

## The Study of Association between Mother Weight Efficacy Life-style with Feeding Practices, Food Groups Intake and Body Mass Index in Children Aged 3-6 Years

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### ABSTRACT

**Background:** Nutrition in childhood has a significant role in current and adulthood health. Recent studies have shown that the mother's life-style has an important role in the methods used by mother to feed child, child's diet and body mass index (BMI). This study paper aimed to investigate the association between mother's weight efficacy life-style (WEL) with feeding practices and diet in children aged 3-6 years.

**Methods:** In this cross-sectional study, which was carried out in 18 Primary Schools of Rasht (Iran) in 2012, 165 mothers with children aged 3-6 years were participated. Mothers reported their own and their child's demographics. Aspects of mother's WEL and mother's control practices were assessed using WEL questionnaire and Comprehensive Feeding Practices Questionnaire respectively. Height and weight of mothers participated in the study were measured. Child's dietary intake was measured using Food Frequency Questionnaire (FFQ). The role of mother's weight efficacy in predicting child's feeding practices and child's diet was assessed using the linear regression. Statistical significance for all *P* values was set at 0.003.

**Results:** The results were showed that mother's weight efficacy was related to child feeding practices and child's dietary intake. The mothers with similar WEL applied similar methods in child nutrition. Mothers with better weight efficacy used more encourage balance and variety ( $\beta = 1.860$ ), environmental control ( $\beta = 0.437$ ), child involvement ( $\beta = 0.203$ ) and less emotion regulation using foods ( $\beta = -0.213$ ) and their children eat fewer snacks ( $\beta = -0.318$ ) ( $P_v = 0.003$ ).

**Conclusions:** The result of this study showed that maternal life-style was associated with feeding practices and child's intake. There was no significant relation between the maternal self-efficacy and child BMI.

**Keywords:** Child nutrition, feeding practices, life-style

### INTRODUCTION

The prevalence of childhood obesity has turned into global epidemic and public health problem.<sup>[1]</sup> The results of the

various studies showed that 7-16% of Iranian children are obese.<sup>[2,3]</sup> Childhood overweight and obesity is an independent risk factor for obesity and heart diseases in adulthood.<sup>[4]</sup> It is predicted that in the next 10 years, cardio-vascular diseases will be the major factor of mortality all over the world.<sup>[5]</sup> Eating habits of childhood are continued in adulthood. Thus, malnutrition in this stage brings many problems in adulthood.<sup>[6]</sup>

The children nutrition may be impressed by parents, friends, media and personal preferences of children at pre-school ages.<sup>[1]</sup> The influence of parents, who play the role of providers, executors and models for child nutrition at the early stages of childhood, has been recognized as the most important effective factor.<sup>[2,7]</sup>

During the pre-school ages, parents are considered to be the main individuals in charge for food choices of children and they feed their child using different methods.<sup>[5]</sup> The feeding practices used by parents affect child's nutrition.<sup>[7]</sup> Many of the studies have shown that feeding practices are associated with child's ability for food intake regulation,<sup>[5]</sup> food preferences,<sup>[6]</sup> calorie intake and body weight.<sup>[7]</sup>

Studies showed that parent's life-style and their self-efficacy in weight control are effective on the feeding practices and eating patterns of children.<sup>[2,8]</sup> It seems that based on the important role of life-style of mothers in child nutrition and as the behavior change is the most important factor in life-style change,<sup>[9]</sup> instead of choosing short-term diets, the eating-based behaviors should be modified in the family and society<sup>[10]</sup> to mitigate the obesity and other chronic diseases in future.

According to psychology, there are many factors affecting the health-related behaviors including a person belief in his capabilities in applying the change.<sup>[11]</sup> Self-efficacy is defined as one's belief in one's ability to succeed in recognized theories of behavior change as cognitive-social theory of Bandura.<sup>[12]</sup> Bandura theory shows how interpersonal factors such as knowledge and beliefs, social environment and behavior act in a complex relation with each other. This theory emphasizes on the importance of self-efficacy as an intervening factor.

Besides cognitive-social theory of Bandura, other models of health behaviors such as health belief models<sup>[13]</sup> and motivational consulting<sup>[14]</sup>

applied self-efficacy as one of the important factors in behavior change in their theory.

