

The Effect of Sex Education on the Sexual Function of Women in the First Half of Pregnancy: A Randomized Controlled Trial

Malihe Afshar¹, Sakineh Mohammad-Alizadeh-Charandabi^{2*}, Effat-Sadat Mergheti-Khoei³, Parisa Yavarikia²,

¹Students' Research Committee, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

²Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz University of Medical Sciences, Tabriz, Iran

³Department of Health Promotion, Faculty of Health, Tehran University of Medical Sciences, Tehran, Iran

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ABSTRACT

Introduction: There is lack of information on couple's sexual relation during pregnancy and also the lack of a national written training protocol in this regard in Iran. State authorities want to develop and implement such a protocol. Therefore, this study aimed to determine the effectiveness of a sex education package on the sexual function of pregnant women. **Methods:** 88 women in their 8 to 14 weeks of pregnancy were randomly allocated into two groups of intervention and control. In the intervention group a midwife carried out sex education in two 60 minutes lecture sessions and group discussions for the participants. Moreover, educational booklets were distributed at the end of the first session and couple's questions were answered by telephone. In the control group women were taught nutritional education with the same procedure. Sexual function was evaluated using the female sexual function index (FSFI) before and four weeks after the education. Paired t-test, student's t-test and chi square were used to analyze the data. **Results:** There were no significant differences among the groups in terms of their baseline characteristics, including mean sexual function scores before the education. After the education the mean of the total score of sexual function was significantly higher in the intervention group compared with the control group [mean difference 7.0 (95% CI 4.1, 9.9)]. Such a significant difference also existed in all the six domains of sexual function, i.e. desire, arousal, lubrication, orgasm, satisfaction and pain ($p < 0.001$). **Conclusion:** Providing such sexual education during routine prenatal care may improve couples' sexual health during pregnancy.

Introduction

The biological and psychological changes, which occur during pregnancy, may directly affect the sexual function.¹ Changes in sexual behavior, unawareness and couple sexual expectations during this period are usually problematic and have been commonly reported.²⁻⁴ Sexual problems may greatly influence the quality of life of women, because decrease in sexual function can have a negative effect on self-esteem and

interpersonal relationships and can even result in the separation of couples.⁵

In the clinical guide to the assessment of women's health, sexual dysfunction is defined as the inability to participate in the desired sexual intercourse. These dysfunctions may be a sign of biological or psychological problems, or a combination of these factors. According to this clinical guide, any type of stress, emotional disorders or the unawareness of physiological sexual functions could have negative impact on the sexual function.⁶ Lack

* **Corresponding Author:** Sakineh Mohammad-Alizadeh (PhD), E-mail: alizades@tbzmed.ac.ir

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of awareness about the changes resulting from pregnancy can have a negative effect on sexual responses of the couples. It can also cause a reduction in or even cessation of intercourse, increase anxiety, lower self-esteem and decrease emotional connection and subsequently result in a mental health disorder of the family.^{7,8} In some studies there have also been reports about men having extramarital relationships for the first time during their wife's pregnancy.^{9,10}

Studies have shown that most couples do not have sufficient information about sexual relationship during pregnancy, therefore, the importance of sex education and counseling during pregnancy has always been proposed.¹¹⁻¹³ Sexual awareness can decrease couples' anxiety which in turn may help improve the tension resulting from sexual issues during pregnancy and reduce the occurrence of sexual problems.¹⁴ It can also result in more emotional closeness and better understanding between couple, new pleasant experiences and the women's attraction to men.

Most of the studies conducted in Iran and other countries have only given the description of sexual issues during pregnancy and only a limited number of interventional studies have been conducted. In the databases we were able to find only one interventional study on the impact of a one session education for pregnant women on sexual behavior conducted in Thailand.¹⁵

On the other hand, the lack of educational protocols in regards to sexual problems during pregnancy in the national design of integrated care for mothers in health centers, and the interest of authorities towards adding this educational protocol to the care programs has influenced this matter. Therefore, we tried to determine the sexual education needs of pregnant women by reviewing the literature and performing a pre-test and to develop an educational protocol to answer these needs based on the latest scientific resources, and to examine the effectiveness of this educational protocol through an interventional package.

