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سعادة أ. د. رئيس تحرير المجلة المصرية للدراسات المتخصصة المحترم

جامعة عين شمس، كلية التربية النوعية، القاهرة، مصر

تحية طيبة وبعد،،،

يسر **معامل التأثير والاستشهادات المرجعية للمجلات العلمية العربية (ارسيف – ARCIF)**، أحد مبادرات قاعدة بيانات "**معرفة**" للإنتاج والمحتوى العلمي، إعلامكم بأنه قد **أطلق التقرير السنوي التاسع للمجلات للعام 2024**.

ويسرنا تهنئتكم وإعلامكم بأن **المجلة المصرية للدراسات المتخصصة** الصادرة عن **جامعة عين شمس، كلية التربية النوعية، القاهرة، مصر، قد نجحت في تحقيق معايير اعتماد معامل "ارسيف Arcif"** المتوافقة مع المعايير العالمية، والتي يبلغ عددها **(32) معياراً**، وللاطلاع على هذه المعايير يمكنكم الدخول إلى الرابط التالي: http://e-marefa.net/arcif/criteria/

وكان **معامل "ارسيف Arcif" العام** لمجلتكم لسنة 2024 **(0.4167).**

كما صُنفت مجلتكم في **تخصص العلوم التربوية** من **إجمالي عدد المجلات (127)** على المستوى العربي ضمن الفئة **(Q3)** وهي الفئة الوسطى ، مع العلم أن **متوسط معامل "ارسيف" لهذا التخصص** كان **(0.649).**

وبإمكانكم الإعلان عن هذه النتيجة سواء على موقعكم الإلكتروني، أو على مواقع التواصل الاجتماعي، وكذلك الإشارة في النسخة الورقية لمجلتكم إلى معامل "**ارسيف Arcif**" الخاص بمجلتكم.

ختاماً، نرجو في حال رغبتكم الحصول على شهادة رسمية إلكترونية خاصة بنجاحكم في معامل " **ارسيف** "، التواصل معنا مشكورين.

وتفضلوا بقبول فائق الاحترام والتقدير

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محتويات العدد

تابع محتويات العدد

Effect of nutritional intervention on height status among stunted children (6 -12) years

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Abstract

Short stature is a major health problem worldwide especially in Egypt. This study aimed to evaluate the dietary pattern of stunted children and assess the effect of nutritional intervention on improving their height status. Study was conducted on 100 children aged (6:12 years) who suffered from short stature. Dietary intervention including suitable diet, healthy and nutritional education along 6 months was made for 50 cases of them. Anthropometric, biochemical, clinical and dietary assessments were made for all cases at baseline and at the end of intervention for selected 50 cases. Main results showed highly significant (p=0.000) improvement in anthropometric measurements (weight, and height)

Keywords: Short stature, school aged children, Dietary intervention

ملخص:

العنوان : تأثير التدخل الغذائي على حالة الطول بين أطفال قصر القامة (6-12) سنة

المؤلفون : إقبال محمود محمد ، السيد محمود حماد ، إيمان السيد محمد حبيب ، منار مصطفى عبد الرحمن

قصر القامة مشكلة صحية رئيسية علي مستوي العالم وخاصة في مصر. هدفت هذه الدراسة إلى تقييم النمط الغذائي للأطفال الذين يعانون من قصر القامة وكذلك تقييم أثر التدخل التغذوي على تحسين حالة الطول بينهم. أجريت الدراسة على 100 طفل أعمارهم من (12:6 سنة) يعانون من قصر القامة. تم إجراء التدخل التغذوي بالنظام الغذائي المناسب والتثقيف الغذائي على مدار 6 أشهر لعدد50 حالة منهم. تم تقييم المقاييس الجسمانية والتحاليل المعملية والفحص الإكلينيكي والتقييم الغذائي لجميع الحالات في بداية الدراسة وفي نهاية مدة التدخل للحالات المختارة. أظهرت النتائج تحسنًا معنويا واضحا (p = 0.000) في القياسات الجسمانية (الوزن والطول)

الكلمات الدالة : قصر القامة ، الأطفال في سن المدرسة ، التدخل التغذوي

Research problem

Short stature is defined as a condition in which an individual's height is in or less than the minus 3rd percentile for the mean height of a given age, sex, and population group **(Warrier*et al*., 2023)**.

