



Health-Promoting Lifestyle and Eating Behavior Patterns in Pregnant Women: A Cross- Sectional Study

Sepideh Hajian ¹ , Armin Aslani ² , Azita Fathnezhad-kazemi ^{3,*}

¹ Associate Professor, Department of Midwifery & Reproductive Health, Faculty of Nursing & Midwifery, Shahid Beheshti University of Medical Sciences, Tehran, Iran

² Medical student, Student Research Committee, Islamic Azad University, Tabriz branch, Tabriz, Iran

³ Assistant professor, Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz Medical Sciences, Islamic Azad University, Tabriz, Iran

*Corresponding author: Azita Fathnezhad-kazemi, Assistant professor, Department of Midwifery, Faculty of Nursing and Midwifery, Tabriz Medical Sciences, Islamic Azad University, Tabriz, Iran. E-mail: kazemi56@iaut.ac.ir

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Abstract

Introduction: Weight gaining during pregnancy is under the influence of an adopted lifestyle. For planning appropriate interventions to prevent obesity in pregnancy, it is essential to have a better perception of health-promoting behaviors. This study aimed to evaluate Health-promoting lifestyle and eating behavior patterns in pregnant women.

Methods: A cross-sectional study was carried out on 360 pregnant women by a multistage cluster sampling method for a period of 6 months from March-August 2017 in Tabriz, Iran. Data were collected by self-reported questionnaires including demographic and obstetric, health-promoting behaviors (HPLPII), and eating behavior patterns questionnaires. Descriptive and inferential statistics, namely Pearson's test were used to evaluate the association between variables.

Results: The Mean (SD) total score of health-promoting behaviors in pregnant women was 135.21 (20.03) and maximum and minimum scores were perceived by Spiritual growth 26.84(4.90) and physical activity 16.71(40.14) respectively. In eating behavior patterns, the greatest score was received by eating healthy and low-fat meals and cultural behaviors. According to the Pearson Correlation test, there was a significant inverse relationship between health-promoting behaviors and fast food consumption ($P < 0/001$). Also, a significant direct relation was detected between health-promoting behaviors and the cultural eating pattern.

Conclusions: Intermediate scores received in adopting health-promoting behaviors suggest the habits need special attention regarding stress management and physical activity in pregnant women. Despite the tendency to low-fat meals, dietary consultation and informative programs are essential. Also, a comprehensive approach to adopting a healthy lifestyle is required.

INTRODUCTION

One of the biggest health challenges in the current century is the increased rate of obesity, overweight and its consequences [1, 2]. More than two billion (39 percent) of world population are obese or overweight and women comprise 40% of this population [3]. As expected, most of women, enter their pregnancy period

being either obese or overweight [1, 3, 4]. On the other hand, pregnant women are prone to obesity and overweight [5, 6]. Based on studies, only 40% of women have proper weight gain during pregnancy [7]. Gaining improper weight during pregnancy is under the influence of lifestyle and individual tendency toward

healthy behaviors [8, 9]. In accordance to social acceptance, adopted lifestyle during pregnancy has long-lasting effect on maternal-child health and quality of life [10-12]. According to studies, most of the pregnant women are trying to adopt a healthy lifestyle for achieving better pregnancy outcomes [13, 14]. However, despite the limited consumption of certain foods and drinks like alcohol, tea and caffeine and adopting a healthy diet during pregnancy, the consumption of healthy and essential nutrient such as fruits, vegetables, proteins and low fat foods is not sufficient for achieving better outcomes [15, 16]. More than one fourth of the pregnant women specially at first half of the pregnancy lose their control over their eating habit and emotional eating and excessive food consumption increases which is a risk factor for obesity and overweight [17, 18]. However, inappropriate weight gaining has adverse effects on pregnancy outcomes, such as premature birth, low birth weight, gestational hypertension and diabetes mellitus and it could increase obesity in children [18, 19]. It has been proven that maternal eating habit could have a positive effect on child's appetite [17]. While adopting healthy behaviors is one of the basic criteria for an underlying disease and prevention of diseases is directly related to these behaviors [16, 20]. However, most pregnant women do not comply with health recommendations for eating and physical activity [21, 22]. In a study conducted in Poland, it was reported that women attending antenatal classes had more favorable health-related nutritional behaviors in comparison with those not attending [20]. In another study in Turkey, examining the association between university students' mindful eating and health-promoting lifestyle status with their body mass index among students showed that as the mindful eating questionnaire scores increased, HPLP-II scores and all the sub-scales of HPLP-II increased significantly, also the total score of HPLP-II had a correlation with 4 sub-scales (disinhibition, eating control, eating discipline, and interference) [23]. Pregnancy is the proper time for doing lifestyle adoption related interventions, because pregnant women are in close contact with health care providers [4, 24], also due to their concern for fetus wellbeing, there is a tendency for adopting healthy behaviors. Therefore, ensuring proper adoption of healthy behaviors could be effective in providing a safe pregnancy and delivery [24, 25]. However, there are limited data about healthy behaviors such as eating habits and healthy behaviors during pregnancy. Studies on the matter of healthy lifestyle interventions specially weight gain during pregnancy have contradictory results. Familiarity with health-promoting lifestyle in pregnant women and conduction of additional studies about eating habits for planning essential intervention in accordance with target population is crucial. This study aimed to evaluate Health-promoting lifestyle and eating behavior patterns in pregnant women.

