

THE EFFECTS OF DEPRESSIVE SYMPTOMS ON HEALTHY LIFESTYLE BEHAVIORS DURING PREGNANCY DEPRESSION AND HEALTHY LIFESTYLE BEHAVIORS DURING PREGNANCY

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Received: 25.05.2022; **Accepted:** 20.10.2022; **Available Online Date:** 31.01.2023

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Cite this article as: Topaloglu-Oren ED, Ertem G, Yasar O. The Effects Of Depressive Symptoms On Healthy Lifestyle Behaviors During Pregnancy Depression And Healthy Lifestyle Behaviors During Pregnancy. J Basic Clin Health Sci 2023; 7: 376-386.

ABSTRACT

Purpose: The aim of this study is to evaluate the effect of depressive symptoms on healthy lifestyle behaviors during pregnancy.

Material and Methods: This is a descriptive and cross-sectional study. The study was conducted with 314 pregnant women between June and December 2021. The data of the study were collected by face-to-face interview method using Introductory Information Form, Edinburgh Postpartum Depression Scale and Healthy Lifestyle Behaviors Scale-II. Number, percentage, mean, standard deviation (min-max.) and spearman correlation analysis were used in the analysis of the data.

Results: Results indicated that 19.1% of pregnant women were found to be at risk for depression (Edinburgh Postpartum Depression Scale \geq 12). While the mean the Healthy Lifestyle Behaviors Scale-II total scores of pregnant women were 136.83 ± 24.11 , the highest subscale was "Spiritual Development" with a mean score of 26.55 ± 5.27 , and the lowest subscale was "Physical Activity" with a mean score of 15.59 ± 4.91 . A negative and significant correlation was found between the Edinburgh Postpartum Depression Scale and the Healthy Lifestyle Behaviors Scale-II total scores and the mean scores of spiritual development, nutrition, physical activity (low correlation), and stress management subscales (moderate correlation) ($p<0.05$).

Conclusion: It was determined that as the level of symptoms of depression during pregnancy increased, the spiritual development, adequate and balanced nutrition, physical activity, stress management and healthy lifestyle behaviors of pregnant women decreased. Women should be screened for depression starting from the pre-pregnancy period and counseling for depression should be provided by health professionals.

Keywords: pregnancy, depression, lifestyle, health-promoting behavior

INTRODUCTION

Depression during pregnancy, is a frequently encountered mood disorder that negatively affects

both the pregnant woman, the fetus, and the family in the long term (1-4). While the prevalence of depression during pregnancy varies between 3.7-

28.6% in studies conducted in Turkey (5-9); it varies between 4.1-17.9% worldwide (2,10-12). Genetic, psychological, biological, environmental, and hormonal factors are among the predisposing causes of depression during pregnancy. It can lead to complications of pregnancy and obstetric such as preterm labor, preeclampsia, difficult and invasive delivery, intrauterine growth retardation, low birth weight, and newborns with low Apgar scores. In addition, the increased risk of depression during pregnancy increases the risk of attempted suicide and postpartum depression. Therefore, depression and the risk of depression experienced by women during pregnancy may adversely affect the healthy lifestyle behaviors of pregnant women. For this reason, early diagnosis and treatment of the risk of depression and depression during pregnancy will minimize the risks for the mother and the fetus (3,4,8,9,13-16). Bae et al. (2010) and Omidvar et al. (2018) stated that, as the level of depression symptoms increased, healthy lifestyle behaviors decreased (17,18). Healthy lifestyle behaviors are defined as “controlling all the behaviors that affect the individual's health and choosing behaviors appropriate for his/her health status in arranging activities of daily living”. Healthy lifestyle behaviors should include not only protection from diseases but also behaviors that increase the level of well-being throughout life. These behaviors increase the level of well-being of the individual and provide self-actualization; including adequate and balanced nutrition, stress management, adequate and regular exercise, not smoking, health responsibility, and hygienic measures (1,15,19). Health professionals should control the healthy lifestyle behaviors of pregnant women and therefore all behaviors that affect their health, help them choose behaviors appropriate for their own health status, and identify who is at risk of depression from the early period (8-11,20,21). The Edinburgh Postpartum Depression Scale (EPDS) is frequently used and recommended during pregnancy in Turkey and the world identifies the level of symptoms of depression and detects the ones who are at risk of depression (10-12,20,22,23). In this study, the EPDS was used to determine the level of the symptoms of depression and the risk of depression in pregnant women. Identification of pregnant women at risk for depression with regular screenings at every follow-up of pregnancy will ensure appropriate diagnosis, treatment, and planning of training programs and counseling