The relation between self-efficacy and food behaviors is investigated from various aspects including the relation of self-efficacy and weight change,<sup>[15]</sup> eating pattern and overweight control,<sup>[16]</sup> lack of eating control,<sup>[17]</sup> fat consumption<sup>[18]</sup> and fruits and vegetables intake.<sup>[19]</sup> The result of most of the studies showed that self-efficacy is an important factor in prediction of nutrition behaviors.

Weight-efficacy is defined as one's beliefs about his abilities to resist eating when overeating risk is high.<sup>[20]</sup> Various studies showed that the individuals, who believe in their ability to weight loss, are more successful in this regard.<sup>[21-24]</sup>

To the best of our knowledge, there is not any study that investigated the precise relation between maternal weigh-efficacy and children feeding practices and dietary intake; the present study investigated the relation of maternal weight efficacy life (WEL) style on and feeding methods and child diet and body mass index (BMI).

## METHODS

### Participants

In a cross-section analytical study, 165 children aged 3-6 years from 18 kindergartens of Rasht were selected through the second-stage cluster random sampling from March 2011 to August 2011.<sup>[8]</sup> After visiting the Welfare Organization of Gilan Province (Iran) and managers of the required kindergartens, the planning was made for face-to-face visit and data collection from the mothers. On that day after talking with the mothers of children, the study aims were explained. 165 mothers and children were included in the study.

### Assessment of mother's WEL and mother's control practices

The mothers were asked to complete three questionnaires of general information, WEL questionnaire and Comprehensive Feeding Practices Questionnaire (CFPQ). Also, the information of children diet was achieved through asking from the mothers and filing out the FFQ.

General information questionnaire was applied for data collection of personal characteristics of mothers such as age, education, employment,

the number of children, smoking and child's age, gender and weight at birth. To measure the height and weight of the mother and child, Seca scale and meter were used. To determine the self-efficacy of the mother regarding the weight control, WEL questionnaire WEL was applied.<sup>[25,26]</sup> The 20-item WEL instrument is consisting of five-item subscales; the subscales were including the evaluation of mother resistance against eating in five circumstances including food availability in different conditions, negative emotions (e.g., anxiety), social pressure, physical discomfort and positive activities.

### Assessment of dietary intake

To determine the child feeding method by the mother, CFPQ was applied.<sup>[27]</sup> The questionnaire was consisting of 46 questions and 12 different aspects including child authority, emotion regulation by food, encourage balance and variety, environmental control, using food as reward, children involvement in food preparation, modeling, monitoring, pressure, restriction for health, restriction for weight control and teaching about nutrition. The validity and reliability of the questionnaire were investigated in a separate study and they were verified.<sup>[28]</sup> To determine the scores of each question in two above questionnaires, a five-point Likert scoring method was applied. The options for questions 1-5 are

“never” to “always” or “agree” to “disagree.” For data collection about child diet, FFQ was applied.<sup>[29]</sup>

By this questionnaire, the information about intake of refined grain, fruit and vegetables, simple sugar, fat, desserts, snacks, dairy and meat were analyzed.

### Statistical methods

Finally, the collected data to describe self-efficacy of the mother regarding weight control by feeding methods, diet and BMI of the child were analyzed. The role of mother weight-efficacy in determining the type of the applied approach of the mother for child feeding, child diet and BMI of the child were evaluated by multiple block linear regression analysis. In this study, the effect of some independent variables on many dependent variables is measured; Bonferroni correction coefficient was used to determine significance level of the results and hence that the results have no difference with univariate analysis.<sup>[30]</sup> By this formula, the adjusted significance level for data analysis was 0.003.

## RESULTS

Parent and child general characteristics are shown in Table 1.

The sample consisted of 102 boys and 63 girls who had a mean age of 4.7 years. The majority

**Table 1:** Parent and child demographics (*n*=165)

Variables	%	N	Mean	SD	Variables	%	N
Child gender					Mother's smoking		
Boy	61.8	102			Yes	0	0
Girl	38.2	63			No	100	165
Child age (years)			4.7	0.88			
Child birth weight (kg)			3.4	0.43	Stay at home mothers		
Child BMI (kg/m <sup>2</sup> )			17.73	5.86	Yes	18.18	30
Mother age (years)			31.67	4.59	No	81.82	135
Mother height (m)			157	17.10			
Mother weight (kg)			71.54	1.72			
Mother BMI (kg/m <sup>2</sup> )			33.22	3.07			
Single parent status							
Yes	3.6	6					
No	96.4	159					
Mother highest certified educational qualification							
Primary school	1.8	3					
Secondary school	38.1	63					
University degree	60	99					

SD=Standard deviation, BMI=Body mass index

of mothers had a job and had a university degree. The most of the mothers would be classified as overweight or obese.

