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A non-randomized study of sexual health education on the sexual function of primigravid women

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Abstract

Background Sexual function is a particularly important aspect of pregnant women's lives that can affect mental health and family cohesion.

Aim This study aimed to determine the effect of sexual health education on sexual function in primigravida women.

Methods In a non-randomized study, primigravida women were divided into an intervention group ($n=43$) and a control group ($n=43$). The intervention group participated in six 60-minute sex education sessions, while the control group received no intervention. Both groups were monitored for 8 weeks. Sexual function was evaluated using the Female Sexual Function Index (FSFI) questionnaire before the intervention, at 4 weeks, and at 8 weeks post-intervention.

Results Ultimately, data from 80 patients were analyzed. The two groups did not differ significantly in terms of demographic and pre-intervention clinical characteristics. At the 4-week mark post-intervention, there was no statistically significant difference observed in the average score of the overall index of sexual performance between the pregnant women in the two groups. However, upon comparing sexual function before intervention and at 4 and 8 weeks after intervention, significant improvements were noted in desire, arousal, lubrication, orgasm, satisfaction, and pain subscale scores within the intervention group ($p<0.001$). Conversely, in the control group, desire (psychological interest or motivation), arousal (physiological and emotional readiness), lubrication, and satisfaction subscale scores decreased, while the pain subscale score slightly increased between pre-intervention and the 8-week follow-up. The mean difference in the overall FSFI score before and 8 weeks after the intervention was notably higher in the intervention group (7.37 points) compared to the control group (-0.87 points ($p<0.001$).

Conclusion The findings of this study highlight the transformative impact of sexual health education during pregnancy. By dispelling misconceptions and enriching knowledge, such interventions have the potential to enhance

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the sexual function of pregnant women significantly. These results underscore the effectiveness of integrating sexual health education into routine prenatal care, emphasizing its pivotal role in promoting the overall well-being of primiparous pregnant women.

Trial registration This study retrospectively registered with the Iranian Clinical of Trials Registry with IRCT registration number IRCT20090810002324N20 (08-04-2025) (https://irct.behdasht.gov.ir/trial/82382).

Keywords Sexual function, Sexual health education, Pregnant women

Introduction

Sexual behavior, a pivotal aspect of human mental health, undergoes notable changes during pregnancy [1]. These changes often manifest as decreased sexual function, encompassing reduced sexual desire, arousal, lubrication, orgasm, satisfaction, and increased pain. Such changes can result from physiological factors, including hormonal shifts and physical discomfort, as well as psychological factors, such as anxiety and depression [2, 3]. Furthermore, alterations in a pregnant woman's appearance, such as the development of chloasma and striae gravidarum, can influence her perception of sexual function [4]. Decreased sexual function is prevalent during pregnancy and may exacerbate as gestation progresses [4, 5], discontinuation of sexual activity during this period often stems from feelings of guilt or fear of harming the fetus [5, 6]. Studies show that approximately 93% of pregnant women experience some form of sexual dysfunction, with one-third completely ceasing sexual intimacy. These patterns are shaped by a combination of cultural norms, insufficient knowledge, and heightened anxiety [7].

The complications arising from sexual dysfunction during pregnancy extend beyond individual well-being, potentially impacting marital relationships and family cohesion. Discontinuation of sexual activity may increase the risk of extramarital affairs and emotional distancing, jeopardizing family stability [8]. Furthermore, sexual dysfunction can exacerbate psychological distress and negatively affect maternal-fetal bonding, emphasizing the need for proactive management [9].

Management of sexual dysfunction during pregnancy often involves education and counseling, aimed at improving knowledge, dispelling myths, and promoting healthy attitudes toward sexual activity. While sex education has shown promise in changing perceptions, its effectiveness in improving sexual function remains inconclusive. For example, Bahadoran et al. (2015) reported that sexual health education prevented sexual dysfunction in pregnant women [10], while Wannakosit (2010) found no significant change in sexual function following similar interventions [11]. Moreover, Gazafroodi et al. (2012) observed that primiparous women demonstrated better sexual function scores compared to multiparous women, indicating the role of parity in influencing outcomes [12].

