

Nutritional Status and Food Behavior among Primary School Students in Duhok City

الحالة التغذوية و السلوك الغذائي لطلاب المدارس الأساسية في مدينة دهوك

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الخلاصة

خلفية البحث: تقييم الحالة التغذوية كجزء من مكونات الصحة المدرسية يمكن أن تكون بمثابة أداة لفحص وتحديد الأطفال الذين يحتاجون إلى التدخل الغذائي ومنعاً لمزيد من التدهور في وضعهم الغذائي مع تقليص احتمالات الضعف في أداءهم المدرسي.

هدف الدراسة: تقييم الوضع التغذوي لتلاميذ المدارس الابتدائية في مدينة دهوك ومعرفة العلاقة بين الحالة التغذوية للتلاميذ مع سلوكهم الغذائي. **المنهجية:** دراسة مقطعية تم إجراؤها خلال الفترة ما بين 25 نوفمبر 2014 و 25 نوفمبر 2015 من أجل معرفة الحالة التغذوية و السلوك الغذائي بين طلاب المدارس الابتدائية في مدينة دهوك. تم اختبار 700 طالب تراوحت أعمارهم بين 6-12 سنة من خلال اعتماد الخطوات (العنقودية والطبقية والعشوائية البسيطة) من 41 مدرسة ابتدائية في مدينة دهوك. البيانات المتعلقة بالسلوك الغذائي والبيانات الديموغرافية تم جمعها من خلال المقابلة المباشرة مع أولياء أمور الطلبة. بالإضافة إلى ذلك تم قياس طول و وزن الطالب لغرض حساب كتلة الجسم. الاستبانة تم تطويرها كأداة لجمع البيانات مع استخدام مقاييس الطول و الوزن لغرض قياس طول و وزن الطالب ضمن متطلبات هذه الدراسة. تم تحليل البيانات من خلال استخدام التحليل الاحصائي الوصفي والاستدلالي.

النتائج: أظهرت هذه الدراسة أن أعلى نسبة (57.1%) من الحالة التغذوية للطلاب في المدارس الابتدائية كان وزنها صحي، وأكثر من ثلثهم كانوا ضمن السلوك الغذائي الصحي إلى حد ما (71.3%). بالإضافة إلى وجود علاقة ذات دلالة معنوية عالية بين الوضع التغذوي لطلبة المدارس الابتدائية وسلوكهم الغذائي مع قيمة (0.001). P.

الاستنتاج: أظهرت هذه الدراسة تأثير الحالة التغذوية لطلاب المدارس الابتدائية بسلوكهم الغذائي. **التوصيات:** توصي الدراسة بأن تقوم مدارس مدينة دهوك ونظام الرعاية الصحية بوضع خطوات برنامج تعليمي تغذوي ومبادئ توجيهية وإدراج موضوعات ذات صلة بالصحة الغذائية في المناهج المدرسية كما ويجب شمول أولياء الأمور بذلك الشأن مع فحص الأطفال سنوياً بما في ذلك فحص الطول والوزن ومؤشر كتلة الجسم وفقاً للعمر.

Abstract

Background: The assessment of nutritional status as a part of school health component, can serve as a screening tool to identify children who need nutritional intervention and to prevent further deterioration in their nutritional status with reducing the risk of poor school performance.

Objective: Evaluate the primary school students' nutritional status in Duhok City and find out the relationship between students' nutritional status with their food behavior.

Methodology: A cross sectional study was conducted throughout the period 25th November 2014 to 25th November 2015. Cluster stratified simple random sampling of (700) primary school students who aged 6-12 years were selected from 41 primary schools in Duhok city. Food behavior and socio- demographic data were obtained by direct interview. In addition, height and weight measured in order to calculate body mass index of primary school age children. A questionnaire was modified as a tool of data collection and utilized the height and weight scales for measuring student's height and weight for the purpose of the present study. Data were analyzed through the use of descriptive and inferential statistical analysis approaches.

Results: the present study showed highest percent (57.1%) of primary school student's nutritional status was healthy weight and more than two third of them were at somewhat healthy food behavior (71.3%). In addition to highly significant relationship between such nutritional status of primary school students and their food behavior with P. value (0.001).

Conclusion: The present study revealed that the primary school students' nutritional status is influenced by their food behavior.

Recommendations: The researchers recommended that schools of Duhok City, health care system and parent should involve in establishing nutritional educational program steps, guidelines, inclusion of health related nutritional topics in school curriculum with yearly screening children including: checking height, weight and BMI according to age.

Keywords: Nutritional Status, Food Behavior, Primary School Students.

