

Investigation the effect of maternal education on nutritional status of children aged 2 to 5 years in Zanjan, Iran

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Abstract: Background and Objectives: child nutrition plays a vital role in the growth and development not only in infancy but also later in life. The mother's education is of great importance and has a strong theoretical and research background in increasing of the status of nutrition children 2-5 years old. The present study was designed to evaluate the effect mother's education package on the state of nutrition children 2-5 years old. **Subject and Methods:** It was an experimental study a total of 81 children 2-5 year's old Zangan city. They were divided into two groups, including experimental and control groups. The experimental group was participated in mother's education of the state of nutrition training course but the control group did not. The data were collected through measuring of weight and height; and questionnaires, which were completed by interviewing children's parents. The nutritional status was evaluated according to the weight-for-age (Gomes), weight-for-height (Waterlow) and height-for-age (Waterlow) methods. The two groups were consequently compared. The T-test was used for the statistical analysis. **Results:** The post-test mean scores with concern to increasing the Mothers information and changing the attitudes and nutrition children 0-2 years old in the experimental group were significantly different from those of the pre-test mean scores. **Conclusion:** To overcome the problems related to growth and development, revision of the current nutritional protocols and educational programs is essential. In addition, involvement of mothers, caregivers, elderly women, and all those involved in child care, in nutrition education activities are recommended.

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Introduction

Natural process of growth and physical development in childhood is very important, because every problem that the child is faced with can affect child's growth and development (1). Furthermore, normal growth (gaining weight, height or the size of different parts of the body) and development (increasing skills in different parts of body in doing natural functions) are related to good nutrition performance; and since child's mother is the main feeder, therefore, the mother has an important role in child's growth and development (1, 2, 3). And also infrastructure of proper child's nutrition that has a direct effect on child's mental and physical growth is the parents' rate of awareness. One of the most important factors in the formation of the society's dietary pattern is a set of food and nutrition habits and cultures of people in that society. These habits are formed at birth which is affiliated to the substrate that the society provides (5). But the set of factors that

makes this substrate has been taken from culture and tradition of each society which is affected by nutritional awareness of the people in the society especially mothers (2, 6). 2-5 years of age is a period that child usually spends in the family and the most impact of nutrition tradition is in these ages and the child's taste is formed (6, 7); and any neglect in this regard causes mental and physical growth failure in children that in the future in addition to diseases and mental and physical damages, imposes high costs of treating and caring the child or young patient to the parents and the society (2, 4). Child's stomach capacity is small and therefore a limited amount of food can be eaten at each meal. On the other hand, child's physical growth is rapid and requires much food. To put it simply, helping food that child can use in each meal should have a lot of nutritional value and contain nutrients needed for growth (3, 8). Sufficient nutrition and use of nutrients meal require mothers' awareness of proper nutrition culture. Unfortunately,

deficiency of mothers' awareness of proper nutrition and change in the pattern of food consumption in recent decades has led to substitute low-value food instead of high-value and proper meals (1, 5). Low consumption of milk and dairy (per capita milk consumption is 480 liters in Netherlands but 80 liters in Iran), lack of adequate energy and protein intake and increase in valueless junk foods make children susceptible to malnutrition (9). Feeding children is often difficult, they are often looking to play and unwilling to eat new foods and generally it seems that they don't eat much and insufficient knowledge of mothers makes it more difficult (1, 7, 8). Obviously, malnutrition due to food poverty and malnutrition resulting from welfare (overeating, bad-eating and their complications) are dramatically affected by nutritional awareness. Consumption problems in Iranian society are not confined to low-income class, but Iranian families with high income aren't also able to select the proper food items that provide their health, and their selection is sometimes problematic as well (4, 8). The main point is to make eating style and culture consistent with health and increase nutritional awareness. In Iran, 800 thousand children under 5 years have moderate and severe stunting (height of Iranian children has been shorter 6 cm due to improper nutrition (9). That is, due to lack of adequate food intake, they are chronically malnourished. Receiving little food at first causes child's weight loss and if this less food lasts, the child gradually comply itself with it. That is, its stature will be small to be able to survive with little food. Even if the children are free from malnutrition, some changes are created in their body composition. The ratio of fat to fatless tissue is increased and causes changes in the metabolism which is associated with obesity. When the child doesn't have enough nutrition in important periods of growth, their body will change to prepare the child for a poor diet throughout their lives (4). On the other hand, one of the most important reasons of parents for referring to doctors is nutritional problems and concerns of parents in their physical and mental growth. Various studies have showed that 70% of patients referred to health systems are due to lack of parental awareness of how children must be fed (4, 8). About the status of malnutrition and micronutrient deficiencies in Iran, national anthropometric survey in 1377 has reported that 11% of children (about 540 thousand children) have it, and 15% of children (about 800 thousand children) have moderate and severe nutritional short stature which demonstrates long-term chronic malnutrition. Losses caused by malnutrition of children have been estimated annually about 5.5 billion dollars which decreases capability and efficiency of the country (9). The last national survey conducted in 1380 indicated that there is anemia and