Sexual health during pregnancy and postpartum is critical to fostering family and community well-being [13]. With normal sexual function observed in only 20.8% of Iranian pregnant women [14], a figure that likely decreases further during pregnancy [15], there are clear gaps in awareness and access to effective interventions. Previous research highlights the value of sex education in shaping attitudes [16, 17], yet persistent misconceptions and conflicting findings point to the need for further studies to establish its role in improving sexual function [18–22]. This study aims to evaluate the impact of sexual health education on sexual function in primigravida women, addressing an important gap in existing research. By focusing on this population, the study seeks to provide actionable insights to guide interventions that promote sexual health and enhance well-being during pregnancy.

Methods

Study design and patients

A prospective non-randomized study was conducted from March 2019 to December 2020. Primiparous pregnant women who fulfilled the following inclusion criteria were eligible for the study: (1) women of 18 to 45 years old, (2) gestational age of 14–28 weeks, (3) intended and singleton pregnancy, (4) low-risk pregnancy [23] (based on a patient's medical record), (5) stability in marital relationships (based on a patient's demographic data), (6) no history or occurrence of obstetric complications (such as bleeding, spotting, ectopic pregnancy, twins, etc.) in recent pregnancy, (7) no chronic medical conditions, (8) no psychiatric disorders recorded in the medical history or statements of the participant, and (9) no addiction to drugs or psychotropic medications. Women who did not engage in sexual intercourse during the follow-up period, were unwilling to continue their participation or had complications during pregnancy were excluded from the study (Fig. 1).

In the present study, the target population comprised primiparous pregnant women who were referred to the urban-rural health center of Pole Dokhtar city, Iran, for prenatal care. Recruitment was conducted through a referral process, with eligible participants identified using the Integrated Health Record System (SIB) [24] an electronic data registry that records information on all pregnant women in Iran seeking prenatal care. Initially,