services. Thus, risky behaviors that may occur during pregnancy and the risk of depression will be minimized and behaviors that improve the health of pregnant women will increase (1,8,9,13,16,21). In this study is important in terms of determining the level of depressive symptoms and the risk of depression in pregnant women in the early period using screening tests, planning the diagnosis and treatment, and shedding light on the increase in healthy lifestyle behaviors of pregnant women. In line with this, the aim of this study is to examine the effects of depressive symptoms during pregnancy on healthy lifestyle behaviors.

Research Questions

- What is the level of symptoms of depression of pregnant women?
- What are the healthy lifestyle behaviors of pregnant women?
- Is there a relationship between level of symptoms of depression and healthy lifestyle behaviors of pregnant women?

MATERIAL AND METHODS

Study Design and Sample

This study is a descriptive and cross-sectional type of research. The study was conducted in the obstetrics and gynecology clinics (routine control), and Non-Stress Test (NST) room of a public hospital in Izmir, Turkey, between June and December 2021. The needed minimum sample size of the study was calculated based on the prevalence of depression in pregnant women in the literature (24). The frequency of depression in pregnant women in Turkey ranges from 3.7 to 28.6% (5-8). In line with this data, considering the prevalence of depression in pregnancy 16.2% (min: 3.7%- max: 28.6%, mean: 16.2%), the number of pregnant women to be sampled was determined as 209 at least (with 95% confidence and $p=0.05/ n=t^2pq/d^2$). By taking 50% more of the predetermined sample number, 314 pregnant women were reached between June and December 2021 (random sample method). Pregnant women who did not have any communication barriers, did not have any pregnancy-related problems, did not have a chronic disease, and did not have serious life-threatening psychiatric diseases were included in the study. The research was conducted with pregnant women in the 2nd and 3rd trimesters. The high risk of abortion in pregnant women in the first trimester increases the risk of depression. The data of the study by the researchers

¹ **Table 1.** The Obstetrics and Current Pregnancy Characteristics of the Pregnant Women

	Mean±SD	Min-Max
Age at first birth	22.37±3.69	(15-35)
	n	%
Trimester		
2. Trimester	58	18.5
3. Trimester	256	81.5
BMI before pregnancy		
19.8 kg/m² Underweight (12.5-18 kg)*	55	17.5
19.8-26 kg/m² Normal weight (11.5-16 kg)	166	52.9
26.1-29 kg/m² Overweight (7-11.5 kg)	57	18.2
29.1 kg/m² Obesity (≥6 kg)	36	11.5
Number of pregnancies		
1	143	45.5
2-3	144	45.9
4 ≤	27	8.6
Living children		
None	162	51.6
1	113	36.0
2	27	8.6
3 ≤	12	3.8
Abortion		
Yes	42	13.4
No	272	86.6
Miscariage		
Yes	38	12.1
No	276	87.9
Delivery type at the last birth		
Vaginal	80	51.9
Cesarean	74	48.1
Planning pregnancy		
Planned	279	88.9
Unplanned	35	11.1
Problems during pregnancy		
Yes	26	8.3
No	288	91.7
Violence during pregnancy		
Yes	14	4.5
No	300	95.5
Smoking during pregnancy		
Yes	37	11.8
No	277	88.2

Table 1. Continue

Exercise during pregnancy		
Yes	53	16.9
No	261	83.1
Healthy nutrition during pregnancy		
Yes	264	84.1
No	50	15.9
Control during pregnancy		
Yes	186	59.2
No	128	40.8
Information about pregnancy		
Yes	28	8.9
No	286	91.1
Social Support		
Yes	275	87.6
No	39	12.4
Coping with Stressful Events		
Yes	229	72.9
No	85	27.1

BMI: Body mass index, n:number, %: percent, SD: standard deviation, min-max: minimum-maximum, *range of weight that should be taken during pregnancy.

appropriate room of the obstetrics and gynecology clinics and in the NST room, following the social distance rules.

