

## The effect of pregnancy yoga on the pregnant's psychosocial health and prenatal attachment

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Pregnancy is a special period in which women experience many changes. Negative psychosocial health level and poor prenatal attachment during pregnancy can result in negative maternal behaviors, postpartum anxiety, and depression. This study was conducted as a randomized controlled experimental study which aimed at identifying the effect of pregnancy yoga on the pregnant's psychosocial health and prenatal attachment. Sixty three pregnant women who were primipara, who were in the 14 to 26 weeks of their pregnancy, who did not have any chronic disease and a past yoga experience, and who had singular and spontaneous pregnancy were included in the study. Before the intervention, all the pregnant women were evaluated with Pregnant Information Form (PIF), Pregnancy Psychosocial Health Assessment Scale (PPHAS), and Prenatal Attachment Inventory (PAI). The yoga group did yoga for 40 minutes two days a week for a period of 8 weeks under the supervision of one of the researchers. At the end of 8 weeks (post intervention), both the yoga group and the control group were re-evaluated through the Pregnancy Psychosocial Health Assessment Scale and Prenatal Attachment Inventory. Chi-square, independent sample *t* test, paired sample *t* test, Mann Whitney U test and Wilcoxon Signed Ranks were used for data analyses. Post intervention analyses revealed that the mean Pregnancy Psychosocial Health Assessment Scale scores of the experimental group were significantly higher than the scores of the control group ( $p < 0.001$ ). At the beginning of the study, the Prenatal Attachment Inventory mean scores of both groups were similar. However, at the end of intervention, it was observed that Prenatal Attachment Inventory mean scores of the experimental group were significantly higher than those of the control group ( $p < 0.05$ ). The mean anxiety and stress subscale score was found to be higher in the experimental group than the score in the control group ( $p < 0.05$ ). When the mean anxiety and stress subscale score increased, anxiety and stress level decreased. Prenatal yoga is an effective method in increasing the pregnant's psychosocial health level and prenatal attachment.

**Keywords:** Pregnancy, Yoga, Prenatal attachment, Psychosocial health, Nursing, Midwifery

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Pregnancy is defined as a crisis period in the life of a woman. It is a progressive phase, which disturbs the biopsychosocial stability of women and requires adjustments to new roles. Furthermore, this is a phase during which a parental relationship is formed between the mother and the baby<sup>1,2</sup>. Problems during pregnancy such as stress, anxiety, depression and concern may disturb the psychosocial and fetal health of the pregnant woman and the attachment between the mother and the baby during the prenatal period. It is stated that the mental health of the pregnant during pregnancy affects the attachment between the mother and the baby. Moreover, it is reported that a weak attachment between the mother and the baby and

negative maternal behaviors are related with anxiety and depression after birth<sup>3</sup>. Psychological attachment to the fetus starts within the uterus and most of the pregnant women speak with their unborn child. Emotional talk with fetus not only demonstrates early attachment of the mother and the baby, but also the mother's effort for a healthy pregnancy. Mother's effort in this sense may be to quit smoking and caffeine which are psychosocial problems<sup>4</sup>.

Recognition and prevention of the psychosocial reactions are as important as the recognition and prevention of the physiological reactions during pregnancy in order to improve the health of the mother and the baby and to develop protective mental health services. For this reason, when physical evaluation of the pregnant woman is being done, it

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should not be forgotten that the psychosocial evaluation is also significant to have a complete approach<sup>5-8</sup>.

Yoga is an old application which emerged in India thousands of years ago. It focuses on mediation together with physical stance, and it is the perfect harmony of body, mind and soul, achieved by releasing the mind<sup>9,10</sup>. Yoga, which is utilized in many areas today, is being employed in pregnancy since the 20<sup>th</sup> century<sup>9-11</sup>. The positive effects of prenatal yoga for the pregnant women are stated in many studies. It is emphasized that pregnant women who regularly do yoga have less pregnancy problems, stress, depression, and sleep loss<sup>10,12-14</sup>.

Satyapria *et al.* investigated the effects of prenatal yoga on the anxiety and depression levels of pregnant women in a randomized controlled study. They found that the anxiety and depression levels of pregnant women in the experimental group were meaningfully low, when compared with the control group<sup>13</sup>. Newham *et al.* and Field *et al.* expressed that antenatal yoga decreases the anxiety and depression symptoms of the pregnant women during pregnancy<sup>12,13</sup>. While there are various studies conducted all over the world for investigating the effects of prenatal yoga on the health of the pregnant women,<sup>10,12,14</sup> no studies have yet been conducted in Turkey.