METHODS

Study Design and Participants

This cross-sectional study was conducted during the first six months of 2017 in Tabriz, Iran. The inclusion criteria included the Iranian nationality, Tabriz residency, singleton pregnancy, ability to read and write in Persian, age range of 18-40 years, no experience of severe psychological crises over the past six months (declared by the participants), no known medical disorders or problems, and obstetrics-related risk factors during and before pregnancy based on medical files approved by the physician or midwife at the center. Incomplete questionnaires were excluded from the study.

After the approvals were obtained from the authorities of the healthcare centers, a number of centers by multi-stage cluster sampling were randomly selected from 11 clusters existing in the city, including 20 healthcare complexes and 87 healthcare centers using Lottery Randomizer software. In total, 36 healthcare centers were selected. Afterwards, the suitable sample size was calculated and determined for each center or according to the main sample size (n=360) using quota sampling method and based on demographic characteristics of the participants.

Then the list of all qualified pregnant women covered by each unit was extracted. Moreover, the names of the people were put in columns with numbers and randomly selected using computer and Lottery Randomizer software. The lack of meeting the criteria for entering the study led to the replacement of the participant with a person randomly chosen from the list. The sampling continued until reaching the estimated sample size. It is noteworthy that the selection of the cases introduced as the main individuals on the list was prioritized based on the quota of the center.

Sample Size and Sampling

The sample size was once calculated as 180 based on the study conducted by Stark et al. [26] on the standard deviation of sub-domains of Health-promoting behavior, (SD= 0.54), d=0.05 around the mean (M=1.67), a=0.05, and power=80% and recalculated as 130, based on the study conducted by Dehghan et al. [27] on sub-domains of eating behavior (SD=0.70), d=0.05 around the mean (M=2.35), a=0.05, and power=80%. The higher sample size obtained for health-promotion and due to cluster sampling and considering the design effect of 2 was calculated as much 380 women participated in this study. The Sample size was calculated using the following formula:

$$n = \frac{z_{1-\frac{\alpha}{2}} \times s^2}{d^2}$$

Measurements and Statistical Analysis

1. Socio-Demographic and Pregnancy History. It consists of the demographic variables of pregnant women containing age, educational level, occupational status of pregnant women and their spouses, self-assessment of household economic status, self-assessment of health status (which were classified on one's feelings), as well as obstetric variables, including the first day of the last menstruation, probable due date, gestational age based on first trimester ultrasound, number of pregnancies and childbirths.

2. Health-promoting Lifestyle-II Questionnaire. It contains 52 items assessing six dimensions of nutrition (nine items), exercise (eight items), accountability regarding health (nine items), stress management (eight items), interpersonal support (nine items), and self-actualization (nine items). All the items are scored based on a four-point Likert scale (1=never, 2=sometimes, 3=often, 4=always). The total score for these behaviors is within the range of 52-208 [28]. The Persian version of this tool has been evaluated in previous studies in terms of validity and reliability, and the Cronbach's alpha coefficients for the total tool and its dimensions was obtained as 0.82 within the range of 0.64-0.91, respectively. In addition, the questionnaire had sufficient stability (0.89) [29, 30].

3. Eating Behavior Pattern Questionnaire. It contains six dimensions of low-fat eating (11 items), convenience snack foods (fast food) and sweets (10 items), emotional eating (eight items), accidental planning (six items), meal skipping (seven items), and cultural/lifestyle behaviors (nine items). All the items were scored based on a five-point Likert scale from completely agree to completely disagree [31]. According to a study, the Persian version of the tool has an appropriate validity and reliability [32].

