INVESTIGATING NUTRITIONAL STATUS OF EXCEPTIONAL PUPILS IN TEHRAN CITY (2014)

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Abstract

Nutritional assessment is the first component of nutrition care and it is necessary for prevention of malnutrition and promoting health. The aim of this study was to assess nutritional status and physical activity level in exceptional children. This survey was a cross sectional study conducted on 470 exceptional students aged 5-15 years. All children were selected from 20 Special Education Centers for exceptional children in different districts of Tehran. Height and weight were measured using standard tools. International Physical Activity Questionnaire (IPAQ) was used to determine physical activity levels. According to body mass index (BMI) cut off points defined by WHO, 12.6%, 38.1% and 49.3% of children were thinness/severe thinness, overweight/obese and normal, respectively. The prevalence rates of low height for age (stunting) were 71.7% for mentally retarded, 36.3% for deaf and 17.7% for blind children. Time spent in intense activity was significantly higher in deaf children compared to children with mental retardation (P<0.05). Blind children had significantly highest daytime sitting among all children (P<0.05). Due to high prevalence of malnutrition among exceptional students, incorporating a proper nutritional intervention into the comprehensive program will likely be successful.

Keywords: Nutritional Status; Anthropometry; Physical Activity; Exceptional Children.

Introduction

Malnutrition stands for over-nutrition, under-nutrition and inappropriate eating; thus malnutrition defines as relative or complete deficiency or excessive nutrient intake. Malnutrition is not a disease, rather it is an outcome that result from
nutrient deficiency or excessive nutrient intake. Childhood is one of the most important stages of life to achieve adequate growth health foundation for the rest of life. Poor diet condition in childhood the leads to irreversible outcomes. Learning attenuation, more susceptibility to ailments and decreasing physical and mental abilities are the most considerable complications of childhood malnutrition (1). Being physically health is one of the requirements of the learning process. Student’s education and training without directing attention to their health would be an imperfect and dysfunctional subject. Nutritional status is one the most fundamental basis to prevent malnutrition and promote health levels. Anthropometric indexes are invaluable to survey the nutritional status in children. Height and weight are the most important anthropometric indexes which are used in children, adolescents, and also in adults (2). Exceptional students which are known as students with special needs are more vulnerable than the others. The incidence of malnutrition in an exceptional student in compare with the other students accompanied with more unpleasant effects. Developing malnutrition in an exceptional student not only increases the risk of developing other disease, but also can result in numerous problems and difficulties for their family and teachers (3). First of all, an exceptional child is a child (a human being with all the human characteristics) and the next is a child with exceptional characteristics and differences compared with other children. For as much as vulnerability of exceptional children is more than the others, nutritional care and health care of them will be more important. Study on the prevalence of malnutrition in both its range (obesity and thinness) by using standard anthropometric indexes depicts an acceptable and documented picture of nutritional status of exceptional students as one of the most authentic criteria to determine health.

Stunting, defines as “the gaining of insufficient height relative to age” (4), during childhood is a major public-health problem in underdeveloped and developing countries (4-6). Linear growth retardation, which is the manifestation of chronic malnutrition, can be developed because of inadequate intake of food, inappropriate quality of diet, or a combination of both (7-11). The 2000 report of the World Health Organization (WHO) illustrated that 215 million children were stunted. Findings from a national survey in Iran in 2005 represented that 4.7% of Iranian children were affected (12).

As regards the studies on the nutritional status of exceptional students on the international levels and within country is very limited, this study was conducted to determine the prevalence of malnutrition in exceptional students with the aim of achieving documented statistics to codify the preventive and control programs in Iran.
Materials and Methods

This cross-sectional study was conducted as a survey for the first time in Iran in 2014. The studied population was included the both sexes of blind, deaf and mentally retarded primary school student in Tehran city. All of blind and deaf pupils were selected as the sample size; however, since the number of mentally retarded pupils was higher than the aforementioned groups, the studied sample was randomly selected among the 10 exceptional education centers. At the beginning, informed written consent form was obtained from all participants and their parents. Also, children with Down syndrome, Prader-Willi Syndrome and other similar subjects did not enter to the study and only mentally retarded pupils were studied, because foresaid groups have their own specific height and weight growth pattern.

Children's weight was measured while the subjects were minimally clothed without shoes, using digital scales and recorded to the nearest 0.1kg. Height was measured in a standing position, without shoes, using stadiometer while shoulders were in a normal state and recorded to the nearest 0.1cm. Food consumption frequency was calculated by using Food Frequency Questionnaire (FFQ). This questionnaire has been translated and has been standardized in Iran. Validity and reliability of FFQ have been determined in Iran and other countries. The overall correlation coefficient of FFQ was 0.74 and was calculated discretely for each item. Required information on FFQ was obtained for each subject through interviewing their parents.