## Materials and methods

### Sample size calculation

The sample of the study was determined by using the Anxiety Scale, which was utilized by Satyapriya *et al.* (2013) in their studies to investigate the effect of prenatal yoga on the anxiety and depression levels of the pregnant women. The minimum number of the participants in a group is determined as 30 in this study, by using the same Anxiety Scale with a 2.45 standard deviation, a 95 % confidence interval and a 98 % power by the arithmetic average.

### Design

The study was a randomized controlled, experimental study, which included experimental and control groups. The experimental group did yoga and routine antenatal care, whereas the control group received routine antenatal care only. All the pregnant women in the control and yoga group were evaluated first. The control group did not have any interview. Data collection from the control group was completed 8 weeks after the first test. Subsequently, yoga

intervention and data collection were implemented in the experimental group.

### Setting

In Turkey, national health insurance provides four antenatal care visits for low-risk women over the course of pregnancy. The routine antenatal care consists of prenatal examinations, screening, and routine antenatal education. The participants were recruited from Yozgat Bozok Gynecology and Child Health Hospital. They were registered to the pregnancy education center. One of the researchers held the yoga sessions in this center every day. The participants, who practised yoga in groups of 5 or 6, joined the yoga practice for two days a week when they were available. They did not participate in the yoga sessions on two consecutive days. They did the practice every two days.

### Selection criteria

Women were eligible to participate if they were aged 20- 35 yrs, had a gestational age of 14 to 26<sup>th</sup> weeks and had no indications of a high-risk pregnancy. Participants were primipara and they did not have any chronic illnesses, they have never done yoga or exercise during pregnancy before, they had singular and spontaneous pregnancy, they did not smoke, and they had no maternal physical anomaly. Women with a history of high-risk pregnancy, preterm labor, or mental illness were excluded. The target population of the study was the pregnant women who were registered to pregnancy education center in Yozgat Bozok Gynecology and Child Health Hospital between April 2015 and May 2016. The study was completed with 63 pregnant women. While 31 women were in the yoga group, 32 were in the control group

### Recruitment process

Women with low-risk pregnancies who were in their 14 to 26 weeks gestation were approached by the midwife, who then introduced the potential participants to the researchers. Pregnants who met the inclusion criteria were invited to participate in the study. All the participants were informed about the aim of the study, and then their written informed consents were obtained. Randomization was done according to the simple random numbers table. The pregnant women were taken into experimental and control groups. The researchers collected data from the control group and the experimental group. The study procedure is illustrated in Fig. 1.

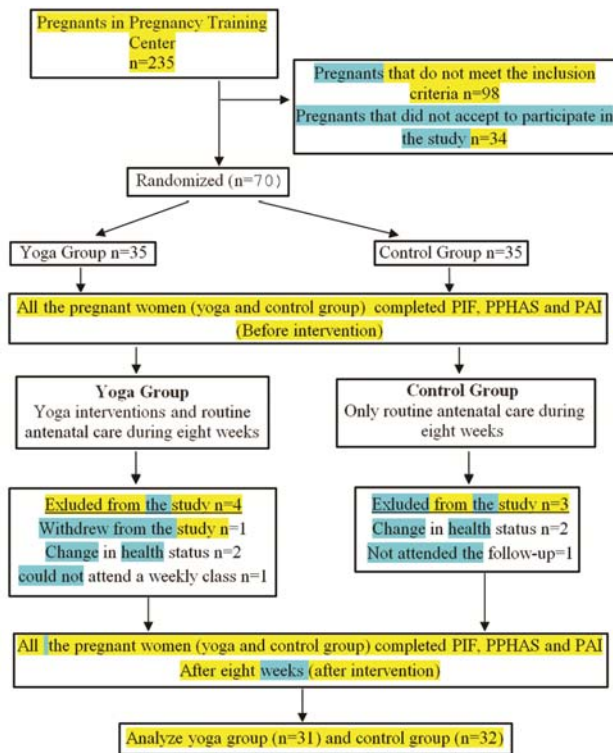


Fig. 1 — Flowchart of the study procedure

Prior to the intervention, all the pregnant women in the control and yoga group were evaluated with PIF, PPHAS and PAI. Women in the experimental group received both the routine antenatal care and the yoga intervention, whereas women in the control group only received routine antenatal care. After to the intervention, all the pregnant women in the control and yoga group were re-evaluated with PPHAS and PAI.