Reliability of the questionnaire was determined by using test-retest method after conducting a pilot study on 20 pregnant women. Both the reproducibility (ICC= Intraclass Correlation Coefficient) and internal consistency (Cronbach's alpha coefficient) were determined for eating behavior pattern, ICC (confidence interval) was 0.94 (0.89 to 0.97) and Cronbach's alpha coefficient of 0.94, and for health-promoting, ICC (confidence interval) was 0.93 (0.88 to 0.97) with Cronbach's alpha coefficient of 0.95.

Data Collection

The subjects were chosen after the referral to healthcare centers and investigation of the pregnant women's medical files. The cases with BMI 18.5-24.9 before pregnancy and a group of women with BMI within the range of 25-29.9 during the same period were contacted through phone calls or in-person consultation. First, the

researcher explained the objectives of the study and requested the women to determine a time and date for referring to the healthcare center for completing the questionnaire in case of willingness to participate in the project. Upon referral to the centers, in addition to the primary evaluations by the researcher, a written informed consent was obtained from the subjects. Following that, the study questionnaires were completed by each participant in one of the empty rooms of the center.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Grant no: SBMU.PHNM.1395.498. as part of a PhD dissertation. Written informed consent was obtained from all participants.

Data Analysis

Data analysis was performed by SPSS software (version 21) using descriptive statistics to adjust the frequency tables and determine the central indexes, as well as the distribution of study variables to describe the features of the research units, health-promoting and eating behaviors. Furthermore, the data were analyzed utilizing analytical statistics, including Chi-square and independent t-test (to compare the quantitative variables), and logistic regression analysis. The normality of quantitative data was measured based on kurtosis and skewness, all of which were normal. All the statistical tests were two-sided, using a significance level of $P < 0.05$.

RESULTS

In the present study, 17 women were excluded due their unwillingness to participate in the study however; sampling was continued until the sample size reached 360.

Data analysis indicated that the mean(SD) age of mothers was 27.49(4.9) with range of 18-39 years old and mostly between 25 to 35 years old also two third of them had educational level of diploma or higher (90 percent) and were also house wives.179 (49.7 percent) women had gestational age of 14-28 weeks and 171 (47.5 percent) of them were Primigravida. Most of husbands had academic education and more than one third of them were workers (Table 1).

Data analysis indicated that mean (SD) score of health promoting behaviors in pregnant women were 135.21(20.03) with the domain of 71-187. according to our data maximum and minimum scores were received by Spiritual growth 26.84(4.90) and physical exercise 16.71(40.14) respectively. In addition, mean (SD) score of Health responsibility was 22.49(4.55) (Table 2).

Table 1. Sociodemographic Characteristics of Pregnant Women Referred to Tabriz Health Care Centers

Variable	N (%)
Maternal age	
18-24	104(28.9)
25-30	235(65.3)
31 and above	21(5.8)
Maternal educational level	
Primary & Secondary school	134(37.2)
Diploma	129(35.8)
University	97(26.9)
Housekeeper	326(90.6)
Maternal occupational status	
Employment	34(9.4)
Educational level of spouse	
Primary & Secondary school	153(42.5)
Diploma	124(34.4)
University	83(23.1)
Occupational status of spouse	
Unemployed	9(2.5)
Employed	63(17.5)
Self-employed	287(79.8)
Self-assessment of health status	
Excellent	45(12.5)
Good	179(49.7)
Middle	122(33.9)
Weak	14(3.9)
Get support from	
Mother	46(12.8)
Father	19(5.3)
Mother and father	73(20.3)
Husband	211(58.6)
Friends	4(1.1)
Others	4(1.1)
Income level	
Less than sufficient	105(29.2)
Sufficient	253(70.3)
More than sufficient (Ability to save money)	2(0.6)
Family size	
2	164(45.6)
3	143(39.7)
4 and above	53(14.7)
Gestational age	
Under 14 weeks	66(18.3)
15-28	179(49.7)
29 and above	115(32)
Number of pregnancies	
1	171(47.5)
2	130(36.1)
3 and above	59(16.5)

Table2. Score of Total and Sub-Scales of Health-Promoting Lifestyle

Variable	Mean(SD)	Min- Max
Interpersonal relationship	23.20 (4.01)	8-32
Health responsibility	22.49 (4.55)	11-32
Physical activity	16.71(4.14)	8-31
Spiritual growth	26.84(4.90)	9-36
Nutrition	26.17(4.22)	14-36
Stress management	19.80 (3.78)	10-31
Total score of HPLP-II	135.21 (20.03)	71-187

Table 3 demonstrates relation between total mean score of health promoting behaviors with some of demographic variables of investigated population. Amongst the studies variables there was statistical significant relation between income sufficiency ($P < 0/001$) and husband education ($P < 0.05$) with health promoting behaviors. Received score of health

promoting behaviors in group of second trimester was higher than first and third trimester yet it was not statistically significant ($P > 0.05$). Women with intentional pregnancy had received higher health promoting behaviors score but there was no meaningful difference ($P > 0.05$).