The aim of this study is to evaluate the effectiveness of a sex education package (developed by the research team based on the results of need assessment) on the total score of sexual function in pregnant women as a primary outcome. The secondary outcomes of the study were to examine its effect on each of the six dimensions of sexual function (desire, arousal, orgasm, satisfaction, pain and lubrication) and to study its effect on the type of relationships and positions during sexual intercourse.

Materials and methods

This study is a multicenter randomized trial with two parallel arms. Recruitment was done from 23/07/2011 till 22/09/2011 in four public health centers (Valiaasr, Shohaday Fardis, Tabatabaei and Meshkin Dasht) located in Karaj, Iran, that covered the highest number of pregnant women (around 200 pregnant women in each center). The sample size was calculated to be 38 people. It was calculated using STATA software version 9.2, by considering $m_1=24.3$, $SD_1=6.2$ and $SD_2=8.6$ based on the total score of the sexual function index (primary outcome) of a study conducted in Tehran, Iran¹⁶, considering at least 15% change in the mean score due to the intervention ($m_2 = 29.5$), the significant level of 0.05, and statistical power of 0.80. Considering the probability of 15% loss of the follow-up, 44 people were recruited in each group.

Data collection tool consisted of questions about demographical and reproductive history, the standard questionnaire of the female sexual function index (FSFI) and some questions about sexual relationship during pregnancy.

The FSFI is a validated and reliable questionnaire for evaluating the sexual function of women during the past four weeks. This questionnaire consists of 19 questions covering the six different domains of the sexual functions; desire, arousal, lubrication, orgasm, satisfaction and pain. The scores of each domain are calculated through adding the scores of the individual items that comprise the

domain, and multiplying the sum by the domain factor (sexual desire 0.6, sexual arousal and lubrication 0.3, orgasm, satisfaction and pain 0.4). The sexual desire score ranges from 1.2 to 6 and the rest of the domains score from 0 to 6. The FSFI total score is determined by the sum of the six domains and can vary from 2 to 36. Higher scores show better sexual function.^{17,18} The reliability of the women sexual function questionnaire has been approved by Mohammadi et al.¹⁹ in Tehran, Iran, and Rosen et al.¹⁷ in other countries.

The questions about the sexual relation during pregnancy were 8 questions about the way of sexual intercourse (different kinds of sexual relations during pregnancy and the sexual position) during the past four weeks. Content validity method was used for the questionnaire's validity. The opinion of ten of the faculty members of Tabriz University of Medical Sciences that included six MSc in midwifery, two PhD in reproductive health, one M.A. in counseling, and a specialist in sexual health promotion was applied. Questionnaire reliability was evaluated through test re-test, which is done in two stages, with a two week interval. The Pearson's correlation coefficient was used for the functional domains and Kappa coefficient for the different kinds of sexual relations and in all the cases the correlation coefficient was more than 0.85.

22 eligible women were selected from each of the four selected centers (11 for each group). The inclusion criteria were; being in the 8-14th week of pregnancy (based on the first day of the last menstrual cycle (LMP) or ultrasound result) living permanently with a spouse, and being literate. Women who had any medical sexual intercourse contradictions (abortion threat, inevitable abortion, habitual abortion history or inferior cervical, infertility history, multiple pregnancy, preterm delivery history or premature rupture of membranes) or had a history of any untreated sexual problem, addiction, drug intake that affects sexual responses, physical, mental or medical disease known by the

patients, or the experience of an unpleasant event during the past three months were not recruited. Women who had a miscarriage during the study were excluded from the research. The recruitment was performed through the attendance of a researcher in the health centers by inviting the eligible clients in person or through inviting the pregnant women, whom their names and contact details were registered in the health centers' offices, by telephone.

After completing a written consent, all participants completed a coded anonymous pre-test questionnaire and placed it in a sealed box. Then, their address and contact details were collected for the follow ups.

