positivity is associated with cervical, oropharyngeal, and anal cancers. There is insufficient published evidence regarding the effectiveness of obtaining oropharyngeal and anal swabs from patients with cervical HPV positivity to detect potential pathologies. Our aim was to analyze the feasibility of this potential screening protocol in a pilot group.

Material and Methods: In this cross-sectional exploratory analysis, women diagnosed with cervical intraepithelial neoplasia (CIN) grades 1, 2, or 3 were recruited. In order to evaluate HPV infection beyond the cervix, oropharyngeal and anal swab samples from HPV-positive women presenting to the obstetrics and gynecology clinic with histopathologically confirmed CIN were collected.

Results: A total of 30 women who provided informed consent were included in this pilot study. HPV 16 was the predominant cervical HPV type across all CIN grades (46.7% of cases), but HPV genotype did not significantly correlate with the severity of CIN lesions (p=0.786). No statistically significant association was found between cervical and anal HPV infections (p=0.427). Oral HPV positivity was rare (6.7%) and similarly showed no significant correlation with cervical HPV infection (p=0.499).

Conclusion: These findings provide preliminary data on the effectiveness of multi-site HPV screening in this population. Future larger-scale studies are needed to determine whether detecting extra-cervical HPV in women with cervical HPV positivity will influence clinical management decisions. [J Turk Ger Gynecol Assoc. 2025; 26(4): 289-96]

Keywords: Anal, cervical, human papillomavirus, oropharyngeal, screening

Received: 27 March, 2025 **Accepted:** 30 August, 2025 **Epub:** 19 September, 2025 **Publication Date:** 03 December, 2025

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DOI: *10.4274/jtgga.galenos.2025.2025-3-10*

The preliminary abstract of this study, titled "Evaluation of oropharyngeal and anal swab samples in patients with HPV positivity", was accepted for oral presentation and presented by the co-author (NBT) at the XV. Turkish German Gynecologic Congress in Antalya, Türkiye on April 23rd–27th, 2025. The abstract was published and remains accessible as of September 5, 2025 at: https://tajev.org/tajevDATA/Uploads/files/XV_TAJEV_Bildiri_kitabi2025.pdf

Cite this article as: *Akçaoğlu T, Soykan Y, Bayramoğlu Tepe N, Doğan O. Multi-site HPV infection in women with cervical intraepithelial neoplasia: an exploratory analysis. J Turk Ger Gynecol Assoc. 2025; 26(4): 289-96*

Introduction

Human papillomavirus (HPV) is a DNA virus from the Papillomaviridae family virus family, and associated with cervical, oropharyngeal and anal cancers (1). The International Agency for Research on Cancer and World Health Organization classify HPV as a necessary cause of cervical cancer (2-4). Persistent infection with high-risk HPV, particularly HPV-16 and HPV-18, is an almost universal cause of cervical cancer, with studies showing HPV DNA in 99.7% of cases (2,3). In patients with confirmed cervical HPV positivity and pathological findings categorized as cervical intraepithelial neoplasia (CIN) 1, CIN 2, or CIN 3, there is a paucity of data in the current literature regarding the clinical utility of concurrent oropharyngeal and anal sampling for the detection of additional HPV-associated lesions (5).

Although HPV's primary clinical impact is in the cervix, high-risk types like HPV-16 and HPV-18 may also cause malignancies in the oropharynx and anus (6,7). Approximately 5% of all cancers worldwide are attributable to HPV, with women more affected than men (8). Cervical HPV is far more common than oral HPV, but coinfection risk increases substantially in HPV-positive women (9). Notably, women with cervical HPV are up to five times more likely to harbor oral HPV (10). Simultaneous cervical and anal infections occur even more frequently, with studies reporting anal HPV positivity in over 50% of cervical HPV-positive women, often involving oncogenic strains (9,11).

Evidence suggests that cervical HPV positivity could serve as a predictive marker for extra-cervical infection risk, particularly for the anal region (12). Collaborative pooled analysis show HIV-negative women with cervical HPV-16 positivity have a 41% prevalence of anal HPV-16, versus 2% in HPV-16-negative counterparts (13,14). While anal HPV screening (via cytology and anoscopy) is cautiously being considered for high-risk groups in recent international guidelines, there is still no standardized screening recommendation for oropharyngeal HPV (15). Current global and national cervical screening programs, including in Türkiye, do not include oropharyngeal or anal sampling, largely due to insufficient data.

Despite growing awareness of the potential for multisite impact of HPV, clinical guidelines do not currently support routine extra-cervical HPV screening (16). Key barriers include a lack of validated screening protocols for the oropharynx and uncertainty about how to manage subclinical findings in the anal region. Existing studies are often small and geographically limited (17,18). Nonetheless, theoretical benefits, such as early detection of premalignant lesions, refined individual risk profiling, and improved prevention strategies, support the need for further large-scale studies (17).

This study sought to evaluate the diagnostic value of adding oropharyngeal and anal swabs in women with cervical HPV positivity. We aimed to assess whether concurrent oropharyngeal and anal HPV screening would detect otherwise unrecognized HPV-related lesions in patients with established cervical HPV infection. The clinical utility of such screening, including its potential to inform patient management decisions, was the primary objective.

Material and Methods

This prospective cross-sectional pilot study was conducted at the department of obstetrics and gynecology to evaluate the prevalence of extra-cervical HPV infections in women with histopathologically confirmed CIN. Women who presented to the outpatient gynecology clinic and had cervical HPV DNA positivity along with histologic findings consistent with CIN 1, CIN 2, or CIN 3 were invited to participate between April 2023 and June 2024. A total of 30 women were recruited, and written informed consent was obtained from all participants prior to enrollment.

Ethics

Ethics committee approval

The study protocol was reviewed and approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval number: 362, date: 14.04.2023).

Clinical trial registration

This trial was registered at ClinicalTrials.gov under the identifier NCT06906913.

Sample collection and laboratory methods

All patients were previously diagnosed by the gynecologic oncology specialist (YS), and pathological evaluations were used to stratify the study groups. Patient management, including follow-up and treatment decisions, was conducted in accordance with the guidelines of the American Society for Colposcopy and Cervical Pathology (19), with surgical intervention offered when indicated by colposcopic and histopathologic findings.

Oropharyngeal and anal swab samples were collected from each participant under sterile conditions by a gynecologic oncology specialist (YS) using standardized sampling techniques. All samples were labeled with unique, anonymized patient identifiers and stored in validated transport media under temperature-controlled conditions until processing. HPV DNA detection was performed using PCR-based assays incorporating both consensus and type-specific primers. Internal human DNA controls, as well as positive and negative controls, were used in each run to ensure assay accuracy and sensitivity. All laboratory procedures were carried out under the supervision of faculty of the department of medical microbiology from the sponsor institution.

Samples were collected from the patients using Digene® HC2 DNA Collection Device (Qiagen, Hilden, Germany) swabs. Each sample was vortexed separately to ensure homogeneous mixing. Then 800 µL of the samples were removed and extracted in an automated QIAsymphony SP/AS (Qiagen, Hilden, Germany). The extraction products were amplified in Rotor Gene Q 5Plex Real Time PCR (Qiagen, Hilden, Germany) using NLM HPV Genotypes 14 Real-TM Quant kit (Nuclear Laser Medicine, Italy). For each patient, 14 different HPV DNA types (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 and 68) were analyzed. Negative and K2 positive controls were used as controls.

To ensure methodological integrity, quality control measures included complete documentation of sample collection and processing steps, random repeat testing for a subset of samples, and strict adherence to data handling and reporting protocols (20). These procedures were followed to ensure the reproducibility, validity, and reliability of the data.

Statistical analysis

All statistical analyses were conducted using SPSS, version 27 (IBM Inc., Armonk, NY, USA). Descriptive statistics were calculated to summarize the demographic and clinical characteristics of the study population. Categorical variables were analyzed using pearson's chi-square (χ^2) test to evaluate associations between cervical HPV status and concurrent oropharyngeal and anal HPV positivity. A p-value of <0.05 was considered statistically significant.

Results

The patient dataset comprised 30 valid observations. The mean age across all cases was 45.07±8.71, and ranged from 29 to 65 years. Of the 30 women, 11 (36.7%) had experienced menopause, while 19 (63.3%) had not. In terms of obstetric history, the mean number of pregnancies (gravida) was 4.1, with a range from 0 to 8. The mean number of live births (parity) was 3.37, with a range from 0 to 7.

Cervical HPV infection in relation to dysplasia severity

Among 30 women with cervical dysplasia, HPV-16 was the most frequently detected cervical HPV type (46.7%), followed by other high-risk HPV types and mixed infections. One patient (3.3%) was positive for HPV 18, and two patients (6.7%) tested positive for both HPV-16 and HPV-18. Furthermore, three patients (10%) were positive for HPV-16 along with other HPV types, and one patient (3.3%) was positive for HPV-16, HPV-18, and non-HPV-16/18 oncogenic type. Nine patients (30%) tested positive for other types of HPV (Table 1).

In the study dataset, HPV-16 was the most common type across all CIN grades. Moreover, the presence of specific HPV types (16, 18, or others) did not differ between CIN 1, 2, or 3 ($p=0.786$) (Table 1).

Anal HPV detection in patients with cervical dysplasia

Among women without anal HPV positivity, all were positive for HPV-16 in cervical samples. Meanwhile, among those with anal HPV positivity, cervical HPV infection was more diverse (HPV-16, 18, and other types detected). Despite this trend, the difference was not significant, likely because of small sample size (Table 2).

Regarding the anal swab results, six (20%) tested positive for HPV-16, one (3.3%) tested positive for HPV-18, and six others (20%) were positive for other HPV types. Additionally, 6 patients (20%) were positive for both HPV-16 and another HPV type, while 1 patient (3.3%) tested positive for HPV-16, HPV-18, and another HPV type. No HPV types were detected in the anal swabs of 10 patients (33.3%). No statistically significant association between anal and cervical HPV positivity was found ($p=0.427$, $p>0.05$) (Table 2).

Oral HPV detection in patients with cervical dysplasia

Oropharyngeal HPV infection was rare, being present in only two of the patients (6.7%), both of them with a type of HPV other than those specified. No correlation was observed between cervical and oropharyngeal HPV infection ($p=0.499$) (Table 3).

Discussion

HPV is a common, sexually-transmitted virus associated with significant health risks (7). Infections at one anatomical site may increase susceptibility at others, particularly with cervical high-risk HPV, which elevates the likelihood of concurrent anal and possibly oral infections (21). Though oral transmission from the anogenital area is less common, isolated oral HPV cases without simultaneous genital or anal involvement are rare (21). Our study supports these observations (Tables 1-3).

HPV-related cancer risks vary across populations, including transgender and gender-diverse individuals assigned female at birth (TGD AFAB), who may face similar or even greater risks than cisgender women. This highlights the need for accessible screening tools, such as self-sampling (22,23).

In the present study of HPV-positive women with CIN 1-3, 66.7% had HPV DNA in anal swabs, while only 6.7% had it in oral swabs (Table 1). This suggests that the anal canal is a far more frequent site of concurrent infection than the oropharynx. Our findings are consistent with prior studies, including one by Nasioutziki et al. (5), which found anal high-risk HPV in 54.2% of women referred for colposcopy.

Behavioral risk factors and anatomical proximity likely explain the frequent detection of identical HPV types in

Table 1. Analysis of the association between colposcopic biopsy findings and cervical HPV

Variable	CIN 1 n=17 (56.7%)		CIN 2 n=5 (16.7%)		CIN 3 n=8 (26.7%)		p**
	n	%	n	%	n	%	
Cervical HPV							
HPV 16	7	41.2	3	60.0	4	50.0	
HPV 18	-	-	-	-	1	12.5	
Other HPV types	6	35.3	1	20.0	2	25.0	χ^2=6.336
HPV 16 and 18	1	5.9	-	-	1	12.5	p=0.786
HPV 16 and other	2	11.7	1	20.0	-	-	
HPV 16 and 18 and other	1	5.9	-	-	-	-	

**There was no statistically significant relationship between colposcopic biopsy and cervical HPV (p>0.05). The groups were found to be independent and homogeneous in terms of the specified characteristics
HPV: Human papillomavirus, CIN: Cervical intraepithelial neoplasia

Table 2. Analysis of the association between anal and cervical HPV infections

Variable	Anal HPV (-) n=10 (33.3%)		Anal HPV (+) n=20 (66.7%)		p*
	n	%	n	%	
Cervical HPV					
HPV 16	5	100.0	9	45.0	
HPV 18	-	-	1	5.0	
Other HPV types	-	-	4	20.0	χ^2=4.911
HPV 16 and 18	-	-	2	10.0	p=0.427**
HPV 16 and other	-	-	3	15.0	
HPV 16 and 18 and other	-	-	1	5.0	

*The association between two categorical variables was analyzed using pearson chi-square cross-tabulations
**There is no statistically significant association between anal HPV and cervical HPV (p>0.05). The groups were found to be independent and homogeneous with respect to the specified characteristics
HPV: Human papillomavirus

Table 3. Analysis of the association between oral and cervical HPV infections

Variable	Oral HPV (-) n=28 (93.3%)		Oral HPV (+) n=2 (6.7%)		p**
	n	%	n	%	
Cervical HPV					
HPV 16	13	46.4	1	50.0	
HPV 18	1	3.6	-	-	
Other HPV types	9	32.1	-	-	χ^2=4.362
HPV 16 and18	2	7.1	-	-	p=0.499
HPV 16 and other	2	7.1	1	50.0	
HPV 16 and 18 and other	1	3.7	-	-	

**There is no statistically significant association between oral HPV and cervical HPV (p>0.05). The groups were found to be independent and homogeneous with respect to the specified characteristics
In summary, no significant associations were found between cervical lesion grade (CIN 1-3) and HPV type, between cervical and anal HPV infection, and between cervical and oral HPV infection (Tables 1-3)
HPV: Human papillomavirus

cervical and anal sites. This co-infection supports the theory of autoinoculation and highlights the clinical significance that the women with cervical neoplasia are at increased risk for anal lesions. Histologic high-grade intraepithelial lesions of the anus have been reported in up to 9% of women with cervical or vaginal dysplasia (24,25), and anal cancer incidence is several times higher in women with a history of cervical high-grade lesions (26).

