Original Article

Relationship of Social Cognitive Theory Concepts to Dietary Habits of Pregnant Women

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Abstract

Background: Nutrition during pregnancy is undoubtedly one of the most important factors affecting maternal health. In this regard, considering the cognitive-behavioral factors associated with feeding, behaviors will play an important role in the effectiveness of interventions. Therefore, this study aimed to investigate the correlation between food habits and structures of social cognitive theory in pregnant women. **Materials and Methods:** In this cross-sectional study, 192 pregnant women were randomly selected. Data were collected using a questionnaire based on the social cognitive theory structures and food habits questionnaire in the questioning manner and was also analyzed using Pearson correlation and multiple linear regression with the software Statistical Package for the Social Sciences, version 19. **Results:** There was a significant correlation between nutritional behavior with self-regulation ($p = 0.001$), self-efficacy ($p = 0.001$), outcome expectations ($p = 0.001$), social support ($p = 0.002$), and access ($p = 0.001$). A significant correlation was observed between lack of consumption of unnecessary and unhelpful food with self-regulation ($p = 0.02$). In the multivariable regression analysis, only self-regulation revealed significant and direct contribution in relation to nutritional behavior ($p < 0.001$). **Conclusions:** Results of this study showed that self-regulation is one of the important factors associated with feeding behavior in pregnant women so that it is suggested to be considered in nutritional interventions in order to improve nutritional behavior.

Keywords: *Dietary habits, fast food, food pyramid, nutritional behavior, pregnant women, social cognitive theory*

Introduction

Nutritional behavior is one of the most important effective factors in the health of mothers. Lack of appropriate nutrition causes numerous issues for both the mother and fetus.[1] Low birth weight, lack of sufficient growth and development of the fetus, or heavy birth weight, childhood and adulthood obesity, and the risk of diabetes mellitus (DM) and cardiovascular disease (CVD)[2] are issues which arise with hypertension, preeclampsia (PE), obesity, and other diseases in the mother.[3]

Despite the importance of this issue and interventions undertaken regarding nutrition during pregnancy, the issue of unhealthy nutritional habits and its consequences are still observed in pregnant women.[4-6] The consumption of fast food and soft drinks, excessive sugar intake, and lack of consumption of fruits, vegetables, and food with high fiber content are consequences of the nutrition transition that have affected all social classes including women.[7,8] A study showed that the diet of 73% of Iranians require modification.[9] Moreover, 63.90% of Iranian women are overweight or obese, 35% of which gain more weight than recommended during pregnancy.[10]

Various interventions have been implemented for weight management and nutritional modification during pregnancy, but their results have not presented long-term effects.[7] Researchers' lack of consideration of psychological issues related to nutritional behavior has been reported as one of the main reasons for the lack of success of interventions and education in this regard.[11] In many studies, specialists in this field have emphasized on appropriate goal determination for the most important individual, social, and environmental factors in order to improve health behavior such as nutritional habits.[12,13]

Social cognitive theory (SCT) was extracted from Bandura's theory of self-efficacy.

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The SCT holds that a combination of factors effective on behavior form a structure with the self-efficacy construct at its center, which has bilinear interaction with other important constructs such as determination of goals, outcome expectations, and understanding of environmental structures (facilitators and obstructers).[14,15] The interaction of constructs and their direct and indirect effect on each other creates a spider web network.[13] Moreover, promotion of self-motivation and self-regulation, increased coping skills, and adaptation to the surrounding environment provide an appropriate context for the changing of bad habits. If the individuals have a positive attitude toward the received social support, which is a regulatory construct, their self-efficacy will be improved and they are more likely to continue their healthy habits for a longer duration with the controlling of behavior in case of internal and external conflicts.[16]

The accurate identification of key psychological factors effective in nutritional interventions during pregnancy is still necessary.[13] Further research with the aim of identification of these factors will assist in the improvement of mothers' diet and prevention of the dangerous consequences of an unhealthy diet during pregnancy.[11] Thus, the present study was conducted to evaluate the correlation between nutritional habits and SCT constructs.

Materials and Methods

This cross-sectional study was conducted on 192 pregnant women referring to community health centers in Isfahan, Iran, in autumn 2015 (September–December). Random stratified cluster sampling was used for the selection of participants. From each of the two health networks (No. 1 and 2), five centers were randomly selected and from each center subjects were selected proportional to the population covered by the health center. The study population was determined as a minimum of 190 individuals ($z_1 = 1.96$, $z_2 = 0.84$, $r = 0.2$). The study inclusion criteria consisted of being Iranian, gestational age of 20 weeks and higher, and lack of presence of complications associated with pregnancy such as severe constipation and heartburn, recognized mental disorders, any illnesses which require a certain diet, substance abuse, and infertility, and not being a vegetarian.