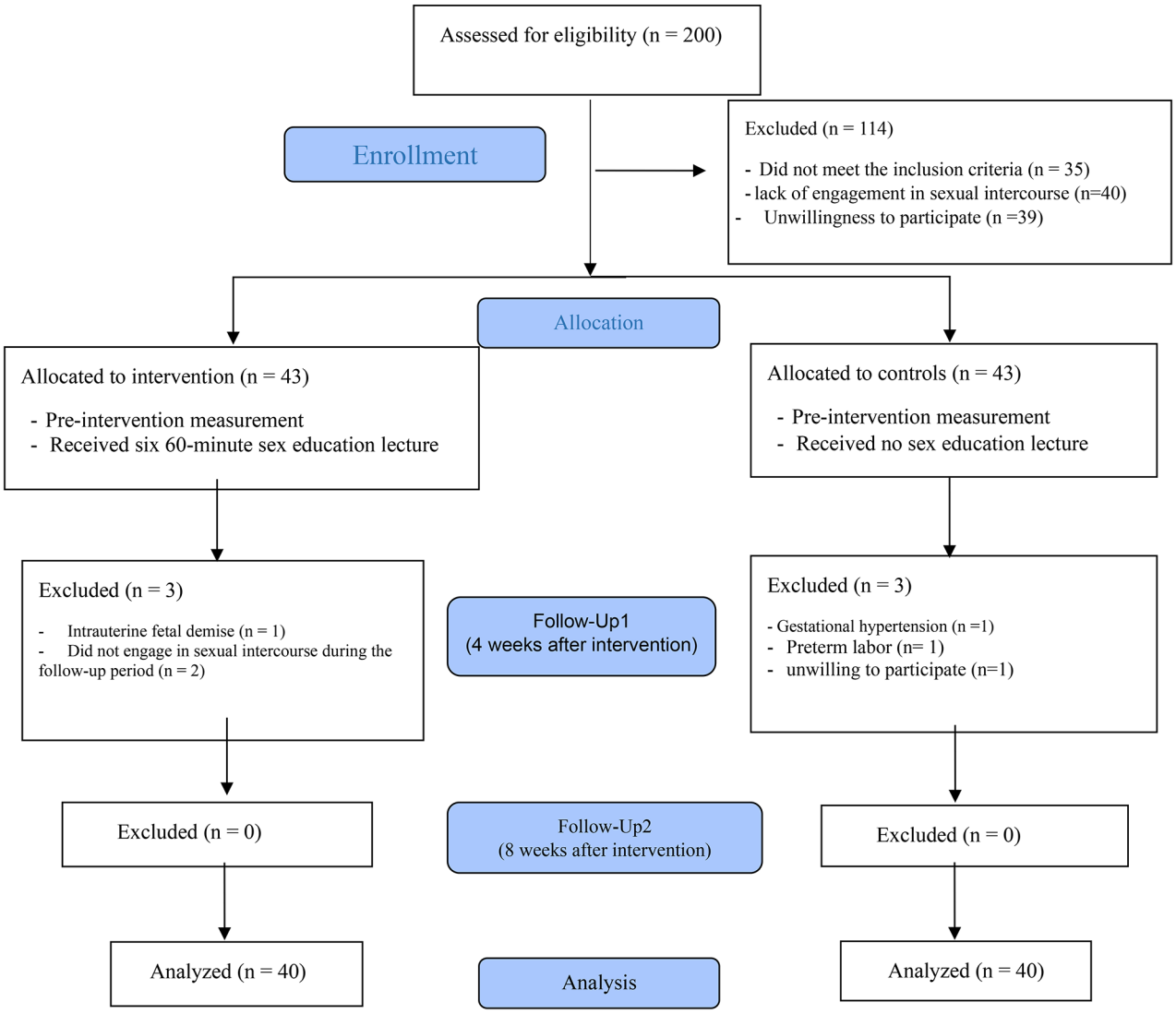

Fig. 1 Flow diagram of study

a list of the study population was generated from the SIB, including all primiparous pregnant women who met the inclusion criteria and were receiving prenatal care at the health center. A systematic sampling plan was implemented by selecting every fifth eligible woman from the list for study participation.

Intervention

The women were assigned either to the intervention group ($n=43$) or control group ($n=43$) based on their desire. The intervention group received a comprehensive program comprising six 60-minute sessions, conducted in small groups of 3–5 individuals at the conference hall of the health center over two consecutive weeks. These sessions addressed various topics, such as the anatomy and physiology of the female reproductive system, changes in the sexual cycle during pregnancy, important aspects of female sexual stimulation, common misconceptions about sexual performance, appropriate sexual positions during pregnancy, the importance of maintaining optimal sexual function throughout pregnancy, and detailed explanations about sexual dysfunction. The content of the sex education intervention was curated using materials from the textbooks " The sex education debates " by Nancy Kendall [25]. Subsequently, the content was reviewed by three professors with expertise in reproductive health from the Faculty of Nursing and Midwifery at Iran University of Medical Sciences, and necessary adjustments were made accordingly. The educational content was delivered through lectures, interactive question-and-answer sessions, group discussions facilitated by PowerPoint presentations, distribution of brochures, and provision of booklets. During the study period, the control group did not undergo any sex education

Table 1 Socio-demographic data in the two groups.

Characteristics	Intervention group (*n*=40)	Control group (*n*=40)	*P*-value
Age (year)	25.63±5.4	27.83±6.26	0.113[a]
Husband age (year)	30.62±4.44	32.50±5.24	0.142 [a]
Gestational age (weeks)	22.53±3.64	23.18±3.95	0.415 [a]
Level of education			
< High school	4(10)	3(7.5)	0.796 [b]
High school	20(50)	18(45)	
University	16 (4)	19(47.5)	
Economic status			
High	4(10)	9(22.5)	0.237 [b]
Middle	29(72.5)	23(57.6)	
Low	7(17.5)	6(18.2)	
Occupational status			
Housekeeper	38(95)	32(80)	0.087[b]
Employed	2(5)	8(20)	

Data presented as mean ± Standard Deviation or number (percentage)

[a] Student's t-test

b: Chi-square ($\chi 2$)

interventions; however, they received standard prenatal care as per routine practice.

Objective

The study aimed to assess effect of a sexual health education program on the sexual function of primigravid women.