While there are no established screening guidelines for anal cancer in immunocompetent women, some experts advocate targeted screening for high-risk subgroups (27). Similar to cervical pap testing, anal cytology and HPV testing, followed by high-resolution anoscopy for abnormal results, have been studied, but mostly in HIV-positive individuals and men who have sex with men (28). For women with cervical HPV, it remains unclear whether detecting and treating anal lesions improves outcomes. Our findings support further research into this area (Table 2). Until definitive evidence emerges, individualized evaluation and clinical vigilance are recommended, particularly for patients with persistent HPV-16 infection, immunosuppression, or prior anogenital warts.

The rising incidence of anal squamous cell carcinoma (SCC) justifies a shift in focus toward prevention through detection of precancerous lesions. Asymptomatic individuals, as well as those with proctological symptoms, should undergo appropriate evaluation (27,29). The nonavalent HPV vaccine, which protects against nine major types (6, 11, 16, 18, 31, 33, 45, 52, 58), offers a first line of defense not only against cervical cancer but also oropharyngeal and anal cancers (30).

Oral HPV infections were much less common in our cohort. Only 2 of 30 women (6.7%) had detectable oral HPV, both involving HPV-16 (Table 3). HPV-16 is the genotype most strongly associated with oropharyngeal SCCs. Nonetheless, our detection rate was low, consistent with studies like that of Nasioutziki et al. (25), who found a 2.5% prevalence in similar populations, although others have reported higher rates (31-33). These discrepancies may reflect differences in sampling methods and population characteristics. Our use of oropharyngeal swabs rather than oral rinse may have contributed to lower sensitivity, and many oral infections may be transient and undetectable by single sampling. Moreover, prior research has shown that oral HPV infections are often independent of cervical types, even when both sites are infected (34). While we did not assess concordance between oral and cervical genotypes, both oral-positive cases involved HPV-16, suggesting possible overlap. The low prevalence of oral HPV compared to anal HPV suggests differences in susceptibility, exposure, or immune clearance between these sites.

Given the limited yield, routine oral HPV screening is not currently recommended in asymptomatic women. No clinical guidelines support testing the oropharynx for HPV, especially since the most affected areas which are the tonsils and base of tongue, are not easily accessible for swabbing. In addition, no proven treatment exists for asymptomatic oral infections, making screening less actionable. Since recent increases in incidence and survival of oropharyngeal cancers in the United States (US) have been attributed to HPV infection, researchers from the National Cancer Institute of the National Institutes of Health estimated trends in HPV prevalence and concluded that the increases in the population-level incidence and improved survival of oropharyngeal cancers in the US since 1984 are caused by HPV infection (35). Patients with detected oral HPV can be counseled about signs and risks of oropharyngeal cancer, but referral for invasive evaluation is not generally indicated without lesions.

A meta-analysis of HPV biomarkers in head and neck cancer found that combining HPV DNA, E6/E7 mRNA, and p16INK4a was most effective in identifying HPV-driven tumors, with E6/E7 mRNA being the most biologically relevant (36). More work is needed to validate screening strategies and biomarkers for HPV-associated oral and anal pathologies.

Our findings support the hypothesis that HPV positivity across anatomical sites is often interconnected. Behavioral factors, such as non-coital sex and autoerotic practices, may contribute to viral transmission across sites (37-40). However, no routine otolaryngologic or surgical consultations were performed in our cohort to investigate potential subclinical oral or anal disease.

Public health efforts focused on education, HPV vaccination, and regular screening are essential to reduce the HPV-related cancer burden (41). These strategies are especially important in high-risk populations, such as incarcerated individuals. HPV-related cancers, including anal SCC, are on the rise, reinforcing the need for preventive screening (42).

Although infections may vary by site, the natural history of HPV likely differs anatomically. Prospective studies should assess multi-site infection patterns to inform effective screening and vaccination protocols (11). As Darragh and Winkler (43) note, while both anal and cervical cancers share an HPV etiology, especially HPV-16, screening methods differ. Anal cytology has lower sensitivity and specificity than cervical cytology, and standardized anal screening guidelines are still under development (43). A widespread lack of awareness about HPV and other sexually transmitted infections (STI) persists (44). Frisch et al. (45) found that anal cancer, like cervical cancer, is strongly associated with sexual behavior, including multiple partners, positive STI history, receptive anal intercourse, and immunosuppression.

Surveys among students revealed that many are unaware HPV causes cancers beyond the cervix (46). This highlights the need for public health campaigns focused on safe sex, early STI diagnosis, self-sampling, and HPV vaccination, especially among vulnerable groups (47,48).

A major preventive opportunity lies in prophylactic HPV vaccination, especially since most of the common strains in cervico-anal co-infections are vaccine-preventable. Many participants in our study were likely unvaccinated or vaccinated later in life. We suggest that future cohorts may benefit from

reduced multi-site HPV prevalence as vaccine coverage improves.

Our findings reinforce the importance of considering HPV as a multi-site infection. For women with cervical HPV positivity and CIN, concurrent anal infection was common, while oral infection remained infrequent (Tables 2, 3). This supports a growing recognition that a subset of women may harbor synchronous HPV infections, especially across the anogenital tract, which may influence future cancer screening practices.

Study limitations

We acknowledge that the inclusion of only 30 patients in this pilot study was a significant limitation, particularly within subgroups, which restricts the statistical power of our findings. Stratification by CIN grade was not performed, nor was genotype concordance between infection sites assessed. Furthermore, the cross-sectional design of the study limits our ability to draw conclusions regarding HPV persistence. Potential confounding variables, such as sexual behavior, HPV vaccination status, and smoking history, which are known to influence HPV transmission and persistence, were not addressed.

The collection of samples from the oral cavity may have resulted in underestimation of infection, as these samples might not fully capture the extent of HPV presence. In addition, variations in pH and local acidity could further affect sample accuracy. Consultation with infectious disease specialists could provide a more comprehensive understanding of these factors.

We also acknowledge that we have not yet consulted with an otolaryngologist or general surgeon in the management of this case, which could offer additional clinical insights. Anal cytology and anoscopy were not performed, potentially leading to missed subclinical lesions. Finally, the lack of robust data explaining the simultaneous presence of different HPV types in multiple anatomical regions underscores the need for further investigation of this topic. We also wish to emphasize that our cohort consisted exclusively of female patients. However, HPV affects individuals of all genders, and comprehensive preventive strategies must address the needs of both men and women and patients in the LGBTQ community (49,50).

Oral and anal pathologies related to cervical HPV positivity are an often-underestimated conundrum (51,52). Our exploratory analysis highlights the multifactorial nature of HPV-related disease progression and suggests that HPV genotyping alone may not be sufficient for risk stratification in cervical dysplasia. Alongside this, would like to note that we have not collected any data regarding the vaccination status of the patients in our cohort, which could potentially be a preventive strategy against the development of multi-site infections (53).

Conclusion

Incorporating oral and anal swab screening in patients with cervical HPV positivity and CIN may aid in the early detection of related pathologies beyond the cervix. However the prevalence of oral positivity in our cohort of women was low, suggesting that oral screening is not as feasible or necessary as anal screening, which may be justified as concurrent CIN and anal HPV infection was present in two-thirds of our cohort. Other populations are likely to be even more at risk of anal HPV positivity.

The swab test emerges as a promising novel strategy and heralds a new era in HPV-related screening protocols. It has the potential to be a valuable addition to STI testing, particularly in the realm of early detection. Clinicians, encountering physical manifestations, such as condyloma acuminatum, might find merit in incorporating this screening tool to avert diagnoses at advanced stages. In doing so, it could contribute to more effective prevention measures, such as vaccination strategies. Nonetheless, the exact data for this population is scarce. Larger studies are warranted to evaluate the feasibility of implementing this sampling method as a routine screening tool.

Ethic

Ethics Committee Approval: *The study protocol was reviewed and approved by the İstanbul Medipol University Non-Interventional Clinical Research Ethics Committee (approval number: 362, date: 14.04.2023). This trial was registered at ClinicalTrials.gov under the identifier NCT06906913.*

Informed Consent: *A total of 30 women were recruited, and written informed consent was obtained from all participants prior to enrollment.*

Acknowledgements

The authors would like to express their sincere gratitude to Dr. Yasemin Zer for her valuable guidance on the validation of the laboratory procedures undertaken in this study.

Footnotes

Author Contributions: *Surgical and Medical Practices: T.A., Y.S., N.B.T., O.D., Concept: T.A., O.D., Design: T.A., O.D., Data Collection or Processing: T.A., Y.S., N.B.T., Analysis or Interpretation: T.A., Y.S., N.B.T., O.D., Literature Search: T.A., Y.S., N.B.T., Writing: T.A., Y.S., N.B.T., O.D.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *This study is funded by Gaziantep University Scientific Research Project support program (TF. HZP.23.31).*

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Fertility sparing surgery for malignant ovarian sex-cord stromal tumors: long-term obstetric and oncologic outcomes

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Abstract

Objective: To evaluate the oncological and reproductive outcomes of patients with ovarian sex-cord stromal tumors (SCSTs) treated with fertility sparing surgery (FSS).

Material and Methods: This retrospective study included patients diagnosed with malignant ovarian SCSTs between February 2007 and June 2020 at Başkent University Hospital, Ankara. All patients underwent FSS, which preserved at least one ovary and the uterus. Data on demographics, surgical and pathological features, adjuvant treatments, follow-up, recurrence, survival, and obstetric outcomes were collected. Follow-up continued until September 2025, with survival analyses performed using Kaplan-Meier and Cox regression methods.

Results: The median age of the 35 included patients was 29.0 years, with a median follow-up of 141.0 months. Recurrence occurred in 17.1%, and disease-related mortality was 8.6%. The 5-year disease-free survival (DFS) and overall survival (OS) rates were 85.7% and 97.1%, respectively. No significant factors influenced DFS, while adjuvant therapy impacted OS in univariate analysis. All patients maintained regular menstrual cycles post-treatment. Nine patients conceived (36.0%), resulting in 12 pregnancies and 6 live births (50.0%). Chemotherapy did not significantly affect fertility outcomes.

Conclusion: FSS in patients with ovarian SCSTs demonstrated favorable oncologic and reproductive outcomes. Larger, prospective multicenter studies are necessary to optimize management strategies and establish definitive guidelines for fertility preservation in this patient population. [J Turk Ger Gynecol Assoc. 2025; 26(4): 297-303]

Keywords: Sex-cord stromal tumors, granulosa cell tumors, sertoli-leydig cell tumors, fertility preservation, fertility sparing

Received: 22 September, 2025 **Accepted:** 06 October, 2025 **Epub:** 15 October, 2025 **Publication Date:** 03 December, 2025

Introduction

Ovarian sex-cord stromal tumors (SCSTs) are a group of benign and malignant neoplasms originating from sex-cords or ovarian stroma (1). They can occur across a wide age range. For example, adult-type granulosa cell tumors, the most common subtype of SCST, occur in perimenopausal and postmenopausal women, while Sertoli-Leydig cell tumors typically affect adolescents and young women. SCSTs account for less than 5% of all ovarian malignancies (2-4).

Compared to epithelial ovarian cancers, SCSTs generally have a better prognosis (5). In addition, malignant ovarian SCSTs (MOSCSTs) are often diagnosed at stage I (6). Standard surgical treatment includes hysterectomy with bilateral salpingo-oophorectomy, along with surgical staging procedures, such as omentectomy, peritoneal biopsies, and peritoneal washing (6).

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DOI: *10.4274/jtgga.galenos.2025.2025-9-11*

Cite this article as: *Tunç M, Akıllı H, Haberal Reyhan AN, Kuşçu E, Önalan G, Özgül N, et al. Fertility sparing surgery for malignant ovarian sex-cord stromal tumors: long-term obstetric and oncologic outcomes. J Turk Ger Gynecol Assoc. 2025; 26(4): 297-303*

With the exception of adult-type granulosa cell tumors, these tumors tend to occur in younger women so fertility preservation is often a key concern and has been shown to have similar survival outcomes compared to more extensive surgical approaches. However, evidence regarding the prognosis after fertility-sparing surgery (FSS) for MOSCSTs is limited, because of the rarity of this entity and the scarcity of multicenter, randomized, prospective studies (7).

Therefore, the aim of this study was to evaluate the oncological and obstetric outcomes of patients with MOSCSTs who underwent FSS.

Materials and Methods

This retrospective study included patients diagnosed with MOSCSTs between February 2007 and June 2020 at the Department of Obstetrics and Gynecology, Başkent University Hospital, Ankara. This study was approved by the Başkent University Medical and Health Sciences Research Board (approval number: KA25/336, date: 18.09.2025). Informed consent was obtained from all patients.

Survival and follow-up data were analyzed, as of September 2025. Patients who did not undergo an FSS were excluded from the study. FSS was defined as the preservation of at least one ovary and uterus. The decision for FSS was based on patient preference and tumor extent. Data collected from hospital records included age, marital status, menstrual patterns, medical history, surgical details, histopathological subtype, chemotherapy administration, obstetric outcome, and status of recurrence and survival.

The decision to use adjuvant chemotherapy depended on tumor stage and histopathology and was made by the gynecologic oncology tumor board following current guidelines. Regimens for SCSTs included three courses of bleomycin (20 mg/m^2, on days 1, 8, and 15), etoposide (120 mg/m^2, from days 1 through 5), and cisplatin (20 mg/m^2, from days 1 through 5) [Bleomycin + Etoposide + Cisplatin (BEP)] or 3 to 6 courses of paclitaxel (175 mg/m^2, every 3 weeks) and carboplatin (area under curve =5, every 3 weeks). After the completion of adjuvant chemotherapy, a thoracoabdominal computed tomography scan was conducted.