Short stature (SS) is a major health problem worldwide, especially in Egypt,and it is a result of poor linear growth which is associated with short-term and long-term health consequences including impaired cognitive development and increased risk of child morbidity and mortality. Unlike other growth abnormalities such as childhood obesity, stunting remains invisible and understudied, particularly in school-aged children**(Song *et al*., 2019)**,SS occurred due to many causes; these causes may be genetic, environmental or chronic diseases**(Albalawi*et al*., 2018).**

There is a paucity of data on the prevalence of stunted growth among school-aged children in Middle Eastern countries, with a single study estimating that 17% of children aged 6–11 years in Egypt had stunted growth but iron deficiency anemia and stunting together was reported 9.9%**(El-Shafie*et al*., 2020).**

Ahmed *et al*., (2023) revealed that 17 percent of the youngsters in their big cross-sectional survey from 2020, which included sample 33150 from a stratified listing of Egyptian primary school students aged 6 to 11 years, reported being low in stature**.**

There are many nutritional factors associated with Short stature, as skipping breakfast, not having meals on time, and having <3 meals per day. Scarcity in nutritive foods such as eggs and dairy products and increased soft drink intake can lead to stunting. There are many enabling social factors for stunting such as a mother's education and family income. However, the effects of these factors can be modified by health awareness **(Metwally*et al*., 2020).**

Nutrition plays a key role in the control of linear growth. Good nutrition is vital for children's growth. A balanced diet, containing adequate calories from carbohydrates, fats and proteins, together with sufficient amounts of vitamins and minerals, is important for growth**(Hamed, *et al*., 2020).**

The best management of short stature depends on three strategies, starting by monitoring the growth of children for early detection of any growth problem, then diagnosis to confirm cases and determine the exact cause of short stature to achieve the goal and the way of treatment**(Albalawi*et al*., 2018)**.

Also screening and treatment of parasitic infestation, provision of iron and multivitamin supplementations as well as education of children and parents about healthy nutrition should be a part of school health programes to prevent SS in school-aged children **(Hamed *et al*., 2020).**

The purpose of this study is to evaluate the dietary pattern of school-aged children (6-12 years) who suffer from short stature, and examine the effect of nutritional intervention on improving the height and nutritional status of children with SS.

MATERIALS AND METHODS

Subjects: This study was conducted on 100 Egyptian children aged from 6 to 12 years.

Methods: The study was conducted through two phases:

1- First phase: screening for 100 children (boys and girls) suffered from short stature and/or delayed growth along the growth curve (height for age and sex) who would be diagnosed by a specialist physician. The cases were selected from the National Nutrition Institute (NNI) outpatient clinics.

2- Second phase (6 months): Dietary intervention (suitable tailored diet, healthy lifestyle and nutritional education) was conducted for selected 50 cases with nutritional short stature.

Anthropometric assessment: (height, weight, body mass index BMI) were measured at baseline and at the end of the intervention period for selected cases.

Weight: weight was measured by using a digital scale for body weight; the weight of patients was obtained to the nearest 0.1 kg, with a minimum of indoor clothing and without shoes. Weight for age and sex assessment for children aged 6 to 12, the percentile was used for both boys and girls. The WHO has identified the following weight status classifications:

(1) Underweight: below 5th percentile.

(2) Normal weight: e5th to lower than 85th percentile.

(3) Overweight: 85th to lower than 95th percentile.

(4) Obese: greater than 95th percentile **(WHO, 2019)**.

Height: The standing height was measured to the nearest 0.5 cm while the case was standing straight with the head, shoulders, buttocks and heals vertically aligned, feet slightly spread without shoes according to **(Jelliffe ,1966)**. The WHO identified short stature for height status is below −2 SD **(WHO, 2019)**. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared.

Biochemical assessment: (complete Blood count, serum calcium, thyroid function (TSH), stool analysis and urine analysis) were measured by the NNI laboratory unit at baseline and at the end of the intervention period for selected cases.

