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Influential factors in physical activity amongst pregnant women

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B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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abstract

Background: Correct and adequate physical activity during pregnancy has a significant effect on mother's health and fetal development. The aim of this study was to determine factors affecting physical activity in pregnant women.

Material and methods: The present study is an analytical descriptive study which was performed on 325 pregnant women. To collect data, a researcher-made questionnaire was used. Its design was based on the structures of the BASNEF model and the pregnancy physical activity questionnaire.

Results: Most of the pregnant mothers were inactive or lightly active, and only 6.13% of them had moderate activity and more than average. The components of the BASNEF model did not have any relation with the amount of the mothers' physical activity but the knowledge of pregnant women about physical activity in pregnancy has a significant relationship with the level of physical activity. Also there was a significant correlation between the mother's level of education, her employment status, gravid, and history of abortion and the level of physical activity.

Conclusions: Most of the pregnant mothers were inactive or lightly active. Only the knowledge of pregnant women about physical activity in pregnancy has a significant relationship with the level of physical activity.

Key words: physical activity, pregnant women, BASNEF model, knowledge.

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INTRODUCTION

During pregnancy, proper and enough physical activity plays a significant role in the mother's health and the growth of the fetus [1, 2]; hence, the American College of Obstetrics and Gynecology (ACOG) recommends at least 30 minutes of physical activity of medium intensity to the women with no pregnancy complications during most days of the week [3].

Some benefits of exercising during pregnancy are fitness, reduced cardiovascular diseases levels, prevention of stress urinary incontinence, prevention of backache, reduced depression levels, and weight gain control during pregnancy [4]. Despite the known benefits of physical activity during pregnancy, various studies indicate low levels of physical activity among pregnant women [5–7]; according to research, 60% of pregnant women in the US are inactive [8]. In addition, Esteghamati et al. [9] have reported that 40% of the Iranian population have little physical activity and that physical activity is lower amongst females. Hence, only 30% of Iranian women do exercise and 5–7% of them are pregnant women [10].

Different features can influence pregnant women's physical activity. Certain models can be used in order to determine the key influential factors in the behavior and the correlations between these key elements and features [11]. The BASNEF model is used for the study of behavior and planning with the purpose of indicating and changing the key elements in people's decision making. It provides us with a deep and rich understanding of people's beliefs, emotions, attitudes, and values that lead to healthy behavior. The BASNEF model includes the components attitude, subjective norms, behavioral intention, and enabling factors. BASNEF is a comprehensive and complete model which is adopted to study behaviors and plans to change them and to define the factors effective on individuals' decision making [12–15].

Therefore, considering the importance of physical activity during pregnancy, the shortage of studies on this subject, and the capabilities of the BASNEF model in recognizing the influential factors, the aim of this project is to study the influential factors in physical activity of the pregnant women visiting the health centers in Urmia by implementing the said model (BASNEF).

MATERIAL AND METHODS

Subjects

The present study is of a descriptive-analytical nature and was carried out on pregnant women visiting the health centers of Urmia in 2017. The sample volume was estimated at 300 with an attrition rate of 10%, resulting in a sample of 325 subjects. The sample included three groups of 100 women for each trimester. In order to estimate the volume of the sample, 20 subject were chosen for each component of the BASNEF model (attitude, subjective norms, behavioral intention, and enabling factors) and knowledge of pregnant women about physical activity in pregnancy [16].

Criteria for inclusion in the study were as follows: being covered by health centers in the Urmia district, age 18 to 45, absence of any physical problems or obstetrical problem that limit or forbid physical activity.

Tools

A questionnaire consisting of three parts was used in the present study. The first part includes the demographic factors of the pregnant women, such as age, level of education, occupation, spouse's occupation, spouse's level of education, the economic status, body mass index (BMI) before current pregnancy, the number of pregnancy, childbirth and abortion, the type of previous childbirth, and gestational age of pregnancy. The second part was designed based on the BASNEF model and included questions for the model components: attitude (5 questions), subjective norms (5 questions), behavioral intention (3 questions), and enabling factors (10 questions). Knowledge of pregnant women about physical activity in pregnancy was measured by 8 questions. Grading of the BASNEF model component questions was done as follows: the questions for attitude and subjective norms are scored according to Likert scale, that is "Strongly agree" (5 points), "Agree" (4 points), "Neither agree nor disagree" (3 points), "Disagree" (2 points), and "Strongly disagree" (1 point); the choices for the questions for behavioral intention were "Very frequently" (5 points), "Frequently" (4 points), "Often" (3 points), "Sometimes" (2 points), and "Never" (1 point); and the choices for the questions for enabling factors were "Yes" (3 points), "Somewhat" (2 points), and "No" (1 point), and the questions for the knowledge are scored as correct choice (1 point) or wrong choice or blank (0 point). In the third part of the questionnaire, in order to measure the subjects' physical activity, Physical Activity Questionnaire (PPAQ) was used.