After confirmation of no recurrence or any residual disease, the patients were taken into a routine follow-up program. The follow-up protocol for these patient groups was planned for every 3-4 months for two years, biannually between the 3 to 5 years of follow-up, and annually thereafter until the detection of any progression or disease recurrence. Follow-up included a gynecologic examination, pelvic ultrasound (US), testing of disease-related serum tumor markers (alpha-fetoprotein, human chorionic gonadotropin, cancer antigen 125, etc.), and thoracoabdominal computed tomography scans every six months during the first two years. If pregnancy occurred during follow-up, a transvaginal US was added to routine obstetric visits.

Disease-free survival (DFS) was defined as the interval between surgery and disease recurrence. Overall survival (OS) was defined as the time between the surgery and the time of death related to the disease. Obstetric outcomes were evaluated by collecting data up until the patient's last follow-up visit from the hospital records and patient files.

The statistical analyses were performed using IBM SPSS for Windows, version 25.0 (IBM Corp., Armonk, NY, USA). The data are expressed as the median and range for continuous variables. Binary variables are reported as numbers and percentages. The Kaplan-Meier test was used to identify differences between the curves for DFS and OS. Multivariate analysis was performed using the Cox regression test. p-values <0.05 were considered statistically significant.

Results

A total of 35 patients were included in the study. Median (range) age of the patients was 29.0 (12-44) years. The median follow-up duration was 141.0 (41-268) months. Patient characteristics are detailed in Table 1.

A total of 6 (17.1%) recurrences were observed during follow-up. Disease-related deaths were observed in 3 (8.6%) patients. The 5-year DFS and OS were 85.7% and 97.1%, respectively. Five-year DFS rates for stages IA, IC1, and II were 81.0%, 91.7%, and 100%, respectively (p=0.855). Five-year OS rates for stages IA, IC1, and II were 100.0%, 91.7%, and 100.0%, respectively (p=0.938). No factors significantly affected DFS in univariate analysis. Kaplan-Meier survival curves comparing histological subtypes for DFS and OS are shown in Figures 1 and 2. The need for adjuvant treatment was the only prognostic factor for OS in univariate analysis (p=0.015). However, multivariate analysis revealed no significant prognostic factors for OS. Detailed univariate and multivariate analyses for factors affecting DFS and OS are given in Tables 2 and 3.

All patients (100.0%) maintained regular menstrual cycles after treatment. To date, 25 of the 35 patients were married or partnered. Post-treatment, 12 pregnancies occurred in 9 patients (36.0%), resulting in 6 live births (50.0%). Among these pregnancies, 6 (50.0%) occurred in patients with granulosa cell tumors, while the remaining occurred in patients with Sertoli-Leydig cell tumors. Adjuvant chemotherapy and age >35 years did not significantly affect conception or live birth rates (for adjuvant chemotherapy p=0.691 and p=0.615; and for age >35 years p=1.000 and p=1.000; respectively). A flowchart illustrating obstetric outcomes is provided in Figure 1.

Table 1. Demographic and clinical outcomes of the patients

	Median (range)		
Age	29.0 years (12-44)		
	n (%)		
Histologic types		**Median age (range)**	
Granulosa cell	23 (65.7)	31.0 (15.42)	
Adult type	19 (54.3)		**p**
Juvenile	4 (11.4)		
Sertoli-leydig	8 (22.9)	20.5 (12-33)	0.167
Retiform	8 (22.9)		
Sex-cord stromal tm	4 (11.4)	27.0 (15-44)	
Unclassified	4 (11.4)		
Histologic types	**n (%)**	**Cyst size (mean, cm) (range)**	**p**
Granulosa cell	23 (65.7)	9.67 (2-29)	
Sertoli-leydig	8 (22.9)	9.75 (3-17)	0.373
Sex-cord stromal tumor	4 (11.4)	4.85 (1-9)	
Endometriosis			
Yes	3 (8.6)		
No	32 (91.4)		
Surgical Intervention			
USO +/- staging	29 (82.9)		
Cystectomy +/- staging	6 (17.1)		
Stage			
IA	21 (60.0)		
IC1	12 (34.3)		
II	2 (5.7)		
Site			
Right	21 (60.0)		
Left	14 (40.0)		
Adjuvant treatment			
BEP	4 (11.4)		
P/C	8 (22.9)		
None	23 (65.7)		

USO: Unilateral salpingooophorectomy, BEP: Bleomycin + Etoposide + Cisplatin, P/C: Paclitaxel + Carboplatin

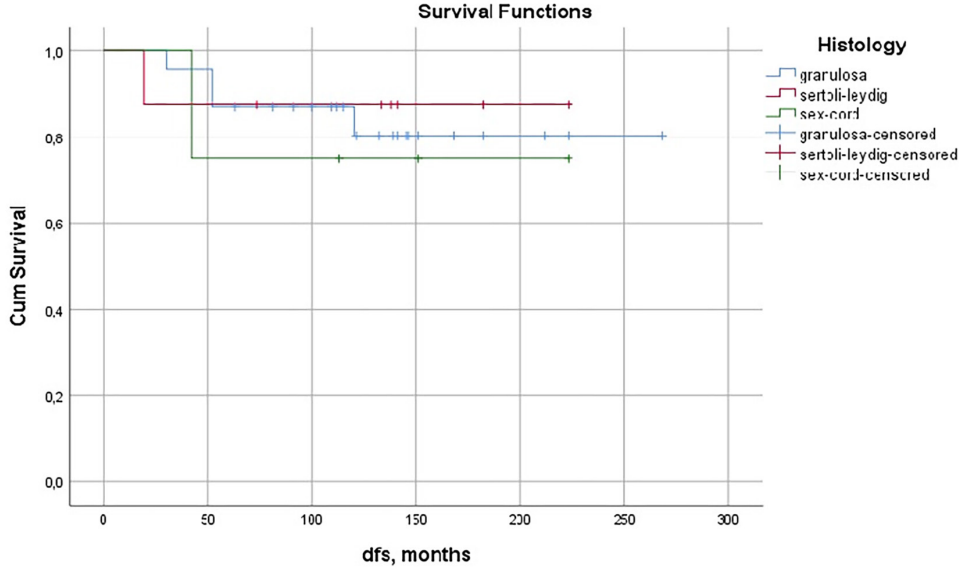

Figure 1. Disease-free survival plot of histologic subtypes (p=0.855)
DFS: Disease-free survival

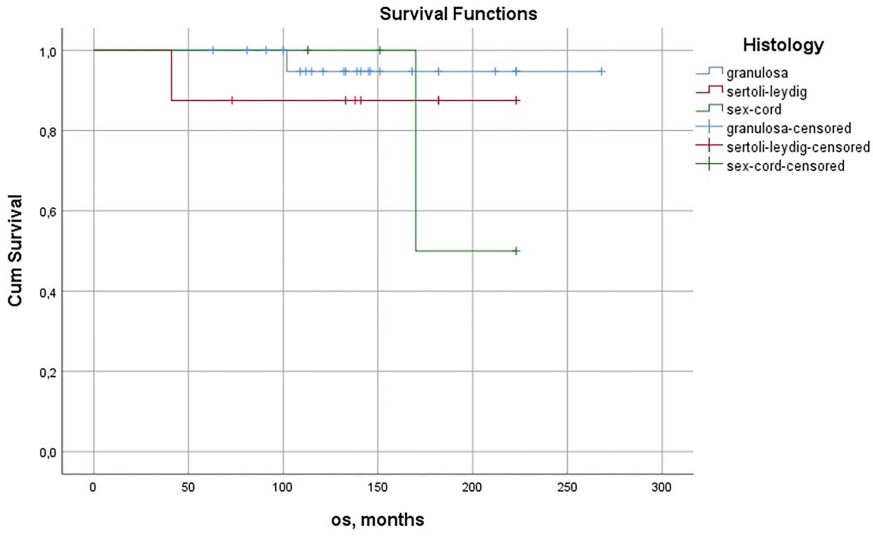

Figure 2. Overall survival plot of histologic subtypes (p=0.530)
OS: Overall survival

Table 2. Univariate and multivariate analysis of disease-free survival

	Univariate analysis			Multivariate analysis		
	N (%)	**5-year DFS (%)**	**p**	**HR**	**95% CI**	**p**
Endometriosis history						
Yes	3 (8.6)	100.0	0.457			
No	32 (91.4)	84.4				
Surgery						
USO	29 (82.9)	82.8	0.232			
Cystectomy	6 (17.1)	100.0				
Lymphadenectomy						
Yes	28 (80.0)	89.3	0.434			
No	7 (20.0)	71.4				
Chemo						
Yes	12 (34.3)	75.0	0.057			
No	23 (65.7)	91.3				
Site						
Right	21 (60.0)	90.5	0.585			
Left	14 (40.0)	78.6				
Tumor size						
<10 cm	21 (60.0)	94.4	0.311			
≥10 cm	14 (40.0)	91.7				
Histology						
Granulosa cell	23 (65.7)	87.0	0.855			
Sertoli-leydig	8 (22.9)	87.5				
Mixed sex-cord stromal tumor	4 (11.4)	75.0				
Histology						
Granulosa cell	23 (65.7)	87.0	0.996			
Others	12 (34.3)	83.3				
FIGO stage						
IA	21 (60.0)	81.0	0.497			
IC1	12 (34.3)	91.7				
II	2 (5.7)	100.0				
Post-treatment pregnancy						
Yes	9 (25.7)	100.0	0.114			
No	26 (74.3)	80.8				

USO: Unilateral salpingooophorectomy, BEP: Bleomycin + Etoposide + Cisplatin, HR: Hazard ratio, CI: Confidence interval, DFS: Disease-free survival

Table 3. Univariate and multivariate analysis of overall survival

	Univariate analysis			Multivariate analysis		
	n	**5-year OS (%)**	**p**	**HR**	**CI 95%**	**p**
Endometriosis history						
Yes	3 (8.6)	100.0	0.682			
No	32 (91.4)	96.9				
Surgery						
USO	29 (82.9)	96.6	0.406			
Cystectomy	6 (17.1)	100.0				
Lymphadenectomy						
Yes	28 (80.0)	96.4	0.115	1.861		0.200
No	7 (20.0)	100.0				
Adjuvant treatment						
Yes	12 (34.3)	91.7	**0.015**	445.864		0.947
No	23 (65.7)	100.0				
Site						
Right	21 (60.0)	95.2	0.834			
Left	14 (40.0)	100.0				
Tumor size						
<10 cm	21 (60.0)	100.0	0.886			
≥10 cm	14 (40.0)	91.7				
Histology						
Granulosa cell	23 (65.7)	100.0	0.530			
Sertoli-leydig	8 (22.9)	87.5				
Sex-cord stromal tm	4 (11.4)	100.0				
Histology						
Granulosa cell	23 (65.7)	100.0	0.305			
Others	12 (34.3)	91.7				
FIGO stage						
IA	21 (60.0)	100.0				
IC1	12 (34.3)	91.7	0.938			
Locoregional	2 (5.7)	100.0				
Post-treatment pregnancy						
Yes	9 (25.7)	100.0	0.256	320.274		0.951
No	26 (74.3)	96.2				

HR: Hazard ratio, OS: Overall survival, CI: Confidence interval, USO: Unilateral salpingooophorectomy

Discussion

Granulosa cell tumors were the most common histological subtype in our cohort (65.7%). Most of the patients were diagnosed at stage I (94.3%). Five-year DFS and OS rates were 85.7% and 97.1%, respectively. In univariate analysis, the need for adjuvant treatment was the only prognostic factor for OS, although it lost significance in multivariate analysis. Regarding reproductive outcomes after completion of treatment, nine patients conceived with 12 pregnancies. Resulting in six livebirths (50.0%).

The 5-year DFS of 85.7% compares favorably with other studies, such as Bergamini et al. (8), who reported 75% DFS in FSS subgroups. The similarity of DFS in patients undergoing radical surgery (87.0%) suggests that fertility-preserving approaches do not significantly compromise oncologic outcomes (8). The 5-year OS rate was 97.1% and was consistent with other series, including the MITO-9 study, which reported 100.0% survival for both radical surgery and FSS subgroups (8).

Interestingly, patients who received adjuvant chemotherapy exhibited shorter OS in univariate analysis but no prognostic factors emerged in multivariate analysis, likely due to the limited sample size. The decision to use chemotherapy in patients with SCSTs is based on both tumor histology and stage, and worse survival would be related to worse tumor behavior and the limited effect of chemotherapy administration for SCSTs. It has been reported that DFS was similar in stage IC patients who received or did not receive chemotherapy (9).

Six patients (17.1%) underwent cystectomy in this study, and 5-year DFS was 100.0% for this group. In a recent review,

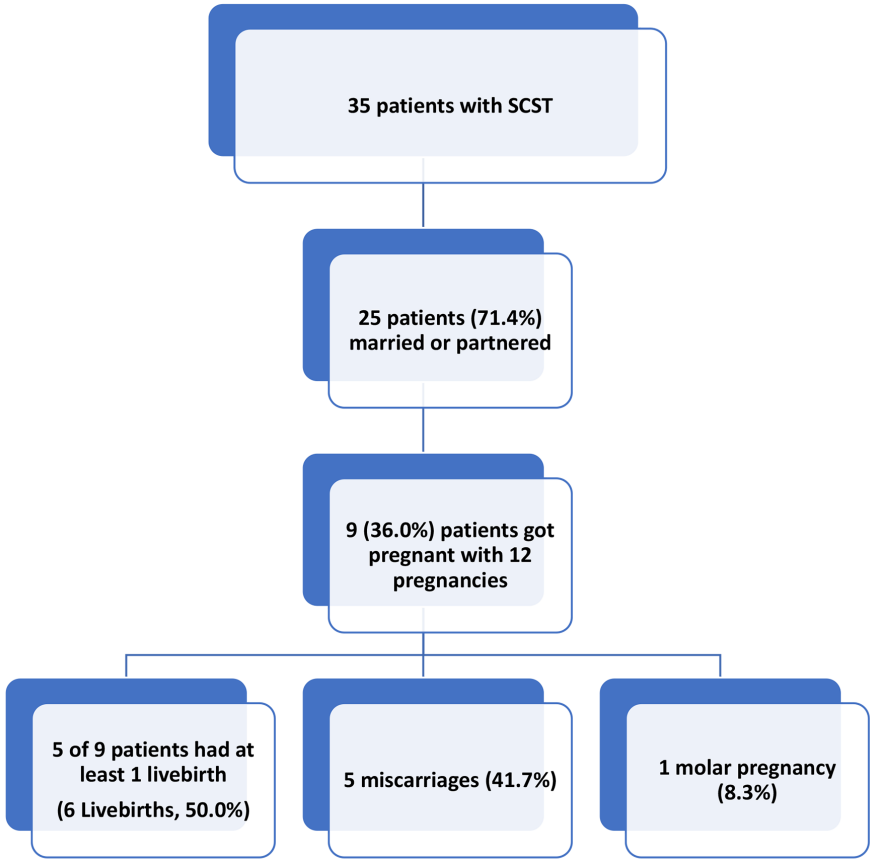

Table 4. Flowchart of obstetric outcomes
SCST: Sex-cord stromal tumor

it was reported that cystectomy was related to markedly worse recurrence outcomes (10). The MITO-9 study also reported worse DFS outcomes in patients who underwent cystectomy (8). The absence of upstaging in our cohort may relate to careful surgical excision.