Clinical and medical assessment: Routine medical examination including full history, general examination including family history of related chronic diseases like obesity, diabetes mellitus and cardiovascular diseases.

Dietary assessment: (24-hour dietary recall, diet history and food frequency questionnaire) were taken at baseline.

- The intake of energy and nutrients was computed through the compiled food composition tables of the **(NNI, 2006)**. Adequacy of the diet consumed was assessed by comparing the consumed energy and nutrients in the cases with their recommended dietary allowances "RDA" using **(FAO and**

WHO, 2004)recommendations. The food frequency method was used to obtain a profile of food intake of subjects.

24-hour recall, diet history and food frequency questionnaire. 24 hourrecall repeated with selected cases every month and at the end of intervention. The dietary intakes included a detailed description of all food consumed including the cooking method, and the amount of each ingredient in the recipe recorded. The intake of energy, iron, zinc, iodine, vitamin A, vitamin C, folic acid, and other nutrients was computed through the compiled food composition tables **(National Nutrition Institute, 2006).** The adequacy of the diet consumed assessed by comparing the energy and nutrient intakes of the child with her recommended dietary allowances **(Raymond and Marrow, 2022).**

Sociodemographic characteristics, social status, food habits and physical activity level were evolved from the different sections of the questionnaire according to**(Park and Park, 1979).**

Exclusion Criteria:

-Children with major illnesses such as diabetes, cancer, hepatic or cardiac diseases.

- Bone genetic diseases.

- Metabolic disorders, epilepsy, digestive disorders and food allergies

- Any disease that hinders exercise or motor activity.

- psychological diseases .

Statistical Analysis:

Data analyzed by SPSS statistical package version 21. The results were reported as percentage and mean ±SD. Comparing means (paired- samples T test) was used. Statistically significant was considered at $P < 0.05$ **(Snedecor and Cochran, 1967).**

Results and discussion

Table (1):Descriptive statistics of anthropometric data for the studied sample

Age		Sex			
		Boys (n=35)		Girls (n= 65)	
		Mean	±SD	Mean	±SD
6:<9y	Weight	18.9	4.1	19.6	4.4
	Height	111.3	10.3	110.7	11.2
9:12y	Weight	23.9	5.2	24.3	5.6
	Height	124.8	11.2	125.7	11.5

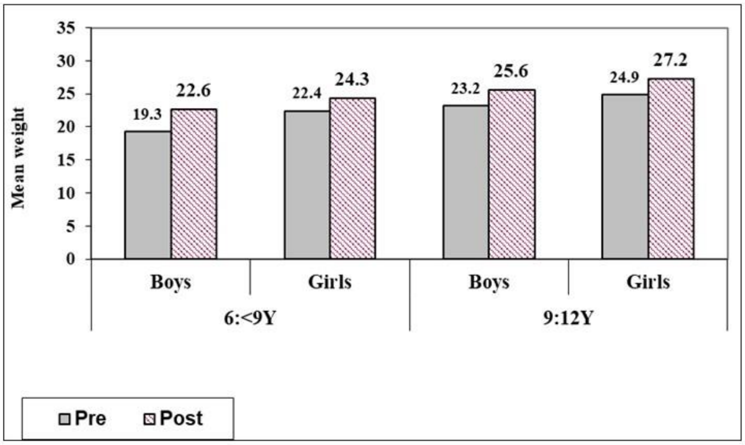
N=100

Results of table (1) showed that the mean and standard deviation of weight from age (6-<9y) were 18.9 ± 4.1 kg for boys, and the mean and standard deviation of weight for the same age groups were 19.6± 4.4kg for girls, the mean and standard deviation of weight from age (9-12y) were 23.9± 5.2 kg for boys, and the mean and standard deviation of weight for the same age groups were 24.3± 5.6 kg for girls. Also results showed that the mean and standard deviation of height for age (6-<9y) were 111.3± 10.3for boys and the mean and standard deviation of height girls for same age groups were 110.7± 11.2 cm, the mean and standard deviation of height from age boys (9-12y) were 124.8± 11.2 cm, and the mean and standard deviation of height for the same age groups were 125.7± 11.5 cm for girls.