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Introduction

Adequate nutrition is essential for maintaining health, decreasing existing health problems, maintaining functional independence, and improving nutritional status, these are seriously important to prolong good health status and well-being (1).

Kelishadi et al and El-Nmera et al were stated that childhood and adolescent malnutrition has become a worldwide health problem. The malnutrition is associated with their food behavior like intake of attractive energy dense food, increased consumption of animal fats and sugars and reduced consumption of dietary fiber, with a lack of sufficient physical activity resulted in an increasing prevalence of malnutrition in many countries (2,3).

A recent study mentioned that the eating habits and food intake result in continuous effect on nutritional status among children. Furthermore, eating habits have also changed and current habits include low consumption of fruits, green vegetables, and milk, increasing consumption of snacks, sweets and soft drinks, and skipping breakfast(4).

Nutritional problems of the school age children affect their physical and mental development and their education. Nutrition problems can arise from many factors that can range from malnutrition to irregular and excessive feeding. However, socioeconomic, genetic, culture, environment, level of education about nutrition, and family affect students' nutrition quality and their habits. Even underdeveloped, developing and developed countries, the nutritional problems are different sizes, face with nutrition related problems (5).

Malnutrition is a state of nutrition in which there is imbalance of energy, protein and other nutrients that cause measurable adverse effects on tissue and body form (body shape, size and composition). In fact, most obese children become obese adults. More than half of the obese 6-year-old children remain obese in adulthood, whereas only 10 % of children of the same age and normal weight become obese in adulthood (6).

According to Spear, rapid physical growth during childhood creates an increased demand for energy and nutrients. So, the importance of developing healthful eating habits during childhood and adolescence is obvious to decrease people's risk for a number of immediate health problems, such as iron deficiency anemia, obesity, eating disorders and dental caries, and may prevent long-term health problems as (heart disease, cancer, stroke, hypertension and osteoporosis)(7).

School age is the active growing and dynamic phase period of childhood and many researchers found that health problems due to miserable nutritional status among school-age children are most common causes of high absenteeism, low school enrolment, and early dropout and unsatisfactory classroom performance (8).

Objective

Evaluate the primary school students' nutritional status in Duhok City and find out the relationship between students' nutritional status with their food behavior.

Methodology

A cross sectional study design was applied during the period between 25th November 2014 to 25th November 2015 at primary schools (class one to class six) in Duhok City within the boundaries of Duhok General Education Directory.

In order to select (700) from (20179) primary school students aged from 6 to 12 years old of both gender from grade one to six, the cluster-stratified-simple random sampling was used at (41) primary schools in Duhok city. All clusters were completed during 25th November 2014 to 13th April 2015 in order to reach the study sample size.

The approval has been obtained from the General Directory of Education, and ethical committee from General Directory of Health in Duhok City. Confidentiality regarding personal issues of the student and family Informed consent had been got from the student's parents prior the visit their home by sending request paper that signed by school administer in order to obtain the student's food behavior information.

Data of the study were obtained through measuring child's height and weight in order to calculate the child body mass index in schools, and direct interview with child's parents at home in order to obtain the information that related to child's food behaviors and socio- demographic characteristics.

A questionnaire was designed for assessment the students' socio-demographical characteristics, nutritional health status, and their food behavior. The questionnaire is rated in form of Always (5-7 days per week), Often (3-4 days per week), Sometimes (1-2 days per week), and Never (0 day per week). Food behavior evaluated by calculating the scores' cut of points as Unhealthy food behavior (17-29), inconstant healthy food behavior (30-42), somewhat healthy food behavior (43-55), constant healthy food behavior (56-68).

After completing questionnaire, the height and weight of child were measured by investigator. The weight was measured to the nearest 0.1 kilogram with child wearing light clothes and no shoes using UNICEF calibrated digital scale (UNICEF electronic scale Seca 890). The height was measured to the nearest centimeter with the child standing without wearing shoes, using portable Stadiometer (Seca 208 bodymeter, Secavogel and GmbH and Co, Hamburg/Germany). The body mass index was calculated as the weight in kilogram divided by the height in meter squared.

$BMI = \text{weight (kg)} / [\text{height (m)}]^2$

The BMI for each child was determined by using international standardized chart according to CDC gender-specific BMI form for age 2-20 years to get percentile of them and to categorize the BMI as follows:

Weight Status Category Percentile Range

- Underweight BMI < 5th percentile.
- Healthy weight BMI for age ≥ 5 and < 85th percentile.
- Overweight BMI for age ≥ 85 and < 95th percentile.
- Obese BMI ≥ 95 th percentile.