Menstrual function remained normal after treatment in all cases. While the pregnancy rate was 36.0%, the live birth rate was 50.0%, considerably lower than a recent report of 95.0% (11). A recent review also reported a live birth rate ranging from 65% to 95% (10). We examined factors that could influence pregnancy, such as age >35 years and chemotherapy, but found no significant effects. Furthermore, a Gynecologic Oncology Study Group study reported 87.3% regular menstrual cycles after platinum-based chemotherapy (11). Although it is known that platinum-based regimens may be cytotoxic to the gonads, there appears to be little effect on menstrual regularity (12). Our relatively lower live birth rate suggests the need for further study, possibly related to treatment details or individual patient characteristics. The study's strengths include long median follow-up (almost 12 years), and comprehensive obstetric and oncological data (13). An expert histopathologist's review adds to the reliability of our findings.

Study limitations

Limitations include the retrospective design, which restricts data on subsequent pregnancies and long-term outcomes, and the single-center setting, which limited both sample size and generalizability.

Conclusion

In conclusion, ovarian SCSTs generally have a favorable prognosis, mostly diagnosed at early stages. FSS appears to be a safe and appropriate option, with excellent oncological and obstetric outcomes in selected patients. Larger, prospective, multicentric studies are required to establish definitive guidelines for fertility-preserving management in this patient population.

Ethic

Ethics Committee Approval: *This study was approved by the Başkent University Medical and Health Sciences Research Board (approval number: KA25/336, date: 18.09.2025).*

Informed Consent: *Retrospective study.*

Footnotes

Author Contributions: *Surgical and Medical Practices: A.A., E.K., H.A., N.H., A.H., Concept: M.T., N.Ö., G.Ö., Design: M.T., E.K., Data Collection or Processing: M.T., H.A., G.Ö., Analysis or Interpretation: M.T., N.Ö., G.Ö., Literature Search: M.T., A.A., H.A., Writing: M.T., H.A.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Autoamputation of the ovary after missed diagnosis of ovarian dermoid cyst torsion: a case report and review of literature

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Abstract

Torsion is the most frequent complication of ovarian dermoid cysts. Adnexal torsion typically presents as a severe abdominal pain and is treated as an acute surgical emergency. However, if surgery is delayed or the diagnosis is not made in a timely manner, autoamputation of the ovary is a very rare, but possible, complication. Herein, we report a case of an autoamputated ovary with a dermoid cyst and review the literature. A 33-year-old patient presented with pelvic pain lasting three weeks and was scheduled for a laparoscopy due to the presence of bilateral ovarian cysts, with a dermoid cyst identified on the left ovary. During the procedure, it was discovered that both the left fallopian tube and ovary were absent. The infundibulo-pelvic ligament appeared to terminate abruptly at the pelvic brim. Moreover, an 8 cm pelvic mass was found lodged in the cul-de-sac, which was extensively adherent to the bowel and the uterus, and was covered by vascular omental tissue. Histopathological analysis revealed that this pelvic mass was a dermoid cyst. The cyst contained adipose tissue, hair, and microscopic ovarian stroma, confirming the diagnosis. This case highlights the complexity of diagnosing and managing pelvic masses. Clinicians should maintain a high index of suspicion for ovarian torsion and consider the possibility of autoamputation when an ovary is not found in its anatomical location, especially if imaging suggests the presence of a dermoid cyst. This case also underscores the importance of meticulous surgical dissection for the complete removal of such masses. [J Turk Ger Gynecol Assoc. 2025; 26(4): 304-8]

Keywords: Pelvic mass, autoamputation of ovary, dermoid cyst, ovarian torsion, spontaneous oophorectomy, teratoma

Received: 28 May, 2025 **Accepted:** 18 September, 2025 **Epub:** 14 October, 2025 **Publication Date:** 03 December, 2025

Introduction

Ovarian torsion is an infrequent yet consequential gynecologic emergency, characterized by the rotation of the ovary around its vascular pedicle, leading to compromised blood flow, ischemia, and potential ovarian compromise. Incidence rates of ovarian torsion range from 2.7% to 15% in patients undergoing surgical treatment for adnexal masses (1,2). It has been observed that ovarian torsion often occurs in cases involving mature cystic teratoma. However, their varied composition and atypical presentation make the prompt and accurate diagnosis of ovarian torsion challenging.

Ovarian autoamputation is a rare complication of ovarian torsion that may result in the formation of a parasitic ovarian teratoma (3,4). Reimplantation of the ovary after autoamputation is possible due to the phenomenon of neovascularization, which allows for the formation of new blood vessels and subsequent reperfusion. There have been relatively few documented cases in the literature available on this topic although reimplantation of the ovary following

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DOI: *10.4274/jtgga.galenos.2025.2025-1-10*

Cite this article as: *Seyhan A, Usta Korkut İ, Urman B. Autoamputation of the ovary after missed diagnosis of ovarian dermoid cyst torsion: a case report and review of literature. J Turk Ger Gynecol Assoc. 2025; 26(4): 304-8*

autoamputation has been reported to the pouch of Douglas, omentum, sacrouterine ligaments, and the broad ligament (5-8). In this case report, we present a case of autoamputation of the ovary resulting from a missed diagnosis of ovarian dermoid cyst torsion.

Case

A 33-year-old gravida 1, para 1 patient was referred to our clinic with a suspected ovarian tumor. Her medical and surgical history was unremarkable, except for hospitalization three weeks earlier for abdominal and pelvic pain ascribed to the presence of an ovarian cyst. The acute phase subsided within 24 hours, however intermittent cramping remined. At the time of presentation to our clinic, the pain had worsened, necessitating regular non-steroidal anti-inflammatory drugs for relief.

Abdominal examination revealed tenderness in the suprapubic region and left iliac fossa. Transvaginal ultrasound examination showed the presence of three ovarian cysts (Figure 1).

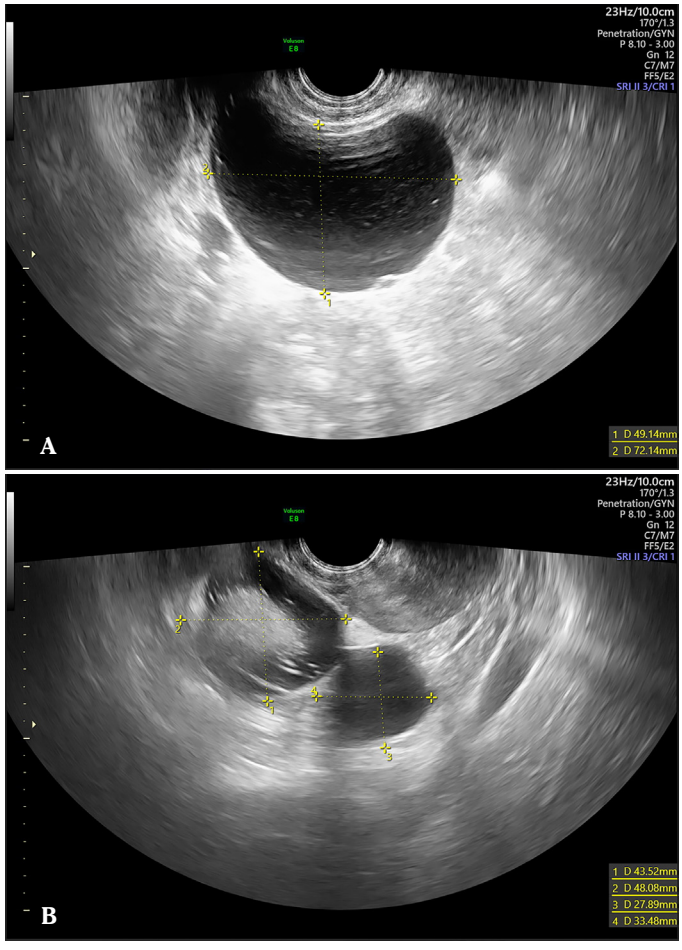

Figure 1. Transvaginal ultrasound imaging showing A) a unilocular cyst with low level echogenity in the right ovary. B) two ovarian cysts: one is a unilocular cyst and the other exhibits hyperechoic lines and dots in the left ovary

The right ovary contained an anechoic unilocular cyst measuring 7x6x5 cm, while the left ovary contained a mixed echogenic cyst measuring 5x4x4 cm and an anechoic unilocular cyst measuring 3x3x4 cm in size. The cyst in the left ovary was consistent with a dermoid cyst located at the pouch of Douglas. Ultrasound with color Doppler demonstrated the presence of blood flow. A laparoscopy was scheduled because of the persistent pain.

At laparoscopy there were extensive dense adhesions in the pelvis precluding the visualization of the internal genitalia. Following lysis of adhesions, it was noted that the left fallopian tube and ovary were absent. The infundibulo-pelvic ligament abruptly terminated at the pelvic brim, while the utero-ovarian ligament was identified as a rudimentary structure arising from the posterolateral aspect of the uterus (Figure 2). A large pelvic mass, approximately 8 cm in size, was found lodged in the cul-de-sac and densely adherent to the bowel and the posterior aspect of the uterus (Figure 3). The mass was covered by a thick and vascular layer of omentum. During careful dissection, the left ureter, adherent to the mass, was identified and dissected meticulously, followed by freeing the mass from the

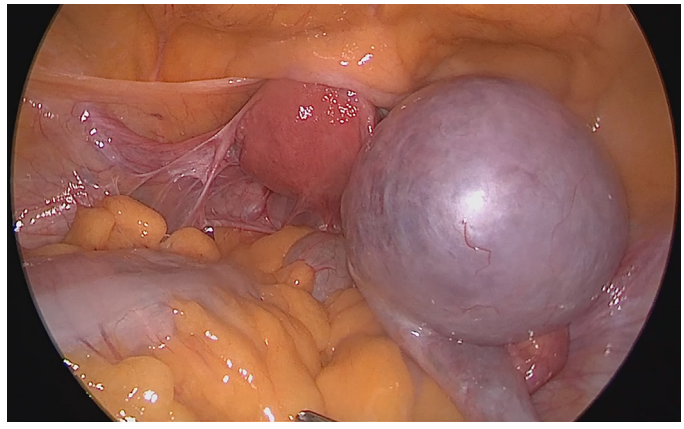

Figure 2. Illustrating the absence left ovary and fimbrial portion of the fallopian tube in the fossa ovarica with abrupt end of left infundibulopelvic ligament

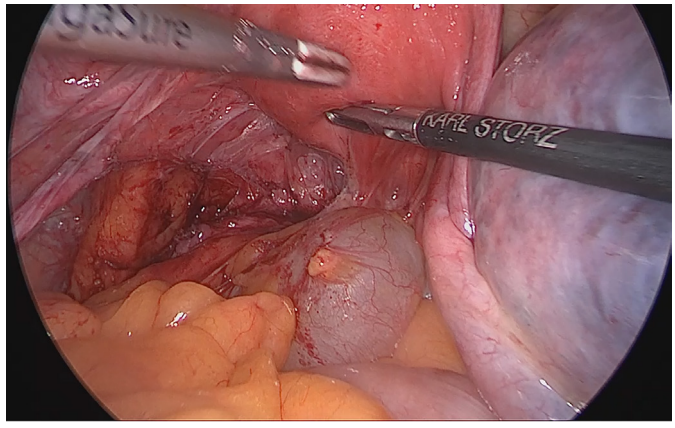

Figure 3. Left ovarian mass and obliteration of Douglas

underlying bowel using the medial pararectal space. Upon full mobilization, two dermoid cysts were removed together with the pelvic mass that had no connection with the right adnexa. The right ovary, adherent to the right pelvic side wall, contained a large cyst that was successfully excised. All specimens were removed inside an endobag through a culdotomy incision. The culdotomy incision was closed using a 3-0 V-Lock suture, and the removed specimens were sent to histopathology. The procedure was terminated without complications, and the patient was discharged the next day.

Histopathological evaluation of the excised specimens showed that the mass removed from the cul-de-sac was a dermoid cyst and the one removed from the right ovary a mucinous cystadenoma. The parasitic mass that was identified as a teratoma contained adipose tissue, hair and also microscopic ovarian stroma (Figure 4).