Table 2. Prevalence of Depression Risk in Pregnant Women According to the EPDS

EPDS	n	%
EPDS ≤ 11 point	254	80.9
EPDS ≥ 12 point	60	19.1

n: number, %: percent

Data Collection Tools

The data of the study were collected by Introductory Information Form, Edinburgh Postpartum Depression Scale and Healthy Lifestyle Behaviors Scale-II. Introductory Information Form were designed by the researchers in light of the literature (1,2,6,10,11,20,21,23). In order to improve the comprehensibility, applicability, and filling time of the scales and the introductory information form in the research, a pre-application was administered to 10 pregnant women before the research started. Pregnant women included in the pre-application were not included in the research sample. After the pre-application, some of the questions that were difficult to understand in the introductory information form were rearranged and it was decided to collect all the forms face to face. All forms were collected by the

pregnant women themselves. The completion of forms took approximately 20 minutes.

The Introductory Information Form

The introductory information form was prepared by the researchers in line with the literature and consists of 25 questions including introductory, obstetric, and current pregnancy-related features of pregnant women (1,2,6,10,11,20,21,23).

The Edinburgh Postnatal Depression Scale (EPDS)

The EPDS was developed by Cox and Holden (1987) to determine the level of symptoms of depression and depression risk in women in the postpartum period, but not for diagnosing depression. It is a 10-item self-report scale in a 4-point Likert format. Responses consisting of 4 options are scored between 0-3, the lowest score that can be obtained from the scale is 0 and the highest score is 30 (25). Turkish validity and reliability of the EPDS were studied by Engindeniz et al. (1996). The cut-off point of the EPDS was determined as 12, and women with a scale score of 11-12 or more were considered to be at risk of depression (26). The Edinburgh Postpartum Depression Scale (EPDS) is frequently used and recommended during pregnancy in Turkey and the world identifies the level of symptoms of depression

Table 3. The mean, minimum, and maximum scores of the HPLP-II total score and the subscales

HPLP-II	Mean±SD	Min-Max
Spiritual Development	26.55±.27	15-36
Nutrition	23.89±4.39	12-35
Physical Activity	15.59±4.91	8-32
Health Responsibility	23.75±5.25	12-36
Interpersonal Relationships	26.02±4.98	13-36
Stress Management	20.54±4.37	12-32
Total Score	136.83±24.	80-196
	11	

n: number, %: percent

and detects the ones who are at risk of depression (10-12,20,22,23). The Cronbach Alpha value, which is the internal consistency reliability coefficient of the scale, was reported as 0.79. In this study, the Cronbach Alpha value was found to be 0.81.

The Healthy Lifestyle Behaviors Scale-II (HPLP-II)