The content of validity is determined through the eight panels of experts. The modifications were done depending on their valued comments. A random sampling of (30) primary school children were selected from one of primary school, data were collected and recollected from them by the direct interview technique after the researcher went to student's home in order to determine the questionnaire reliability with result ($r=0.87$).

The frequency, percentage are computed to determine the children's socio demographics and economic status, age, gender, parent educational and occupational

status. In order to accept or reject research hypothesis an appropriate statistical analysis was performed and includes:

1. Chi square was applied in order to determine the association between socio-demographic status of children and their nutritional status.
2. Regression was conducted to find out the relationship between nutritional status of primary school children and their food behavior.

Results:

Table(1):Socio-demographic distribution of the selected primary school children.

Socio-demographic items	Category	Frequency	Percentage
Age	6-<7	77	11.0%
	7-<8	96	13.7%
	8-<9	60	8.6%
	9-<10	122	17.4%
	10-<11	106	15.1%
	11-<12	135	19.3%
	12-<13	104	14.9%
	Total	700	100%
Gender	Male	299	42.7%
	Female	401	57.3%
	Total	700	100%
Grade	First class	113	16.1%
	Second class	97	13.9%
	Third class	116	16.6%
	Fourth class	120	17.1%
	Fifth class	138	19.7%
	Six class	116	16.6%
	Total	700	100%
Child's ranking	1 st -2 nd	297	42.4%
	3 rd -4 th	223	31.9%
	5 th -6 th	123	17.6%
	7 th -8 th	36	5.1%
	9 th -more	21	3.0%
	Total	700	100%
Parent marital status	Live together	680	97.1%
	Mother died	1	0.1%
	Father died	6	0.9%
	Father married two or more	13	1.9%
	Total	700	100%
Mother educational level	Illiterate	175	25.0%
	Read and write	95	13.6%
	Primary school graduate	146	20.9%
	Intermediate school graduate	123	17.6%
	Secondary school graduate	86	12.3%
	University or higher education	75	10.7%
	Total	700	100%
Father educational level	Illiterate	58	8.3%
	Read and write	82	11.7%
	Primary school graduate	163	23.3%
	Intermediate school graduate	120	17.1%
	Secondary school graduate	107	15.3%
	University or higher education	170	24.3%
	Total	700	100%
Mother employment	Employee	150	21.4%
	House wife	548	78.3%

Father employment	Retired	2	0.3%
	Total	700	100%
	Employee	325	46.4%
	Free job	338	48.3%
	Retired	37	5.3%
	Total	700	100%

Table (1) shows the highest percent of children are at age of (11-<12) (19.3%), and more than half of them are females (57.3%), while the largest percent of children according to grade is at grade fifth class (19.7%), also the number of them ranked as(1st and 2nd) between their siblings (42.4%),and the majority of their parents live together(97.1%),in regarding to parents' level of education, the mother shows (25%) illiterate and the highest percent of fathers are university and higher education (24.3%). This table presents more than three quarters of their mothers are house wives (78.3%) while their fathers (48.3%) have free job.

Table(2):Distribution the selected primary school children by socioeconomic characteristics.

Socioeconomic level	Frequency	Percent
Low	213	30.4%
Moderate	333	47.6%
high	154	22.0%
Total	700	100%

Table (2) shows the distribution of socioeconomic status of study population. Which is the highest percent (47.6%) of them is moderate socioeconomic status.

Table (3): Distribution of the students by their nutritional status

Students' nutritional status	Frequency	Percent
Underweight	42	6.0
Healthy Weight	400	57.14
Overweight	115	16.43
Obese	143	20.43
Total	700	100

Table (3) shows the nutritional status of primary school student, through which the highest percent (57.1%) of them are healthy weight status.

Table (4):Distribution of primary school children according to their food behavior

Food Behaviors	Frequency	Percent
Unhealthy food behavior	5	0.7
Inconstant food behavior	123	17.6
Somewhat healthy food behavior	499	71.3
Constant healthy food behavior	73	10.4
Total	700	100

Table (4) shows more than two third of students are at somewhat healthy food behavior (71.3%).

Table (5) Relationship between nutritional status of primary school children and their food behavior.

Model	Un standardized Coefficients		Standardized Coefficient	T	Sig
	B	Std. Error	beta		
Students' food behavior	-0.104-	0.030	-0.131-	-3.497-	0.001

Table (5) shows the highly significant relationship between nutritional status of primary school children and their food behavior with P. value (0.001)

Discussion:

1. Discussion about primary school students' socio-demographic characteristics

According to present study results, the large number of primary school Students were at age 11-<12 years old and more than half of them were females, also the highest percent of children was in grade fifth. This findings were emerged due to study design and adopting the probability sample selection.

