

# Parenting Style, Parental Feeding Practices and Children's Nutritional Status in Authoritative Parenting Style Model: A Structural Equation Modeling

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## Abstract

**Background:** The increasing prevalence of overweight and obesity in children has posed some challenges in many countries. There is a relationship between parenting styles, parental feeding practices, and children's nutritional status.

**Objectives:** This study aimed to apply Authoritative Parenting style Model in children's nutritional status.

**Methods:** This research was a cross-sectional study conducted on 1000 parents selected by random cluster sampling. Parents who had primary school children aged 7 - 8 years in Bojnord, Iran, completed questionnaires related to the constructs of the model in 2016. Structural Equation Model (SEM) analysis was used to test the fit of the model. CMIN/DF, GFI, IFI, CFI, PGFI, PNFI, and RMSEA indices were employed to check the goodness-of-fit.

**Results:** Correctly completed questionnaires were collected from 294 dyads of parents. The mean age was 36.26 years (SD = ±5.38) in fathers and 32.96 years (SD = ±4.88) in mothers. 232 mothers (80.5%) were housewives and only 99 of them (34.4%) had university education. Most fathers were employee (115, 40%) or self-employed (111, 38.5%) and 120 of them (41.7%) had university education. The values of goodness-of-fit were obtained for CMIN/DF = 4.6, GFI = 0.91, CFI = 0.93, IFI = 0.92, PGFI = 0.68, PNFI = 0.77, and RMSEA = 0.07. Nutritional knowledge and attitude directly affected authoritative parenting style ( $\beta = 0.21, P < 0.001$ ) and parental feeding practices ( $\beta = 0.33, P < 0.001$ ) and indirectly affected children's nutritional status ( $\beta = -0.01$ ). The authoritative parenting style construct had a direct effect on feeding practices of parents ( $\beta = 0.54, P < 0.001$ ) and an indirect effect on children's nutritional status ( $\beta = -0.01$ ). The feeding practices of parents construct also affected the children's nutritional status directly ( $\beta = -0.02, P < 0.05$ ).

**Conclusions:** This study indicated that the use of this model in the children's nutritional status can result in positive outcomes, and this model can make interventions more effective in this regard.

**Keywords:** Parenting, Style, Feeding, Practices, Children, Nutritional Status

## 1. Background

The increasing prevalence of overweight and obesity in children, which has been pandemic today, is attributed to the change of feeding behavior of children as one of the most important issues in the health of individuals and community (1). The prevalence of overweight reached from 4.8 to 6.1 between 1990 and 2014, therefore, about 41 million children under five years old have overweight problem (2). 23.8% of boys and 22.6% of girls in developed countries were overweight or obese in 2013 and it has increased from 8.1% to 12.9% in boys and 8.4% to 13.4% in girls in developing countries (3). In Iran, the reported prevalence of severe obesity, obesity, and overweight among children of six years old is 2.6%, 3.6%, and 8.6%, respectively

(4).

In recent decades, researchers have revealed the relationship between parenting styles, parental feeding practices, and children feeding behavior that can be a brand new issue in this area (5, 6). By identifying the two main factors, i.e. response and control, in parental behavioral characteristics toward their children, the types of parenting style were introduced among which, Baumrind's typology is one of the well-known types. She reported three parenting styles including authoritative (high responsible/high control), authoritarian (low responsible/ high control), and permissive (high responsible/low control) (7).

Research shows a significant relationship between variety of parenting styles and overweight and obesity in chil-

dren. The prevalence of overweight among families with authoritarian parenting style is high and also shows a significant correlation with the permissive style (8, 9). On the other hand, some studies imply a strong relationship between parenting feeding practices and children nutrition (10, 11). A few studies, if any, have investigated the relationship between children's nutrition and both concepts of parenting styles and parent's practices simultaneously (12, 13), and the relationship between these concepts has not been well explained yet (14).