It was developed by Walker et al. in 1987 based on Pender's health promotion model and measures health-promoting behaviors in relation to an individual's healthy lifestyle. The scale was revised in 1996 and was named as the HPLP-II scale. It is stated that the revised scale can be used to determine health promotion behaviors and evaluate the effectiveness of the programs planned for this purpose (19). The validity and reliability of the Turkish version of the scale were studied by Bahar et al. in 2008 (27). The HPLP-II scale consists of all positive 52 items in a four-point Likert type [1 (never), 2 (sometimes), 3 (often), and 4 (regularly)]. The scale has 6 sub-dimensions which are; spiritual development (min:1; max:36) (6,12,18,24,30,36,42,48,52), health responsibility (min:1; max:36) (3,9,15,21,27,33,39,45,51), physical activity (min:1; max:32) (4,10,16,22,28,34,40,46), nutrition (min:1; max:36) (2,8,14,20,26,32,38,44,50), interpersonal relationships (min:1; max:36) (1,7,13,19,25,31,37,43,49), and stress management (min:1; max:32) (5,11,17,23,29,35,41,47). The lowest obtainable score is 52 and the highest score is 208. An increase in the scores indicates that the individual applies the specified health behaviors at a higher level (19,27). The Cronbach Alpha value, which is the internal consistency reliability coefficient of the scale, is 0.92, and the reliability coefficients of the sub-dimensions are; health responsibility's is 0.77, physical activity's is 0.79, nutrition's is 0.68, spiritual development's is 0.79, interpersonal relationships's is 0.80, and stress management's is 0.64. In this study,

the Cronbach Alpha value of the scale was 0.83, and the reliability coefficients of the sub-dimensions of the scale were as follows: Health responsibility's was 0.72, physical activity's was 0.74, nutrition's was 0.73, spiritual development's was 0.72, interpersonal relationships's was 0.72, and stress management's was 0.73.

Ethics of the Study

In order to conduct the research, institutional and ethical approval were obtained from the Izmir Katip Celebi University Non-Interventional Clinical Research Ethics Committee (Decision Date: 29.04.2021, Decision No: 0223/2021) and from the public hospital where the research was conducted (Decision No: 02/2021). This study was carried out in accordance with the Declaration of Helsinki, the pregnant women were informed about the research, their verbal and written consent was obtained.

Data Analysis

The data obtained in the research were evaluated with the IBM SPSS (Statistical Package for the Social Sciences) Statistics 25 (IBM Corporation, Armonk, NY, USA) package program. The Kolmogorov-Smirnov test was used to evaluate the distribution of the data. Number, percentage, mean and standard deviation (min-max.) were used in descriptive statistics and in order to report the obstetric, current pregnancy-related features, and the rate of depression risk in pregnant women. It was observed that the EPDS and the HPLP-II scores did not present normal distribution. The Spearman correlation analysis was performed for assessing the relationship between the EPDS and the HPLP-II scores. The results were evaluated at the 95% confidence interval and the significance level of $p < 0.05$.

RESULTS

In the study, the mean age of the pregnant women were 27.63 ± 5.47 (16-42) years, the mean age at the first marriage were 22.50 ± 4.41 (15-37) years, and the mean duration of marriage were 4.83 ± 4.36 (1-20) years. 88.5% of them have a nuclear family (n=269), 43% of pregnant women are primary school (n=131), graduates, 79.3% do not work in any job (n=241), 60.5% have lived in rural areas for the longest time (n=184), 88.5% have social security (n=269), and 72.6% of them defined their income as equivalent to their expenses (n=221).

Table 4. The relationship between total and subscale scores of the EPDS and the HPLP-II of the pregnant women

		HPLP-II						
		Total Score	Spiritual Development	Nutrition	Physical Activity	Health Responsibility	Interpersonal Relationships	Stress Management
EPDS	r	-.179 [†]	-.194 [†]	-.184 [†]	-.154*	-.078	-.070	-.337 [†]
	p	0.001	0.001	0.001	0.006	0.165	0.218	0.000

r= Correlation analysis (Spearman Correlation Coefficient)*p<0.05, †p<0.01.

Table 1 contains the data related to obstetric and current pregnancies of pregnant women. The mean age at the first birth of the pregnant women were 22.37±3.69 (15-35) years, 81.5% of them were in the third trimester, 52.9% of them had normal body mass index (BMI) before pregnancy, 45.9% of them had 2-3 pregnancies. 51.6% had no living children, 86.6% had no miscarriage, 87.9% had no abortion, 51.9% had a vaginal delivery at the last birth, and 88.9% had a planned pregnancy.