Data were collected through interviews using a researcher-made nutritional habits questionnaire and the Social Cognitive Constructs Inventory. The validity of the nutritional habits questionnaire was determined through content and face validity and its reliability was determined through test–retest reliability (Spearman's r coefficient = 0.8). The validity of the Social Cognitive Constructs Questionnaire was determined through content and face validity (by eight faculty members in the fields of health education, midwifery, and nutrition) and its reliability was determined through conducting as pilot study through interviews with 30 pregnant women and calculation of Cronbach's alpha. The internal consistency of questions on self-regulation, self-efficacy, outcome expectancy, social support, and access to healthy food was 0.76, 0.77, 0.80, 0.84, and 0.77, respectively.

The nutritional habits questionnaire consists of the three domains of use of food groups based on the standard food pyramid, lack of use of unnecessary and non-nutritious food, and nutritional behavior. To match the mean scores of domains, they were presented as percentage.

Data were analyzed using descriptive statistics (mean and standard deviation), multiple linear regression, and Pearson correlation in Statistical Package for the Social Sciences software (version 19, SPSS Inc., Chicago, IL, USA). In all statistical tests, the significance level was considered as <0.05.

Ethical considerations

This study was approved by the Ethics Committee with the code 394465. The study was conducted through the observance of ethics and material rights of the study subjects and all those who contributed to this study. During sampling, pregnant women with a harmful nutritional habit were referred to the related authorities.

Results

The mean (SD) age, body mass index (BMI), gestational age, and number of pregnancies of the women were, respectively, 27.81 (5.24), 24.49 (4.16), 29.26 (5.92), and 1.82 (0.89). More than 90% of women were homemakers, 50% had a diploma, and 70% had an average economic status.

In the domain of use of food groups based on the standard food pyramid, 57.4, 90, 40, 63, and 73% of the subjects reported undesirable consumption in the bread and grains, vegetables, fruits, milk and dairy products, and meat and beans groups, respectively.

The results of the domains of lack of use of unnecessary and non-nutritious food, and nutritional behavior are, respectively, presented in Tables 1 and 2.

A significant correlation was observed between nutritional behavior and self-regulation, self-efficacy, outcome expectancy, social support, and access to healthy food. In the domain of lack of use of unnecessary and non-nutritious food, a significant relationship was observed between nutritional behavior and self-regulation. However, no significant relationship was observed in the use of food groups based on the standard food pyramid [Table 3].

In multivariate linear regression analysis (stepwise method), with the adjustment of results (age, gestational age, and number of pregnancies, BMI, education, and economic status), only self-regulation explained 20% of variation in nutritional behavior. In other domains, none of the constructs independently predicted nutritional habits [Table 4].

Table 1: Frequency of consumption of unnecessary and non-nutritious foods in the samples based on repetition in 7 days

Unnecessary and non-nutritious foods type	Consuming any or <1 time in a week:N(%)	Consuming 1 or 2 times in a week:N(%)	Consuming 3 or more times in a week:N(%)
Beverages and drinks industries	148 (77.20)	31 (16.30)	13 (6.50)
Fast food types and food industry	185 (96.30)	6 (3.20)	1 (0.50)
Cakes and pastries	94 (49.00)	69 (35.80)	29 (15.20)
Sauces	118 (61.60)	54 (27.90)	20 (10.50)
Chips and snacks and ready-made corn (Puffila)	147 (76.30)	35 (18.40)	10 (5.30)
Candies	137 (71.10)	23 (12.10)	32 (16.80)
Enjoy a variety of herbal brew	178 (92.60)	9 (4.70)	5 (2.70)

Table 2: The frequency of nutritional behaviors of samples

Nutritional behaviors	Usually or always:N(%)	Sometimes:N(%)	Seldom or never:N(%)
Separation of fat from the meat before or after cooking	109 (56.90)	30 (15.40)	53 (27.70)
Isolation of chicken skin before cooking	179 (93.10)	6 (3.20)	7 (3.70)
Nondipped bread to butter or margarine	111 (57.90)	56 (29.20)	25 (12.90)
Low-fat milk rather than whole-fat	91 (47.30)	33 (17.20)	68 (35.50)
Preferring low-fat cream sauces to all fatty	87 (45.40)	19 (9.60)	86 (45.00)
Consumption of high-fiber pasta instead of regular pasta	60 (31.00)	28 (15.00)	104 (54.00)
Consumption of whole grain bread instead of white bread	81 (42.00)	39 (20.70)	72 (37.30)
Failure to remove one or more meals	140 (72.80)	37 (19.60)	15 (7.60)
No catering or outside food consumption	146 (76.70)	43 (21.70)	3 (1.60)
Avoiding the use of salt on the table	114 (59.50)	35 (18.10)	43 (22.40)
Paying attention to nutrition labels when buying	113 (59.20)	42 (21.20)	37 (19.60)