#### Randomization

The variables of pregnant's age, educational status, gestational weeks, and working status were used by the computer software specially produced for randomization to ensure a homogeneous distribution over the two groups.

#### Intervention

Each yoga class consisted of approximately 5-6 pregnant women. The yoga intervention was designed by a certified pregnancy yoga instructor. Each yoga intervention was held for approximately 40-45 min with yoga asana sessions lasting 30 min. A mixture of standing and seating positions were introduced and practiced. Approximately 9-10 positions were repeated each week. Repetitions were consistent from week to week and linked one position to the other. Each yoga intervention ended with a 15 min deep

relaxation period with the subject lying supine. Progressive relaxation and meditation techniques were introduced during this time.

#### Yoga practice steps

- Breathing awareness study for 5 min.
- Practice for twenty minutes (Fig. 2).
- Mother communication and meditation for 5 min.

One of the researchers held the yoga practice every day of the week. Pregnants were expected to participate in yoga practice twice a week on a regular basis for 8 weeks. The data of the pregnant women who took part in the application regularly were evaluated.

#### Ethical clearance and informed consent

Ethical Committee Approval was obtained from Bozok University Clinical Research Ethical Committee (Decision Number: 09.01.2015/05). Written institutional approval was received from Yozgat Bozok Gynecology and Child Health Hospital. Written approval was received through the Informed Consent Form

#### Assessment

The data was gathered with Pregnant Identification Form (PIF), Psychosocial Health Assessment Scale (PPHAS) and Prenatal Attachment Inventory (PAI).

#### Pregnant identification form (PIF)

PIF consists of 32 questions, which were prepared in order to determine the sociodemographic and obstetric characteristics of pregnant women.

#### Psychosocial health assessment scale (PPHAS)

PPHAS, which was developed by Yıldız, is used to evaluate psychosocial health levels of the pregnant women. The scale is in the form of Likert scale over five. The items can take a value between 1 and 5. The scale has 6 sub-dimensions.

Subscales of the scale are as follows: anxiety and stress, pregnancy and spouse relationships, family violence, psychosocial support needs of the pregnant, family traits, and physical-psychosocial changes. In the assessment of the scale, "1" demonstrates that the psychosocial health level is very low and "5" demonstrates that the level is very high. The evaluation is interpreted based on the earned score<sup>15</sup>.

#### Prenatal attachment inventory (PAI)

PAI, which was developed by Muller (1993), is utilized in order to explain the thoughts, emotions and situations experienced by pregnant women during



Fig. 2 — Yoga postures

pregnancy and to determine the attachment levels during the prenatal period. The inventory is in the form of Likert scale over 4. Each item takes a value between 1 and 4. An increase in the score received by the pregnant woman meant that the attachment level increased<sup>16</sup>.

**Data analyses**

Data from all the instruments were evaluated for completeness. Frequency distributions were checked for extreme or inconsistent values. Descriptive statistics were used to characterize the sample. Chi square test and independent samples *t* test were used for baseline comparisons and mean differences within groups. As the data were not normally distributed, Mann–Whitney test (between groups) and Wilcoxon's

test (within groups) were used for statistical analysis. P value of less than < 0.05 was considered to be statistically significant.

**Results**

The yoga and control groups were similar in terms of socio-demographic characteristics (age, education, working status, marriage age, years of marriage) and obstetric characteristics (gestational weeks, average control numbers, stress / anxiety situations during pregnancy) (*p* > 0.05).

Prior to yoga practice, it was observed that the mean PPHAS scores of the experimental group and the control group were similar (*p* > 0.05). After the intervention, it was found that mean PPHAS scores of the experimental group were significantly higher than

the control group ( $p < 0.001$ ) (Table 1). Prior to the intervention, it was determined that the mean “*pregnancy and spouse relationships*” subscale score of the control group ( $4.2 + 0.4$ ) was significantly higher than the mean experimental group score ( $3.9 + 0.3$ ) ( $p < 0.001$ ). However, no significant difference was found between the groups after the end of the intervention (Table 1). Before the intervention, similar mean scores were obtained in the “*anxiety and stress*” subscale in both the experimental group and the control group. The mean anxiety and stress subscale score was found to be higher in the experimental (yoga) group ( $3.8 + 0.5$ ) than the score

obtained in the control group ( $3.1 + 0.7$ ). It was found that when the mean anxiety and stress subscale score increased, anxiety and stress level decreased. It was determined that the difference in the mean score between the two groups was statistically significant ( $p < 0.001$ ) (Table 1).