Moreover, the high proportion of students ranked as (1st and 2nd) between their siblings. This result is similar to the result of study conducted in Duhok City by Mohammed that revealed the large proportion of children was ranked (1st and 2nd) among siblings ⁽⁹⁾.

In addition to that the most of their parents were living together. This result is according to the culture norms and values of parents in Duhok City.

Regarding to students mother's level of education the quarter percent of them were illiterate. This finding of present study is somewhat similar to studies conducted by Al-Atrushi et al, in Duhok City⁽¹⁰⁾ and Shabu in Erbil City⁽¹¹⁾, but other studies were made in Duhok City found more than half of mother were illiterate^(9,12).

The present study showed housewife take more than three quarters of students' mothers' occupation. However the highest percent of them were house wife as presented in other study conducted by Al-Atrushi et al ⁽¹⁰⁾.

A nearly to quarter percent of their fathers were at university or higher education graduate. This finding agreed with finding which emerged in the studies conducted in Duhok city⁽¹²⁾ and Erbil City⁽¹¹⁾, found in their studies among school boys similar result as boys' father were university graduated.

The current study presented the highest percent of children were at moderate socio-economic status. So, these results agreed with the results emerged in the studies established in Duhok City by Mohammed ⁽⁹⁾ and Shabu⁽¹¹⁾ in Erbil City, these showed most of children were at moderate socio-economic status.

2. Discussion the evaluation of primary school student's nutritional status

In relation to evaluation the nutritional status of primary school students, this study revealed more than half of them were within healthy weight status. Similar findings were obtained by Shabu⁽¹¹⁾ that found the most of school children in Erbil City were in normal nutritional status. Furthermore, another study has been done on children in Duhok City by Mohammed ⁽⁹⁾ found the most of them were normal nutritional status.

The current study findings showed that the most of primary school students were at somewhat healthy food behavior. On other hand, study results in Sheraz found that approximately fifty percent of primary school children did not intake the enough

amount of dairy product and the majority of them were consume vegetables and fruits less than recommended amount. In addition to that they behave unhealthy food habits through high consumption of sweets and fast foods ⁽¹³⁾.

3. Discussion of relationship between nutritional status of primary school students and their food behavior

As the research progressed, the relationship between food behavior and student's nutritional status was analyzed, then the results showed most of students were at somewhat healthy behavior that leads to highest of them were in healthy weight status which means whenever the children have healthy food behavior they will have healthy nutritional status. A supportive evidence study was found in study conducted in Brazil on primary school children aged from 6-12 in city of San Francisco do conde⁽¹⁴⁾ that clarified the direct relationship between nutritional status of children and their food behavior, and concluded that the food habits have a large effect on the occurrence of overweight and obesity. Food habits also have changed and current habits include low consumption of fruits, green vegetables, and milk, increasing consumption of snacks, sweets, and soft drinks, and skipping breakfast, these food habits result in continuous increase in adiposity among children ⁽¹⁵⁾. Similar studies by Merchant et al ⁽¹⁶⁾ and Neumark-Stainzer et al⁽¹⁷⁾, have reported that overweight and obese children consumed more fats and less vegetables, fruits, legumes and dairy products. Also Badawi et al, showed that faulty dietary habits; having more fast food, candy, chocolates, sugary Juices, and carbonated beverage lead to a higher BMI ⁽¹⁸⁾. While Thilakarathne and Wijesinghe presented the direct association between dietary and life style practices and nutritional status of the children could not be established ⁽¹⁹⁾.

Conclusion

The study reveals that more than half of primary school students were within healthy weight.

Most of primary school students were in somewhat healthy behaviors. The study found out that the nutritional status of school age children influenced by their food behaviors.

Recommendations:

1. The research recommended that schools of Duhok City, health care system and parent should involve in establishing nutritional educational program steps, guidelines, inclusion of health related nutritional topics in school curriculum.
2. Taking in the consideration the findings of present study to implement school-based food programs.
3. Integrate schools syllabus with nutritional health education messages and incorporation of appropriateness for proper food choices, also emphasizing the importance of breakfast, the hazards of frequent eating fatty fast food, high calorie snacks and the importance of certain food items in prevention of obesity should be included in each health educational plan.
4. Community health nurse and other health practitioner play an important role in educating the parent about nutritional status and how they follow up their children. So, the general health directorate should put in its plan training nurses as community health to share in establishing, development and applying of food educational program targeted to primary school children.
5. Yearly screening children including: checking height, weight, BMI according to age.
6. Coordinate with mass media to avoid advertising on fast food like chips sweetened beverage and other high calories foods.

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