iron deficiency in a high percentage of population in different age groups, so that about 26% of 6-year old children suffer from iron deficiency. Due to harmful and irreversible consequences of iron deficiency anemia on brain growth and development and IQ reduction, immediate interventions is necessary to reduce the prevalence of the problem (9). Non-social causes and roots go beyond nutrition problem, but researchers have argued that nutrition is a missing key ring in non-social behavior (8). In terms of physical and mental chronic diseases in children under 5 years, analyzing the nutritional status of Iranian society indicates that currently besides malnutrition and food poverty, nutritional transition period is rapidly passing. Warning signs of metabolic diseases expansion are found in large cities after urbanization expansion and lifestyle changes. National health and disease survey in 1378 showed that about 30% of boys and 45% of girls have overweight and obesity, while their parents consider children's overweight as proper growth and are even proud of it (9). Sufficient food and nutrition in childhood as a timely alarm system for predicting emergency situations and timely planning for supporting groups at risk of malnutrition and starvation is very important (15). By ensuring better nutrition for children, parents can prevent their bad behavior in future. Unhealthy nutrition leads to low IQ that later can lead to non-social behavior (4). Willy and Wong believe that health care should not only focused on children's physical and mental health but it must be based on their quality, nutrition and growth. Because the concept of health doesn't mean lack of disease but the most important goal of growth management is to achieve the best quality of growth and development. Therefore, evaluating children's growth from the quality of nutrition is the biggest step that has been taken in recent decades; that is, its basis is parental education (7, 27). The present study was conducted to evaluate the impact of maternal education on the nutritional status of 2-5 years old children in Zanjan.

Methods

To evaluate the nutritional status of children, three indices of weight for age according to Gomez standard, child's weight to standard weight for height and height for age according to Waterloo standard were used respectively for different degrees of underweight, thinness, and stunting. Tools used in this study include analog scale and non-elastic tape which are standard tools for measuring height and weight. Equivalent reliability was used for measuring reliability. A child demographic questionnaire was completed for each caregiver. For parents who were illiterate or had low education, the questionnaire was completed by the researcher.

The booklet that was provided to the caregiver includes: child's growth and development

and factors affecting it, explaining growth percentile, common problems of children's nutrition, nutritional behavior, properties of some important foods, how keeping and preparing some foods. The manual was extracted from the curriculum of the Ministry of Health, and Willy and Wong's books and was completed under the supervision of nutrition consultant. The study population was mothers with 2-5 years old children and without diagnosed psychiatric problems (which has been stated in their medical record) who were selected by random sampling method.

Sample size was selected considering 90% confidence level and estimating standard deviation of impact of training, based on conducted studies at $s=1$ value and assuming the least error equals $d=10\%$. The minimum sample size was calculated 81 that was divided into two witnessed and control groups.

Sampling and data analysis method: in this study, stratified random sampling was performed in 3 regions of 14 districts of Zanjan. After the administrative process and obtaining introduction letter from Zanjan Azad University and presenting it to children's parents and taking their consent for performing the study, the researcher referred to the homes in the desired regions throughout the entire week (to reduce the risk of error) until the completion of sample size and obtaining written consent from the children's parents and ensuring them about keeping the questionnaire data and fidelity in preserving information in case of their approval to participate in the study, they completed the questionnaires at the same location. Time of sample collection was 60 days, 160 days training time and 40 days sample re-collection. Due to the possibility of samples removal because of different reasons such as chronic disease, lack of cooperation, long travel, etc. number of samples in the experimental group was considered more than control group (total number of samples removed during training was 7 persons). Age of children was between 24-month children to 4-year and 12-month children, that NCHS reference curve was use for comparison. Samples were randomly divided into two witnessed and control groups. The witnessed group samples were trained and control group wasn't given any training. Children's weight was measured standing, without shoes and with minimal clothing. Children's height was measured standing without shoes with a non-elastic tape attached to the wall so that hips, shoulders and heels attached to the wall and the child faces straight. Then the witnessed group was trained about children's proper nutrition singly, and booklet and contact number were provided to them; and parents and their child were trained for 160 days through direct contact or by telephone once a week, and their weight and height were measured every month. At the end, the demographic questionnaire was