In each health center subjects were randomly allocated to two groups of intervention and control with allocation ratio of 1:1 using permuted block randomization with block size of 4 and 6. Opaque sealed and sequentially numbered envelopes were used for allocation concealment. The envelopes were opened after the completion of the pre-test.

In the intervention group the sex education classes were held in two sessions once a week for two consecutive weeks in the related health centers and were scheduled according to the participants' desire. The number of participants in each session was a minimum of five and maximum of eleven people.

The education package was designed in a way that could be carried out in all the health centers around the country. The content for the educational sessions were prepared from four sources: the results from previous studies on the issues and needs of sex education for pregnant women, the assessment of the educational needs of participating pregnant women with the use of open and closed questions in the pre-test stage, information available in scientific texts and interviews with specialists of sexology.

The educational classes were conducted through lectures, photos, a model of the human body. Every session lasted 60 to 90 minutes, and the last 30 minutes was assigned to questions and answers. The sex education

content in the first session covered; sexual physiology consisting of getting familiar with sexual organs and sexual erogenous zones, and understanding sexual responses. The second session included; the impact of pregnancy on sexual behavior, sexual intercourse techniques during pregnancy, sexual health and answering questions about common concerns related to sex. At the end of the first session the educational booklet containing the contents taught during the classes were handed out to the pregnant women and they were asked to study the contents with their spouse and ask their questions in the next session. The researcher provided the couples with her contact number in order to answer their questions.

In order to control the possible confounding effect of increasing the subjects' contact with the health care staff on study outcomes, the same time and number of sessions were given to the control group, but with another content; i.e. nutrition during pregnancy.

Four weeks after the last educational session, both group's participants were contacted and asked to complete the post-test questionnaire at the related health care centers. The pregnant women would complete this questionnaire and place it in a sealed box.

The data for the quantitative and qualitative variables were reported respectively as mean (standard deviation) and frequency (percent). The normal distribution of data was checked through the Kolmogorov-Smirnov test. Paired t-test was used to compare the mean score of sexual function before and after the intervention within the groups, and the independent t-test was used to compare the mean score between the groups. Chi-square test was used to compare the frequencies between the groups. The data were analyzed with SPSS software version 13. Values of $p < 0.05$ were considered significant.

In order to perform this study a license (with the code 915) was obtained from the ethics committee of Tabriz University of Medical Sciences.

Results

88 pregnant women that were in their first trimester of pregnancy answered the baseline questionnaire in this trial (44 in each group). However, five participants were excluded from the study due to miscarriage (3 from the intervention group and 2 from the control group) (Figure 1).

Demographic and reproductive characteristics were similar in both intervention and control groups. The age average was 26 years in both groups and about half of the women were nulliparous. In both groups about half of the participants said that they had got no information regarding sexual relationships during pregnancy from any sources (Table 1).

The intergroup comparison regarding the scores of all the domains of sexual function and the total score showed that there was no significant difference in the control group before and after the education. But, there was a significant increase in the total score and scores of all sexual function domains in the intervention group after the education compared with before the education.

The intergroup comparison before the education showed no significant differences in terms of the total function score and the scores of its domains. However after the education there was a significant increase in the total score and the scores of its six domains in the group that had received sex education in comparison with the control group. Mean of change in the total score of the sexual function after the education was also significantly higher in the intervention group compared with control group (4.0 vs. -0.6, $p=0.02$) (Table 2).