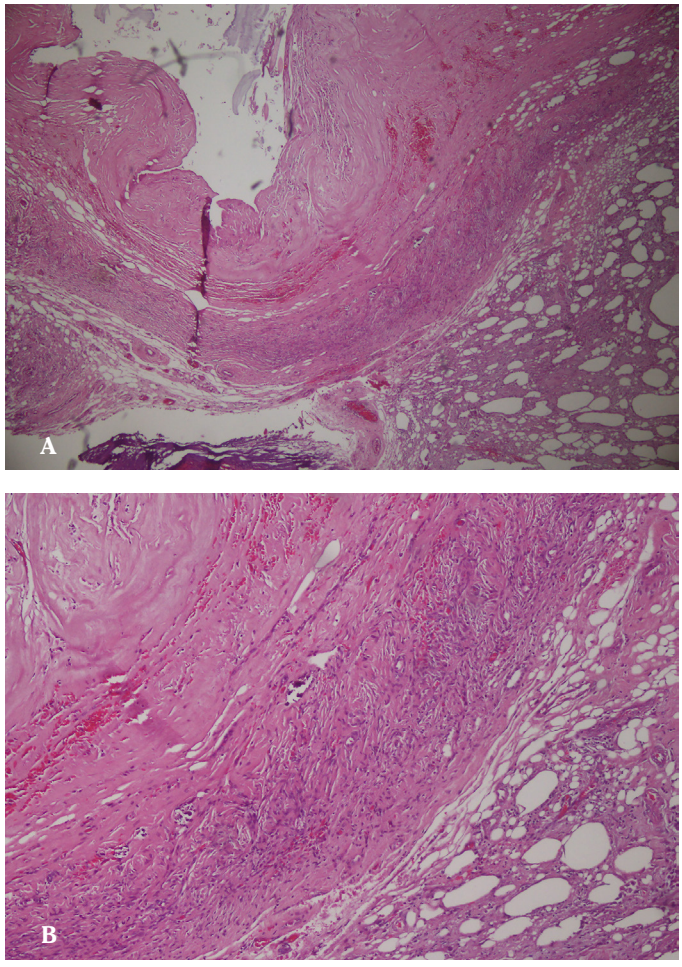

Figure 4. Microscopic findings of the tumour: A) ovarian cyst wall with with hair shafts in the lumen B) ovarian cyst wall and ovarian stroma (hematoxyline & eosin staining, original magnification x40, x200)

Discussion

When torsion occurs, the ovary usually rotates around both the infundibulo-pelvic and the utero-ovarian ligaments. The rotation of the infundibulo-pelvic ligament leads to compression of the ovarian vessels, compromising partial or complete obstruction of lymphatic and venous outflow as well as arterial inflow. Persistent arterial perfusion, coupled with blocked outflow, causes ovarian edema, resulting in significant ovarian enlargement and increased vascular compression. Subsequently, ovarian ischemia develops, potentially leading to ovarian necrosis and local hemorrhage. The treatment of ovarian torsion is via prompt detorsion usually via laparoscopy. However, if the diagnosis is missed and the patient placed on analgesics, the pain usually subsides within a few days and the affected tissues becomes necrotic and eventually undergoes atrophia. In some rare cases, adnexal torsion may lead to autoamputation and subsequent reimplantation of the amputated adnexal mass to the neighboring structures. This may lead to the formation of a parasitic pelvic or abdominal mass, supported by new collateral blood flow (3,7,9-16). Based on earlier case reports, the autoamputated ovary, most commonly harboring a teratoma, was found to be situated at the omentum, pouch of Douglas, attached to the uterosacral ligaments and even within an inguinal hernia. The majority were covered by the omentum, which is unsurprising as omentum is a very mobile organ that controls inflammation and promotes revascularization due to its rich vascular supply. Doppler flow in a torsional ovary may be present, decreased, or absent. Normal Doppler flow does not rule out torsion, as preserved flow can result from incomplete occlusion, intermittent torsion, or collateral blood supply, as observed in our case, where the omentum provided the blood supply.

There are two possible hypotheses for parasitic teratomas; one originating from an autoamputated dermoid cyst, as in the presented case, and the other originating from ectopic ovarian tissue (17-19). The absence of the ovary and the presence of a separate cyst in the pelvic or abdominal cavity covered by omentum supports the first cause. Histopathological observation of ovarian tissue in the excised tumor adds further evidence to support this suggestion.

The second hypothesis for supernumerary ovaries proposes that if the migration of certain primitive germ cells is halted during their journey to the gonadal ridges, their influence on the surrounding epithelium can result in the formation of ectopic ovarian tissue (20,21). Supernumerary ovaries are ovarian tissue that is completely separate from the normally positioned ovary. There is no ligamentous or direct connection with the ovaries, broad ligament, utero-ovarian ligament, or infundibulo-pelvic ligament, as it originates from a distinct

primordium. A supernumerary ovary is typically located in the pelvic region, near structures such as the uterus, bladder, pelvic wall, retroperitoneum, omentum, mesentery, and inguinal region (22-25). In rare cases, supernumerary ovaries have been reported to be located in unusual areas, such as the hepatorenal space, near the right psoas major muscle, and at the intrarenal pole (26,27).

A search was conducted in the PUBMED database to investigate the incidence of reported cases concerning autoamputated ovarian dermoid cysts between 2000 and 2024. Table 1 presents the clinical data for the 10 cases identified. The patients' age ranged from 14 to 77 years. Of these patients, three reported no abdominal pain, four had chronic abdominal pain and the remainder experienced acute abdominal pain. Notably, among those with chronic pelvic pain, the duration of symptoms ranged from 1 to 5 years. Size of the tumor varied between 4 and 10 cm. Autoamputation due to torsion of the ovarian dermoid cyst did not show a preference for laterality. The laterality of origin of the dermoid cyst was found to be similar (six from the left and four from the right ovary). In the majority of cases, preoperative diagnostic imaging was conducted using ultrasound (n=9), followed by computed tomography (n=2) and magnetic resonance imaging (n=2). Preoperative diagnosis was inaccurate in 30% and the presence of a dermoid cyst was confirmed in only half of the cases. Dermoid cyst was bilateral in 30% of cases.

Autoamputation of the ovary is a rare phenomenon with various potential locations for implantation. The most common location was the pouch of Douglas (n=5), followed by the left adnexal region (n=1), peritoneal cavity (n=1), vesicouterine space (n=1), right subhepatic region (n=1), and pelvic side wall (n=1). The unexpected intraoperative finding of the absence of an ovary and the corresponding fallopian tube being blind-ended without fimbriae and infundibulum usually leads to the diagnosis of ovarian autoamputation. In cases when bilateral dermoid cysts are present and one ovary has been autoamputated and migrated, misdiagnosis is quite common, resulting in incomplete removal of all cystic components. In a 14 year-old girl, the initial intraoperative diagnosis was right ovarian dermoid cyst and congenital absence of left ovary. Following right ovarian cystectomy, the 4 cm left dermoid cyst was successfully removed after a thorough pelvic exploration and meticulous dissection from the surrounding omental adhesions. In another case, a 42-year-old patient was preoperatively diagnosed with an 8 cm right ovarian cyst, suggestive of cystadenoma, and a 2 cm echogenic left ovarian cyst. Initially, the plan was to perform a bilateral ovarian cystectomy.

However, due to technical difficulties encountered during surgery, an adnexectomy for the right ovarian cystadenoma was performed. Unexpectedly, the left ovary was not found in its usual location in the ovarian fossa; instead, it was discovered completely detached and located in the pouch of Douglas. Consequently, the patient underwent a bilateral adnexectomy, which inadvertently triggered the onset of menopause. Meticulous localization of anatomical structures can significantly influence surgical outcomes and patient well-being. It is important for the surgeon to have a high level of suspicion, thorough preoperative evaluation, and intraoperative assessment to identify any migrated cysts and ensure complete removal, especially in cases when ovary is not identified in its normal anatomical location and there are pelvic adhesions enveloped by omentum.

The removal of adnexal specimens through an abdominal port site or posterior culdotomy incision is a feasible and safe option for pelvic specimen extraction. This approach can be tailored based on the preferences of the patient and surgeon, as well as individual patient factors. Colpotomy negates the need to enlarge abdominal incisions or performing intracorporeal specimen size reduction. We particularly prefer this method in obese patients to minimize the risk of port-site hernias and skin infections. For closing the cul-de-sac incision, we favor the use

Table 1. Articles about autoamputation of the ovary

Author, year	Age	Symptom	Size	Preop diagnosis	Location of AO
Daccache et al. (9)	42	Aysmptomatic	80 mm	Cystadenoma	Douglas pouch
Gorginzadeh et al. (10)	14	Chronic pelvic pain	101x60 mm (RO) and 40x25 mm (LO)	Dermoid cyst	Douglas pouch
John (11)	32	Asymptomatic	60 mm	Complex cyst	Douglas pouch
Kim et al. (12)	34	Chronic pelvic pain	50x27 mm	Complex cyst	Left adnexal region
Lee et al. (3)	77	Acute abdominal pain	143x140 mm, 90 mm	Dermoid cyst	Right subhepatic space
Kusaka and Mikuni (7)	24	Chronic pelvic pain	50x35 mm	Dermoid cyst	Douglas pouch
Ollapallil et al (13)	46	Acute abdominal pain	80x60x40 mm	Complex cyst	Peritoneal cavity
Peitsidou et al. (14)	33	Asymptomatic	Incidental finding	NA	Douglas pouch
Shah et al. (15)	26	Chronic pelvic pain	40x40 mm	Dermoid cyst	Vesicouterine space
Üreyen et al. (16)	27	Acute abdominal pain	68x40 mm	Complex cyst	Pelvic side wall

of a barbed suture material, which provides consistent tension along the suture line without the need for knots. This feature is particularly advantageous in laparoscopic settings, where space is limited and visibility can be challenging. This suture type not only enhances the speed of closure but also improves the overall security of the incision, thereby reducing the risk of cuff dehiscence.

Conclusion

It is important for the surgeon to have a high level of suspicion, thorough preoperative evaluation, and intraoperative assessment to identify any migrated cysts and ensure complete removal, especially in cases when ovary is not identified in its normal anatamical location and there are pelvic adhesions enveloped by omentum.

Footnotes

Author Contributions: *Surgical and Medical Practices: B.U., Concept: A.S., İ.U.K., Design: A.S., İ.U.K., Data Collection or Processing: A.S., İ.U.K., Analysis or Interpretation: A.S., İ.U.K., Literature Search: A.S., İ.U.K., Writing: A.S., İ.U.K., B.U.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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What is your diagnosis?

A 28-year-old primigravida visited obstetrics outpatient department at 26 weeks of gestation with complaint of loss of perception of fetal movements for six hours. There was no history of abdominal pain, vaginal leakage or bleeding. There was no history of fall or any blunt trauma to the abdomen. There was no history of diabetes, hypertensive disorders, or any other chronic illness in self or family. The present pregnancy was conceived spontaneously, from a non-consanguineous marriage and the patient was on regular follow up, since the sixth week of pregnancy. First trimester screening results with combined test were suggestive of low risk for trisomy 13, 18 or 21. Nuchal translucency was 0.9 mm, normal for gestational age. Targeted ultrasound scanning for detailed fetal anatomical assessment was normal, with growth of fetus appropriate for gestational age. Fetal echocardiography at 24 weeks was also normal.

On examination, general physical examination was unremarkable. On per-abdominal examination, fundal height corresponded to 22 weeks of gestation; with the fetus in breech presentation and fetal heart sounds were not heard. An urgent ultrasound examination was done, which was suggestive of an intra-uterine fetal demise. After taking an informed consent, induction of labour was done with misoprostol, with dosage appropriate, as per gestation. Patient delivered a male fetus weighing 510 grams. The baby had no external malformations. Placenta and membranes were delivered complete and intact. The fetus was sent for autopsy and placenta for histopathological examination. The karyotype of the baby was normal.

The male fetus corresponded to a gestational age of 24 weeks; the weight was 510 grams. The crown to rump length was 19 cm; the crown to heel length was 28.2 cm; the chest and abdominal circumference were 18.6 cm and 15.7 cm respectively. The biparietal diameter was 9 cm. The distance between the inner and outer canthus was 0.52 cm and 2.9 cm respectively. The fetus had brachycephaly. Palpebral fissures were normal with bilaterally normal eyeballs. There were bilaterally low set ears. The external auditory canal was patent on both sides. The nose was funnel shaped with flat nasal bridge and patent choana. Oral cavity was normal. The fetus had barrel shaped chest with rounded abdomen. The external urethral meatus and anal orifice were normal. Scrotum was empty and there was no midline defect. All four limbs were symmetrical. On internal examination of the fetus, it was found that right lobe of the liver was macerated and there were blood clots in the pleural cavity. Except for these, the internal features were normal for the gestational age. The placenta was discoid shaped weighing around 8.8 g. The maternal surface was normal. The umbilical cord was 19 cm long with marginal insertion on the placenta. The cord had two veins and one artery. The umbilical cord presented a typical stricture of length 5.9 mm and diameter 8 mm at the fetal insertion site (Figure 1). The distal segment to it was dilated to 3.1 cm and congested. This constricted part of the umbilical cord was subjected to histopathological examination.

On histopathological examination of placenta, placental development was found to be appropriate, corresponding to second trimester of pregnancy. Focal dystrophic calcification was present with increased syncytial knot formation. There was no evidence of infarct or any other vascular lesion, and no signs of inflammation. Membranes were unremarkable. The umbilical cord showed three vessels, both in the normal and in the stricture region. At the stricture site, the umbilical cord showed complete loss of Wharton's jelly with areas of fibrosis and neo-vascularization at the periphery (Figure 2).

