

## Determinants of Preparing Healthy Breakfast and Snacks for School Children by Mothers

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### ABSTRACT

**Introduction:** An unhealthy breakfast and the consumption of low-value meals among students are associated with adverse health consequences and chronic diseases in adulthood. The main purpose of this study was to identify the determinants of preparing healthy breakfast and snacks for school children by mothers in the city of Islamshahr.

**Methods:** 320 boys and girls were selected by cluster random sampling and their mothers were invited to participate in the study. Data were collected using the researcher-made questionnaire that included demographic characteristics, questions were related to knowledge, attitude, perceived benefits, perceived barriers and behavior. The reliability was assessed through the test-retest method, and in order to assess internal consistency, Chronbach's alpha coefficient was used. Data were analyzed by SPSS 16 software, and Descriptive statistics (Percent & Frequency), Multiple regression and Kendall's tau-b correlation tests were used.

**Results:** Based on the findings of this study, none of the demographic characteristics had a significant correlation with the behavior of the mother's healthy breakfast and meal ( $p > 0.05$ ) and among variables, knowledge ( $p < 0.001$ ,  $B = 0.40$ ) and perceived barriers ( $p < 0.001$ ,  $B = 0.33$ ) were strong and positive predictors of preparing breakfast and healthy snacks by mothers. Knowledge and perceived barriers predict %28 of variance in mothers' behavior in preparing breakfast and healthy snacks ( $p < 0.001$ ,  $R = 0.527$ ,  $R^2 = 0.278$ ).

**Conclusion:** It is better to put more emphasis on the strategies to promote the knowledge of mothers and reduce their perceived barriers in designing nutritional interventions aiming to prepare breakfast and healthy snacks for children.

**Keywords:** Healthy breakfast, Healthy snacks, Children, Mothers.

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## Introduction

Nutritional problems that are caused by inappropriate diet can influence the generation of young people and reduce their learning capacity. Consequently, it threatens the future, continuing the poverty cycle and malnutrition with severe consequences (1). Malnutrition is the cause of one-third of all child deaths (2).

Children must have three balanced meals with snacks per day to provide energy and help them grow and keep them healthy (3). Breakfast is the most important meal of the day and choosing the right type of breakfast every morning can directly affect the weight and general health of children (4). Eating breakfast is very important before going to school and it helps children to learn because hungry children cannot read well (5). Eating breakfast can help increase math scores and problem-solving and also increases focus and memory. Children who regularly eat breakfast are less likely to be overweight and those who eat breakfast have better behavior at school with their peers. The students who eat breakfast, take the most important nutrients, vitamins, and minerals such as calcium, fibers, folic acid, and protein (6).

small snacks during the day, along with breakfast, increases performance, boosts memory and increases energy in children (7). The failure to eat breakfast and meals causes hunger symptoms such as drowsiness, headache (4), reduced learning, decreased attention, fatigue, restlessness and irritability, and overweight and poor diet choices for the rest of the day can lead to the development of chronic health issues in long term (8). The findings of a study by Motlagh et al. showed that 17.3% of the students did not have breakfast and 16.2% did not consume snacks at school (9).

Also, the results of a study by Bagherniya and his colleagues showed that 6.8% of students did not eat any of the weekly snacks and did not eat 57% of the breakfast (10) and 31% of the teens did not eat breakfast in a study by Deshmukh and his colleagues (11). In the systematic review of Ghaffari and his colleagues, it was found that the total pooled prevalence of skipping breakfast was

0.21 (95% CI: 0.21-0.22). The girls had a higher percentage of skipping breakfast compared to the boys (26% vs. 18%) (12).

Lack of time for employed mothers is the factor that affects the nutrition of children (13). Knowledge and attitude of mothers about the nutritional needs of children (14,15) family income (16) structure and household size (17), mother's age and education are the issues that influence the performance of mothers in providing healthy meals, especially breakfast and snack for children (18).