It was observed that before the yoga practice, the mean “*family violence*” subscale scores in both the experimental ( $4.7 + 0.2$ ) and the control group ( $4.8 + 0.2$ ) were at very favorable levels and that there was no significant difference between the two groups ( $p > 0.05$ ). Following the yoga sessions, it was seen that the mean score in the experimental group for the

Table 1 — PPHAS Score average for the yoga and control groups before and after the intervention (N = 63 pregnant)

PPHAS		Groups		Test	p
		Yoga group (n=31 ) av+sd	Control group (n=32 ) av+ss		
Pregnancy and spouse relationships	Before intervention	3,9+0,3	4,2+0,4	$Z^a=-2,192$	0,028
	Post intervention	4,1+0,4	4,1+0,5	$Z^a=-1,503$	0,133
	Test	$Z^b=-4,279$	$Z^b=-422$	Test	$Z^b=-4,279$
	p	0,000	0,673	p	0,000
Anxiety and stress	Before intervention	3,2+0,5	3,4+0,6	$t=-1,264$	0,211
	Post intervention	3,8+0,5	3,1+0,7	$t=4,078$	0,000
	Test	$t=-5,517$	$t=3,152$	-	-
	p	0,000	0,004	-	-
Family violence	Before intervention	4,7+0,2	4,8+0,2	$Z^a=-675$	0,499
	Post intervention	4,8+0,2	4,8+0,1	$Z^a=-635$	0,526
	Test	$Z^b=-1,657$	$Z^b=-598$	-	-
	p	0,976	0,550	-	-
Psychosocial support needs of the pregnant	Before intervention	4,0+0,5	3,9+0,5	$t=0,597$	0,553
	Post intervention	4,3+0,4	3,8+0,4	$t=3,731$	0,000
	Test	$t=-2,781$	$t=1,706$	-	-
	p	0,009	0,098	-	-
Family traits	Before intervention	3,9+0,5	4,0+0,6	$Z^a=-927$	0,354
	Post intervention	4,2+0,6	4,0+0,9	$Z^a=-1,773$	0,076
	Test	$Z^b=-2,197$	$Z^b=-695$	-	-
	p	0,028	0,487	-	-
Physical-psychosocial changes	Before intervention	3,7+0,4	3,7+0,7	$t=-572$	0,569
	Post intervention	4,0+0,5	3,8+0,6	$t=1,156$	0,252
	Test	$t=-3,028$	$t=-276$	-	-
	p	0,005	0,785	-	-

Note:  $Z^a$ =Mann Whitney;  $U Z^b$ = Wilcoxon Signed Ranks test;  $t = t$  test; sd= Standard Deviation; av=Average

Table 2 — PAI Score average for the yoga and control groups before and after the intervention

PAI	Groups		Test	p
	Yoga group (n=31) av+sd	Control group (n=32) av+sd		
Before the intervention	56.5+9.6	58.5+11.9	$t=-.724$	0.472
Post intervention	67.6+8.7	61.9+11.4	$t=2.209$	0.031
Test	$t=-12.955$	$t=-5.665$		
P	0.000	0.000		