Considering the characteristics of the pregnant women regarding their current pregnancies; 91.7% of them do not experience any problems during pregnancy and 95.5% of them do not experience violence, 88.2% do not smoke during pregnancy, 83.1% do not exercise, 84.1% think that they eat healthy during pregnancy, 59.2% of them come to their controls during pregnancy, 91.1% of them received information about pregnancy and 87.6% of them have social support, and 72.9% of pregnant women stated that they could cope with stressful events in their life.

In the study, 19.1% of the pregnant women were found to be at risk of depression according to the EPDS (Table 2). Table 3 shows the distribution of the total HPLP-II scores and the mean scores of the subscales. The total mean score of the HPLP-II is 136.83±24.11, and the mean scores of the subscales are from the highest to the lowest respectively; spiritual development's is 26.55±5.27, interpersonal relationships's is 26.02±4.98, nutrition's is 23.89±4.39, health responsibility's is 23.75±5.25, stress management's is 20.54±4.37, and physical activity's is 15.59±4.91.

There was a negative and significant relationship between the mean scores of the EPDS and the mean scores of the HPLP-II total (r=-.179, p<0.01), spiritual development (r=-.194, p<0.01), nutrition (r=-.184, p<0.01), physical activity (r=-.154, p<0.05) (low correlation), and stress management subscales (r=-.337, p<0.01) (moderate correlation) (Table 4). As the

depression symptom level of pregnant women increased, their spiritual development, adequate and balanced nutrition, physical activities, health responsibility, interpersonal relationships, stress management, and healthy lifestyle behaviors decreased.

DISCUSSION

This study was carried out to examine the effects of depressive symptoms on healthy lifestyle behaviors during pregnancy. In the study, 19.1% of the pregnant women were found to be at risk for depression (EPDS ≥ 12) (Table 2). In studies conducted in Turkey, the risk of depression during pregnancy varies between 3.7-28.6% (5-9) however, the rate is 4.1-17.9% worldwide (2,10-12). The risk of depression in pregnant women in this study is similar to the risk of depression in pregnant women in studies conducted in Turkey. It is stated that the lack of adverse events related to pregnancy, having a planned pregnancy, and social support reduces the risk of depression and affects coping positively (8,9,14,15,18). In this study, 91.7% of the pregnant women did not have any problems during pregnancy, 88.9% of them had planned pregnancy and 87.6% had social support, and this may have reduced the risk of depression. In addition, the risk of depression in pregnant women in this study (19.1%) is higher than the risk of depression in pregnant women worldwide (4.1-17.9%) (2,10-12). Depression in pregnancy is an important health problem that has different causes and can be affected by socio-cultural characteristics (8,9). Therefore, socio-cultural differences between countries may have caused this result (4.1% in Hong Kong; 12.4% in Italy; 12.8% in Czech Republic; 17.9% in Hungarian) (2,10-12). Another reason why the risk of depression in pregnant women in our study was higher than the rates were given worldwide may be that the majority of the pregnant women in our study had a low level of education (43% primary school graduates), were mostly unemployed (79.3%)

and were mostly in the third trimester (81.5%). It is stated that low education level and not working in any job increase the risk of depression during pregnancy (3,9,28). In addition, the different reported depression risks in pregnant women may be due to the fact that the studies were conducted at different time intervals of pregnancy (differences between trimesters) and different diagnostic criteria were used. Also, In addition, this difference incidence in the risk of depression in studies may have been measured in different trimesters of pregnancy and used different scales.