In addition, recent studies emphasize individual, family, and environmental factors as determinants of unhealthy behaviors, including unhealthy breakfast and snack (19). Parents, especially mothers, have an irrefutable role in shaping the preferences and dietary habits of children. They play this role through the transfer of attitudes and beliefs about the types of food, exercising, the control over the nutritional behavior of children, and providing and preparing food (20,21).

Clarifying the role and importance of proper and effective nutrition for mothers considering their important and effective role in nutrition and food preparation of family members especially children has a very important role in reducing the nutritional problems of children. Besides, identifying the determinants of preparing healthy breakfast and snacks for school children is the guarantor of a healthy and efficient generation. Therefore, the present study was conducted to determine the determinants of healthy breakfast and meals among mothers.

## Methods

This was a descriptive study. The sample size was calculated according to the formula  $n = \frac{z^2(1-\frac{\alpha}{2})p(1-p)}{d^2}$   $n=288$  people and with considering 10 percent of the loss, calculated 320 people. ( $P=0.25$ ,  $d=0.05$ ) (22).

The sampling method was random sampling. At first, two primary schools (a girls' school and a boys' school) were randomly selected from among

the 154 primary schools in Islamshahr. Then, from each level, 27 students were randomly selected (6 levels in each school) and their mothers were invited to participate in the study. Inclusion criteria were voluntary and informed participation, the mothers with children aged 6-12 years old and having at least reading and writing literacy. The data collection tool was a questionnaire designed and developed by the research team. The questionnaire had 53 questions totally. The first part of the questionnaire was related to the demographic characteristics of the population studied including age, education, occupation, household size, household structure, employment status and economic situation with 8 questions and the second part of the questions was related to knowledge with 9 questions.

(e.g., What is the most important meal for school children?), attitude with 10 questions (e.g., not eating breakfast does not cause a problem for my child), perceived benefits with 6 questions (e.g., If my child eats breakfast and snack, he will learn the lesson better), perceived barriers with 12 questions (e.g., We do not have enough income for a healthy breakfast and snack for our child.) and behavior with 8 questions (e.g., Are you preparing breakfast for your child?) In order to score the questions of knowledge, the correct answer had score 2 and 'I do not know', the score of 1 and the wrong answer had zero score. In the section of attitude questions, perceived benefits and perceived barriers that were optionally based on the Likert scale, 'I agree' had a score of 3 and 'I have no idea', score 2 and the answer, 'I disagree', score 1. Also, in the behavioral questions section, the range of scores varied from zero to four. The range of scores in the knowledge section was 0-18, for the attitude 10-30, perceived benefits 6-18, the perceived barriers 12-36, and for behavior 0-32.

The questionnaire was designed by the review of sources and texts and experts panel and its face and content validity were both measured. To determine the content validity, the questionnaire was examined by 7 experts (3 dietitians and 4 health education and health promotion specialists) and

their comments were applied to the questionnaire and ultimately, after fixing the ambiguities and errors, its validity was confirmed. To determine the reliability of the questionnaire by a test-retest method, the questionnaire was completed by 15 mothers, then after 15 days, the questionnaires were given to the same number of mothers. The gathered data were analyzed by the SPSS16 and ICC = 0.73 was calculated. To determine internal consistency, Cronbach's alpha coefficient was used and it was ( $\alpha=0.84$ ) that is acceptable and verifiable. Then, in coordination with school authorities, the questionnaires were distributed among the samples. Data were analyzed using SPSS 16 software and Descriptive statistics (Percent & Frequency), multiple linear regression and Kendall's tau-b correlation tests.

## Results

The mean(SD) age of mothers was  $35.78 \pm 5.18$  and most of them (87.9%)277 were housewives. The level of education of (60%)189 of mothers was diploma and this ratio was (62.60%)144 in their husbands. (67.61%)213 of the families had a middle economic situation, and most of them (57.1%)180 were 4 people (Table 1). Based on the findings of this study, none of the demographic characteristics had a significant correlation with the behavior of the mothers about healthy breakfast and meal ( $p>0.05$ ). However, there was a significant correlation between knowledge ( $r=0.47$ ) ( $p<0.001$ ), attitude ( $r = 0.23$ ), ( $p<0.001$ ) the perceived benefits ( $r=0.75$ ) ( $p=0.005$ ) and perceived barriers ( $r=0.35$ ) ( $p<0.0001$ ) with mothers' behavior of preparing breakfast and healthy snack (table2).