Physical activity level was evaluated by using International Physical Activity Questionnaire (IPAQ) (13). Weight and height was measured at school and related information to physical activity were collected by using questionnaire and through interviewing their parents. Anthropometric data collection and completion of IPAQ were conducted by a nutritionist.

It has been used Body Mass Index (BMI) and Height for Age (H/A) to analysis anthropometric data. After that these measurements were compared with standard values for primary school children and adolescents published by World Health Organization (WHO2007) by using Anthro software (14). Comparison of these indexes with WHO standard reference was done by using Z-score value. In this study according to the definition that is accepted by most of references, malnutrition percentage in the population regarding each index equals Z-score percentage less than -2 in that population, for instance according to weight for height, if a child have Z-score equal to -2 he or she will considered as stunt (15). All statistical analyses were done by Statistical Package for Social Sciences software (SPSS Inc, version 16).
Results

In this study 470 exceptional pupils aged 5-15 years with average age 10.03±2.04 were studied. 258 subjects were boy (54.9%) and the number of girls was 212 (45.1%). In terms of type of disability, 226 subjects (48.1%) were mentally retarded, 182 subjects (38.7%) were deaf and 62 subjects (13.2%) were blind. These pupils were studied in 20 education center specialized for exceptional children in Tehran city. Regarding BMI, 12.6% of studied subjects were under-weight or very under-weight, 38.1% were obese or overweight and 49.3% were within normal range. Also, according to BMI, more than 50% of mentally retarded children were obese or overweight which was significantly higher than other groups (p<0.001) (Table1).

**Table-1: Description of anthropometric indexes (Body Mass Index and Height for Age) in terms of studied groups.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Body Mass Index</th>
<th>Height for Age</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under-weight</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Number (percent)</td>
<td>Number (percent)</td>
</tr>
<tr>
<td>Mentally retarded</td>
<td>18 (8)</td>
<td>93 (41.2)</td>
</tr>
<tr>
<td>Blind</td>
<td>23 (12.8)</td>
<td>112 (62.6)</td>
</tr>
<tr>
<td>Deaf</td>
<td>18 (29)</td>
<td>25 (40.3)</td>
</tr>
<tr>
<td>Total</td>
<td>59 (12.6)</td>
<td>230 (49.3)</td>
</tr>
</tbody>
</table>

†Chi-Square, (P<0.001)

According to the height for age index, subjects were categorized into three bands including normal, stunt and tall. 71.7% of mentally retarded subjects, 36.3% of deaf subjects and 17.7% of blind subjects were stunt or susceptible to stunting. Regarding this index, mentally retarded children were significantly more stunt than other bands (p<0.001) (Table1).

Regarding physical activity, T-test had demonstrated a significant difference in average hours of doing vigorous physical activity in the mentally retarded group and the deaf group. According this result, it had been observed that hours of doing vigorous physical activity in deaf subjects was significantly more than mentally retarded subjects; however, there was no report on any kind of moderate to vigorous physical activity or walking by blind subjects. Hours of sitting during the day in blind subjects was significantly more than the others (p<0.001) (Figure 1).
Figure-1: Hours of sitting status in studied groups.

About the food consumption frequency, numerous foods were studied; but because of the importance of height index as the one of precious index to evaluate this factor and extensive studies that demonstrated the relationship between dairy products consumption and height. Milk consumption frequency was evaluated. According to the data that obtained from milk consumption frequency, the higher percentage of subjects who had drank milk less than 7 days a week was belong to mentally retarded subjects (23.5%). Also, the higher percentage of those with no milk consumption was belonging to the aforementioned group (24.8%). Regarding Table1, the prevalence of stunting in mentally retarded subjects was more than the two other groups which these results could be evidence on a direct relationship between dairy product consumption and height of individuals. On the other hand, the lower percentage of ones who did not consume milk was belong to blind subjects (11.6%) and the lower percentage of stunting was related to this group (17.7%).

In this study, there was a significant positive correlation between weight and hours of sitting (p<0.002, r=0.2). Figures 2 and 3 demonstrate the mean weight and hours of sitting in studied subjects.

Figure-2: Mean weight in studied subjects. Figure-3: mean hours of setting in studied subjects.
Discussion

The results of numerous studies have shown that the brain is one of the most vulnerable organs to malnutrition. It has been observed that malnutrition in adolescence does not attenuate the number of brain cells, however, decreases that weight which could have an effect on their efficacy and operation. Energy intake of a child suffering from malnutrition is low; thus, cells of such a child would be exhausted. Subsequently, function of these cells in the body will decreased and will not be optimized. It is obvious that such a child with such cells would not be successful at doing homework and learning process (17).