In terms of the maternal weight efficacy, the mean WEL was 52.99. The range of measures that one could acquire was between 20 and 100. Table 2 provides the raw means ( $\pm$ SD) for the WEL measure.

In terms of the child feeding practices, mean score of any subscale of CFPQ was determined. Higher scores for the feeding scales reflected greater use of scales.<sup>[31]</sup> The frequency that mothers used each feeding practices is shown in Table 3. The most commonly used feeding practice was environmental control, encourage to balance, modeling and teaching about nutrition and only a minority used emotion regulation.

In terms of the child diet, children's food group's intake is shown in Table 4. Data were classified by pre-existing feeding guide.<sup>[4]</sup> About a half of the mothers reported fruits and vegetables intake of their children less than recommendations.<sup>[4]</sup> More than a half of the children had meat group intake less than recommendations. About a half of the children had more than two portions of simple sugars and snacks groups on an average day.

Multiple block linear regression was used to predict children feeding practices and children's diet and BMI using parent/child demographics (block 1) and maternal WEL (block 2) as independent variables. Although our primary analysis was on the WEL total score, values for the subscale scores are included [Table 4].

Mothers with better weight efficacy used more encourage balance and variety, environmental control, child involvement and less emotion regulation using foods and their children eat fewer snacks ( $P < 0.0003$ ). There was no significant relation between maternal self-efficacy and child BMI.

## DISCUSSION

The current study aimed to study the maternal WEL, the applied methods of the mother in child feeding and diet and BMI of children aged 3-6 years. Regarding weight efficacy, the mothers faced with physical discomfort reported the highest resistance and the lowest resistance against food availability.

In a similar study done by Chang in Malaysia regarding the study of WEL of mother by WEL

**Table 2:** Describing maternal control practices and maternal weight efficacy (n/%)

Scale	%	N	Scale	%	N	Scale	%	N	Scale	%	N	Scale	%	N	The mean WEL scores ( $\pm$ SD)					
Child's control			Modeling			Encourage balance and variety			Pressure			Food as reward			Total					
Low	6.1	10	Low	0.6	1	Low	0	0	Low	0	0	Low	23	38	27.9	46	34.5	57	Negative emotions	
Medium	60.6	100	Medium	21.8	36	Medium	8.5	14	Medium	52.7	87	Medium	50.3	83	50.3	83	48.5	80	Availability	
High	33.3	55	High	77.6	128	High	98.5	151	High	24.20	40	High	21.8	36	21.8	36	17	28	Social pressure	
Emotion regulation			Monitoring			Environment			Restriction for Health			Involvement			Teaching about nutrition					Physical discomfort
Low	37.6	62	Low	4.2	7	Low	0	0	Low	10.3	17	Low	0	0	0	0	0	0	0	Positive activity
Medium	58.2	96	Medium	25.5	42	Medium	23	38	Medium	64.2	106	Medium	10.9	18	10.9	18	15.8	26		
High	4.2	7	High	70.3	116	High	77	127	High	25.5	42	High	89.1	147	89.1	147	84.2	139		

WEL=Weight efficacy lifestyle, SD=Standard deviation

**Table 3:** Describing children’s diet (n/%)

Portion/day	%	N
Refined grains		
<3	9.69	16
≥3	90.3	149
Dairy products		
<3	16.94	27
≥3	83.03	137
Fruits and vegetables		
<5	48.49	80
≥5	51.51	85
Meats		
<2	61.21	101
≥2	38.79	64
Simple sugar		
<2	56.36	93
≥2	43.64	72
Colas		
<1	87.87	145
≥1	12.13	20
Dessert and snack		
<2	56.36	116
≥2	43.64	72

questionnaire, the mothers were least able to control their eating under social pressure and food availability, according to their WEL score.<sup>[32]</sup>

In the above study, the sample study was of both genders (men and women) with age mean 42 years that is the probable reason of existing differences in the results. A study was conducted by Presnell *et al.* in USA has emphasized on the role of gender in determining the type of efficacy of an individual in weight control.<sup>[33]</sup> In another study done by Rejeski *et al.*, the least resistance was reported in eating control under food availability and the results were consistent with the results of the current study.<sup>[34]</sup>