Some secondary studies suggest that parenting style does not directly affect the children's nutrition; but it is a mediator that can have an influence on nutritional behavior of children only by affecting the parent's practices (15, 16). On the other hand, it is believed that parent's practices should be studied in the context of their beliefs, values, and attitudes. These concepts and the relationships among them can be found in the Authoritative parenting style model (APM) presented by Darling and Steinberg (17). This model suggests that goals and attitudes of parents directly affect the parenting style and parent's practices. Parenting styles also have an influence on children's behavior in two ways: the first way is through influencing parent's practices and the other way is by influencing the wishes of children for socialization; hence, parent's practices affect directly the behavior of children. Although the model has been applied in a few studies (18), more research is needed to identify its role in children's nutritional status. It seems that this model can investigate and clearly explain the relationship between parenting style, feeding practices of parents, and children's nutritional status simultaneously.

## 2. Objectives

This study aimed to apply APM in children's nutritional status, investigate the relationship among the relevant concepts, and evaluate its application in the field of children's nutrition.

## 3. Methods

### 3.1. Participants

This research was a cross-sectional study conducted on a sample of 1000 parents (500 mothers and 500 fathers) who had primary school children aged 7 - 8 years in 2016. They were selected according to random cluster sampling method. The questionnaires and consent forms were given to students to hand them to their parents. It should also be mentioned that these students were studying at 10 governmental primary schools in Bojnord, Iran (5 girls' schools and 5 boy's schools). The schools were selected randomly

from all primary schools in five different regions, and the questionnaires were sent to 50 first or second grade students in each school. The inclusion criteria included literate parent living with spouse. According to the exclusion criteria, 332 parents due to lack of consent to participate, and 80 due to incomplete questionnaires or possibility of copied content were excluded from the study. Finally, the number of participants reached to 588 (294 dyad of parents). It has been suggested that sample size greater than 200 is large enough to be applied to the most models of confirmatory factor analysis (19). A lower bound for the adequacy of sample size is the ratio of 10 observations (cases) per indicator (model parameter) (20, 21). This study was approved by the ethics committee of Shahid Sadoughi University of Medical Sciences on November 16, 2014 (No. 17-1-179466). Rights of the participants were completely respected and they were ensured of anonymity of their responses.

### 3.2. Instruments

Parenting styles and dimensions questionnaire (PSDQ): the questionnaire was developed by Sherman and Fredman (22) based on the well-known Baumrind's typology to assess the three parenting styles: authoritative, authoritarian, and permissive. Rating of item responses is based on Likert scale. The authoritative style with 15 questions scored 15 to 75, authoritarian style with 12 questions scored 12 to 60, and permissive style with 5 questions scored 5 to 25. According to the hypothesized model, given in this study, only the scores of authoritative style were analyzed. Its validity and reliability were confirmed in the first phase of the current study (23). Also, demographic questions were added to this part.

Comprehensive feeding practices questionnaire (CFPQ): the questionnaire was designed by Mosher-Eizenman and Holub (24) for measuring 12 factors of feeding practices with 49 questions. In Iran, Doaei et al. (25) translated this questionnaire to Persian and could attain acceptable validity and reliability. Rating of item responses is based on the Likert scale and the total score is in range of 49 - 245. In this study, we considered eight factors that were related to the hypothesized model and authoritative parenting style.

Nutrition knowledge and attitude questionnaire: The questionnaire was designed by the Institute of Nutrition affiliated to University of Isfahan and its validity and reliability have been approved (26). The questionnaire consisted of 49 questions about awareness. A wrong response or "do not know" response scored zero and a correct answer scored one. The total score ranged from 0 to 49. In the attitude construct, there are 19 questions with 5 choices according to the Likert scale, and total score ranges from 19

to 95. This questionnaire was used to assess the nutritional values and attitudes of parents in the model.

Food frequency questionnaire (FFQ): The questionnaire consists of 168 questions on food intake and its validity and reliability have been approved in a study named Tehran lipid study (27). Each question collects the information about the times and amount of consumed food, and the questionnaire was used as a component in the outcome through estimating intake of calories, carbs, fat, and protein. The questionnaire with the consent form together was delivered to parents by their students as a package.

### 3.3. Hypothesized Model

Authoritative parenting style model presented by Darling and Steinberg (17) was employed in this study. The only difference was that the values, attitude, and practice of parents were considered exclusively in the field of nutrition.