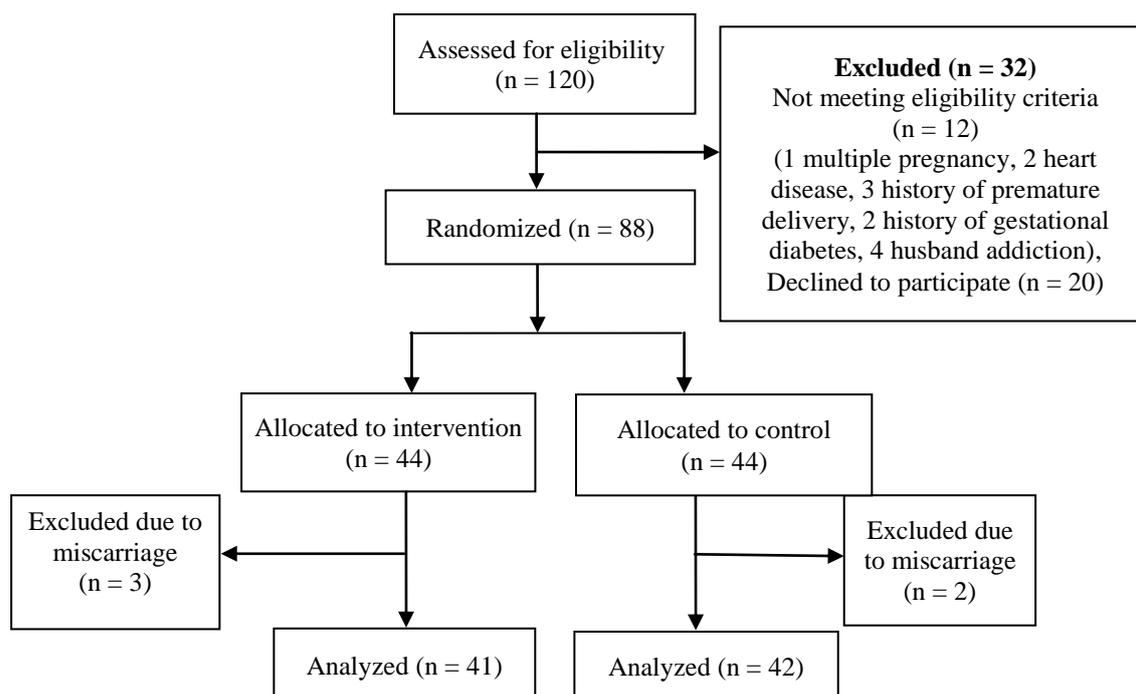


Figure 1. Flow diagram of the progress through the phases of the trial

Table 1. Baseline characteristics of the participants by study group

Characteristics	Intervention (n = 41)	Control (n = 42)	Characteristics	Intervention (n = 41)	Control (n = 42)
Age (Years)			Housewife	38 (92.7)	40 (95.2)
≤ 19	5 (12.2)	5 (11.9)	Husband's job		
20-34	33 (80.5)	32 (76.2)	Laborer	17 (41.5)	11 (26.2)
≥ 35	3 (7.3)	5 (11.9)	Employee	6 (14.6)	6 (14.3)
Mean (SD)	26.6 (5.6)	26.7 (5.6)	Private	18 (43.9)	25 (59.5)
Gestational age* , Mean (SD)	8.9 (2.4)	9.3 (2.7)	Living with the spouse's family	4 (9.8)	7 (16.7)
Marriage duration less than 2 years	16 (39.0)	10 (23.8)	Unwanted pregnancy	9 (22.0)	9 (21.4)
Nulliparous	23 (56.1)	22 (52.4)	Average income less than 5 million Riyals	25 (61.0)	22 (52.4)
Women's education			Main information source		
Elementary (≤8 years)	17 (41.5)	13 (31.0)	Books	13 (31.7)	12 (28.6)
Secondary	19 (46.3)	22 (52.4)	Family and friends	7 (17.1)	4 (9.5)
College	5 (12.2)	7 (16.7)	Health care staffs	2 (4.9)	5 (11.9)
Husband's education			Satellite	0 (0.0)	1 (2.4)
Elementary (≤8 years)	21 (51.2)	23 (54.8)	No information is obtained	19 (46.3)	20 (47.6)
Secondary	14 (34.1)	16 (38.1)			
college	6 (14.6)	3 (7.1)			

The data are given as n (%) unless otherwise is specified. * Weeks at enrolment

There was no significant difference between the groups before and after the education regarding the frequency of types of sexual relations (embracing, oral sex and anal sex) (Table 3).