Table (2):Comparing pre- and post-intervention per sex and age according to anthropometric measurements for the subsample.

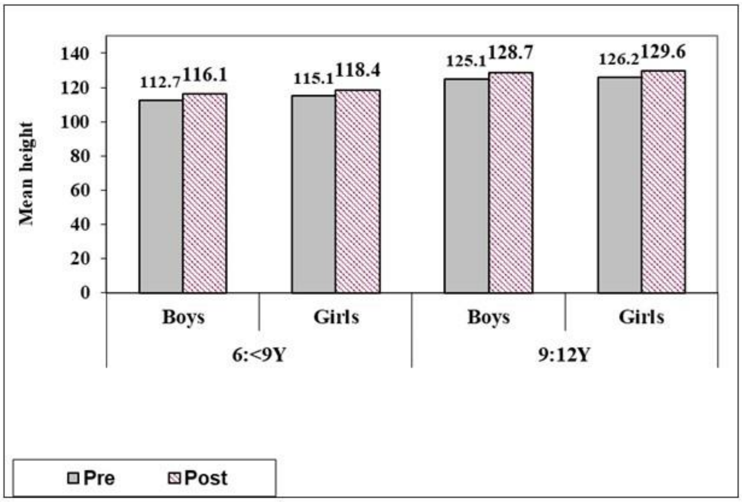
Age		Sex									
		Boys (n=25)				P value	Girls (n= 25)				P value
		Pre-intervention		Post-intervention			Pre-intervention		Post-intervention		
		Mean	±SD	Mean	±SD		Mean	±SD	Mean	±SD	
6:<9y	Weight(kg)	19.3	4.8	22.6	5.0	0.000	22.4	5.2	24.3	5.7	0.000
	Height(cm)	112.7	10.8	116.1	10.2	0.000	115.1	11.8	118.4	12.3	0.000
9:12y	Weight(kg)	23.2	4.9	25.6	5.2	0.000	24.9	5.8	27.2	6.3	0.000
	Height(cm)	125.1	10.1	128.7	10.9	0.000	126.2	11.1	129.6	11.9	0.000

Highly significant (p=0.000)



Highlysignificant (p=0.000)

Figure 1:Comparison between pre- and post-intervention per sex and agefor weight.



Highlysignificant (p=0.000)

Figure 2: Comparison between pre- and post-intervention per sex and agefor height.

Results of table (2) demonstrated highly significant changes (p=0.000) between weight and height among studied samples pre- and post-intervention for all age and sex groups. As shown in this table, the mean and standard deviation of weight pre-intervention were 19.3± 4.8 and 23.2± 4.9 kgfor age groups

(6-<9y) and (9-12y**)**years for boys respectively but post-intervention were 22.6±5.0 and 25.6±5.2 kg, and the mean and standard deviation of weight pre-intervention were 22.4±5.2 kg and 24.9±5.8 kg but post-intervention were 24.3±5.7and 27.2 kg ±6.3 kg .Regarding height the mean and standard deviation of height pre-intervention were112.7±10.8 cm and 125.1±10.1 cm for age groups (6-<9y) and (9-12y**)** years for boys respectively but post-intervention were 116.1± 10.2 cm and 128.7±10.9 cm respectively.The mean and standard deviation of height pre-intervention were115.1±11.8 cm and 126.2±11.1 cm for age groups (6-<9y) and (9-12y**)** years for girls respectively butpost-intervention were 118.4± 12.3cm and 129.6±11.9 cm respectively.

Theseresults agreed with a study by **Marzouk*et al*., (2021)** whofound that in relation to gender, boys had a higher prevalence of underweight/short stature than girls did, whereas overweight was more prevalent in girls. This may be interpreted that girls in Upper Egypt are culturally involved in the cooking of family-food, and have increased access to food, besides boys spend more time playing outdoors than girls. Also results were matched withresults of **(Chaulagain, 2020)**, which showed that boys had a higher underweight prevalence than girls but the reverse was true for overweight and obesity. In addition, the Egyptian study conducted by **Abdelaziz, *et al*., (2015)** showed that short stature was higher in male than in female children. This was explained by sexual differences in the genetic and biological makeup, as boys were biologically weaker than girls **(Mikki, *et al*., 2009**).