$t = t$  test; sd = Standard Deviation; av=Average

family violence subscale was similar to that of the control group ( $p > 0.05$ ) (Table 1). Prior to the intervention, the mean scores obtained in “*psychosocial support needs of the pregnant*” subscale in both the experimental group ( $4.0 + 0.5$ ) and the control group ( $3.9 + 0.5$ ) were found to be at favorable levels and similar to each other ( $p > 0.05$ ). After the application of yoga in the experimental group, it was seen that the mean psychosocial support needs subscale score of the pregnant in the experimental group was higher than their score before the application ( $4.3 + 0.4$ ) ( $p < 0.05$ ). On the other hand, after the application, the mean psycho-social support needs subscale score in the control group was found to be similar to their score before the application ( $3.8 + 0.4$ ) ( $p > 0.05$ ) (Table 1). Prior to the intervention, satisfactory and similar mean scores were also obtained from the “*family traits*” subscale in both the experimental group ( $3.9 + 0.5$ ) and the control group ( $4.0 + 0.6$ ). Following the yoga practice in the control group, better family traits subscale mean scores were obtained by the pregnant in the experimental group ( $4.2 + 0.6$ ) than those in the control group ( $4.0 + 0.9$ ) although this difference was not statistically significant ( $p > 0.05$ ) (Table 1). It was also found that the mean “*physical-psychosocial changes*” subscale scores in the experimental group and the control group were at satisfactory levels and were not statistically different before the intervention ( $p > 0.05$ ). After the yoga practice, it was observed that in the experimental group, the mean physical-psychosocial changes subscale score ( $4.0 + 0.5$ ) was significantly higher than the score obtained in the group before the intervention ( $p < 0.05$ ) (Table 1).

Before the intervention, it was seen that the mean PAI scores in the experimental group ( $56.5 + 9.6$ ) and

the control group ( $58.5 + 11.9$ ) were similar ( $p > 0.05$ ). Following the yoga practice, it was observed that the mean PAI scores in the experimental group were significantly higher than the scores obtained before the yoga practice ( $p < 0.001$ ). Also, higher mean PAI scores were obtained in the control group following the intervention ( $p < 0.001$ ) (Table 2).

## Discussion

Pregnancy is a developmental crisis period in which women undergo profound biological, physiological, and psychosocial changes. It has been argued that improvement in the psychosocial health level of the pregnant has significant benefits for the pregnant’s adaptation to pregnancy, prenatal attachment, and mother-child health. Complementary practices such as exercises, preparatory classes to pregnancy, yoga, and meditation are used to improve the pregnant’s psychosocial health level and ensure a sufficient level of prenatal attachment<sup>6,17-20</sup>.

It has been suggested that pregnancy yoga offers great benefits for stress management and reduces the causes of stress. Furthermore, it ensures that the pregnant have a strong intuitive sense of close contact with their body and their emotions. All these benefits are indirectly important for the betterment of the pregnant’s psychosocial health level. The improvement in the psychosocial health of the pregnant and the maintenance of this well-being help to establish the mother-child bond and contributes to the child’s healthy development by strengthening mother-child communication and togetherness<sup>19-22</sup>.

After the intervention, it was found that the total mean PPHAS scores of the pregnant in the experimental group increased ( $p < 0.001$ ). Cowen and Adams reported in their studies that the flexibility and sense of health increased in the pregnant who practiced yoga<sup>23</sup>. In a meta-analysis in which six separate randomized controlled studies were evaluated, it was reported that prenatal yoga practice had a significant effect on decreasing the depressive symptoms in the pregnant diagnosed with depression<sup>24</sup>.

In their study, Muzik *et al.* revealed that yoga is an effective alternative method in the improvement of health of the pregnant women who are psychopathologically under risk<sup>10</sup>. In another randomized controlled study, Noggle *et al.* found that yoga positively affected the psychosocial well-being of the pregnant<sup>25</sup>. Likewise, in the current study, it was found that the psychosocial health of the pregnant in

the experimental group significantly improved and their mean PPHAS scores were significantly higher ( $p < 0.001$ ) than those in the control group after yoga practice, although the psychosocial health levels in both groups were very similar at the beginning of the study. The findings obtained in this study bear strong similarities with other studies in the relevant literature.

In our study, after the yoga practice, it was observed that the mean “*pregnancy and spouse relationships*” subscale scores of the pregnant in the experimental group increased to  $4.1 \pm 0.4$  points ( $p < 0.001$ ), whereas no meaningful change was observed in the control group. However, it was determined that the mean pregnancy and spouse relationship subscale scores in both groups were similar after the yoga practice (intervention) ( $p > 0.05$ ). In the relevant literature, it has been reported that the meditation performed in yoga practice contributes positively to (a) eliminating the tension and stress in pregnancy, (b) development of self-identity, (c) increase motivation, (c) increase in the emotions of love and affection, and (d) feelings of happiness<sup>21,23-27</sup>. The literature supports the findings of this study. It has been argued that the pregnant think positively and internalize pregnancy thanks to the positive attitude that the yoga practice provides to them, thereby increasing their feelings of happiness.