Before the education four participants in the intervention group and six in the control group stated that they had not had sexual activity during the past four weeks and this difference was not statistically significant. However, after the education no participant

in the intervention group and eight in the control group reported this matter, and this difference was statistically significant ($p=0.005$).

The most common position reported during intercourse in the four weeks before the education in both groups was the man on top position (about 50%) and there were no significant differences among the groups

regarding the intercourse frequency of this position, woman on top, and side by side positions. After the education the frequency of the man on top position in the intervention group was reported significantly lower than the control group (15% vs. 45%, $p=0.002$) and the frequency of woman on top position in the intervention group was significantly high (41% vs. 9%, $p=0.001$) (Table 4).

Table 2. Mean and standard deviation scores of female sexual function index (FSFI) before and after education by study group

Functional domains	*Before the education			*After the education		
	Intervention (n = 41)	Control (n = 42)	MD** (95%CI)	Intervention (n = 41)	Control (n = 42)	MD (95%CI)
Sexual desire	3.3 (0.9)	3.1 (1.0)	0.3 (0.2, 0.7) †	3.8 (0.9)	3.0 (1.1)	0.7 (0.3, 1.2) ‡
Arousal	3.2 (1.5)	2.7 (1.6)	0.5 (-0.2, 1.2) †	4.0 (0.9)	2.7 (1.7)	1.3 (0.7, 1.9) ‡
Orgasm	3.8 (1.9)	3.2 (1.8)	0.6 (-0.2, 1.4) †	4.7 (0.9)	3.1 (1.9)	1.6 (1.0, 2.3) ‡
Satisfaction	4.7 (1.2)	4.2 (1.4)	0.5 (-0.1, 1.0) †	5.0 (0.9)	4.2 (1.0)	0.7 (0.3, 1.2) ‡
Pain	3.7 (2.0)	3.5 (2.0)	0.3 (-0.6, 1.1) †	4.4 (1.3)	3.1 (2.0)	1.3 (0.6, 2.0) ‡
Vaginal lubrication	3.8 (1.7)	3.5 (1.9)	0.2 (-0.5, 1.0) †	4.7 (1.0)	3.4 (1.9)	1.3 (0.6, 2.0) ‡
Total	22.6 (7.9)	20.2 (8.4)	2.4 (-1.2, 5.9) †	26.6 (4.3)	19.6 (8.4)	7.0 (4.1,9.9) ‡

Possible range score for all domains were 0-6 except for desire which it was 1.2-6.0 and for the total function was 2-36.

*Values are expressed as mean (SD). **Mean difference (95% confidence interval), † $p > 0.05$, ‡ $p < 0.001$,

Table 3. Frequency of types of sexual activity* before and after education by study group

Types of sexual activity*		Intervention (n = 41)	Control (n = 42)	X ^{2†}	P
Before the education	Embracing	33 (80.5)	33 (78.6)	0.04	0.8
	Oral sex (man to woman)	16 (39.0)	19 (45.2)	0.3	0.6
	Oral sex (woman to man)	18 (43.9)	17 (40.5)	0.1	0.7
	Anal sex	6 (14.6)	3 (7.1)	1.2	0.3
After the education	Embracing	40 (97.6)	38 (90.5)	1.8	0.4
	Oral sex (man to woman)	15 (36.6)	17 (40.5)	0.1	0.7
	Oral sex (woman to man)	19 (46.3)	15 (35.7)	1.0	0.3
	Anal sex	3 (7.3)	2 (4.8)	0.2	0.6

The data are given as n (%) unless otherwise is specified;

* Means having sex at least once a month, †In all the cases $df = 1$.