Analysis of the variance related to regression of multiple variables and the behavior of preparing breakfast and snacks by mothers in the study showed that F which is the result of the analysis of variance compared with the critical values, was significant ( $p<0.001$ ,  $F=31.543$ ) and the values of  $R^2$  indicated that the predictive variables (knowledge, attitudes, benefits, and perceived barriers) are able to predict a total of 29 percent of the variation of the criterion (Table 3).

Analysis of variance related to regression of knowledge variables and the perceived barriers and healthy breakfast and meal behaviors in mothers understudy showed that F which is observed as the result of the analysis of variance and regression statistical indicators for these two variables was significant compared to critical values ( $p < 0.001$ ,  $F = 903/59$ ). Moreover, the values of  $R^2$  showed that predictive variables are generally able to predict

28% of the variation of the criterion.

The analysis of beta coefficients for awareness variables and perceived barriers was 0.39 and 0.33 respectively, which shows that there is a positive and significant relationship between these variables and the behavior of breakfast and snacks and among them, knowledge was the strongest predictor of the behavior of breakfast and snacks (Table 4).

**Table 1.** Demographic information of the Participants

| Variables            | Group Sub        | Number | Percent |
|----------------------|------------------|--------|---------|
| Age                  | 20-30 year old   | 170    | 53.96   |
|                      | >30 year old     | 145    | 46.04   |
| Education            | Lower of diploma | 79     | 25.08   |
|                      | diploma          | 189    | 60      |
| occupation           | Academic         | 47     | 14.92   |
|                      | housewife        | 277    | 87.93   |
| Husband's education  | Employed         | 38     | 12.07   |
|                      | Elementary       | 35     | 15.21   |
| Husband's occupation | Diploma          | 144    | 62.60   |
|                      | Academic         | 51     | 22.19   |
| Family size          | Employee         | 91     | 28.88   |
|                      | laborer          | 100    | 31.74   |
| Economic situation   | Self-employment  | 124    | 39.38   |
|                      | 3 people         | 79     | 25.09   |
|                      | 4 people         | 180    | 57.1    |
|                      | >4 people        | 56     | 17.81   |
|                      | Poor             | 21     | 6.66    |
|                      | Middle           | 213    | 67.61   |
|                      | Good             | 81     | 25.73   |

**Table 2.** Correlation matrix of demographic and psychological variables with the behavior of healthy breakfast and snack in mothers

| Variables              | 1       | 2       | 3      | 4      | 5       | 6      | 7     | 8      | 9      | 10     | 11     | 12 |
|------------------------|---------|---------|--------|--------|---------|--------|-------|--------|--------|--------|--------|----|
| 1.Age                  | 1       |         |        |        |         |        |       |        |        |        |        |    |
| 2.Education            | .026    | 1       |        |        |         |        |       |        |        |        |        |    |
| 3.Job                  | -.073   | -.405** | 1      |        |         |        |       |        |        |        |        |    |
| 4.Husband's education  | .018    | -.077   | .080   | 1      |         |        |       |        |        |        |        |    |
| 5.Husband's Job        | -.108   | .105    | -.110  | .133*  | 1       |        |       |        |        |        |        |    |
| 6.Family size          | -.294** | -.177** | .194** | -.143* | -.156** | 1      |       |        |        |        |        |    |
| 7.Economic situation   | -.072   | -.302** | .147** | -.023  | -.062   | .107   | 1     |        |        |        |        |    |
| 8.Knowledge            | -.083   | -.042   | -.008  | .009   | -.001   | .026   | .112* | 1      |        |        |        |    |
| 9.Attitude             | .108    | .060    | .053   | -.120* | .043    | .040   | -.031 | .120*  | 1      |        |        |    |
| 10.Perceived benefits  | -.066   | .021    | .077   | -.024  | .026    | .050   | .052  | .082   | .134*  | 1      |        |    |
| 11.Pperceived barriers | -.096   | .007    | .145** | -.055  | .053    | .157** | .091  | .138*  | .358** | .255** | 1      |    |
| 12.Behavior            | -.102   | -.002   | .058   | -.010  | .098    | .008   | .053  | .416** | .157** | .357** | .235** | 1  |