Outcomes, measurements, and follow up

Before the intervention, we recorded general parameters such as the age, level of education, and employment status of the participants and their spouses, as well as their economic status, duration of marriage, and gestational age. Gestational age was calculated based on the date of the first day of the last menstrual period. The sexual function of women was assessed using the Female Sexual Function Index (FSFI). The FSFI is a reliable and validated tool designed to evaluate women's sexual function across six domains: sexual desire (2 questions), sexual arousal (4 questions), lubrication (4 questions), orgasm (3 questions), satisfaction (3 questions), and pain (3 questions). The total score is calculated based on the responses to these questions, ranging from a minimum of 2 to a maximum of 36 [26].

The FSF was developed by Rosen and his colleagues [27] to assess women's sexual performance. Initially validated in a group of women with sexual arousal disorder, it has since been widely utilized internationally with confirmed reliability. In Iran, FSFI was validated in 2007 [28]. In the present study, to assess the reliability of the sexual function tool, the instrument was administered to 15 women from the research sample in two stages (initial stage and again 2 weeks after completing the initial stage). The results obtained from comparing these two stages demonstrated the reliability of the tool in the intended sample in this study (Cronbach's alpha 0.88). FSFI questionnaire was completed by the participants of both educational intervention and control group in three stages: before the intervention, 4 and 8 weeks after the last training session.

Sample size

Based on the data reported by Rostamkhhani et al., the sample size was determined to be a minimum of 35 patients in each group, assuming a standard deviation of 5 in the intervention group and 4 in the control group [29]. To compensate for potential loss to follow-up, 20% was added. Thus, the final estimated sample size was 43 patients in each group. The study power was set at 80%, and the two-sided alpha error was 0.05.

Assignment method and blinding

Initially, by accessing the SIB system, we generated a list of pregnant women between 14 and 28 weeks of gestation. We reviewed the summaries of their medical conditions, pregnancy history, and the types of medications they were using. To ensure data accuracy, we conducted follow-up phone calls with each pregnant woman to verify the necessary information. After preparing the final list of individuals meeting the study's inclusion criteria, we recorded their details and contact numbers. Each participant was assigned a unique three-digit code ranging from 001 to 200. Out of the 200 eligible primiparous pregnant women, we conducted sampling using a number table. Starting from a random point in the table, we continued the selection process until we had 86 codes for study participation. A follow-up call was made to each selected pregnant woman to explain the study and obtain their consent. The final list of participants was then divided into intervention and control groups, based on the willingness of the women to participate in either the intervention or control group. In this study, the principal investigator and the statistician were blinded to the allocation of individuals into groups.

Statistics analysis

All data were analyzed using SPSS software version 27 (SPSS Inc., Chicago, IL, USA). For qualitative variables, frequencies (percentages) were used for description, and group comparisons were conducted using Chi-square analysis followed by Fisher's exact test when appropriate. The normal distribution of quantitative data was assessed using the one-sample Kolmogorov-Smirnov test, and all data were found to follow a normal distribution pattern. Quantitative variables were presented as mean ± standard deviation (SD) and compared between groups using Student's t-test. To assess the intervention effects on FSFI, repeated measures analysis of variance (rANOVA) was

Table 2 Comparison of sexual function before intervention, 4, and 8 weeks after intervention in the two groups

Sexual function	Intervention group ($n=40$)				Control group ($n=40$)				
	Baseline	4 weeks	8 weeks	P value[a]	Baseline	4 weeks	8 weeks	P_value[b]	P_value[c]
	Mean ± SD				Mean ± SD				
Desire	3.02 ± 1.22	4.39 ± 0.83	4.32 ± 1.08	< 0.001	3.64 ± 0.78	3.87 ± 0.86	3.36 ± 0.85	0.445	< 0.001
Arousal	2.31 ± 1.64	4.02 ± 1.61	4.02 ± 1.46	< 0.001	3.03 ± 1.84	3.44 ± 1.59	2.76 ± 1.68	0.07	< 0.001
Lubrication	2.95 ± 1.93	4.17 ± 0.1.62	4.46 ± 1.56	< 0.001	3.57 ± 2.03	3.87 ± 1.64	2.85 ± 1.58	0.71	<0.001
Orgasm	2.70 ± 1.85	4.06 ± 1.60	4.26 ± 1.53	< 0.001	3.43 ± 1.95	3.91 ± 1.47	3.11 ± 1.62	0.63	< 0.001
Satisfaction	3.41 ± 1.32	4.40 ± 1.37	4.72 ± 1.12	< 0.001	4.23 ± 1.39	4.36 ± 1.09	3.52 ± 1.12	0,91	< 0.001
Pain	3.75 ± 2.37	4.78 ± 1.87	4.74 ± 1.62	< 0.001	3.86 ± 2.27	4.60 ± 1.76	4.29 ± 1.93	0.52	< 0.001
Total Female Sexual Function Index Mean ± SD	19.16 ± 9.04	25.83 ± 7.79	26.53 ± 7.03	< 0.001	21.78 ± 9.43	24.07 ± 7.37	20.91 ± 7.02	0.31	< 0.001