### 3.4. Data Analysis

Structural equation model (SEM) analysis was used to test the fit of model. Due to the high sample size, minor non-normality data (Skew < 3, Kurt < 10), and lack of missing data, maximum likelihood (ML) estimation method was used (19). CMIN, GFI, IFI, CFI, PGFI, PNFI, and RMSEA indices were used as goodness-of-fit statistics. Because CMIN test is sensitive to high sample size (28), CMIN/DF was used instead of CMIN in this study. Acceptable criteria for CMIN/DF have been reported in the range of 3 to 1, CFI  $\geq$  0.90, GFI  $\geq$  0.90, IFI  $\geq$  0.90, PGFI  $\geq$  0.50, PNFI  $\geq$  0.50, and RMSEA  $\leq$  0.05. Some researchers have suggested that CMIN/DF  $\leq$  5 indicates a reasonable fit (29, 30). MacCallum et al. has implied that the value of RMSEA ranging from 0.08 to 0.1 indicates mediocre fit and a value greater than 0.1 shows poor fit (31). The data were analyzed using SPSS software, version 19, and AMOS software, version 22.

## 4. Results

Correctly completed questionnaires were collected from 294 dyads of parents. 147 of them (50%) were the parents of boy students and 144 (49%) were the parents of first-grade students. The mean age of fathers was 36.26 years (SD =  $\pm$  5.38) and of mothers was 32.96 years (SD =  $\pm$  4.88). 232 mothers (80.5 %) were housewives and only 99 of them (34.4%) had university education. Most fathers were employee (115, 40%) or self-employed (111, 38.5%), and 120 of them (41.7%) had university education.

Means and standard deviations of measured variables of the model are shown in Table 1. As the software works by making a connection between two measurement errors (restriction for weight control and restriction for health

subscales of feeding practices of parents), the values of goodness-of-fit indices were obtained as CMIN/DF = 4.6, GFI = 0.91, CFI = 0.93, IFI = 0.92, PGFI = 0.68, PNFI = 0.77, and RMSEA = 0.07, which confirms the adequacy of the model. Direct and indirect unstandardized (b) and standardized ( $\beta$ ) coefficients and total effect of variables included in the model are presented in Table 2.

Table 1. Means and Standard Deviations of Measured Variables

| Variable                       | Rang                 | Mean $\pm$ SD        |
|--------------------------------|----------------------|----------------------|
| Knowledge                      | 0 - 49               | 31.87 $\pm$ 6.27     |
| Attitude                       | 9 - 95               | 65.64 $\pm$ 8.50     |
| Connection Dimension           | 5 - 25               | 21.64 $\pm$ 2.70     |
| Regulation Dimension           | 5 - 25               | 20.34 $\pm$ 3.22     |
| Autonomy Dimension             | 5 - 25               | 19.60 $\pm$ 3.46     |
| Encourage Balance and Variety  | 4 - 20               | 7.98 $\pm$ 0.95      |
| Environment                    | 4 - 20               | 16.62 $\pm$ 2.49     |
| Involvement                    | 3 - 15               | 12.15 $\pm$ 2.13     |
| Modeling                       | 4 - 20               | 18.25 $\pm$ 2.04     |
| Monitoring                     | 4 - 20               | 15.97 $\pm$ 3.55     |
| Restriction for Health         | 4 - 20               | 15.05 $\pm$ 3.19     |
| Restriction for Weight Control | 8 - 40               | 27.33 $\pm$ 7.48     |
| Teaching                       | 3 - 15               | 13.27 $\pm$ 1.90     |
| Energy                         | 1500 - 2500          | 2000.56 $\pm$ 836.30 |
| Protein                        | 10 - 30 <sup>a</sup> | 66.13 $\pm$ 29.03    |
| Carbohydrate                   | 45 - 65 <sup>a</sup> | 291.72 $\pm$ 143.51  |
| Fat                            | 25 - 35 <sup>a</sup> | 71.90 $\pm$ 34.25    |

<sup>a</sup>Percent of total Energy.

Questions regarding the construct of nutritional knowledge and attitude were used to assess goals and values of the construct in the model. It can be observed that this construct directly affected authoritative parenting style ( $\beta = 0.21$ ,  $P < 0.001$ ) and feeding practices of parents ( $\beta = 0.33$ ,  $P < 0.001$ ) and indirectly influenced the children's nutritional status ( $\beta = -0.01$ ). Thus mothers who had higher nutritional knowledge and attitude had higher authoritative parenting style and used more feeding practices. The path coefficient for the indirect effect of nutritional knowledge and attitude on nutritional status through authoritative parenting style and feeding practices was 0.002, and through feeding practices was 0.006. The total effect of nutritional knowledge and attitude on nutritional status was -0.01. Standardized regression of attitude subscale with the coefficient of 0.73 was more than standardized regression of knowledge subscale with the coefficient of 0.36.