PPAQ includes five sets of questions: occupational activities (five questions), daily household activities (12 questions), heavy physical activity (2 questions), commuting (3 questions), and sports/exercise (6 questions). The intensity of activities is calculated based on MET (a unit for estimating the metabolic expenditure while being physically active). One MET represents the consumption of 3.5 milliliters of oxygen per kilogram of body weight. The intensity of each activity of PPAQ is calculated by multiplication of the MET ratio and the time spent doing that activity. The amount of activity is calculated according to the type of activity and through summing the activity intensity calculated in one day. For example, if somebody spends half an hour a day on a heavy household activity such as sweeping, this number is multiplied by the MET of the activity (3 for sweeping); eventually, the total of all household activities' intensity number, the amount of activity at home is calculated. Overall, activity with a MET less than 1.5 is considered as inactivity, 1.5 to 3 is light activity, 3 to 6 is medium activity, and higher than 6 is considered heavy activity [17].

Reliability and validity of the tool

The reliability and validity of the PPAQ was accredited in 2004 by Chasan-Taber et al., and its reliability was confirmed with Cronbach's alpha value of 0.78 [17]. The reliability and validity of its Persian translation has been previously approved and has been used in Iran in studies on physical activity; its reliability was confirmed with Cronbach's alpha value of 0.85 [18, 19].

The questionnaire made by the researcher which was based on the BASNEF model was designed by using similar studies and scientific texts; and the content and the structure of the questionnaire was approved with the help of three professors of the midwifery department, three professors of the physical activity department, and two experts of health education department. In all items, the estimated content validity ratio (CVR=0.83) and content validity index

(CVI = 0.78) were in keeping with the standard values and the form of the questions for each section was finalized. The reliability of the questions in this section was assessed by means of Cronbach's alpha on a separate group of 30 people and the internal contingence (Cronbach's alpha) of the questions is 0.76 for attitude, 0.91 for behavioral intention, 0.87 for subjective norms, 0.83 for enabling factors and 0.72 for knowledge.

Sampling

After obtaining a reference letter from the vice chancellery for research of the Urmia University of Medical Sciences, we visited Urmia Health Centers' Headquarter and made a list of all the health centers and clinics in Urmia. Since there are 30 health centers in Urmia, we divided the city to northern and southern areas and chose 5 centers in each area on the map, making a total of 10 centers chosen. Then we visited the health centers; and from each center 10 mothers were chosen randomly (table of random numbers) for each trimester. We called the samples and gave them a general overview of the study and asked them to attend the health center to participate in the study; if the chosen person was hesitating to participate, she was replaced by the next sample. After informing the pregnant women about the current study, if they were willing to participate, gave their informed consent, and met the criteria for entering the study, they were chosen as samples and were handed in the questionnaire.

Data collection

A face to face interview based on the questionnaire was the data collection method. Interviews took place in the morning in the working hours of the health centers.

Data analysis

SPSS16 was used for analyzing the data; descriptive statistics and analytic statistics tests including Kolmogorov–Smirnov tests to determine data distribution normality, Pearson correlation coefficient to determine the relation between physical activity and scores on BASNEF model components, and the t-test to identify the relation of the demographic factors and physical activity were carried out, and the relation was meaningful at $p < 0.05$.

Ethics code

Present study meets the merits of IR.UMSU.REC.1394.257 ethics code issued by the Ethics Committee.

RESULTS

The women's mean age the was 25.52 ±4.92 years. Most of the women did not have college education and were housewives, 28% of them experienced their first pregnancy and most of them had a BMI in the normal range (Table 1).

The average and standard deviation of scores related to the BASNEF model components are presented in Table 2.

Data analysis showed that most of the pregnant women were inactive or had light activity; only 6.14% of them had a medium or higher level of activity (Table 3).