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed)

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**Table 3.** Multiple regression by Entering method among knowledge, Attitude, Perceived Benefit, perceived barriers and behavior

| Model (1)                        | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|----------------------------------|-----------------------------|------------|---------------------------|-------|------|
|                                  | B                           | Std. Error | Beta                      |       |      |
| (Constant)                       | 19.074                      | 10.028     |                           | 1.902 | .058 |
| Knowledge                        | .561                        | .073       | .374                      | 7.696 | .000 |
| Attitude                         | .414                        | .233       | .094                      | 1.775 | .077 |
| Perceived Benefit                | .382                        | .508       | .039                      | .752  | .452 |
| Perceived Barrier                | .782                        | .131       | .298                      | 5.988 | .000 |
| R= 0.527, R <sup>2</sup> = 0.290 |                             |            |                           |       |      |

**Table 4.** Multiple regression by Entering method among knowledge and perceived barriers and behavior

| Model (2)                      | Unstandardized Coefficients |            | Standardized Coefficients | t     | Sig. |
|--------------------------------|-----------------------------|------------|---------------------------|-------|------|
|                                | B                           | Std. Error | Beta                      |       |      |
| (Constant)                     | 32.193                      | 6.766      |                           | 4.758 | .000 |
| Knowledge                      | .584                        | .073       | .389                      | 8.048 | .000 |
| Perceived Barrier              | .856                        | .127       | .325                      | 6.731 | .000 |
| R=0.527, R <sup>2</sup> =0.278 |                             |            |                           |       |      |

## Discussion

This study aimed to investigate the determinants of preparing healthy breakfast and snacks for school children by mothers. According to the results of this study, there was a significant correlation between knowledge, attitude, perceived benefits and perceived barriers to mothers' healthy breakfast and snacks which is consistent with the study by Khodaveisi et al. that determined the nutritional behavior of high-weight women based on the Pender Health Promotion Model. There was a significant correlation between perceived benefits and perceived barriers to the nutritional behavior of the women in this study (23). The results of the study by Vereecken et al. also showed that a low-quality diet in children is correlated with a low level of knowledge and nutritional attitudes and maternal food health (24). The present study results showed that the attitudes and perceived benefits were not able to predict the behavior of preparing breakfast and healthy snacks by mothers but knowledge and perceived barriers were positive predictors of preparing breakfast and healthy snacks by mothers. In a study by Rahimi and his colleagues, one of the predictors of eating breakfast in girl students was perceived barriers (25) and in the study by Alizadeh and his colleagues awareness and perceived barriers were breakfast predictors for students (26).

Therefore, an increase in knowledge and a reduction in the perceived barriers can help mothers improve the behavior of preparing breakfast and healthy snacks and it is necessary to pay more attention to these two structures in order to strengthen the behavior of breakfast and healthy snacks in mothers. Besides, this emphasizes the importance of educational programs to raise awareness and reduce barriers affecting health promotion behaviors.

Knowledge is, in fact, knowing what is needed to change and promote behavior (27). It is known that the optimal development of children requires good nutrition at different stages of childhood, and mothers as the first and most important health care providers play a decisive role in the nutritional status of children. Lack of nutritional knowledge of mothers or any failure in their attitude provides a suitable platform for the development of various disorders in children. Hence, providing mothers with the necessary nutritional knowledge and promoting their awareness will ensure the health of children in the coming years and by increasing the awareness of mothers, their performance in terms of providing breakfast and snacks for students will be improved.