After the intervention (yoga practice) in the experimental group, the mean “*anxiety and stress*” subscale scores of the pregnant in the experimental group ( $3.8 \pm 0.5$ ) were found to be significantly higher ( $p < 0.001$ ) than the mean anxiety and stress subscale scores obtained in the control group ( $3.1 \pm 0.7$ ). When the mean anxiety and stress subscale scores increased, anxiety and stress level decreased. Our study revealed that yoga practice significantly reduced the level of stress and anxiety in pregnancy. Beddoe *et al.* also found that yoga practice significantly reduced the perceived stress and anxiety in pregnancy<sup>28</sup>. In their randomized controlled study, Javnbakht *et al.* found that 90 min sessions of yoga practice twice a week for a period of two months significantly decreased anxiety in pregnant<sup>29</sup>. Also, Jabarna Kiruba *et al.* found that mind body interventions practice significantly reduced anxiety in pregnancy<sup>30</sup>. In another study, Jiang *et al.* found that yoga practice reduced pain and stress and it was more effective than the standard prenatal exercises and walking<sup>31</sup>.

In the related literature, it has been suggested that the meditation involved in the yoga practice ensures a

better relationship with other individuals by making the pregnant feel more comfortable in their relationships with themselves and the world around them<sup>25</sup>. Rakhshani *et al.* found that yoga practice positively affected inter-personal relationships<sup>32</sup>.

Long *et al.* also stated that yoga practice was an effective application in eliminating the stress and anxiety affecting the physical and mental health conditions<sup>33</sup>. Impett *et al.* reported that yoga practice had positive effects on the feelings of comfort and life satisfaction<sup>34</sup>. In other related studies, it has been demonstrated that pregnancy yoga positively affects the life quality of the pregnant<sup>29,35</sup>.

It was determined that in the experimental group and the control group, the mean “*physical-psychosocial changes*” subscale scores within PPHAS scale were at satisfactory levels and were not statistically different before and after the intervention (yoga practice) ( $p > 0.05$ ). However, the mean physical-psychosocial changes subscale score obtained in the experimental group after the intervention ( $4.0 \pm 0.5$ ) was found to be significantly higher than the mean score obtained prior to the intervention ( $3.8 \pm 0.6$ ) ( $p < 0.05$ ). Yi-Chin Sun *et al.* found that prenatal yoga practice significantly reduced the maternal disorders in pregnant<sup>36</sup>. Similarly, Field *et al.* reported that prenatal yoga program relieved pains in the pregnant’s back and legs<sup>13</sup>. In their randomized controlled study, Jiang *et al.* reported that prenatal yoga practice diminished the maternal disorders in pregnant<sup>31</sup>. Vogler *et al.* found that yoga practice increased the physical well-being in pregnant<sup>37</sup>.

The findings indicated that the post PAI mean scores in both the experimental group and the control group were higher than the scores obtained before the yoga practice ( $p < 0.001$ ). Kang & Chung reported that stress reduced the prenatal attachment and that the prenatal attachment was low in women with high risk<sup>38</sup>. Newham *et al.* found that prenatal yoga significantly reduced the stress levels in pregnant<sup>12</sup>. Muzik *et al.* demonstrated that prenatal yoga practice contributed to the development of positive feelings about motherhood in pregnant<sup>10</sup>. In addition, Souma found that the women who did exercises and who dreamed about positive things ended up with significantly higher levels of prenatal attachment<sup>39</sup>. Likewise, Toosi reported that relaxation exercises



significantly increased the prenatal attachment scores in pregnant<sup>40</sup>.

### Conclusion

Prenatal yoga is an effective method in increasing the pregnant's psychosocial health level and prenatal attachment. After the yoga practice in the experimental group, the scores obtained from the subscales of psychosocial support needs of the pregnant, anxiety and stress, pregnancy and spouse relationships, and physical-psychosocial changes were found to be better than the scores of the control group.

### Study limitations/ Recommendations for future studies

The most important limitation of the study is that all the pregnant had a higher education level. For this reason, it is recommended to conduct similar studies with a larger sample of pregnant women with different education levels.

### Conflict of Interest

The authors have no conflicts of interest to disclose.

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We confirm that the listed authors meet the authorship criteria and that all the authors are in agreement with the content of the manuscript.

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