Table 1. Demographic profile of pregnant women referring to Urmia health centers

Variable	Category	Number (%)
Female education	no college education	297(91/4)
	college education	28(8/6)
Female employment status	employee	25(7/69)
	housewife	300(90/9)
Male partner's status	employee	51(15/7)
	other businesses	274(84/3)
Male partners' education	under the diploma	200(61/5)
	college education	125(38/5)
Economic status*	sufficient	284(87/4)
	inadequate	41(12/6)
Gravid	first pregnancy	93(28/2)
	more than one pregnancy	232(73/4)
History of childbirth	yes	232(71/3)
	no	93(28/6)
History of abortion	yes	64(19/7)
	no	261(80/3)
The type of previous delivery	vaginal delivery	171(52/61)
	cesarean section	61(18/76)
Living child	yes	224(68/9)
	no	101(31/1)
Body Mass Index	low	22(6/7)
	normal	227(69/8)
	overweight	59(17/9)

Table 2. Mean scores of the BASNEF model components and knowledge in pregnant mothers referring to Urmia health centers

Variable	μ ±SD
Knowledge (0-8)	6.29 ±1.53
Attitude (5-25)	21.28 ±3.33
Behavioral intention (3-15)	7.29 ±2.28
Subjective norms (5-25)	12.17 ±4.75
Enabling factors (0-30)	7.44 ±3.42

Table 3. The rate of physical activity of pregnant mothers referring to Urmia health centers

Variable	Number (%)
Inactivity	37(11.38)
Light activity	268(82.46)
Medium activity	9(2.76)
Heavy activity	11(3.38)

On the relation between demographic factors and the amount of physical activity of the pregnant women, data analysis showed that there is a significant statistical relationship between the woman's education level, the woman's occupation status, the man's occupation status, the number of pregnancies, and a history of abortion and the amount of physical activity (Table 4).

Table 4. The relationship between demographic characteristics and mean daily physical activity of pregnant women referring to Urmia health centers

Variable	Category	μ ±SD	*P-value
Female education	under the diploma	2.12 ±0.81	0/000
	college education	3.77 ±2.43	
Female employment status	employee	4.67 ±2.53	0/000
	housewife	2.07 ±0.64	
Male partners' education	under the diploma	2.21 ±1.13	0/31
	college education	2.34 ±1.16	
Male partner's job	employee	2.79 ±1.70	0/000
	other businesses	2.16 ±0.97	
Home status	the owner	2.23 ±1.20	0/45
	non-owner	2.33 ±1.01	
Family income	sufficient	2.27 ±1.11	0/76
	inadequate	2.21 ±1.31	
Gravid	first pregnancy	1.95 ±1.10	0/002
	more than one pregnancy	3.39 ±1.13	
Abortion history	yes	2.56 ±1.50	0/018
	no	2.19 ±1.02	

*T-test

ANOVA did not show any meaningful relationships between the mothers' BMI and the amount of physical activity either within or outside the group (P = 0.316).

Data analysis suggested that there is a direct significant relationship between the mothers' knowledge and their amount of physical activity, but the components of the BASNEF model did not have any relationship with the amount of the mothers' physical activity (Table 5).

Table 5. The association of physical activity with the scores of the BASNEF model and knowledge of women referring to Urmia health centers

Variable	Attitude	Subjective norms	Behavioral intention	Enabling factors	Physical Activity
Knowledge	P = 0.24	P = 0/000	P = .024	P = .38	P = .009
	*0/125	**-.122	*-.125	-0.4	**.14
Attitude		P = 0/000	P = .94	P = .65	P = .34
		**-.202	-.004	.026	.048
Subjective norms			P = .31	P = .29	P = .33
			0.056	.006	0.054
Bahavioral intention				P = 0/000	P = .57
				**.039	.031
Enabling factors					P = .67
					.02

*Significant relationship at the level of 0.05

**Significant relationship at the level of 0.01

DISCUSSION

The present study was designed and carried out aiming to utilize the BASNEF model for predicting influential factors of physical activity amongst pregnant women visiting health centers in Urmia.

Analysis of the data on the amount of physical activity in pregnant women showed that most of them do light physical activity on a daily basis during pregnancy. The results of the study conducted by Clarke suggested that during pregnancy women's day-to-day activity and occupational activity drops down in comparison with the time prior to pregnancy [20]. The results of the study by Oken also suggested that women's activity level decreases during pregnancy [21]. Roushan's study also suggested that most women tend to experience a decrease in day-to-day physical activity while being pregnant [6]. Pduovigen's study showed as well that physical and occupational activity of women declines during their pregnancy, and that most women have light physical activity in their pregnancy [22]. In Akbari's study, most pregnant women had light physical activity every day. The results of this study are in agreement with the results of the aforementioned studies. It could be said that due to the lack of knowledge about the positive correlation between physical activity and the childbirth results as well as due to fear of side effects of physical activity, pregnant women choose an inactive lifestyle during their pregnancy.