Data analysis of Eating behaviors habits indicated highest score was received by consumption of low fat and healthy food and cultural behaviors and lowest score was received by Planning Ahead and Meal Skipping. According to Pearson test of correlation, there

was a statistical significant yet inverse relation between total score of health promoting behaviors and decreased fast food consumption ($P < 0.001$). Also health promotion and cultural eating habits had a statistical significant relation ($P < 0.02$) (Table 4).

Table 3. Mean and Standard Deviation of Health Promoting Behaviors and Their relation with Some Demographic Variables

Variable	Mean(SD)	CI(95%)	P-Value
10-14	134.60 (20/55)	-139.65-129.55	0.72
15-28	136.10 (21.28)	132.93-139.26	
Gestational age			0.72
29 and above	134.29 (17.77)	131.00-137.59	0.72
Mother age			0.56
18-24	135.07 (21.00)	135.07-142.28	
25-30	135.68 (18.95)	133.23-138.12	
31 and above	130.76 (26.48)	118.70-142.81	
Maternal educational level			0.70
Primary & Secondary school	134.25 (21.13)	130.61-137.88	
Diploma	135.26 (18.97)	131.94-138.58	
University	136.47 (19.98)	132.44- 140.50	
Maternal occupational status			0.80
Housekeeper	135.13 (20.02)	132.94- 137.32	
Employment	136.00 (20.33)	133.13-137.30	
Educational level of spouse			0.01
Primary & Secondary school	133.63 (20.45)	130.36- 136.90	
Diploma	133.12 (19.40)	129.61- 136.63	
University	140.81 (19.12)	136.64 -144.99	
Income level			0.001<
Less than sufficient	130.03 (18.82)	126.39 – 133.68	
Sufficient	137.52 (20.00)	135.03 – 140.01	
More than sufficient (Ability to save money)	118.50 (40.30)	-243.62 – 480.62	
Tendency to the pregnancy			0.32
Wanted	135.73 (19.92)	-2.61- 7.94	
Unwanted	133.07 (20.45)	-2.75- 8.07	

Table4. The Mean Score of Eating Behaviors Pattern and Its Relation with Health Promotion Behaviors

Dimensions of Eating Behavioral Patterns	Mean(SD)	Min- max	Health-Promoting Lifestyle	
			r	P-value
Consumption of low-fat and healthy foods	40.08 (5.10)	21-55	0.328	< 0.001
Fast food and sweets	23.84 (5.17)	12-47	-0.127	0.016
Emotional eating	24.04 (4.14)	10-36	0.057	0.27
Planning Ahead	18.97 (3/02)	6-28	0/073	0/16
Cultural behaviors and lifestyle	27.73 (3.98)	14-39	0/119	0.02
Meal Skipping	22.39 (3.44)	14-34	0.048	0/36

DISCUSSION

In the present study, health-promoting behaviors and eating habits were investigated. Mean total score and subscales of health-promoting were evaluated. Based on Data analysis health-promoting behaviors had an intermediate state in participants. Previous studies have shown the same results in such a way that mean total score of health-promoting behaviors in pregnant women were intermediate to low except Thaewpia in Thailand [33] and Onat in Turkey [34] The reported score in these locations was higher, which might be resulted from differences in participant's characteristics, especially the time that studies took place and all samples were chosen from women in the third trimester. In comparison to the first and second trimester, during the third-trimester pregnant women are in more stable

and low-stress condition. According to reviewed articles adopting such behaviors could be affected by socio-cultural factors, environmental factors, and also individual differences like education and occupation [13, 14] From overall received health-promoting behaviors score the highest scores were received by spiritual growth and nutrition respectively, in contrary lowest scores were received by stress management and physical activity. Based on studies conducted in Iran, Spiritual growth and nutrition received the highest score and physical activity was the lowest scoring aspect in health-promoting behaviors which are in accordance with our study. Unlike Iran pregnant women in other parts of the world had scored higher in spiritual growth, social support, Health responsibility and intermediate in nutrition and lower in stress management and