Childhood obesity is becoming a global health problem (18). Obesity, itself, is a form of malnutrition. One of the main reasons of obesity is decreasing energy consumption in body. Decreasing physical activity is a key factor leads to attenuating energy consumption. Reduced learning and developing mental, social and physical problems are the major outcomes of childhood obesity (19).

Quetelt index (w/H$^2$) is the most applicable weight-height index that usually named Body Mass Index (BMI) and is a reliable measure for nutritional assessment. Calculating BMI needs height and weight measurements and according to the result of this index, it could be demonstrated over or under nutrition. In this study regarding BMI, 12.6% of subjects were underweight, 49.3% were normal and 38.1% were obese or overweight. According to the obtained information, approximately more than half of studied exceptional children were developed a kind of deviation from normal range of weight.

By comparing these two statistics, it is clearly seen that in terms of thinness and under-weighting the number under-weight exceptional children is two folded of normal children. Also, according to the obesity and over-weight the number of obese and over-weight an exceptional child is about 15% more than normal children.

In another study by Kelishadi et.al (12) showed that the prevalence of over-weight and obesity were 14% and 6%, respectively (21). This change is comparable with Turkish and Pakistani children and adolescents (22). Also, Weight charts of Iranian children and adolescents were similar to those in neighboring countries such as Turkish and Saudi children and adolescents of both genders (23,24) ; whereas, Iranian children and adolescents had higher weight than their German counterparts (25). By comparison, these studied subject have a more complicated condition. For instance, 38.1% of studied subjects were obese or over-weight that is 18.1% more than normal children.
The prevalence of obesity and over-weight in mentally retarded subjects were parallel to results of a study which conducted in South Korea. South Korea studies showed that approximately half of mentally retarded children were obese or over-weight (26).

In the studied subjects the prevalence of malnutrition was more than normal children that this part of this study result was similar to a study in Chile (27).

A Saudi survey showed that the prevalence of obesity in blind children was more than deaf children (28). Also, in this study obesity in terms of W/H and BMI in blind subject was more prevalent than in deaf subjects.

In all of three studied group, deviation from normal range for both W/H and BMI was more than normal children. Another studied factor was physical activity. Physical activity could improve body composition and promote health (29).

In this study not only there was no report of physical activity including moderate to vigorous physical activity and taking a walk in blind subjects, but also in more than 60% of them sitting time was more than or equal to 6 hours per day. Only 23.7% of deaf and mentally retarded subjects had taken a walk for less than 30 minutes a day. Physical activity, especially regular physical activity, has a key role in general health. Considering the aforementioned statistics, it has been clearly seen that physical activity status in studied subjects chiefly in blind and mentally retarded subjects was not desirable.

Lack of adequate physical activity in these stages could predispose people to vide variety of chronic disease consist of type2 diabetes, metabolic syndrome, cardiovascular disease and other ailments.

Esfarjani et.al in a study in 2013 had found a significant preventive relationship between following “carbohydrate-protein” diet and stunting in primary school children in Tehran (30). In this study three items of food which categorized in this group including milk, fruit and vegetable were studied and were compared with Reference Daily Intake (RDI).

According to the RDI of milk and alternatives for children in these age bands that is about 2-4 serving per day (1), most of studied children had consumed milk less than this amount. 27.6% of studied subjects have consumed milk less than 7times a week (once a day) and 52% have consumed 7times a week. In total, 79.6% of studied subjects have consumed milk less than daily recommended serving.

The next studied food group was vegetables and fruits. Daily recommended serving for children and adolescent in these age groups is 5-6 serving per day (1). However, 33.3% of all of these subjects have consumed fruit less than once a day and 53.2% of them have consumed fruit once a day. Broadly speaking, fruit intake of 86.5% of studied subjects was less
than daily recommended serving. If we want to evaluate fruit consumption within these three groups, it could be said that deaf subjects who have consumed fruit less than once a day have accounted for the large percentage (36.8%).

Similarly, vegetable consumption frequency in the subjects was studied. Daily recommended serving of vegetables for children and adolescents is 5 serving a day (1). 36.3% of all of these subjects have consumed vegetables less than once a day and 8.5% of them have consumed vegetables once a day. Totally, vegetable intake of 44.8% of studied subjects was less than daily recommended serving.

Results have shown that, regarding obese, over-weight, under-weight and extremely under-weight subjects, more than 50% of studied subjects have abnormal BMI/BMI of more than 50% of participants was not within normal spectrum. Results of this study could delineate a picture of nutritional status in blind, deaf and mentally retarded children. However, considering that this survey is a cross-sectional study and may not be able to demonstrate the cause and effect relationship between nutritional status and related factors, result of this study could benefited to design prospective and interventional studies.

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