The results of this study showed that maternal self-efficacy in weight control was related by the applied methods in child feeding and mothers with similar WEL applied similar methods in child nutrition. In the previous studies, the role of maternal self-efficacy and the belief in her ability was supported in weight loss<sup>[35-37]</sup> and reduction of behavioral disorder of the child.<sup>[38]</sup> Moreover, Dutton *et al.* in a study showed that obese or overweight individuals had lower self-efficacy in weight control compared with others.<sup>[10]</sup> A research done by Sanders and Woolley, the parent’s self-efficacy was associated with childcare methods.<sup>[39]</sup> In the

**Table 4:** Standardized Regression coefficients for the role of maternal weight efficacy in child feeding practices and child’s diet

Variables	Child’s control	Emotion regulation	Encourage balance and variety	Environmental control	Involvement	Modeling	Monitoring	Refined grains	Fruits	Snacks	Simple sugar
Total	-0.050	-0.213*	1.860*	0.437*	0.203*	0.142	-0.069	0.26	-0.106	-0.318*	0.237
Negative emotions	0.161	0.026	0.027	0.036	-0.060	0.070	-0.236*	0.182	0.259	-0.141	0.031
Availability	0.325*	0.042	0.136	0.080	0.009	0.050	-0.042	0.090	-0.547*	0.131	0.227
Social pressure	0.197	-0.128	0.319	0.073	0.551*	-0.096	-0.064	-0.446*	-0.126	-0.132	-0.048
Physical discomfort	-0.373*	-0.256*	0.173	0.714*	0.119	0.26*	-0.032	0.345	0.295	-0.156	-0.48*
Positive activity	0.181	0.156	-0.196	0.045	0.046	-0.23	0.167	0.039	0.228	0.119	0.067

\*P<0.0003

study conducted by Danaher *et al.*, it was shown that high self-efficacy of the parents was associated with the improvement of child feeding methods.<sup>[40]</sup>

In the present study, the mother who had less self-efficacy against eating food used a few of the following methods: Balance encouragement and variety in eating, environment control and child involvement. The results of this study done by Birch and Davison showed that the obese parents applied some methods in child nutrition control leading into child obesity and overweight.<sup>[41]</sup> In our previous study the relation of less application of balance encouragement and involvement with frequent intake of high calorie food was shown.<sup>[42]</sup>

In the present study, the mothers with low self-efficacy in weight control used children emotion regulation by food. In a study done by Gholamalizadeh *et al.* Mothers obesity was associated with emotion regulation with food.<sup>[43]</sup> In a study done by Swanson *et al.*, it was reported that low self-efficacy of the mother led into the reduction of the quality of feeding methods and child nutrition.<sup>[8]</sup> According to Powell *et al.*, children behaviors regulation with foods was associated with food consumption and avoiding food consumption in the child.<sup>[44]</sup>

Another result of the present study was the relationship between mother self-efficacy and child nutrition. The dessert and snacks consumption was significantly high among the children whose mothers had low self-efficacy with the least resistance against eating. Scaglioni *et al.* in a study showed that mother attitude in food consumption was effective in formation of food behaviors of the child.<sup>[45]</sup> Moreover, in a study done by Blissett *et al.*, child emotion regulation by food was associated with high consumption of snacks. Thus, the results of the study supported the results of the previous study in this regard.<sup>[46]</sup> A research done by Campbell *et al.* showed that high maternal self-efficacy was associated with high consumption of fruit and vegetables and low consumption of cake and drinking among 5-year-old children.<sup>[47]</sup> In a new study conducted by Morrison, it was shown that emotional maternal eating (eating in response to outside stimuli, hunger) was associated with food consumption of the child.<sup>[48]</sup>

In this study, maternal self-efficacy in weight control had not significant association with child BMI. Although the various studies showed that the

effect of maternal life-style and feeding methods on child BMI had long-term effect.<sup>[31,42,49-51]</sup> The longitudinal studies are more useful in this regard.

It can be said that the limitations of the present study are the self-report of the mothers regarding self-efficacy in weight control, child feeding methods and child diet. The study was also cross sectional in design, which has implications for understanding causality and the relationship between variables.

## CONCLUSIONS

Based on the limitations, it can be concluded that the result of the study showed that maternal weight efficacy was associated with feeding and eating methods of the child. The results show that mothers use several different strategies to feed their children. The mothers with more control on their weight applied better methods in child nutrition. The instrumental application of the food was low in these mothers and their children applied less dessert. There was no significant relation between maternal self-efficacy and child BMI.

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