Table 4. Frequency of the sexual positions during the past four weeks before and after the education by study group

Sexual position		Intervention (n = 41)	Control (n = 42)	χ ^{2*}	P
Before the education	Man on top	18 (43.9)	24 (57.1)	1.4	0.2
	Woman on top	9 (22.0)	5 (11.9)	1.5	0.2
	Side by side	12 (29.3)	13 (31.0)	0.02	0.9
	Other positions	4 (9.8)	0 (0.0)	4.3	0.03
	No sexual activity	4 (9.8)	6 (14.3)	0.4	0.5
After the education	Man on top	6 (14.6)	19 (45.2)	9.2	0.002
	Woman on top	17 (41.5)	4 (9.5)	11.2	0.001
	Side by side	20 (48.8)	17 (40.5)	0.6	0.4
	Other positions	5 (12.2)	3 (7.1)	0.6	0.4
	No sexual activity	0 (0.0)	8 (19.0)	8.6	0.005

The data are given as n (%) unless otherwise is specified.

Because in some cases more than one option is selected, the total percentage is more than hundred.

* In all the cases $df = 1$.

Discussion

The results of this study reveal an improvement in the sexual function of pregnant women due to the education provided. Considering the reports of about half of the participants on not gaining any information on sexual relationships during pregnancy from any sources, the improvement in the women's function as a result of this education confirm the studies which reported the positive correlation between sexual knowledge with a satisfying sexual function.^{14,20}

Mangeli et al. in a single group study in Iran showed the positive effect of education on improving marital satisfaction in pregnant women compared to before the education.²¹ On the other hand, in a study conducted in Thailand, no statistically significant difference was observed between the two groups of intervention and control regarding a change in sexual behavior after education.¹⁵ The existing contradictions of our study with the results of this study could be due to the demographic characteristics of the community under study, attitude and cultural differences, the tools or different contents, and techniques used for the education. The duration and number of the group education sessions in this study was more than the study conducted in Thailand (two 60 to 90 minute sessions compared to one 20 minutes session). In addition, we also used photos, a model of the human body, and educational booklets in simple language for the education, and this could be another reason for the positive effect shown in this study. Since we emphasized that the women share the educational booklets with their spouse and studying it together, this informational exchange can also impact its effectiveness.

In the present study the education did not have any effect on the frequency of embracing, oral sex and anal sex. Women's sexual relation is not just vaginal sex but also noncoital contacts should be considered.³ In addition to vaginal sex, sexual activities during pregnancy include massage, oral sex,

foreplay, mutual caressing, kissing, and embracing.¹² It should be noted that pregnant women need more intimacy with their spouse, and they usually satisfy their need for security and closeness to their husbands through physical contact such as hugging and kissing.²² Anal sex is not recommended since it can result in *Escherichia coli* infection of the vagina.²³ Men should be advised not to blow air into the vagina during oral sex specially during the end of pregnancy since several air embolism cases in pregnancy as a result of oral sex with the husband active have been reported.²⁴

In this study, education had a positive effect on reducing sexual inactivity and the sexual position of man on top, and increasing woman on top position. The positions recommended during pregnancy are; woman on top, side by side, rear entry, and on hands and knees.^{25,26} Change in the sexual position should be considered during progress of the pregnancy.²⁷ In most cases, due to lack of knowledge about the different sexual positions, couples avoid intercourse during pregnancy in order to prevent from putting pressure on the fetus.²⁸

This paper reports the results of first phase of a longitudinal study that evaluates the effects of sex education on sexual function of pregnant women in different trimesters and the more completed results will be released in the future.

Due to cultural reasons and the sensitivity of the topic it was possible that the participants would avoid giving correct information about their relations and unusual sexual positions. This limitation was mostly controlled with the use of sealed boxes for placing the anonymous completed questionnaires. Not reviewing the sexual function before pregnancy could also be another limitation for this study. In addition, since sexual relation is a bilateral relationship and there is the possibility that the sexual function of the women is affected by the sexual function of the spouse, it would be better to study the men's sexual function as well.

The results of this study show the positive effect of a sex education package, in the form of holding educational small group classes in public health care centers and providing simple educational booklets for the couples to study at home, on improving sexual function of pregnant women. Providing such an education during routine prenatal care by health care staff specially midwives, who have been trained for this purpose, could possibly improve the couples' sexual health during pregnancy.

Ethical issues

None to be declared.

Conflict of interest

The authors declare no conflict of interest in this study.

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