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The Relationship between Physical Activity during Pregnancy and Postpartum Mood in Primiparous Women

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ABSTRACT

BACKGROUND AND OBJECTIVE: Physical activity might reduce postpartum depressive symptoms and improve temperament. This study aimed to evaluate the relationship between physical activity during pregnancy and postpartum mood in primiparous women.

METHODS: This cohort study was conducted in 165 primiparous women aged 18-35 years referring to the healthcare centers in Tehran, Iran, during 2013-2014. The participants were chosen through stratified random sampling and divided into two groups of low physical activity (n=68) and moderate or high physical activity (n=97). Both groups completed the International Physical Activity Questionnaire (IPAQ) during weeks 28 and 34 and Depression Anxiety Stress Scale (DASS) at the end of the sixth postpartum week. For each sub-scale, the minimum and maximum possible scores of this scale are 0 and 21, respectively.

FINDINGS: Mean total scores of stress, anxiety, and depression of the low physical activity group were 9.85±5.74, 5.61±5.11, and 6.23±5.77, respectively, while for the moderate or high physical activity group they were 9.88±5.84, 5.72±5.03, and 6.51±5.70, respectively. In addition, no significant difference was observed between the two groups in terms of mean total score of stress (p=0.969), anxiety (p=0.585), and depression (p=0.396) at the end of the sixth postpartum week. Moreover, no statistically significant relationship was observed between the level of physical activity during pregnancy and postpartum mood.

CONCLUSION: According to our results, physical activity during pregnancy is not associated with postpartum stress, anxiety, and depression.

KEY WORDS: *Physical activity, Stress, Anxiety, Depression, Pregnancy, Postpartum.*

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Introduction

Physical activity is defined as any body movement performed by skeletal muscles and consuming sufficient energy, which should not be misconstrued as sport. Physical activity incorporates activities such as playing, walking, doing housework, gardening, and dancing (1). On the other hand, physical inactivity is considered as the fourth leading risk factor for global mortality (2). Temperament is a stable feeling, generally affecting the perception of individuals about the world and their function. In general, variations in postpartum mood are categorized as grief, depression, and postpartum psychosis based on the severity, onset time, and duration of symptoms (3). While mental health problems in the first trimester have been evaluated in the majority of high-income countries, few studies have been conducted on this issue in low- and middle-income countries (4). In developing countries, major mental health issues have been observed in one in of 3-5 women during pregnancy and postpartum periods; however, this rate was estimated at one in 10 women in developed countries (5).According to the literature, stress during pregnancy can be associated with some degrees of mental illness (6). Mental health issues, including depression and anxiety, are considered as the most common mental health disorders (5, 7) and are some of the most current problems during and after pregnancy worldwide (7).

Evidence suggests that 10-15% of women are diagnosed with mental disorders, especially anxiety that is one of the most common mental problems (8). Vulnerability to depression increases during puerperium (9). It seems that primiparous women might be at an increased risk of fatigue, distress, anxiety, frustration, and depression in early postpartum period (10). Since these symptoms affect 6.5-12.9% of women in the first postpartum year (12), it seems necessary to conduct relevant interventions to address family issues, as well as social and personal functions in women suffering from depressive symptoms (13).

According to the previous studies, postpartum depression is one of the most serious health risks and a common disorder adversely affecting mothers, neonates, and families (11). Therefore, promoting awareness regarding the relationship between physical activity and anxiety might help physicians recognize those women at risk of postpartum fatigue, distress, or even depression (14).

Part of our understanding regarding the effects of physical activity on postpartum mood is based on some previous studies conducted on the impact of physical activity on postpartum depressive symptoms (15-18). Norman et al. conducted a study to evaluate the effects of therapeutic exercise program and healthcare education on maternal mental health. However, the results were indicative of a significant improvement in depression scores in the intervention group (19). In a study by MacDonald, conducted on 130 Canadian primiparous women, no significant association was observed between the level of physical activity during pregnancy and temperament at the sixth and 12th postpartum weeks (3).

Enhanced physical activity could improve postpartum maternal health (20, 21). Symons Downs et al. concluded that physical activity could significantly decrease postpartum depressive symptoms, enhance mood, and increase energy and endurance during and after pregnancy (22). Therefore, participation in physical activities to fight against common postpartum mental and physical disorders seems to be of paramount importance (23). Given the short- and long-term benefits of physical activity for overall health, it seems necessary to conduct studies on the impact of physical activity on temperament during and after pregnancy (24), Based on the review of available literature, no studies were found on the relationship between physical activity during pregnancy and its effects on postpartum mood in Iran. Since maternal, fetal, and family health is highly affected by behavioral symptoms, this study was conducted to investigate the relationship between physical activity during pregnancy and postpartum mood.