re-filled by the intervention and control groups that include 2 additional questions about their satisfaction and personal opinions of the research process. Children with congenital disorders and lasted chronic illness weren't participated and parents who weren't able to respond to questions, the questionnaire was completed by the researcher. Children's height and weight at birth was recorded from their growth card. After data collection, data was used by the nutrition consultant to evaluate the nutritional status of children, to the three indices of weight for age according to Gomez standard, child's weight t standard weight for height and height for age according to Waterloo standard respectively for the prevalence, and varying degrees of underweight, thinness and stunting. Then data was divided as follows according to standard growth curve and under the supervision of nutrition consultant, below the third percentile of growth curve=1; between the third and 50th percentile of growth curve=2; between the 50th and 97th percentile of growth curve=3; and above 97th percentile of growth curve=4; and also below the third percentile was calculated as growth retardation and above 97th percentile as unusual growth. After segmentation, data was analyzed using SPSS version 17 software; and the impact of maternal training on the nutritional status of 2-5 years children was investigated and intervened in Zanjan. At the end, according to a survey, 99% of parents were completely satisfied and wanted to continue their training.

Findings

At first, the two test groups, control and experimental, were matched in terms of underlying independent variables that their initial difference may affect the final results. Data analysis indicates that in the control group 50% were boys and in the experimental group 50% were boys in terms of child's gender. In terms of mothers' age, the research units in the control group 90.7% and in the experimental group 89.5% were aged 21-39 years. In terms of mothers' educational level, research units in the control group 41.5% and in the experimental group 43.9% had a diploma. In terms of mothers' occupation, research units in the control group 75% and in the experimental group 74.3% were housewives. In terms of economic condition, research units, 78.4% in the control group and 77.4% in the experimental group had moderate economic condition in terms of monthly net income and ownership. In terms of number of people living together, in research units 72.8% in the control group and 72.5% in the experimental group were in 2-5-person families. In terms of wanting the child in research units, 76.3% in the control group and 78.5% in the experimental group were wanted children. In terms of rank in the family in research units, 58.5% in the control group and 62.3% in the experimental group

were the first child in the family. Then the chi-square test between the two control and experimental groups demonstrated that there is no significant difference in terms of research criteria between the control and experimental groups.

In order to prevent from the error, the two control and experimental groups were also matched in terms of research variables (weight and height) and independent statistical t-test indicated that there is no significant difference between the two control and experimental groups.

In table 1, using numerical descriptors (central indices and dispersion indices), research variables such as height and weight were examined in testing groups before the intervention and control. As it has been shown in table 1, the majority of children in the control and experimental groups have scores between 2-3 in terms of research variables; that is, they are between 50th and 97th percentile of growth curve; and independent t-test also demonstrated that there is no significant difference between the two control and experimental groups in terms of weight and height before intervention.

According to table 2, in the experimental group after intervention, in order to examine the impact of training on variables affecting the nutrition, Mc Nemar non-parametric test was used. According to the results obtained from this study, training was effective on overcoming problems due to nutrition

such as eating, appetite problem, and food hatred, rejecting new foods, bowel problem and soil-eating problem.

Table 3- in relation to research objectives; that is, the impact of mothers' training program on improving children's nutrition, the results obtained from dependent t-test of experimental group indicate that the mean of height and weight had a significant increase after intervention; and also results obtained from dependent t-test of control group indicate that mean of height and weight didn't have significant increase without intervention with 160 days interval.

Table 4- in relation to research objectives; that is, the impact of mothers' training program on improving children's nutrition, the results obtained from independent t-test of experimental and control groups indicate that mean of height and weight had a significant increase after intervention in the experimental group and without intervention with 160 days interval in the control group.