The current study suggests a relationship between mothers' level of education, occupation status, times of pregnancy, and record of abortion with the amount of physical activity during pregnancy. The average amount of physical activity was higher among mothers with higher education, having a job, with an earlier experience of pregnancy or a record of miscarriage. In Akbari's study there was a positive relationship between mothers' education level and occupation status and their physical activity; those who had higher education and those who had a job were more physically active [23]. In Dabiran's [24] study too, a positive relationship was observed between pregnant women's physical activity and their education level and job status. In Evenson's [25] study, there was a meaningful relationship between the educational level and physical activity of pregnant women, but there was no relationship between the intensity of their physical activity and their job status or a number of their children. The results of this study are in agreement with the results of the studies mentioned. It could be said that mothers with higher educational levels have a better knowledge of the benefits of physical activity during pregnancy; that knowledge causes them to be more physically active than mothers with lower educational levels. In addition, mothers who are more educated have jobs more often, and their occupational activity also makes them more active. Since multigravida mothers have an earlier experience of pregnancy, they are less afraid of a possible negative influence of pregnancy; they also have other child(ren) at home to look after; hence, they are more physically active than the primigravida mothers.

In this study, a positive relationship was observed between the mothers' knowledge about physical activity during pregnancy and their daily physical activity. In the study carried out by Abedzade, an observation was made on the positive relationship between knowledge and exercising [26]. In Salehi's study [27] too, one of the facilitators of physical activity was having knowledge about its benefits. Harris [28] showed in his work that increasing women's knowledge about physical activity during pregnancy causes behavioral changes. It appears

that mothers' worries about exercising and sport during pregnancy relates to their lack of knowledge, if and what kinds of sports are permitted to do and how to do them; since misleading information is an influential factor on their behavior, these false beliefs lead women to choose an inactive lifestyle during pregnancy. In addition, obviously, knowing about the benefits of physical activity leads to an improvement in the attitude and to increasing women's intention to do it [29, 30].

Components of the BASNEF model failed to predict the amount of physical activity in pregnant women. In Ouji's study, however, the physical activity of mothers after childbirth and the components of the BASNEF model were meaningfully related [31]. The reason for the difference in the results could be the difference in the amount of mothers' activity. That is because of the 17% of women having medium or heavy daily activity in the mentioned study in comparison to the 6% of women having medium or heavy daily activity in this study. Therefore, educative mediation for motivating and guiding women for physical activity during pregnancy is in order.

CONCLUSIONS

In this study, data analysis showed that most pregnant women participating in the study were either inactive or had only light activity. The knowledge of pregnant women about physical activity in pregnancy has a significant relationship with the level of their physical activity.

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APPENDIX 1. QUESTIONNAIRE

Knowledge of pregnant women about physical activity

1. All healthy pregnant women should have at least 30 minutes of average physical activity per day.
2. Physical activity and exercise in pregnancy can be beneficial for the development of the fetus.
3. Exercise during pregnancy can lead to weight loss in the baby.
4. Regular physical activity helps control stress.
5. Exercise and physical activity in pregnant women, with no health problems, may cause abortion.
6. Short trips during pregnancy are dangerous.
7. Walking in pregnancy is dangerous.
8. Mothers who do exercise during pregnancy have a very short recovery.

Attitude of pregnant women to physical activity

1. Regular physical activity during pregnancy helps me to keep my body fit.
2. Regular physical activity during pregnancy helps me to have more energy.
3. Regular physical activity during pregnancy helps me to be more charming.
4. Regular physical activity during pregnancy helps me to control my stress.
5. Regular physical activity during pregnancy helps me to feel fresh.

Questions about the structure of subjective norms

1. My mother and my sister believe that physical activity is essential during pregnancy.
2. My partner considers physical activity essential during pregnancy.
3. My in-laws consider physical activity essential during pregnancy.
4. Doctor or health workers believe that physical activity is essential during pregnancy.
5. My friends and neighbors say that physical activity is necessary during pregnancy.

Questions about the behavioral intention

1. I intend to have regular exercise within the next month (at least three times a week).
2. It is very likely that I will have a regular exercise program (at least three times a week) in the current pregnancy.
3. I intend to have a regular exercise program (at least 3 times a week) after childbirth.

Questions about the enabling factors

1. I am busy at home but I have enough time to exercise.
2. I have enough skill in doing exercises.
3. I have a good place to exercise.
4. The gym is within minutes from my house.
5. I have access to the equipment necessary for exercise.
6. I have good friends to go to the gym or to prepare for childbirth.
7. My friends are interested in doing exercises.
8. Regular physical exercise is not expensive for me.
9. It is costly for me to exercise.
10. I am interested in doing exercises.

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