Abbreviation: MD; mean differences, SD; standard deviation

[a] Comparison of before, 4, and 8 weeks after intervention in intervention group by repeated measures analysis of variance (rANOVA)

[b] Comparison of before, 4, and 4 weeks after intervention in control group by rANOVA

[c]: Comparison of total female sexual function index in intervention and control groups by rANOVA

performed with time (baseline, 4 weeks, and 8 weeks) as the within-subjects factor and group (intervention/control) as the between-subjects factor. The significance level was set at $P<0.05$.

Results

In total, 200 primiparous pregnant women were assessed for eligibility, with 86 eventually included in the study (43 in each group). Of these eligible participants, six were excluded from both the intervention and control groups due to various reasons, such as not engaging in sexual intercourse during the follow-up period, being unwilling to continue their participation, or experiencing complications during pregnancy, including intrauterine fetal demise, preterm labor, and preeclampsia (Fig. 1). The two groups did not significantly differ in terms of age, level of education, and employment status of the participants and their spouses. Additionally, there were no significant differences in their economic status, duration of marriage, and gestational age. Demographic and pre-intervention clinical characteristics of participants are summarized in Table 1.

At the 4-week mark post-intervention, the results indicated that there was no significant difference in the average score of the overall index of sexual performance between pregnant women in the two groups. The study compared women's sexual function before intervention, at 4 weeks, and at 8 weeks after intervention in both groups. The rANOVA revealed significant improvements ($p<0.001$) in desire, arousal, lubrication, orgasm, satisfaction, and pain subscale scores in the intervention group between pre-intervention 4, and 8 weeks post-intervention. Conversely, in the control group, desire, arousal, lubrication, and satisfaction subscale scores decreased, while the pain subscale score slightly increased between pre-intervention and the 8-week follow-up (Table 2).

The mean difference in the overall FSFI score before and 8 weeks after the intervention was 7.37 points in the intervention group and − 0.87 points in the control group. The rANOVA revealed that the difference was significant between the groups ($p<0.001$). Changes in the overall FSFI score before the intervention, at 4 weeks, and at 8 weeks follow-up after the intervention in the two groups are summarized in Table 2.

Discussion

This study aimed to determine the effect of sexual health education on sexual function in primigravida women. In a study with 86 primigravida women, divided into intervention and control groups, significant improvements were observed in desire, arousal, lubrication, orgasm, satisfaction, and pain scores in the intervention group compared to controls, four weeks post-intervention. The mean difference in the overall FSFI score before and 8 weeks after the intervention was 7.37 points in the intervention group and − 0.87 points in the control group, with a significant difference between the groups ($p<0.001$). These findings indicate the effectiveness of the sexual health education program in enhancing sexual function during pregnancy.

The studies conducted by Heidari et al. and Afshar et al. highlight the critical role of early intervention in addressing sexual health concerns during pregnancy [30, 31]. Heidari et al. demonstrated that a carefully designed sexual training package administered during the first trimester significantly improved sexual function throughout pregnancy [30]. Similarly, Afshar et al.'s study revealed notable enhancements in sexual function just four weeks after two 60-minute training sessions during the first trimester, emphasizing the potential of early interventions to positively impact pregnant women's sexual well-being [31]. The observed significant effect of

the training in both studies may be attributed to assessing participants' sexual function during the second trimester of pregnancy. This period typically sees a stabilization of emotions and feelings, along with an improvement in symptoms experienced during the first trimester. Increased energy and reduced physical discomfort during this time likely contribute to heightened sexual desire. Additionally, concerns about miscarriage may diminish, and improved blood supply to pelvic organs during the second trimester could enhance overall sexual function compared to the first trimester. These factors collectively suggest that the timing of the assessment during pregnancy plays a crucial role in understanding the impact of interventions on sexual well-being [32, 33].