Studies have shown that knowledge has a significant contribution to explaining the variance of appropriate nutritional behavior among women

(28). Also, there was a significant relationship between the knowledge of mothers and the onset of supplementary supplementation in children (29). Besides, the results of the study by Kiani and his colleagues showed that a direct and positive correlation existed between maternal knowledge and practice (30). However, the results of the study by Fathi and his colleagues were not consistent with the results of this section of the present study (31).

Perceived barriers are potential negative factors of a particular health action that hinders the proposed behavior. Perceived obstacles may act as a barrier to one's behavior. When an individual expects the expected efficacy of a behavior against the negative aspects of that behavior such as expensiveness, dangerous (having side effects or unknown effects), lack of good behaviors (such as feeling pain, difficulty carrying out an act and being distressed), time spent, etc., in his mind, he subconsciously performs a cost-effectiveness analysis. In other words, perceived barriers are the belief in the likely costs of pursuing a new behavior (32).

The perceived barriers to the study were the strongest predictor of mothers' healthy breakfast and snacks. Among the most important barriers mentioned in this study were believing in becoming overweight and obese, heavy by eating breakfast and snacks, having no appetite, hurry and having no time to eat breakfast and snacks, the child's preference to eat unhealthy snacks, hatred, not having enough time to make breakfast and waking up late. Therefore, by increasing awareness and improving the attitude of mothers through appropriate and effective interventions for breakfast and snacks, these barriers can be reduced.

It seems that avoiding eating breakfast and healthy snacks or eating unhealthy and ready breakfast due to being employed, excessive occupation and fatigue and worries of working mothers and lack of enough time to be at breakfast table are the reasons for not paying attention to children's desire to have breakfast. As a result, working women's children probably watch more

TV and drink carbonated drinks and consume little fruit and vegetable. From other barriers, 'too late to sleep' and 'late students' can be mentioned. Having no breakfast for schoolchildren has many reasons and one of them is their sleeping schedule. The kids' sleeping schedule can be directly related to their diet plan. They usually go to bed late at night in the summer and their sleep schedule becomes irregular and at the beginning of the school year, it takes a long time to get their sleep settled, for this reason, they have no appetite during the morning and do not eat breakfast. Late sleep and waking up late will eliminate the most important meal for children. Perhaps the late-sleep children also wake up late and time pressure before going to school reduces the tendency to eat breakfast and this causes abnormalities in their bodies.

Studies have shown that not having enough time is a significant predictor of a healthy meal for a school child (33) and so the most important reason for not having breakfast was to wake up late (34). Time and daily busy schedule were introduced as barriers to food preparation by mothers (35). Also, barriers to healthy eating in mothers and children were time limit, lack of nutrition knowledge about high-quality breakfast, financial constraints and environmental issues (food availability), which are consistent with the present study (36). Therefore, breakfast and snacks should be available so that children and teens can consume them, and as a result perceived barriers to breakfast will be reduced.

According to the findings of the study, none of the demographic characteristics had a significant correlation with the behavior of breakfast preparing and mothers' healthy snacks. Studies have shown that there was only a significant relationship between maternal age and healthy snack consumption in children, while there was not any correlation between parental education, parental employment and family income with the use of healthy snacks in children. Studies also showed that there is no significant relationship between taking breakfast for teens and mothers' jobs (21,37) and there was a positive and significant correlation

between household income and the education of women with nutritional behavior (23) that did not confirm the results of this study.

This study was conducted in one city and in limited areas. In order to increase the ability to generalize to a wider population, more studies are needed in different parts of the country. Other limitations are the use of self-reporting tools. Also, in this study, some factors such as environmental factors, etc. (access and availability, etc.) have been considered to be investigated in the future studies.

### Conclusion

The results of the present study introduce knowledge and perceived barriers as determinant factors in nutrition education programs for mothers of students. Therefore, by designing

and implementing educational interventions emphasizing these factors, it is possible to reduce the problems of unhealthy breakfast and snacks in children.

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### Conflict of Interest

The authors have no conflicts of interest.

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