When the HPLP-II total score and the mean scores of the subscales of the pregnant women were examined in this study; among the mean scores of the subscales the highest score was for spiritual development, second place was for interpersonal relationships, and the lowest score was for physical activity (Table 3). Other study results also confirm this result (21,23,29-32). In the literature, it has been stated that when individuals have high spiritual development, self-awareness, and self-actualization their interpersonal relationships also develop positively. It is reported that individuals who have spiritual development and aim to achieve spiritual satisfaction have better interpersonal relationships and are humanistic, productive, sensitive, and social (33). In this context, it was an expected result that the mean scores of the spiritual development and the mean scores of the interpersonal relationships of the pregnant women were parallel to each other. In addition, the high spiritual development and interpersonal relationships scores of the pregnant women participating in this research may be due to the fact that the pregnant women are honest and have high self-consciousness, high self-awareness, positive thinking habits, self-development, and positive experiences. In addition, this situation can be associated with the cultural structure and religious beliefs experienced by pregnant women in Turkey (31,33). However, Bahabadi et al. (34) also examined healthy lifestyle behaviors of pregnant women with the HPLP-II and found that, unlike our study, the averages of the stress management scores of the pregnant women were the highest among the subscales and also were higher than in our study (their's is 29.6 ± 2.2 ; our's is 20.54 ± 4.37). The reason for this may be the lower education level (Primary education rates, their's: 43% our's: 37%) and the higher unemployment status of the pregnant women in our study (unemployed: our's: 79.3% their's: 66%).

As education levels and participation in working life increase, socialization, social support, and coping skills also improve (30,32,35). Therefore, stress management and coping with stress can be easier. In addition, 27.1% of the pregnant women in this study stated that they could not cope with stressful events. This may have caused the mean scores of stress management to be lower in our study.

The physical activity subscale had the lowest mean scores in this study (Table 3) which is similar to the results of the study of Fathnezhad-Kazemi and Hajian (36). In the same study, pregnant women reported that they did not know the appropriate exercises during pregnancy therefore, did not exercise (36). In our study, 91.1% of the pregnant women did not receive information and 83.1% did not exercise during pregnancy. In this context, the mean scores of the physical activity subscale may have been low. In addition, the fact that most of the pregnant women were in the last trimester of their pregnancy (81.5%) and lived in a rural area for the longest time (60.5%) may have affected their physical activity levels (Table 1). The lack of or insufficient areas for physical activity may have limited their physical activities.

As the depression symptom level of the pregnant women increased, their spiritual development decreased (Table 4). Omidvar et al.'s (18) findings show parallelism to these findings. Spiritual development shows the individual's ability to realize himself, her/his life goals, how well she/he knows himself or the ways to be satisfied, and life satisfaction (33). One of the reasons for this negative relationship between the depression symptom level and their spiritual development may be that 4.5% of the pregnant women in this study experienced violence during pregnancy. Violence is an important situation that affects an individual's spiritual development and self-esteem (4,7,35,37). Taspinar et al. (7) and Ghoneim et al. (37) stated that violence during pregnancy increases the risk of depression. Colak et al. (4) reported that violence aggravates the symptoms of depression and women who experience violence see themselves as less valuable. Additionally, it is stated that depression during pregnancy is associated with thoughts of worthlessness, lack of interest, decreased concentration, unhappiness, and dissatisfaction in life (4). In this context, this may be a second reason for the decreases in the spiritual development of the pregnant women due to the increase in the levels of depression symptoms.

In the literature, it is stated that depression causes changes in eating behaviors (4,17,38). In this study, as the depression symptom level of pregnant women increased, adequate and balanced nutrition decreased. Omidvar et al.'s (18) study shows parallelism with these results. In addition, 19.1% of the pregnant women were at risk of depression and 15.9% of them stated that they did not have a healthy diet during pregnancy. It is thought that this situation affects the adequate and balanced nutrition of pregnant women.

In the study, as the depression symptom level of pregnant women increased, their physical activity levels decreased (Table 4). One of the reasons for this may be that depression causes unhappiness, immobility, and sedentary behavior (4,39). Another reason may be that the majority of pregnant women (83.1%) did not exercise during pregnancy. It is known that exercise increases the feeling of happiness and the secretion of endorphins, which in turn reduces the risk of depression. Endorphin secretion is the body's self-reward system, and the feeling of happiness experienced after exercise is due to the effect of endorphin secretion (40). It has been reported in the literature that physical activity and exercise reduce the level of depressive symptoms during pregnancy (17,18,39,41). These reasons may explain the negative relationship between the depression symptom level and physical activities of pregnant women.