Bahadoran's research underscored the effectiveness of a 120-minute training session, employing both face-to-face and group methods, in improving the sexual function index among pregnant women beyond 20 weeks gestational age [10]. Additionally, another study reported positive outcomes in sexual function following four sessions of 120 min focusing on sexual issues and kegel exercises in pregnant women between 6 and 28 weeks gestational age, emphasizing tailored educational interventions' value in addressing sexual health concerns during pregnancy [34].

Hashem et al.'s investigation explored the impact of training on sexual function among 240 women with a gestational age of at least 8 weeks. Although specific trimester distributions weren't detailed, the results indicated significant improvements in sexual knowledge and overall function, highlighting the effectiveness of sexual health education in pregnant women [35].

Sexual health education plays a pivotal role in informing pregnant women about the natural changes in sexual function during pregnancy, alleviating anxiety, and improving overall sexual performance [36]. While there's less discussion on education's effect on sexual function components, studies suggest a decrease in libido during pregnancy. Nonetheless, interventions have shown promise in increasing sexual desire, addressing misconceptions, and enhancing overall sexual function [29, 37].

A lack of sexual health education during pregnancy significantly impacts sexual function, particularly in the third trimester [38]. Misconceptions and lack of knowledge contribute to decreased sexual activity and increased anxiety among pregnant women, necessitating education on appropriate sexual activity during routine pregnancy care [39, 40].

Sexual health education is crucial in informing pregnant women about the natural changes during pregnancy, alleviating anxiety, and enhancing sexual performance [41]. However, sexual health remains neglected in many developing countries due to barriers such as limited access to information and services, women's lack of authority, and cultural taboos, underscoring the urgent need for greater attention in addressing these issues [29].

Generalizability

The generalizability (external validity) of this non-randomized trial is influenced by several factors. The study population, consisting of primigravid women from the urban-rural health center in Pole Dokhtar city, Iran, may limit the applicability of the findings to populations with different demographics or socio-economic backgrounds. The intervention, specifically designed as sex education for this group, might not directly translate to women in other cultural or healthcare settings. Additionally, it is possible that some participants had received prior sexual education, which could influence the outcomes and limit the ability to isolate the intervention's effect. The relatively short follow-up period of 8 weeks may also restrict the study's ability to capture long-term effects on sexual function. Additionally, the non-randomized design, driven by logistical constraints during the COVID-19 pandemic, raises concerns about potential selection bias.

Future research should address these limitations by involving diverse populations, using randomized controlled designs, extending follow-up durations, and considering external factors to improve the broader applicability of the findings.

Conclusion

In summary, our study investigated the impact of sexual health education on sexual function in primiparous pregnant women. While no significant difference was found in overall sexual performance at the 4-week mark post-intervention, notable improvements were observed in desire, arousal, lubrication, orgasm, satisfaction, and pain subscale scores in the intervention group over the 8-week follow-up period compared to the control group. The mean difference in overall FSFI score before and after the intervention was significant, highlighting the potential role of sexual health education in enhancing sexual function during pregnancy. These findings emphasize the importance of integrating such interventions into routine prenatal care. However, further research with larger sample sizes and longer follow-up periods is needed to confirm and expand upon these results.

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Author contributions

A.A. and M.K. participated in the study's design, acquisition, and analysis of the data. E.G and L.A. participated in the study's conceptualization and sampling. F.S. participated in the analysis of data. L.A, H.S., and I.A. participated in reviewing and editing the manuscript. All authors read and approved the final version of the submitted manuscript.

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Data availability
The data supporting this study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
The study protocol was in accordance with the declaration of Helsinki and was approved by the Research Ethics Committee of The IUMS, Tehran, Iran (ethics code: 1398.734). Informed written consent was obtained from all subjects before the start of the study and they were fully informed about the study objectives and methodology. Moreover, the participants ensured the confidentiality of their information, and they were allowed to leave the study at any time.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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