Table 3: The association between food habits and other social cognitive theory

Variable	Mean (SD)	Following part of food groups on the standard food guide pyramid mean(SD) 38.85 (20.29)		Lack of consumption of unnecessary and non-nutritious mean(SD) 63.04 (12.04)		Nutritional behaviors mean(SD) 64.34 (13.73)	
		r	*p*	*r*	*p*	*r*	*p*
Self-regulation	68.08 (12.52)	0.11	0.07	0.15	0.02*	0.55	0.001
Self-efficacy	66.97 (16.69)	0.06	0.23	0.04	0.30	0.28	0.001
Outcome expectations	72.17 (12.41)	0.02	0.38	0.02	0.42	0.21	0.001
Social support	72.52 (14.42)	−0.04	0.30	0.10	0.09	0.27	0.002*
Accessibility	66.72 (15.05)	0.10	0.08	−0.02	0.40	0.24	0.001*

Table 4: Linear regression analysis of social cognitive theory to the dietary habits of the participants

Variable	[f]Following part of food groups on the standard food guide pyramid		[€]Lack of consumption of unnecessary and unhelpful		[£]Nutritional behaviors	
	β	*p*	*β*	*p*	*β*	*p*
Age	0.02	0.75	0.37	0.02*	0.09	0.13
Gestational age	0.07	0.28	0.02	0.75	−0.05	0.35
Parity	−0.05	0.47	−0.03	0.66	0.02	0.68
Body mass index	0.02	0.75	0.02	0.73	0.09	0.10
Economical situation	0.00	0.97	−0.05	0.43	2.86	0.04*
Education	0.27	0.001	−0.05	0.49	4.14	0.001
Self-regulation	0.04	0.58	0.09	0.23	0.50	0.001
Self-efficacy	0.03	0.66	−0.01	0.83	−0.01	0.95
Outcome expectations	−0.05	0.44	−0.03	0.67	−0.46	0.47
Social support	−0.05	0.42	0.08	0.23	0.06	0.32
Accessibility	0.02	0.27	−0.04	0.45	−0.01	0.93

[f]Total R^2=0.76, F=26.15, p=0.001, Adjusted R^2=0.71. [€]Total R^2=0.05, F=79.40, p=0.03, Adjusted R^2=0.04. [£]Total R^2=0.37, F=83.57, p=0.001, Adjusted R^2=0.37 (Self-regulation; p=0.001, Adjusted R^2=0.2)

Discussion

The results of the present study suggested the lack of appropriate compliance to the food pyramid among the pregnant women. In the three food groups of meat and beans, vegetables, and milk and dairy products, more than 60% did not accurately comply with the food pyramid recommendations. Jalily *et al*.[17] also reported unsatisfactory compliance with the food pyramid in their study. However, they reported the use of dairy products as satisfactory, which was not in agreement with the results of the present study. This may be due to the cultural and geographical differences between Isfahan and Tabriz, Iran.[17] Takimoto *et al*.[18] reported satisfactory compliance to the food pyramid among women in Japan. This may be due to their subjects' education level and pregnancy training.

The participants obtained satisfactory scores in the domain of lack of use of unnecessary and non-nutritious food. Beiranvandpour *et al*.[19] reported 2.2% (per week) use of fast food, and the highest rate of consumption as related to sausages. The difference in the results of this study and the present study may be due to the present study subjects' pregnancy.

Wen *et al*.[20] found that the majority of pregnant women consume more than 500 cc soft drinks and fast food more than twice a week. This finding is not in agreement with that of the present study. This may be due to the subjects' preference for Western food (fast food and ready-made food) due to cultural circumstances and lower mean age in the study by Wen *et al*.[20] Younger individuals have greater inclination toward fast food consumption.[21]

Therefore, in addition to educating younger pregnant women in this regard, healthy ready-made food must be provided, because individuals cannot be constantly prevented from the consumption of fast food.

In the present study, pregnant women obtained an average score in the domain of nutritional behavior. Lindsay *et al*.[22] reported the consumption of sauces and saturated fat as common unhealthy nutritional behavior in more than 50% of obese and overweight pregnant women. This behavior was only observed in 30% of the subjects of the present study. This difference may be due to the differences in demographic characteristics and socioeconomic status of the subjects of the two studies.

The evaluation of SCT constructs showed a significant relationship between nutritional behavior and self-regulation, self-efficacy, outcome expectations, social support, and access to healthy food. In the domain of lack of use of unnecessary and non-nutritious food, only self-regulation presented a significant relationship. No significant relationship was observed in the domain of use of food groups based on the standard food pyramid. Anderson-Bill *et al*.[23] and Doerksen and McAuley[15] presented self-regulation as the key predictive factor in the nutritional behavior domain. The results of the present study was in agreement with that of Beiranvandpour *et al*.,[19] who have reported that self-regulation does not have a significant role in the prediction of fast food consumption.