The results by **(Saavedra and Prentice, 2022)** showed that the increase in height gain is the most noticeable change in trajectory in anthropometric measures of the school years. About 40% of an individual's linear growth will occur during this time.

There are major differences between the first and second 5 years of school age.During middle childhood, height velocity actually decreases, to the lowest levels of the entire life cycle, only to quickly increase in the middle of the school years to the highest rate of linear gain of all post infancy years. In North America, (USA Centers for Disease Control and Prevention (CDC), growth velocity charts show median height velocity will be at its lowest since birth just before 9years of age in girls and at approximately 10.5years in boys. At that point, before the puberty-related acceleration, both girls and boys will have reached 80% of their final height. Thus, height at that point will be a strong predictor of ultimate height in most individuals. This speaks to the importance of adequate nutrition and sustained growth between 5years and 10years of age**(CDC, 2022)**.

Table (3) Comparison of laboratory parameters for sub-sample pre- and post-intervention

	Pre-intervention		Post-intervention		P value
	Mean	±SD	Mean	±SD	
Hemoglobin	11.4	1.1	12.1	0.9	0.000
Serum calcium	1.08	0.2	1.14	0.27	0.011
TSH	1.99	0.6	1.96	0.6	0.786

(N=50)

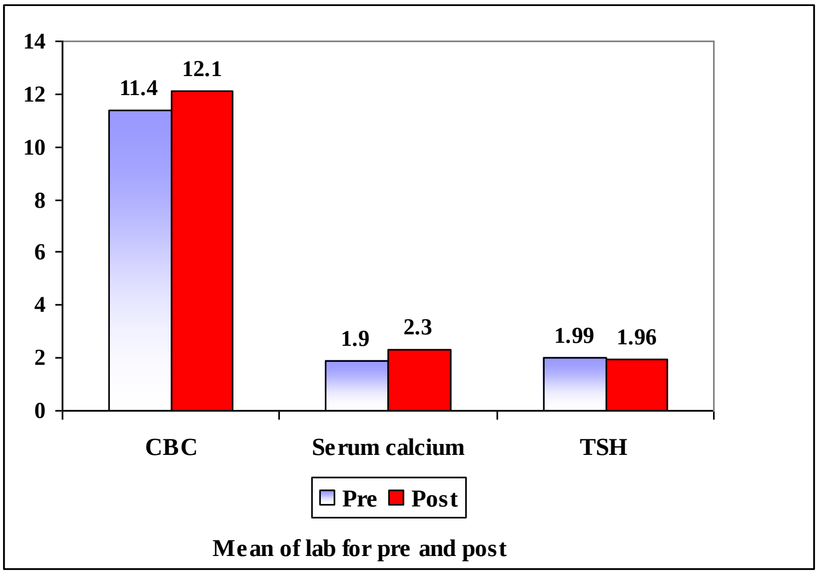


figure 3:Comparison of laboratory parameters for sub-sample pre- and post-intervention

Data from table (3) and figure (3) showed comparison between laboratory analysis data like HB, serum calcium and TSH of the sub-sample studied pre- and post-intervention. Results showed highly significant differences (p= 0.00) between pre- and post-intervention especially for hemoglobin as the mean of HB pre-intervention was (11.4±1.1) and post-intervention was 12.1±0.9, mean of serum calcium was 1.08±0.2 pre-intervention and was 1.14±0.27 post-intervention, Also results of this table showed slightly changes between pre- and post-intervention laboratory analysis data of TSH as mean of TSH was (1.99±0.6)pre-intervention and (1.96±0.6) post-intervention.

The finding of **(Saleh*et al*., 2020)** was in line with the present study, regarding the mean of TSH was within normal levels among stunted children.

Table (4) Comparing of dietary intake from calories, macronutrients and fibers pre- and post-intervention for subsample.