Table 1. Frequency distribution of numerical indices of control and experimental groups

Experimental group	Control group	Numerical indices	
		2/28	2/30
2/31	2/34	Current weight	
2/24	2/25	Height at birth	mean
2/23	2/26	Current height	

Table 2. Comparison of experimental group in responding to nutrition questions before and after intervention

Mc Nemar test	After intervention		Before intervention		Nutrition questions
	percentage	Number	percentage	number	
	12/2	7	29/5	15	Eating problem
	26/5	12	48/6	25	Appetite problem
	12/2	7	26/6	13	Food hatred
	14/3	8	30/5	16	Rejecting new food
	12/3	6	5/17	9	Soil-eating problem
P-value = 0.040 < 0.05					14/3 5 22/8 11 Bowel problem

Table 3. Comparison of descriptive indices of children's height and weight in control and experimental groups

dependent t-test	mean	Control group	dependent t-test	mean	Experimental group	Variable
	2/26	First sampling		2/23	Before intervention	height
P-value=0/131	2/30	Last sampling	P-value=0/000	2/76	After intervention	
P-value=0/185	2/34	First sampling	P-value=0/000	2/31	Before intervention	weight
	2/36	Last sampling		2/78	After intervention	

Table 4. Comparison of descriptive indices of children's height and weight in the two experimental and control groups

Independent t-test	Mean	group	Variable
	2/76	Experimental group	height
P-value=0/00	2/30	Control group	
P-value=0/00	2/78	Experimental group	weight
	2/36	Control group	

Discussion

The research findings indicated that by increasing mothers' awareness in relation to the child's nutritional needs, the quality of children's nutrition is increased and leads to increase in growth indices such as weight and height and their nutrition problems was minimized as far as possible this study proved to mothers of experimental group that without additional cost and need of medicine, their children can have a better nutrition quality and thus better

growth. Also 92% of parents welcomed the proposed nutrition behavior. National association of child growth and development in the United States (2010) believed that training affects all aspects of life (11). According to the statement by WHO on child's growth standard, training increases quality of children's nutrition (10, 12). Blank wrote in 2003: nutrition education is considered as an important factor for increasing children's growth and continued that the three corners of the triangle affecting child's growth and development are environment, nutrition and genetic and among the three sides, the nutrition issue appears to be more bold because it can be modified and manipulated (13). Results of the present study in comparison with studies conducted in the country such as qualitative study by Akbarian and Diagnat in Booshehr (14), and Rostamnejad and Amani in Ardebil (15) and Ebrahimi (16) indicated that parents' awareness is an effective factor in child's nutrition and breast feeding. Also similar results obtained from Ramos's study that examined factors affecting child's nutrition and breast feeding, parents' training is essential in successful implementation of child's nutrition and breast feeding. Kalantari et al. (1388) conducted a study aimed at investigating the relationship between obesity and overweight of first-grade primary school students in Shiraz and the pattern of breast feeding, weight at birth and socio-economic condition in Shiraz, and have stated their findings as follows: obesity and overweight of first-grade primary school students in Shiraz is related to the pattern of breast feeding and mother's awareness about nutrition; although this relation may not be an independent one (19). In a qualitative study by Saka in Turkey, mothers with low education level often imagine that growth increase or lack of child's increase is only due to genetic; therefore no attempts are done to increase child's growth (22). Based on WHO classification, Iran is among countries with low prevalence in terms of underweight, stunting and thinness. High prevalence of overweight must be taken into consideration seriously and the simultaneous attention to the two head of malnutrition spectrum is essential. One of the Millennium Development Goal in order to eliminate poverty and hunger in the world is to reduce malnutrition in children less than 5 years. Tracking the Millennium Development Goals in various countries requires access to reliable data on the growth status of children at the national level and in the next step is all-round education (12). Results of Salarkia's (1389) studies revealed that parents' awareness is considered an effective key factor in the mental image and child's nutrition quality (18). Results of Esfarjani's (1386) studies demonstrated that parents' training is effective on children's growth

(23). Results of Klasen's (2008) studies showed that children having parents with high awareness have a better growth than children at the same age (24). Results of Franca's studies (2007) indicated that training is one of the most important factors for improving children's nutrition (25). National association of nutrition in the U.S reported that proper nutrition and children's growth improvement depend on various factors that the most prominent one is parents' training (12). Results of Rezazadeh's (1388) studies showed that parents' awareness increase increases nutrition quality and proper nutrition is related to proper growth (26). Results of Saka's (2005) studies indicated that nutrition is an important factor in children's life quality (22). Wong believes that in order to enhance the most important index of children's life that is life's quality, is the urgent need to increase parents' awareness about children's nutrition in order to prevent growth reduction and reduce diseases, etc. (27).

Conclusion

The results of the present studies indicated that by improving nutrition, children's growth and development are increased. But in order to increase children's growth and prevent complications due to malnutrition either as thinness and stunting or obesity, parent must be trained continuously. The training must be so strong, reasonable and scientific that meets nutritional problem caused by cultural, social, economic, superstition and other interventions in order to achieve this matter, a comprehensive cooperation of media, cultural groups, ministry of Health and government policies is required.

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