In this study, stress management decreased as the symptom levels of depression of the pregnant women increased (Table 4). Omidvar et al.'s (18) study results are similar to the results of this study. However, in the study, although the pregnant women mostly stated that they could cope with stressful events, 27.1% of them stated that they could not cope. Pregnant women who can not cope with stressful events are more likely to experience depression symptoms during this period. Thus, depression experienced during pregnancy also negatively affects stress management. Zaman et al. (16) and Atalay and Özyürek (28) stated that the levels of depressive symptoms in pregnancy increase, especially in the third trimester. In our study, the majority of pregnant women (81.5%) were in the third trimester, which may have affected the increases in their levels of depressive symptoms. In this context, it is thought that the increase in the level of depressive symptoms complicates the stress management of pregnant women.

There was no statistically significant relationship between the levels of depression symptoms and the health responsibility, contribution to their health, and interpersonal relationships of the pregnant women ($p>0,05$) (Table 4). In this study, although the mean age at first birth of pregnant women was 22.37 ± 3.69 , the number of pregnancies was low, there was no living child, the majority of them were checked during pregnancy, their BMI was normal before pregnancy, there was no miscarriage or abortion, their pregnancy was planned, they did not have any problems related to pregnancy, and not smoking may have reduced the depression symptom levels of pregnant women also positively affected the perceptions of health responsibilities and health awareness. It is also known that women with social support during pregnancy are less risky for depression (9,14,18). In this study, 87.6% of pregnant women stated that they had social support. Perceived social support during pregnancy positively affects women's ability to cope with depression symptoms. In addition, it is stated that social support also affects interpersonal relationships positively (14,18,32,34,36). These reasons may have improved the health responsibility and interpersonal relationships of pregnant women by reducing the level of depression symptoms.

Limitations

The findings obtained from the study are limited only to the findings of the pregnant women who visited the specific obstetrics clinics and the Non-Stress Test (NST) room during the data collection process and agreed to participate. Therefore, it may affect the generalizability of the results.

CONCLUSION

It was found that 19.1% of the pregnant women were at risk of depression in this study (Table 2). It was determined that as the level of depression symptoms increases during pregnancy, the spiritual development, adequate and balanced nutrition, physical activities, stress management, and healthy lifestyle behaviors of pregnant women decreases (Table 4). In line with these results, women should be screened for depressive symptom levels, depression risk factors, and healthy lifestyle behaviors from the preconception period. Women with risk factors, high levels of depressive symptoms, and poor healthy lifestyle behaviors should be provided training and counseling by health professionals from the pre-pregnancy period. Thus, the level of depressive

symptoms, the risk of depression, and poor health behaviors that can be seen during pregnancy will be minimized. In this regard, posters and billboards can be prepared in public and non-public areas, and awareness can be increased through social media.

The services provided by healthcare professionals in the preconception period can be improved, possible risky situations can be identified and controlled, and the necessary interventions can be made in the early period. The study has not been found in Turkey that reveals which level of depressive symptoms affects healthy lifestyle behaviors in pregnant women. Since there are limited studies in the literature worldwide, it is recommended to conduct comprehensive intervention studies that examine and manage the depressive symptoms on healthy lifestyle behaviors in pregnant women from different cultures.

Acknowledgement: We would like to thank all the participants for helping with recruitment for the study.

Author contribution: Ekin Dila Topaloglu Oren, Gul Ertem, and Ozgur Yasar designed the study, collected and analyzed the data and prepared the manuscript. ICMJE authority criteria has been complied.

Conflict of interests: The authors declare that they have no competing interests.

Ethical approval: In order to conduct the research, institutional and ethical approval were obtained from the Izmir Katip Celebi University Non-Interventional Clinical Research Ethics Committee (Decision Date: 29.04.2021, Decision No: 0223/2021) and from the public hospital where the research was conducted (Decision No: 02/2021). This study was carried out in accordance with the Declaration of Helsinki, the pregnant women were informed about the research, their verbal and written consent was obtained.

Funding: There were no sources of grant funding used for this publication.

Peer-review: Externally peer-reviewed.

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