physical activity [35-37]. What is important is to inspect the social support, physical activity, and stress management condition which could affect maternal and child health in different ways. According to studies ameliorating, one aspect affects the others for instance improving social support lowers the stress and improves the stress management aspect. Increased focused of mothers on spirituality led to spiritual growth according to researches done in Iran [38-40]. Studies conducted at two Muslim countries Jordan and Turkey showed the same results in which spiritual growth has led to better Health responsibility and harmful behaviors voidance during pregnancy [35, 36, 41]. Also, in our pervious study, women had an emphasis on spirituality and religion. These all indicate that cultural factors such as religious beliefs are important factors in mother's psychological health and healthy lifestyle. These beliefs could be beneficial in planning healthy lifestyle interventions. The husband's income and educational level had a significant statistical relationship with the mean total score of health-promoting behaviors. In such a way that income sufficiency had a positive effect on other health-promotion behaviors which was in accordance with a study conducted by Mahmoodi et al [39].

In the present study, the total score of behaviors increased as mothers grew older however, it was not statistically relevant which was in accordance with Gokyildiz et al [35] and in contrast with lin et al findings [37]. This contrast might be resulted from the different individual tendency to adopt healthy behaviors in different cultural context, for instance in some communities as individuals grow older their tendency to their health increases. According to our findings, women with higher educational level scored higher in health-promotion behaviors, yet there was no statistically significant relationship which was in agreement with Pender and Mahmoodi's findings [35, 36, 42]). Educational level and health-promoting behaviors have a significant statistical relationship. This difference might be due to the educational level of participants in current study which was mostly academic. In our study employed women had scored higher than housewives. However, no significant statistical relationship was detected. This finding was in contrast with kavlak [36] and mahmoodi's finding [39]. The disagreement could be a result of the participant being mostly housewives. As for gestational age, there was no significant statistical relationship between healthy behavior and gestational age. However, the received score became lower as gestational age increased which was in accordance with Gokyildiz [35] and Lin [37] studies, This may be due to increased stress and decreased physical activity in the third trimester. Also, according to current study, there was no relationship between intention of pregnancy and received score of health- promoting behaviors which was in agreement with other studies findings [36, 39].

As for eating behaviors pattern, highest score was received by low fat meals and there was a tendency to cultural cuisine. Sims et al have investigated the eating behavior patterns in African Americans women that scored higher in consuming low-fat meals but the cultural cuisine had a lower score than our study [43]. It should be noted that the cultural cuisine in our study means excessive food consumption on holidays which almost always contains a high amount of carbohydrate and meat. In both studies, sweet consumption and meal deletion received a higher score. Based on this, it is essential to look into this matter to check if there is a relation between these two adopted behaviors. Based on the reviewed papers, despite the fact that pregnant women try to change their lifestyle and eating habits, these changes are not efficient [15]. In the current study regardless of the fact that pregnant women scored higher in the nutrition aspect of health-promoting behaviors, they lack proper eating patterns. in our previous study, the first change that pregnant women mentioned was dietary changes and eating healthy foods however according to them, their knowledge in this regard was not good enough and they needed nutrition consultation [11]. According to studies factors, such as perceived control, demographic characteristics, social supports and healthcare policies could affect adoption of healthy behaviors like eating [6, 18]. Therefore, individual consultations by considering different factors are essential for healthcare programs.

One of the strength of the study is that based on review of the literature our study is the first study conducted to evaluate association between health-promotion and eating behavior in pregnancy in Iran. Also, we used random sampling method. There were some limitations, forexample self-report was one of the drawbacks of this study. Furthermore, since different changes occur in various pregnancy trimesters, it is suggested to perform and compare reviews every three months between matched groups. We suggest more homogenous groups to be used in later studies for comparing health promoting behaviors and for evaluating the relation of different factors with eating behavior patterns. Studying a lifestyle in pregnancy is necessary. Because of its positive effects on pregnancy and neonatal outcome.

CONCLUSIONS

According to the present study, the status of health-promoting behaviors in pregnant women has moderate scores, since health-promotion and healthy lifestyle are two inseparable parts of healthcare services for pregnant women, stress management and physical activity needs special attention. Regardless of tendency to low fat and healthy food, pregnant women need nutrition consultation and informative educations. Since the pattern of cultural behaviors is more relevant, health-promotion requires a comprehensive approach and

interventions designed to adopt a healthy lifestyle should be tailored to the cultural background.

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DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

CONFLICT OF INTEREST

There are no conflicts of interest for all authors in this study.

ETHICS CONSIDERATIONS

This study was approved by the Ethics Committee of Shahid Beheshti. University of Medical Sciences, Grant

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