**Table 2.** Standardized/Unstandardized Direct, Indirect and Total effects in Constructs of Model

|                               |          | Value and Attitude      | Authoritative Parenting Style | Feeding Practices |
|-------------------------------|----------|-------------------------|-------------------------------|-------------------|
| Authoritative Parenting Style | Direct   | 0.21 <sup>a</sup> /0.21 |                               |                   |
|                               | Indirect | -                       |                               |                   |
|                               | Total    | 0.21/0.21               |                               |                   |
| Feeding Practices             | Direct   | 0.33 <sup>a</sup> /0.17 | 0.54 <sup>a</sup> /0.28       |                   |
|                               | Indirect | 0.12/0.06               | -                             |                   |
|                               | Total    | 0.44/0.23               | 0.54/0.28                     |                   |
| Nutritional Status            | Direct   | -                       | -                             | -0.02/-17.06      |
|                               | Indirect | -0.01/-3.95             | -0.01/-4.82                   | -                 |
|                               | Total    | -0.01/-3.95             | -0.01/-4.82                   | -0.02             |

<sup>a</sup>P < 0.001.

It was also found that authoritative parenting style construct had a direct effect on feeding practices of parents ( $\beta = 0.54$ ,  $P < 0.001$ ) and an indirect effect on the children's nutritional status ( $\beta = -0.01$ ). Standardized regression weights of the subscales were close together in range of 0.79 to 0.83. Mothers with higher authoritative parenting style seemed to use more feeding practices. Feeding practices of parents construct affected the children's nutritional status directly ( $\beta = -0.02$ ,  $P < 0.05$ ). Standardized regression weights of the subscales were from 0.33 to 0.65, therefore, the subscale of modeling with the coefficient of 0.65 had the most value, and subscale of restriction for weight control with the coefficient of 0.33 had the lowest value. Based on this model, children whose mothers had more feeding practices and higher authoritative parenting style had fewer intakes of energy, carbohydrate, protein, and fat. Children with fewer intakes of energy, carbohydrate, protein, and fat were close to the standard range of intakes, therefore they had more acceptable nutritional status (Figure 1).

## 5. Discussion

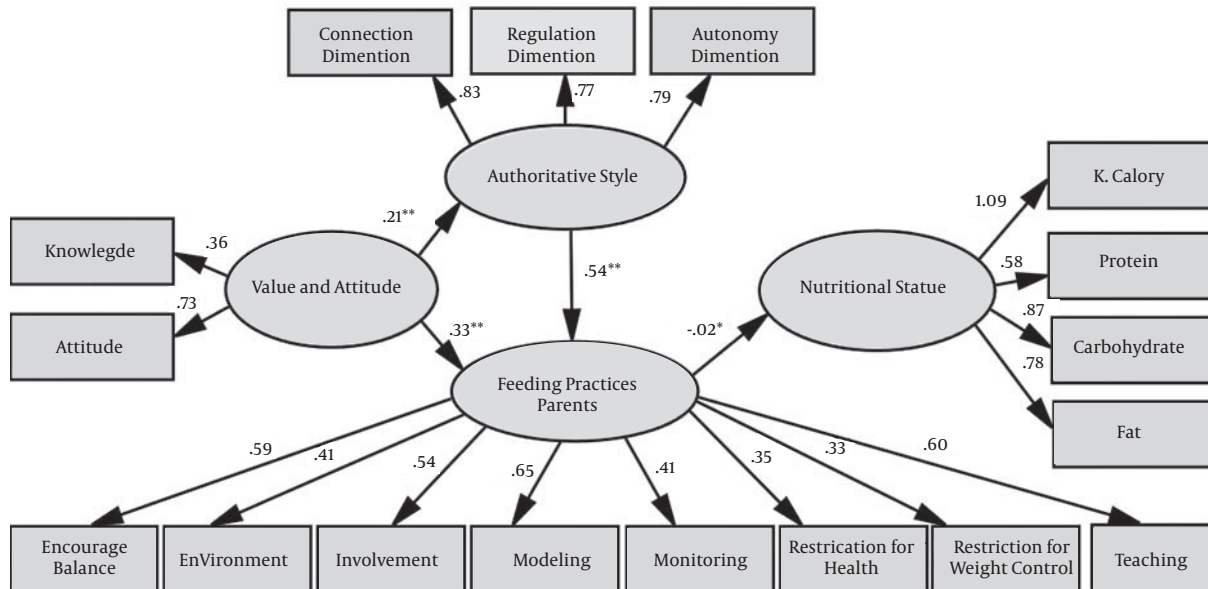
Due to the increasing use of concepts such as parenting style and parents' practices in the field of children's behavior, authoritative parenting style model of Darling and Steinberg could help in this matter with applying these concepts and explaining their relationship. This study indicated that this model can help in the children's nutritional status and including this model in relevant interventions can make them more effective.