Methods

This cohort study was conducted on 165 primiparous pregnant women after obtaining approval of Ethics Committee. The samples were divided into two groups of low physical activity and moderate or high physical activity. In this study, the inclusion criteria were 1) aged 18-35 years, 2) gestational age of 28-34 weeks, 3) Iranian nationality, 4) willingness to participate in the study, 5) having a phone, 6) singleton pregnancy, and 7) residence in Tehran. Meanwhile, the only exclusion criterion was being diagnosed with diseases majorly limiting physical activity (24, 26).

Based on the study by MacDonald et al. (3) on the relationship between physical activity and stress, anxiety, and depression, sample size was estimated at 66 with odds ratio of 3.2, 95% confidence interval, and

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80% power using the G-Power software. However, the final sample size was considered 165 regarding cluster sampling design (double) effect and predicting 25% attrition (27). In the pilot study, approximately 14% of the samples had low physical activity. Given the aim of the present study and the importance of balancing the samples to provide the required test power, sampling was continued until selection of 55 subjects with low physical activity. Sampling was performed in healthcare centers affiliated to Shahid Beheshti University of Medical Sciences in Tehran, Iran, during 2013-2014. With regard to the six districts of Tehran, 12 centers and 10 healthcare stations were selected using stratified random sampling. Afterwards, the samples were selected from the list of pregnant women with gestational age of 28-34 weeks using the same sampling method.

After contacting the subjects via phone calls and explaining the objectives of the study, they were asked to visit the healthcare centers to complete the questionnaires in case of willingness to participate and meeting the inclusion criteria. Written informed consent was obtained from the participants at the first visit, and the questionnaires were completed by the subjects thereafter. If the predetermined sample size was not achieved in the two groups, the same process pursued. After six weeks of postpartum follow-up, the samples visited in person and completed the DASS by interview.

A researcher-made demographic questionnaire, IPAQ, and DASS were employed to collect data. The short version of IPAQ includes seven items, completed by the participants during pregnancy and at the sixth postpartum week.

Data were collected in terms of type of physical activity performed by primiparous women (as part of their daily routines) in the past seven days (28). First, metabolic equivalents were calculated for each physical activity at 3.3, 4, and 8 for walking, moderate, and intense physical activities, respectively. Then, these numbers were multiplied by the number of days and duration of the mentioned physical activity (in minute) (29). Validity and reliability of DASS were confirmed by Baghbani Moghadam et al. at the Cronbach's alpha of 0.7, which is indicative of a good internal consistency. Reliability of this questionnaire was also established using Spearman–Brown prediction formula (0.9) (30). Stress, depression, and anxiety of the samples were evaluated using the self-reporting DASS-21 scale at the sixth postpartum week. This scale consists of 21 items and three sub-scales including stress, depression, and anxiety (seven items in each sub-scale), rated using a 5-point Likert scale ranging from never (zero) to a lot () (31). The minimum and maximum scores of each sub-scale were zero and 21, respectively (32)This scale has also been validated in Iran and its reliability has been confirmed, as well (33). Content and face validities were used to approve the validity of the study tools. In addition, its reliability was demonstrated in terms of internal consistency (Cronbach's alpha coefficient) and replicability (intraclass correlation [ICC]) using test-retest method and 30 subjects. Cronbach's alpha coefficient and ICC (95% confidence interval) were estimated at 0.93 and (0.96-0.81) 0.90, respectively. Data analysis was performed in SPSS version 21 and normality of quantitative variables was evaluated using skewness and kurtosis.

The results were indicative of normal distribution of stress, anxiety, and depression scores. Mann-Whitney U and Chi-squared tests were run to investigate the relationship between physical activity and total scores of stress, depression, and anxiety. In addition, P-value of less than 0.05 was considered statistically significant.

Results

The stages of the present study are presented in figure 1.



Figure 1. Study procedure

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According to the results, samples of the two groups were homogenous in terms of demographic characteristics (table 1). Mean total score of physical activity during pregnancy was 2563.7±3414.6 (table 2). Mean values for stress, anxiety, and depression during pregnancy were 9.8±5.6, 5.5±5.3, and 5.8±5.9, respectively, while in the moderate and high physical activity group, they were 9.88±5.84, 5.72±5.03, and 6.51±5.70, respectively. Nevertheless, no significant difference was observed between the groups regarding the total mean scores of stress (p=0.969), anxiety (p=0.585), and depression (p=0.396) at the end of the sixth postpartum week.

According to our findings, no statistically significant link was observed between the level of physical activity during pregnancy and stress (p=0.823), anxiety (p=0.820), and depression (p=0.807) (table 3).