Received: 10 January, 2024 **Accepted:** 08 May, 2025 **Publication Date:** 03 December, 2025

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DOI: *10.4274/jtgga.galenos.2025.2024-12-3*

Cite this article as: *Chandrupatla M, Mangla M, Kaliappan A, Palo S, Setty A, Gopidas GS, et al. Umbilical cord stricture: a rare and under recognized cause of late second trimester stillbirth. J Turk Ger Gynecol Assoc. 2025; 26(4): 309-13*

Figure 1. Umbilical cord showing stricture at the foetal insertion site

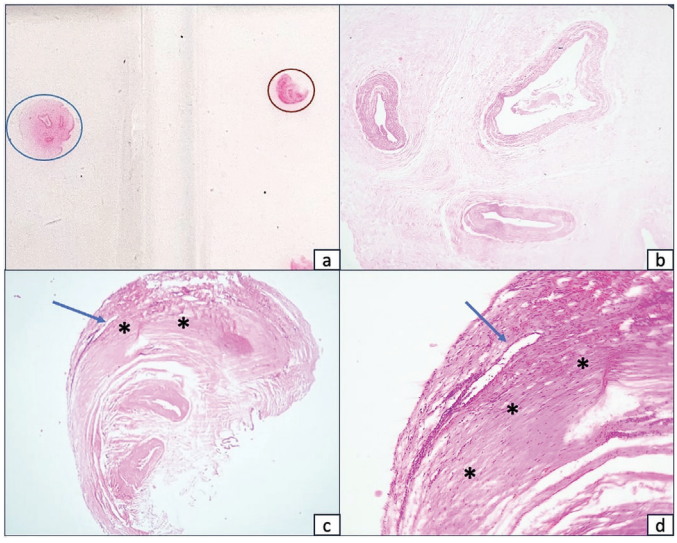

Figure 2. Histopathological findings of the stricture site
(a) Relative comparison of cross-sectional area of the umbilical cord from the normal (circled in blue) and stricture site (circled in red); (b) Microphotograph of the umbilical cord from the normal area showing normal morphology with preserved Wharton's jelly (H&E stain, 40×); (c,d) Microphotograph of the umbilical cord from the stricture site showing loss of Wharton's jelly with areas of fibrosis (asterix) and neovascularisation (arrow) at the periphery (c: H&E stain, 40×; d: H&E stain, 100×)
H&E: Hematoxylin & eosin

Answer

This typical histological finding confirms this is a case of second trimester intrauterine fetal demise as a result of umbilical cord stricture. The histological feature is characteristic, and has been hypothesized due to differentiation of mesenchymal stem cell or as an attempt to form collateral circulation (1).

Stillbirth in the late second trimester remains a significant and distressing event. While many cases can be attributed to well-known factors, such as maternal health issues, placental abnormalities, or fetal genetic conditions, some causes are less apparent and often go undiagnosed. One such under recognized cause is umbilical cord stricture, characterized by a localized narrowing of the umbilical cord, and has been associated with fetal demise by compromising blood flow and nutrient exchange between the mother and fetus (2). In the second or third trimester of pregnancy, clinically, the sole sign is typically a reduction in foetal movements, and foetal death happens shortly after. Until recently, umbilical cord stricture and torsion could only be diagnosed postmortem. This has led to significant discussion over whether or not these findings actually represent causes of death or are simply artefacts from the postmortem process (3). The causes of umbilical cord stricture are the subject of several hypotheses. According to one concept, dubbed the "stretch hypothesis," the length of the cord is determined by tension generated by fetal movements; the greater the length of the umbilical cord, the greater the fetal movements (4). The structure of umbilical cords is helical, with up to 380 turns. An umbilical cord's average length is around 55 cm, and its diameter is 1-2 cm. The first and second trimesters, when the fetus is known to be the most active, are when the majority of the cord's length is reached. The stricture observed in certain umbilical cords has been hypothesized to happen in the second trimester following excessive fetal movements (5). In the present case, the umbilical cord was 19 cm long. The etiopathology of umbilical cord stricture could possibly be a vicious cycle, with narrowing leading to reduced blood flow through the umbilical vessels leading to ischemia and tissue damage, further promoting thrombosis which can further exacerbate narrowing and impede blood flow. Fibrosis and calcification, thereafter contribute to the rigidity and narrowing of the cord. Thrombosis of the chorionic plate vessels often occurs with umbilical cord stricture and over coiling, especially when both are present. This can reduce blood flow, causing hypoxemia and abnormal fetal movements. Fetal death may result if these movements twist the unprotected, stenosed cord section (6). Based on the etiopathology, conditions predisposing are listed in Figure 3.

Another postulated reason for the umbilical cord stricture has been inadequate Wharton's jelly. As chondroitin sulphate and hyaluronic acid are abundant in Wharton jelly, umbilical arteries are shielded from compression. If the Wharton jelly is lost, the fetoplacental circulation may be hampered, which might result in fetal death (7). In the presented case, the umbilical cord from the stricture site showed complete loss of Wharton's jelly

with areas of fibrosis and neovascularisation at the periphery. Blichárová et al. (8), has also reported a similar case where the umbilical cord in stricture area revealed loss of Wharton's jelly, replacement with extensive fibrosis and capillary vessel formation. Peng et al. (6), has documented that Whartons's jelly deficiency was noted in 25% of the cases with umbilical cord stricture.

Previous studies have reported different timings of intrauterine death varying between 21 and 40 weeks of gestation as a consequence of umbilical cord stricture (Table 1) (3,5,9,10). This depends upon when the oxygen need of the fetus is significantly affected. This might differ depending on the number, degree of stricture present and could also change from pregnancy to pregnancy. The growing fetus experiences intrauterine growth limitation, hypoxia, and acidosis as a result of the stricture of the cord and the constriction of the blood vessels inside it, which results in a degree of reduction in oxygen supply and fetal demise.

Though there are several cases of umbilical cord stricture causing intrauterine death, there is a paucity of literature on the possibility of its recurrence. Bakotic et al. (2) reported recurrent umbilical cord over-coiling and stricture resulting in fetal death across three successive pregnancies. In the third pregnancy, the primary stricture site did not exhibit the pronounced coiling seen in the previous two. Instead, the affected cord region showed significant attenuation and fibrosis with only mild coiling. The authors proposed that cord stricture, rather than significant coiling, may have been a more critical factor in the fetus's demise.

Ultrasonographic prediction of umbilical cord stricture is challenging, but certain clues can raise suspicion. Key indicators include localized narrowing of the umbilical cord, often accompanied by reduced or absent Wharton's jelly, which appears as a hypoechoic region surrounding the umbilical vessels. Increased echogenicity in the affected segment may suggest fibrosis. Abnormal cord coiling, particularly hypercoiling or hypocoiling, is also linked to stricture risk. Doppler studies play a crucial role, with elevated resistance in the umbilical artery, intermittent absent or reversed end-diastolic flow, and

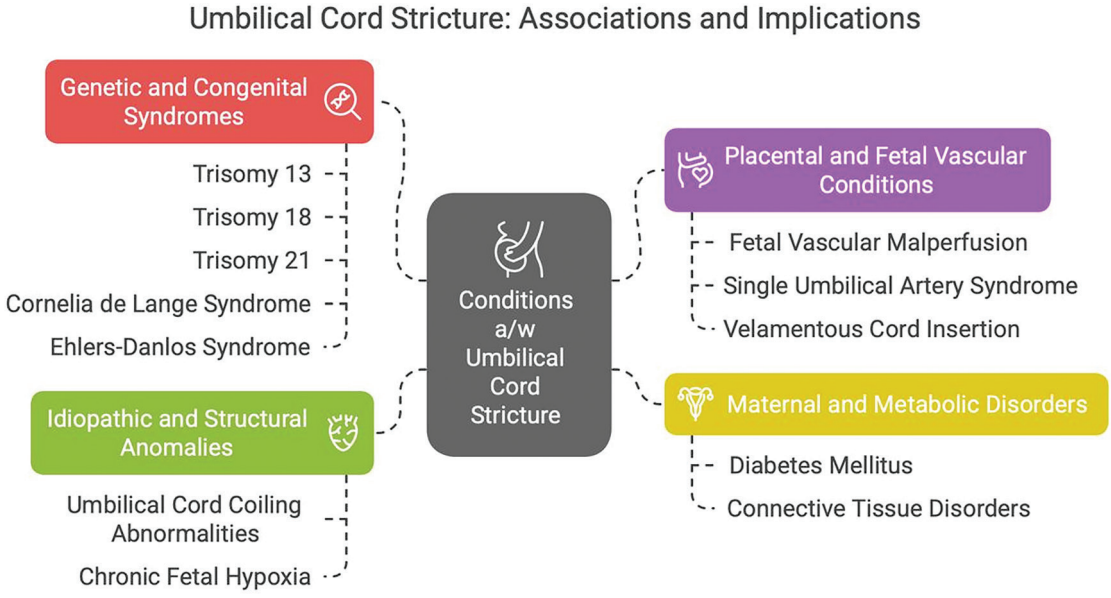

Figure 3. Syndromes and obstetric complications associated with umbilical cord stricture

Table 1. Umbilical cord stricture and intrauterine fetal demis

No	Authors	Timing of IUD	History given by patient	Associated fetal anomaly	Length of umbilical cord
1	Langhe et al. (9)	38 weeks	Absence of fetal movements	No	50.5 cm
2	Ling et al. (5)	22 weeks	Absence of fetal movements	No	Length of the cord not available
3	Chew et al. (10)	33 weeks	Absence of fetal movements	No	37 cm
4	Blichárová et al. (1)	37 weeks	Absence of fetal movements	No	49 cm
5	Present case report	24 weeks		No	19 cm
IUD: Intrauterine device					

Table 2. Guidelines for obstetric ultrasound examination from various medical organizations emphasize different aspects of evaluating the umbilical cord and placental insertion

1	The American Institute of Ultrasound in Medicine (AIUM) (9)	The umbilical cord should be examined to determine the number of vessels and the fetal and placental insertion sites should be assessed during standard 2nd/3rd trimester ultrasound examinations.
2	The Australasian Society for Ultrasound in Medicine (13)	Evaluate carefully, the placental cord insertion, highlighting the identification of marginal and velamentous anomalies. Transvaginal colour or power Doppler scans should be used to rule out vasa praevia.
3	The American College of Radiology (ACR) and the American College of Obstetricians and Gynecologists (ACOG) (14)	Do not advocate routine assessment of placental cord insertion but recommend imaging the umbilical cord and counting the vessels when feasible.
4	The Society of Obstetricians and Gynaecologists of Canada (15)	The placental cord insertion should be evaluated, only in cases of low-lying placenta. It also recommends transvaginal evaluation of the internal cervical os in situations involving placenta praevia, low or velamentous cord insertion, vaginal bleeding, or bilobed/succenturiate placenta.
5	The Royal College of Obstetricians and Gynaecologists (16)	There is insufficient evidence to support routine second-trimester screening for vasa praevia in the general population, despite the high accuracy and low false-positive rate of transvaginal ultrasound scans.
6	The International Society of Ultrasound in Obstetrics and Gynaecology (ISUOG) (17)	Although formal assessment of the umbilical cord insertion is not part of the routine mid-trimester scan, if marginal or velamentous cord insertion is visualized, it should be reported.

turbulent flow patterns being potential warning signs. Additional indicators such as fetal growth restriction, oligohydramnios, or reduced fetal movements may further raise suspicion. While predicting umbilical cord stricture with certainty remains difficult, combining detailed morphological assessment with serial Doppler studies in high-risk pregnancies can improve early detection and enable closer fetal monitoring (11,12).

In subsequent pregnancies following an umbilical cord stricture, careful monitoring and preventive measures are important to reduce risks, as the condition has tendency to recur. Preconception counseling is essential to assess maternal risk factors and review previous pregnancy outcomes. Early and regular prenatal care should include detailed ultrasonographic evaluation, with a focus on umbilical cord morphology, coiling patterns, and Wharton's jelly assessment. Serial growth scans combined with Doppler studies are recommended to monitor umbilical artery blood flow for signs of increased resistance or compromised circulation. Fetal surveillance methods, such as non-stress tests and biophysical profiles, may be initiated in the third trimester to detect fetal distress. Lifestyle modifications, including proper nutrition and smoking cessation, further support maternal and fetal well-being. Delivery timing should be individualized based on fetal growth, Doppler findings, and maternal health, with early delivery considered in high-risk cases. Postpartum evaluation of the placenta and umbilical cord is advised to identify potential risk factors for future pregnancies, and referral to a maternal-fetal medicine specialist may help tailor a comprehensive management plan (11,12).

The guidelines for obstetric ultrasound examination from various medical organizations emphasize different aspects of evaluating the umbilical cord and placental insertion (9,13-17) (Table 2). Other umbilical cord pathologies are generally considered incidental findings and are not specifically screened for. The guidelines do not include the evaluation of free cord loops that might indicate true knots, positional anomalies, structural anomalies, or helical pattern anomalies. These guidelines clearly avoid recommending sonographic measurements of the umbilical cord, Wharton's jelly, or identifying potential abnormal cord morphology (18). They also do not address cord entanglement issues, such as nuchal cords, true knots, or complex entanglements, which are discussed in detail elsewhere. In accordance with a few other authors, we also suggest that the entire length of the umbilical cord available for sonographic assessment should be thoroughly scanned for potential abnormalities in cord morphology. As sonographic resolution continues to improve, diagnostic accuracy will undoubtedly increase (19).

To conclude, the acute and often lethal nature of umbilical cord stricture, along with the rarity of its prenatal sonographic diagnosis, suggests that careful attention should be given to the sonographic appearance of the umbilical cord, particularly the presence of Wharton's jelly near the fetal abdominal wall insertion, during the second and third trimester of pregnancy, when possible. Due to reports of recurrence in subsequent pregnancies, special consideration should be given to detailed sonographic evaluation of Wharton's jelly in this anatomical location for women with previous pregnancy losses, especially in cases attributed to this condition or unexplained.

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Scleredema adultorum of Buschke over the abdomen during pregnancy: an uncommon presentation

Dear Editor,

Scleredema adultorum of Buschke is a cutaneous mucinosis characterized by non-pitting skin induration predominantly affecting the upper back, neck, and face (1). Involvement of other areas, particularly the abdomen, is rare, end its occurrence during pregnancy is uncommon with very few cases documented in the literature (2). We present a case of scleredema at an atypical site during pregnancy.