Major nutrients	Pre-intervention		Post-intervention		P Value
	Mean	±SD	Mean	±SD	
Calories (kcal)	1349.9	411.4	2061.15	372.29	0.000
Protein(g)	46.6	15.4	70.77	22.96	0.000
Fat(g)	43.6	13.8	62.94	19.94	0.000
Carbohydrates(g)	192.1	61.6	301.85	94.85	0.000
Fiber(g)	5.8	1.8	10.17	2.48	0.000

N=50 - very highly significant (p=0.000)

Data from table (4) showed changes indietary intakes ofcalories, macronutrients and fibers between pre- and post 6-months intervention for subsample**,** Results showed very high significant differences (0.000) between pre- and post-intervention for both total energy and macronutrients intake.

The mean and standard deviation of dietary intake (24hour recall) from calories pre-interventionwas 1349.9±411.4 kcal/day and increased to 2061.15±372.29 kcal/daypost6-months intervention. The mean and standard deviation of dietary intake (24hour recall) from Protein pre- interventionwas 46.6±15.4

gm/day and increased to 70.77± 22.96 gm/day , and the mean and standard deviation of dietary intake (24hour recall) from fat pre-interventionwas 43.6±13.8 gm/day and increased to 62.94±19.94 gm/day, the mean and standard deviation of dietary intake (24hour recall) from carbohydrates pre-interventionwas 192.1±61.6 gm/day and increased to 301.85± 94.85 gm/day, the mean and standard deviation of dietary intake (24hour recall) from fiberpre-interventionwas 5.8±1.8gm/day and increased to 10.17± 2.48 gm/daypost 6-months intervention.

Table (5) Comparing of dietary intakes of selected micronutrients for the sub-studied sample pre- and post-intervention

	Pre-intervention		Post-intervention		P Value
	Mean	±SD	Mean	±SD	
Sodium (mg)	2074.6	478.7	2410.76	459.38	0.000
Potassium(mg)	1565.4	497.4	2173.28	335.04	0.000
Calcium(mg)	335.1	107.1	663.86	205.78	0.000
Phosphorus(mg)	597.9	118.5	1103.13	300.13	0.000
Magnesium(mg)	66.0	17.9	145.39	39.71	0.000
Iron(mg)	10.2	2.8	16.81	4.88	0.000
Zinc(mg)	6.9	1.9	11.14	3.53	0.000
Cupper(mcg/day)	0.55	0.3	1.03	.52	0.000
Vitamin A (ug)	198.7	44.0	463.3	155.97	0.001
Vitamin C (mg)	29.5	12.5	36.13	11.63	0.000
Vitamin B1 (mg)	0.6	0.35	0.76	0.27	0.000
Vitamin B2(mg)	0.5	0.3	0.78	0.28	0.000

N=50 - highly significant (p=0.000)

Data from table (5) showed changes in dietary intakes fromsome selected micronutrients pre- and post-intervention for subsample, Results showed very high significant differences (p= 0.000) between pre- and post 6- months intervention for allmicronutrients, as the mean and standard deviation of dietary intake (24hour recall) from calcium pre-interventionwas 335.1±107.1 mg /day and increased to 663.86±205.78 mg /day post 6-months intervention, the mean and standard deviation of dietary intake (24hour recall) from iron pre-interventionwas 10.2±2.8 mg /day and increased to 16.81±4.88 mg /day post 6-months intervention, and the mean and standard deviation of dietary intake (24hour recall) from zincpre-interventionwas 6.9±1.9mg /day and increased to 11.14±3.53mg /day post 6-months intervention, Regarding to their intake from vitaminsthe mean and standard deviation of dietary intake (24hour recall) fromvitamin Apre-interventionwas 198.7±44.0 ug/day and increased to 463.3±155.97 ug/day post 6-months intervention, the mean and standard deviation of dietary intake (24hour recall) fromvitamin Cpre-interventionwas 29.5±12.5mg/day and increased to 36.13 ±11.63 mg/day post 6-months intervention.

According to results of table (5) that demonstrate the correlation between lack of micronutrients specically vitamin A and chronic malnutrition it agreed with study by **Ernawati *et al.*,(2023)** who found that chronic nutritional status was correlated with zinc and vitamin A deficiencies, also acute nutritional status of body mass index-for-age and sex was correlated with a lack of micronutrients, specically vitamin A. their finding indicate that micronutrient defiencies in school-aged children must be addressed immediately by evaluating and planning health programs to address these problems, such as supplementation and fortification with micronutrients, deworming vector control, nutrition and health education, sanitation improvement, clean water supply, and other appropriate approaches.