In the present study, no relationship was observed between self-regulation and the use of food groups based on the standard food pyramid. This finding was not in accordance with that of the study by Byrd-Bredbenner *et al*.[24] Byrd-Bredbenner *et al*. reported a relationship between self-regulation, in the dimensions of food preparation method and enjoyment, use of food labels, and lack of TV watching while eating, and consumption of food groups especially fruits, vegetables, and food with high fiber content in mothers.[24] The difference in the results of this study and the present study may be due to cultural differences between the two studied communities.

In the present study, a significant relationship was observed between self-efficacy and the nutritional behavior domain, but not the other two domains. In the studies by Jalily *et al*.[17] and Beiranvandpour *et al*.,[19] respectively, self-efficacy did not have a significant relationship with nutritional behavior domain in pregnant women and fats food consumption in women.

In the present study, the subjects' expectation of positive outcomes from their healthy diet had a direct relationship with their nutritional behavior. Jalily *et al*.[17] reported outcome expectation as a predictive factor in nutritional behavior. Byrd-Bredbenner *et al*.[24] found a significant relationship between outcome expectation and nutritional performance, and Anderson *et al*.[25] observed an inverse significant relationship between negative outcome expectation and nutritional behaviors.

In the present study, no relationship was observed between outcome expectation and the use of food groups based on the standard food pyramid. Although the subjects expected positive outcomes from their healthy diets, their mean score of compliance with the nutritional pyramid was not acceptable. Based on Bandura's notion, individuals may be unconsciously suffering from false hope syndrome.[23]

The results of the study by Doerksen and McAuley[15] suggested the presence of a relationship between outcome expectations, and high fruit and vegetable intake and low fatty food intake. This finding was not in accordance with that of the present study, which may be due to differences in the subjects' demographic characteristics. The subjects in the study by Doerksen *et al*. were university faculty members and had a higher socioeconomic status compared to the subjects of the present study, and thus, may have better complied with the food pyramid.[26]

In the present study, social support was only correlated with nutritional behavior, which is in agreement with the results of the study by Scholz *et al*.[27]

Access to healthy food was favorable and had a significant relationship with nutritional behavior in the present study. Hojaji *et al*.[28] also found a relationship between food insecurity (limited or uncertain access to adequate and healthy food) and the nutritional status of pregnant women.

In the domain of use of food groups, the access construct showed no correlation, which was in accordance with the results of the study by Najimi *et al*.[29]

The results of the study also showed that access was not correlated with lack of use of unnecessary and non-nutritious food. Beiranvandpour *et al*.[19] reported that fast food and nonbeneficial food consumption was related with the availability of unhealthy food and that this factor was predictor of variation in fast food consumption. Kazemi *et al*.[30] also reported an inverse relationship between access to healthy food and consumption of sweet snacks and food. Obtaining a correct understanding of the concept of need for access is also important because in some cases, despite good food access, individuals do not have good nutritional intake.[31]

In the present study, self-regulation of the SCT predicted 20% of variation in nutritional behavior. In the study by Jalily *et al*.,[17] SCT explained 16% of variation in nutritional behavior and, in addition to self-regulation, outcome expectations was also a predictive factor. In the present study, education and economic status were also predictive factors in assessment with results adjustment in the domain of nutritional behavior.

SCT did not predict variation in the domain of use of food groups based on the food pyramid. After the adjustment of results, only education was found to be a predictive factor.

SCT did not predict variation in the domain of lack of use of unnecessary and non-nutritious food. The majority of pregnant women, due to the sensitivity of this period, refrained from the consumption of unnecessary and non-nutritious food well. Therefore, the lack of relationship between this domain and the studied constructs was not unexpected. Factors such as food preference, individual tastes, and attitudes, which were not studied here, may be more effective on this domain.[26] Age was a predictive factor in this domain; thus, younger women require more attention in this regard.

The limitation of this study was that it was a cross-sectional study, because in the evaluation of factors related to nutritional habits, longitudinal and experimental studies are more illustrative.

Conclusion

The results of the present study suggest that self-regulation is a determining factor in educational programs for pregnant women in the nutritional behavior domain. Factors such as self-efficacy, outcome expectations, social support, and access were also correlated with this domain. Hence, the consideration of these factors in the design and implementation of nutritional interventions for the improvement of nutritional behavior is recommended. It is also suggested that, as an alternative to the absolute inhibition of pregnant women from eating the food they enjoy, their selection and consumption, and food preparation and cooking patterns be corrected through increasing their awareness level and changing their attitudes.

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Conflicts of interest

Nothing to declare.

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