A 37-year-old woman of 36 weeks gestation presented to the dermatology outpatient clinic with a two-week history of progressive thickening and pruritus of the lower abdominal skin. There was no associated fever, trauma, infection, or systemic symptoms. She had no history of diabetes, thyroid dysfunction, or autoimmune disease. On clinical examination, the abdominal skin was diffusely indurated, and non-pitting (Figure 1), with sparing of the flanks and back. Systemic examination was unremarkable. Routine laboratory investigations, including complete blood count, liver and renal function tests, fasting blood glucose, and thyroid profile, were within normal limits. Due to the unusual thickening of abdominal skin with extensive, severe "*peau d'orange*" appearance (not routinely seen in all pregnancies), a skin biopsy was performed. This revealed thickened collagen bundles with interstitial mucin deposition (Figure 2a) confirmed by Alcian blue staining (Figure 2b), which was consistent with scleredema adultorum. Serum immunoelectrophoresis showed no abnormal changes. The patient was managed conservatively with topical emollients and oral antihistamines for symptomatic relief. She was monitored through regular dermatology and obstetric follow-up visits. The induration remained stable throughout pregnancy, and pruritus was adequately controlled. At 38 weeks, she delivered a healthy infant and at six weeks postpartum, the abdominal skin induration showed partial resolution, and the patient reported marked symptomatic improvement. Given the absence of systemic involvement or associated conditions, normal serum immunoelectrophoresis and spontaneous partial resolution of the skin induration post-delivery, a diagnosis of pregnancy-associated scleredema adultorum was made.

Scleredema is a rare form of cutaneous mucinosis that presents with non-pitting induration of the skin (1). It is histologically characterized by thickened collagen bundles and mucin deposition which distinguish it from other sclerosing skin disorders (2). Scleredema is classified into three main types: a) postinfectious that is typically self-limiting; b) diabetic-associated, which is the most common form; and c) paraproteinemia/malignancy-associated, which may be progressive and is sometimes linked with systemic disease or malignancy (3).

The timing of disease onset during pregnancy, without underlying abnormalities, supports the hypothesis that hormonal and immunological changes during pregnancy may

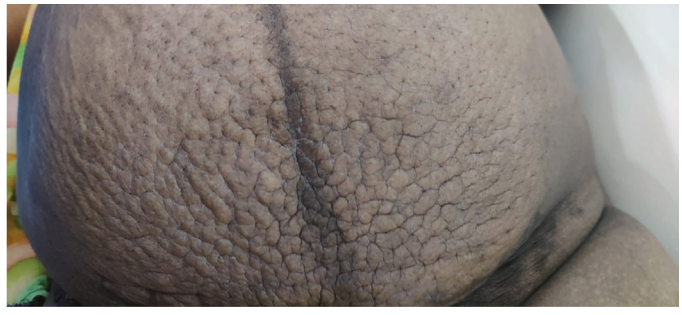

Figure 1. Thick, non pitting induration of skin over the abdomen giving a paeu'd orange dash like appearance

Received: 02 July, 2025 **Accepted:** 18 September, 2025 **Epub:** 31 October, 2025 **Publication Date:** 03 December, 2025

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DOI: *10.4274/jtgga.galenos.2025.2025-6-11*

Cite this article as: *Sumanth TS, Konda D, Mulsange KA, Swetha BS. Scleredema adultorum of Buschke over the abdomen in pregnancy: an uncommon presentation. J Turk Ger Gynecol Assoc. 2025; 26(4): 314-5*

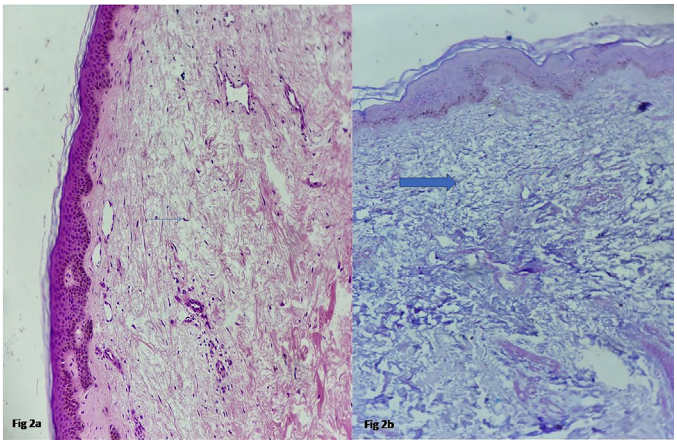

Figure 2. a) Hematoxylin and eosin stain (10x) shows thickening of dermis. The blue arrow indicates a few proliferating fibroblasts. b) Alcian blue PAS stain (10x) highlights the dermal mucin depots denoted by a blue arrow

alter mucin metabolism and fibroblast activity, contributing to the development of scleredema in susceptible individuals. Differential diagnoses considered included morphea (localized scleroderma), scleromyxedema, and nephrogenic systemic fibrosis (3,4). Scleromyxedema, scleroderma and nephrogenic systemic fibrosis are usually characterized by increased number of fibroblasts or fibrocytes which was not seen in the present case.

Treatment options for scleredema vary depending on etiology and disease severity. Conservative management with emollients and antihistamines is often sufficient in self-limiting or pregnancy-associated cases (4,5). In more persistent cases, therapies such as psoralen and ultraviolet A light exposure, intravenous immunoglobulin, methotrexate, and colchicine have shown benefit (5). However, during pregnancy, therapeutic decisions must prioritize fetal safety. The favourable postpartum resolution in the presented case further supports conservative management in similar presentations.

To conclude, this case highlights a rare, pregnancy-associated presentation of scleredema adultorum involving an atypical site, the abdomen. In the absence of systemic disease or comorbidities, the condition followed a benign course with spontaneous postpartum improvement. A high index of suspicion and histopathological confirmation may be essential in diagnosing unusual dermatoses during pregnancy.

Ethic

Informed Consent: *Informed consent was taken from the patient for publishing information about her cutaneous condition and her picture without revealing her identity*

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Laparoscopic management of a mature cystic teratoma in the fallopian tube

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Abstract

Our objective is to present the laparoscopic management of a mature cystic teratoma originating from the fallopian tube and to discuss different surgical approaches. A 28-year-old nulliparous woman presented with right groin pain, and after the diagnostic evaluation, laparoscopic exploration was performed for diagnosis and treatment. Intraoperative findings revealed a 4-5 cm cyst protruding from the right tubal fimbrial ostium was identified, originating from the tubal cavity without ovarian connection. The cyst was successfully extracted through milking technique, preserving the fallopian tube. Mature cystic teratomas of the fallopian tube are extremely rare, with approximately 75 cases reported in the literature. When located near the fimbrial end, direct extraction with tubal preservation is feasible, particularly important for patients desiring future fertility. This case demonstrates successful conservative laparoscopic management preserving tubal function. [J Turk Ger Gynecol Assoc. 2025; 26(4): 316-8]

Keywords: Benign adnexal masses, mature cystic teratoma, teratoma in fallopian tube

Received: 13 December, 2024 **Accepted:** 04 July, 2025 **Epub:** 08.09.2025 **Publication Date:** 03 December, 2025

Mature cystic teratomas, or dermoid cysts, are cystic structures formed in the embryonic period that may originate from all three germ layers and contain different tissues (1).

Mature cystic teratomas are the most common benign ovarian tumors in young women. They are found in approximately 10-20% of women with ovarian cysts, and 10-15% are bilateral (2). Dermoid cysts with a tubal location are very rare in the literature and approximately 75 cases have been reported (3).

The patient, a 28-year-old nulligravida, presented with right groin pain. There was no known disease in her history. Ultrasonography (USG) showed a cystic formation compatible with a dermoid cyst measuring approximately 4-5 cm in the right adnexal area. Pre-operative magnetic resonance imaging (MRI) showed a tubular structure, approximately 35 mm in diameter, with high T2 signal intensity and no contrast enhancement in the vicinity of the right posterior ovary (Figure 1). Laparoscopic cyst extirpation was planned. As can be seen in Video 1, intra-operatively the uterus and both ovaries appeared normal. The left tuba fimbriae was normal but the left ovary was firmly adherent to the surrounding tissue. A 4-5 cm cyst was seen in the right tuba, which protruded from the fimbria ostium. The cyst was not connected to the right ovary and originated from the tubal cavity. The cyst was then removed by extraction from the tubal cavity and milking was performed to remove any possible residual cystic parts. Figures 2a and 2b shows that multiple mature tissues types, including cartilage, adipose tissue, nerve, and salivary gland were present [Hematoxylin and Eosin (H&E), low power 40x]. Methylene blue testing was performed during the surgical procedure to assess the functionality and patency of both fallopian tubes,

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DOI: *10.4274/jtgga.galenos.2025.2024-12-1*

Cite this article as: *Akdemir A, Mutu C, Serin G, Özdemir N. Laparoscopic management of a mature cystic teratoma in the fallopian tube. J Turk Ger Gynecol Assoc. 2025; 26(4): 316-8*

and both were found to be patent. Another advantage of this test is that it can help to expel teratoma tissue remaining in the fallopian tube. Informed consent was obtained from all patients.

The diagnosis is usually made by USG, computed tomography, or MRI. USG is the first-choice imaging modality and dermoid cysts appear as heterogeneous cystic structures with variable echogenicity (2,3).

The differential diagnosis should include hemorrhagic cysts, endometrioma, myoma, immature teratoma, and malignant ovarian cysts (3).

Dermoid cysts may often be asymptomatic but can exhibit symptoms, such as abdominal pain, pelvic pain, and a sensation of pressure. Rarely, symptoms related to hormone secretion may occur (4). The most common complication is torsion, which occurs in (3-16%), followed by cystic rupture (1-4%), malignant transformation (1-2%), and superimposed infection (1%) (5).

Dermoid cysts are most commonly found in the ovary among pelvic organs. However, they may rarely originate in the fallopian tubes. The preoperative diagnosis of this rare occurrence is challenging and so the physician is mostly faced with tubal dermoid cysts intra-operatively. However, this clinical rarity should be remembered to correctly manage the surgical procedure. Besides, patients should be informed related to this uncommon pathology.

Tubal dermoid cyst treatment is very similar to dermoid cysts of other origins, which is surgical removal. The most difficult clinical question is whether to preserve the tube or not. In the presented patient, the cyst was located in the tubal ampulla and protruded from the fimbrial ostium. Fortunately, we were able to preserve the fallopian tube, as direct removal of the cyst was possible because it was close to the fimbrial end.

Surgical treatment options for these patients include salpingectomy, salpingostomy or direct removal of the cyst if it is located appropriately. The most critical criteria for choosing between these surgical options are the patient's desire for fertility and the location of the cyst. If the patient desires fertility, direct extraction may be preferred to increase their chances of conceiving naturally.

During the preparation of this work, the authors used sider artificial intelligence (AI) for the voice-over of the video. The authors take full responsibility for the content of the publication after carefully reviewing the content and editing where necessary. The use of the AI tool primarily ensured that the video was dubbed by what sounds like a native English speaker.

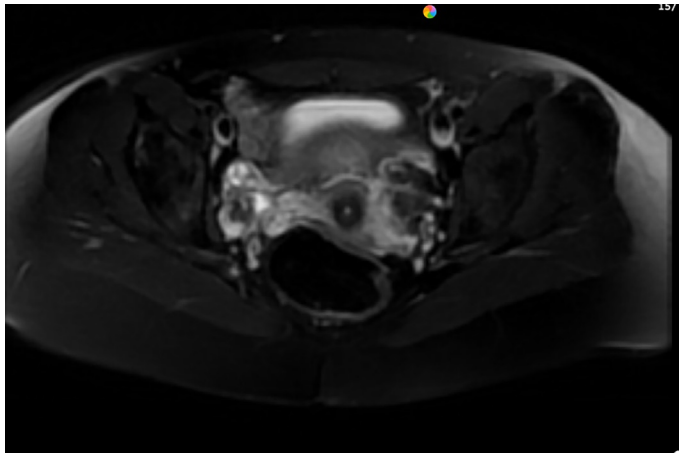

Figure 1. T2-weighted FS MRI showing a tubular structure in the right adnexal area
FS MRI: Fat-suppressed magnetic resonance imaging

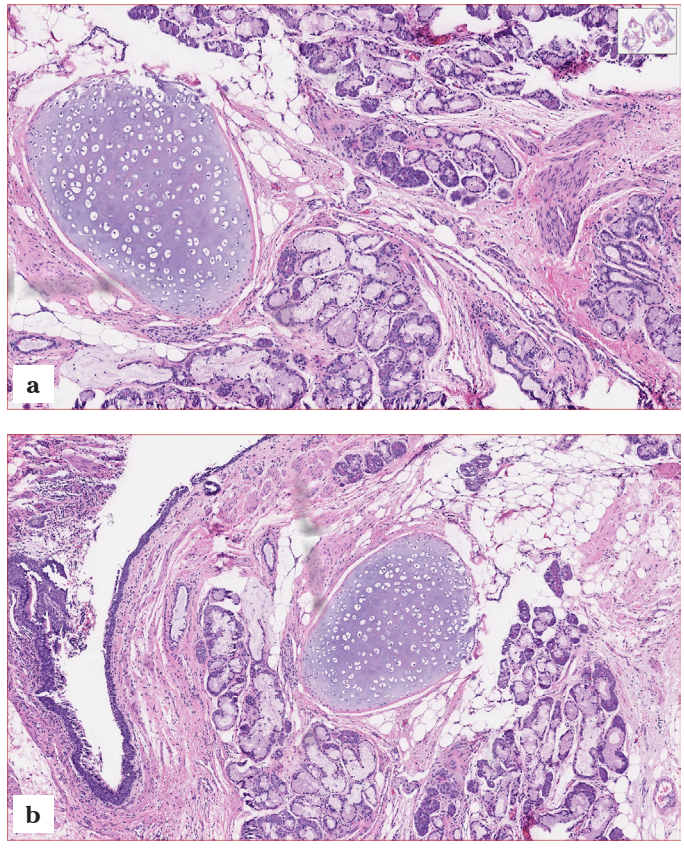

Figure 2. (a, b) Multiple mature tissue types, including cartilage, adipose tissue, nerve, and salivary gland (H&E, low power 40x). The arrow indicates the tubal epithelium
H&E: Hematoxylin and Eosin

Video 1.

http://dx.doi.org/10.4274/jtgga.galenos.2025.2024-12-1.video1

Informed Consent: *Informed consent was obtained from all patients.*

Conflict of Interest: *No conflict of interest is declared by the authors.*

Financial Disclosure: *The authors declared that this study received no financial support.*

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Neuropelviology in minimally invasive surgery: a surgical anatomy-based demonstration

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Abstract

Autonomic nerves regulate the innervation and function of the bladder, uterus, and rectum via their terminal branches. This section emphasizes the superior hypogastric plexus, hypogastric nerve, pelvic splanchnic nerves, inferior hypogastric plexus, and its terminal branches, namely the vesical, rectal, and uterine nerves. Somatic nerves traverse the pelvis, providing motor and/or sensory innervation to the pelvic floor and lower limbs. It is important to recognize the obturator nerve, genitofemoral nerve, lateral femoral cutaneous nerve, lumbosacral trunk, and femoral nerve. [J Turk Ger Gynecol Assoc. 2025; 26(4): 319-20]

Keywords: Hypogastric nerve, internal iliac artery, nerve-sparing surgery, parametrium, pelvic nerve anatomy

Received: 28 July, 2025 **Accepted:** 18 September, 2025 **Epub:** 14 October, 2025 **Publication Date:** 03 December, 2025

Introduction

Understanding the detailed anatomy of the pelvic nervous system is central to nerve-sparing surgical procedures that aim to preserve visceral functions and minimize postoperative complications. Pelvic innervation comprises both autonomic and somatic nerves, each with its distinct pathways and roles.