Table 1. Evaluation of the relationship between demographics of pregnant women with low and moderate or high physical activity referring to the healthcare centers in Tehran, Iran at the sixth postpartum week

Physical activity	Low (n=68)	Moderate or high (n=97)	P-value
Body Mass Index (kg/m^2)			
≤19.8	7(10.3)	8(8.2)	*0.501
19.8-25.9	40(58.8)	62(63.9)	
26.0-29.9	12(17.6)	21(21.6)	
≤30.0	9(13.2)	6(6.2)	
Occupational status			
Housewife	63(93)	87(90)	#0.516
Employed	5(7.4)	10(10.3)	
Educational status			
Elementary	4(6)	6 (6.2)	*0.784
Junior and senior high school	10(15)	21(22)	
Diploma	39(57.4)	39(40.2)	
Academic education	15(22.1)	31(32)	
Sufficient income for living expenses			
Sufficient	5(7.4)	23(24)	*0.032
To some extent	53(78)	62(64)	
Insufficient	10(15)	12(12.4)	
Number of family members			
Two	54(79.4)	83(86)	#0.300
More than two	14(21)	14(21)	
Housing status			
Personal residence	17(25)	29(30)	#0.717
Rental or family	51(75)	68(70.1)	
*** **Preferable feeding mode**			
Breastfeeding only	61(90)	79(81.4)	#0.306
Breast milk with bottle	7(10)	18(18.5)	

*Chi-squared test process, #Chi-squared test

***There was only one case of bottle-feeding in the group of moderate or high physical activity.

Table 2. Total score of physical activity in women with low and moderate or high physical activity referring to the healthcare centers in Tehran, Iran

Physical activity	*Mean±SD	Median	25-75%	Domain
Total score	2536.72±3413.6	1188	436-3360	0-28476
Low	1680.93±2204.73	775	267.50-1731	0-9786
Moderate or high	3182.58±3946.54	1680	706.50-5113	0-28476

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Table 3. The relationship between mood at sixth postpartum week and low and moderate or high physical activity in women referring to healthcare centers in Tehran, Iran

Physical activity	Low (N=63)	Moderate or high (N=84)	P-value
Stress			
Low (0-7)	22(35)	32 (37)	*0.823
Moderate(8-14)	26(41)	34(39.5)	
Severe(≥15)	15(24)	20(23.5)	
Mean±SD	9.8±5.6	9.9±5.8	#0.969
Anxiety			
Low(0-7)	45(72.0)	60(70.0)	*0.820
Moderate(8-14)	14(22.0)	20(23.0)	
Severe(≥15)	4(6.0)	6(7.0)	
Mean±SD	5.5±5.3	5.7±5.0	#0.585
Depression			
Low (0-7)	42(66.0)	53(62.0)	*0.807
Moderate(8-14)	13(21.0)	24(28.0)	
Severe(≥15)	8(13.0)	9(10.0)	
Mean±SD	5.8±5.9	6.5±5.7	#0.396

* Chi-squared test process, # Mann-Whitney U test

Discussion

According to the results of the present study, no significant relationship was observed between physical activity and postpartum stress, anxiety, and depression. The current study is the first cohort study aiming to appraise the association between physical activity during pregnancy and postpartum mood in Tehran, Iran. Armstrong demonstrated attenuated depressive symptoms and improved adjustment in the intervention group with walking program (17), which was not in line with outcomes of the present study. The discrepancy between our results and those obtained by Armstrong and another study by Radloff could be due to homogenizing participants in terms of depression level before the evaluation of physical activity level and its association with postpartum depression, whereas we determined the level of physical activity during pregnancy and evaluated postpartum mood (34). Although previous reports have exhibited the positive effect of physical activity on postpartum depression (3), temperament, energy, endurance (22), and common mental and physical disorders during pregnancy (29), in the current study, no significant relationship was found between physical activity during pregnancy and postpartum mood. This inconsistency in results might be due to the different times of mood appraisal, which was performed in the sixth postpartum week in this study, and the 12th postpartum week in other studies. It seems that this 12-week interval is suitable for the samples to adjust to the new event in their life (i.e., being a mother) and might attenuate stress, anxiety, and even depression. Another study by Downs et al. conducted on 74 mothers in postpartum period was indicative of improved mood due to physical activity.This discrepancy in results might be due to the difference in time of mood evaluation. In the current study, this evaluation was conducted on the sixth postpartum week, while it was performed in the fifth postpartum month in the aforementioned study. It seems that this 12-week interval was a suitable for the samples to adjust to their new event in life (i.e., being a mother) and might lead to their decreased levels of stress and anxiety (22). The main limitations of our study were short time interval (26-28th week of gestation to sixth postpartum week) and lack of adequate follow-up during the mentioned period. Therefore, future studies are recommended to be conducted over longer periods of time with prolonged follow-ups and shorter time intervals. Moreover, this study was carried out on women residing in Tehran, which might not be generalized to residents of rural areas of this city or even other cities in Iran and women with underlying diseases. Given the importance of physical activity for promotion of overall health, conducting clinical trials is recommended to investigate the effect of regular physical activity during pregnancy on postpartum mood to gain an accurate understanding of the relationship between physical activity during pregnancy and postpartum mood.

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