In this study, knowledge and attitude questions specific to nutrition were used for assessing goals and values of the construct of the model. In majority of the studies in the field of health education and promotion, the

relationship between knowledge, attitude, and behavior for explaining and changing unhealthy or healthy behaviors has been proven, and this relationship among them is not negligible (32, 33). Fishbein and Ajzen have shown that attitude can be the strong predictor of behavior (34). Knowledge can be the cornerstone of attitudes and values of the parents. The results of this study indicated that although knowledge and attitudes have not a direct effect on children's nutritional status, by influencing the parenting style and parental feeding practices, they can have an indirect effect on children's nutritional status. Thus, the gap between knowledge, attitudes, and eating behaviors in children has been observed in some studies (35), it is found that the direct relationship between the mentioned constructs is ignored in those studies.

Some studies have pointed to the direct effect of parenting style on children's nutrition (36-38), and the others have referred to the feeding practices as the main determinant of children's nutritional behavior (10, 11). Authoritative parenting style model by representing these concepts and the relationship among them has been able to meet the current challenges. The results of secondary studies can verify this model (15, 16). According to this model of parenting style, by having a direct impact on feeding practices, parents had an indirect effect on children's eating behavior and the only factor that could directly influence the children's nutritional behavior was the feeding behavior of parents.

In this study, the following subscales included in feeding practices of parents: education, monitoring, modeling, involvement, restriction for weight control, restriction for health, environment, and encourage balance and variety. Teaching and modeling were found to have the greatest impact, and restriction for weight control and

**Figure 1.** Structure of Authoritative Parenting style Model

\*P &lt; 0.05; \*\*P &lt; 0.001.

health were known to have the least impact. In previous studies, some of the subscales of this structure had been shown in the form of other concepts, such as the environment and self-regulation. The subscale of monitoring could be found in self-regulation construct of Bandura's social cognitive model (39) with goals and plans. This construct was known in this model as a strong predictor for determining the nutritional behavior of individuals (40). In some studies, the concept of family and home environment has been used to affect the nutritional behavior of children, and the items such as the availability and adequacy of healthy food, involvement, and modeling were considered to assess the effect of family and environment (41). In this study, these items were also applied to parent's feeding practices construct.

Although feeding practices of parents could be a strong predictor of children's nutritional status in this model, to strengthen the interventions in this way, improving knowledge and attitude of parents and increasing parenting skills should be considered as a necessity to get more effectiveness.

Among the strengths of this study can be referred to simultaneous participation of parents, which indicated the current atmosphere in the family, and it is also the result of interactions between parents and children. The numerous questionnaires with many questions can be considered as a limitation in the study. Moreover, since com-

pleting the questionnaire has been done by self-reporting method, it can also be considered as the other limitation of this method.

The determination of nutritional status of children was limited only to the obtained data from FFQ questionnaire, and anthropometric data such as weight or body mass index (BMI) were ignored in this study. Although this study was conducted using random cluster sampling, regarding its limitations, it is recommended for subsequent studies to apply experimental methods and more precise evaluation models. Furthermore, it is recommended to use anthropometric data, in addition to questionnaires, to strengthen the nutrition-related data.

This study indicated the adequacy of authoritative parenting style Model for children's feeding behavior using SEM analysis. In conclusion, this model is appropriate to explain and predict factors influencing children's eating behaviors, and its application in analytical, clinical and educational interventions related to eating behaviors of children could be fruitful.

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## Footnotes

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