Autonomic innervation

Autonomic nerves control the innervation and function of the bladder, uterus, and rectum through the terminal branches. The superior hypogastric plexus, originating from the thoracolumbar splanchnic nerves, is located anterior to the aortic bifurcation at the caudal end of the inferior mesenteric artery. The superior hypogastric plexus splits into the right and left hypogastric nerves, which run down along the anterolateral side of the sacrum within the retrorectal space. At the level of the medial pararectal space, these nerves course medially while keeping their sympathetic nature. The pelvic splanchnic nerves originate from the level of the sacral 2-4 vertebrae at the dorsolateral part of the pararectal space and run obliquely toward the medial paracervix, delivering parasympathetic innervation. The hypogastric and pelvic splanchnic nerves converge to form the inferior hypogastric plexus at the caudal part of the medial pararectal space, inferior to the deep uterine vein (or vaginal vein), which contains both sympathetic and parasympathetic innervation (Figure 1).

Somatic innervation to here

Somatic nerves pass through the pelvis, providing motor and/or sensory input to the pelvic floor and lower limbs. The obturator nerve (lumbar 2-4), which innervates the adductor muscles of the thigh, courses through the lateral paravesical space and is usually embedded within the obturator lymphatic tissue. The genitofemoral nerve (lumbar 1-2) lies lateral to the external iliac artery at the superior part of the psoas major muscle. The lateral femoral cutaneous nerve (lumbar 2-3) is positioned at the superior part of the iliacus muscle, within the

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DOI: *10.4274/jtgga.galenos.2025.2025-7-10*

Cite this article as: *Selçuk İ, Arslanca T, Kayalı E, Leblebici D, Saçıntı KG, Yalçın HR. Neuropelviology in minimally invasive surgery: a surgical anatomy-based demonstration. J Turk Ger Gynecol Assoc. 2025; 26(4): 319-20*

iliopsoas fascia. The lumbosacral trunk (lumbar 4-5) is located at the laterovascular plane (medial psoas space), inferior to the obturator nerve and lateral to the internal iliac vein (Figure 2). It contributes to the formation of the sciatic nerve. Dissection of the iliopsoas fascia and medial mobilization of the psoas major muscle will reveal the femoral nerve (lumbar 2-4) between the psoas major and iliacus (Figure 3), (Video 1).

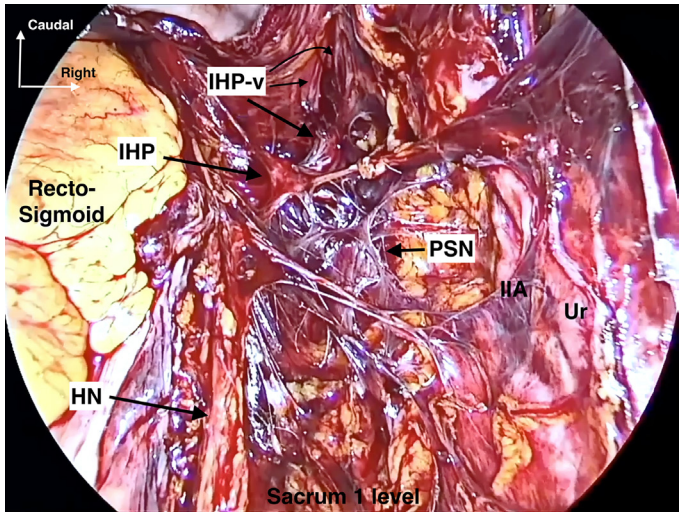

Figure 1. Inferior hypogastric plexus, formed by the contribution of the hypogastric nerve and pelvic splanchnic nerves at the caudal part of the medial pararectal space
IIA: Internal iliac artery, IHP: Inferior hypogastric plexus, IHP-v: Inferior hypogastric plexus vesical branches, HN: Hypogastric nerve, PSN: Pelvic splanchnic nerves, Ur: Ureter

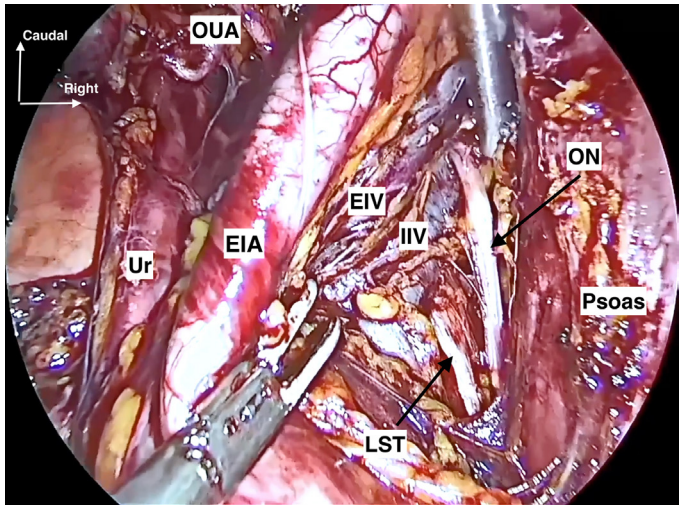

Figure 2. Lumbosacral trunk at the laterovascular plane (medial psoas space), located inferior to the obturator nerve
EIA: External iliac artery, EIV: External iliac vein, IIV: Internal iliac vein, LST: Lumbosacral trunk, ON: Obturator nerve, OUA: Obliterated umbilical artery, Ur: Ureter

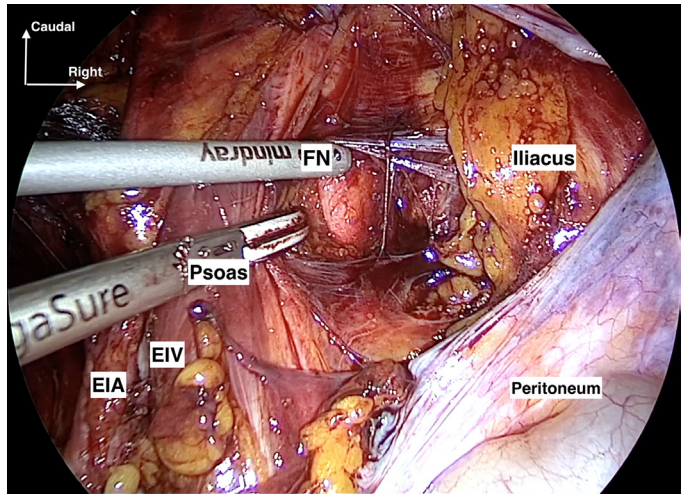

Figure 3. Femoral nerve located between the psoas major and iliacus muscles
EIA: External iliac artery, EIV: External iliac vein, FN: Femoral nerve

Recognizing these anatomical structures during minimally invasive pelvic surgery is essential for improving functional outcomes and reducing the risk of neural injury.

Video 1.

http://dx.doi.org/10.4274/jtgga.galenos.2025.2025-7-10.video1

Informed Consent: *Informed patient consent was taken for medical publications.*

Conflict of Interest: *One of the authors, Koray Görkem Saçıntı, is a member of the editorial board of the Journal of the Turkish-German Gynecological Association. However, he was not involved in any stage of the editorial decision-making process for this manuscript. The manuscript was evaluated independently by editors from other institutions. The other authors declare no conflicts of interest.*

Financial Disclosure: *The authors declared that this study received no financial support.*

2025 Referee Index

Acknowledgements for the year 2025
(Reviewers contributed at the review process in 2025)

On behalf of the office staff and the Editorial Board of the *Journal of The Turkish German Gynecological Association*, we would like to thank to all of our reviewers of the past year for their outstanding contributions. Their thorough reviews and expertise enable our journal to improve its scientific quality. We certainly look forward to their ongoing support, suggestions and recommendations as to how to continue to advance the overall quality of the *Journal of The Turkish German Gynecological Association*.

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CONGRESS CALENDER

INTERNATIONAL MEETINGS

(for detailed International Meeting please go website: https://www.emedevents.com/obstetrics-and-gynecology)

February 05-07, 2026	The First Qatar International Reproductive Medicine Meeting, Doha, Qatar
March 24-28, 2026	Society for Reproductive Investigation (SRI) 73rd Annual Scientific Meeting, San Juan, Puerto Rico
April 09-11, 2026	12th Congress of the Society of Endometriosis and Uterine Disorders (SEUD), Frankfurt, Germany
April 23-25, 2026	ASCCP 2026 Scientific Meeting, Orlando, USA
May 01-03, 2026	American College of Obstetricians and Gynecologists (ACOG) 2026 Annual Clinical and Scientific Meeting, Washington, USA
May 24-27, 2026	American Society for Reproductive Immunology (ASRI) Annual Meeting 2026, Lexington, USA
June 10-13, 2025	International Urogynecological Association (IUGA) 51st Annual Meeting, Rio De Janeiro, Brazil
June 17-29, 2026	The Society of Obstetricians and Gynecologists of Canada Annual Clinical Scientific Conference, Ottawa, Canada
July 05-08, 2025	European Society of Human Reproduction and Embryology (ESHRE) 42nd Annual Meeting, London, UK
September 06-09, 2026	36th ISUOG World Congess, Dubai, UAE
October 04-07, 2026	ESGE 35th Annual Congress, Krakow, Poland
October 24-28, 2026	American Society for Reproductive Medicine (ASRM) 82nd Annual Meeting, Baltimore, USA
November 12-14, 2026	The 34th World Congress on Controversies in Obstetrics Gynecology & Infertility (COGI), Athens, Greece
November 13-16, 2026	The 55th American Association of Gynecologic Laparoscopists (AAGL) Global Congress on Minimally Invasive Gynecologic Surgery (MIGS), Boston, USA

CONGRESS CALENDER

NATIONAL MEETINGS

(for detailed International Meeting please go website: https://www.kongreuzmani.com/2024)

February 12-15, 2026	8. Minimal İnvaziv Jinekolojik Cerrahi Kongresi, İstanbul, Türkiye
April 22-26, 2026	2. Kadın Sağlığı Dernekleri Federasyonu Kongresi, Antalya, Türkiye
May 13-17, 2026	23. Ulusal Jinekoloji ve Obstetrik Kongresi, K.K.T.C.
May 15-19, 2026	5. Uluslararası Pelvik Taban ve Kozmetik Jinekoloji Kongresi, Antalya, Türkiye
May 15-19, 2026	3. Uluslararası Jinekoloji ve Obstetrik Derneği Kongresi, Antalya, Türkiye
September 30-October 04, 2026	8. Jinekoloji ve Obstetrikte Tartışmalı Konular Kongresi, Antalya, Türkiye

JTGGA CME/CPD CREDITING

Answer form for the article titled “Autoamputation of the ovary after missed diagnosis of ovarian dermoid cyst torsion: a case report and review of literature” within the scope of CME/CPD

1. What is the incidence of ovarian torsion in patients who underwent surgery for adnexal mass?

a. 1-3%
b. 2-5%
c. 2-15%
d. 5-7%
e. 10-15%

2. Which of the following is not a tissue change caused by ovarian torsion?

a. Tissue edema resulting from venous block
b. Atrophy
c. Necrosis
d. Autoamputation
e. Bleeding

3, Which of the following is incorrect regarding the diagnosis of ovarian torsion?

a. Doppler flow may be present.
b. Doppler flow may be decreased.
c. Doppler flow may be increased.
d. Doppler flow may be present.
e. A normal Doppler flow does not exclude torsion.

4. Which statement is incorrect regarding chronic ovarian torsion?

a. It can occur at any age.
b. It can cause chronic pelvic pain.
c. The tumor diameter can range from 4 to 10 cm.
d. It is seen equally on the right and left sides.
e. Symptoms are acute.

5. Where is the most common localization of autoamputated ovary?

a. Pouch of Douglas
b. Peritoneal cavity
c. Vesicouterin space
d. Pelvic side wall
e. Right subhepatic region

6. Which is false regarding ovarian torsion?

a. Dermoid cysts are the most common cause.
b. Ultrasound is sufficient for diagnosis in most cases.
c. Dermoid cysts are bilateral in 30% of cases.
d. Intra-abdominal adhesions are the most common cause.
e. The surgeon should suspect autoamputation in the event of the unexpected intraoperative finding of the absence of an ovary.

JTGGA CME/CPD CREDITING

Answer form for the article titled “Autoamputation of the ovary after missed diagnosis of ovarian dermoid cyst torsion: a case report and review of literature” within the scope of CME/CPD

1st Question	A	B	C	D

2nd Question	A	B	C	D

3rd Question	A	B	C	D

4th Question	A	B	C	D

5th Question	A	B	C	D

6th Question	A	B	C	D

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