The finding of this study is in contrast with the finding by **khatib and Elmadfa(2009**) who found in a study carried on Bedouin preschool children in Jordon that recorded low iron intake (25.2%) and presence of anemia (57.3%) among them.

Table(6) Distribution of dietary intake of calories, macronutrients and selected micronutrients for the studied sample compared to their RDA

	Pre-intervention		Post-intervention		P value
	Mean	±SD	Mean	±SD	
Calories(kcal)	73.1	25.5	106.07	35.09	0.000
Protein (g)	73.15	30.6	102.09	36.15	0.000
Fat(g)	71.0	23.8	101.96	31.66	0.000
Carbohydrates (g)	69.25	15.5	108.31	34.17	0.000
Calcium(mg)	38.5	11.0	75.32	23.56	0.000

Magnesium(mg)	49.0	14.8	101.65	20.49	0.000
Iron(mg)	114.3	34.0	138.89	47.33	0.000
Zinc(mg)	107.5	27.6	143.49	42.06	0.000
Vitamin A(ug)	36.8	18.0	92.66	36.61	0.001
Vitamin C(mg)	78.9	25.8	103.23	31.96	0.000
Vitamin B1(mg)	59.7	16.2	101.86	33.66	0.000
Vitamin B2(mg)	46.6	18.1	104.17	36.33	0.000

N=50 - very highly significant (p=0.000)

Regarding to data of table (6) that showed distribution of dietary intake of calories, macronutrients and some selected micronutrients for the studied sample compared to their RDA, results showed very high significant differences (p=0.00) of dietary intake(24hours recall) of calories, macronutrients and selected micronutrients for the sup-studied sample compared to their RDA pre- and post6- months intervention, as the mean and standard deviation from calories was (73.1 ±25.5 % from RDA) pre- intervention and increased to (106.07±35.09% from RDA), the mean and standard deviation from protein was (73.15 ±30.6 % from RDA) pre- intervention and increased to (102.09±36.15% from RDA)

And the mean and standard deviation from fat was (71 ±23.8 % from RDA) pre-intervention and increased to (101.96 ±31.66 % from RDA), the mean and standard deviation from carbohydrates was (69.2 ±15.5 % from RDA) pre-intervention and increased to (108.31 ±34.17 % from RDA). Regarding to their intake from micronutrients,the mean and standard deviation from calcium was (38.5 ±11.0% from RDA) pre- intervention and increased to (75.32± 23.56 % from RDA),the mean and standard deviation from vitamin Awas (36.8 ±18.0% from RDA) pre-intervention and increased to (92.66± 36.61 % from RDA) and the mean and standard deviation from vitamin Cwas (78.9±25.8% from RDA) pre-intervention and increased to (103.23±31.96% from RDA)

Theseresults agreed with study by **Saleh*et al.*, (2020)** confirmed macronutrient intake asserted that mean energy intake among studied stunted children was represent as 74.19% from

RDA for energy, whilenormal group represents 101.2% from RDA for energy, with a significant difference. It was found that the mean intakes of protein, fat, and carbohydrates were less than RDA among stunted children. **Ibrahim and his colleagues,(2002)** made similar conclusions that deficiency of several nutrients, including energy and proteins, is seen in stunted children, and the combined effect of these deficiencies might have a role in the retardation of growth in height.

A Tehran study by **Esfarjani *et al*., (2013)**found that adherence to dietary patterns high in protein might be associated with reduced odds of being stunted among children.

Results agreed with **Saleh *et al*., (2020)** whomfound deficiency of several micronutrients among stunted children (primarily Ca and vitamin A) as well as all macronutrient intake. Dietary deficiency of macronutrients and specific micronutrients may play an essential role in linear growth retardation among stunted children. The calcium intake level among stunted children was far below the recommended figures. So, nutritional education messages that encourage adequate consumption of dairy products are needed to counteract this pattern of low calcium intake in future. Results of iron intake showed high consumption among studied sample probably because they consumed a more diverse group of cereals that may contained more iron, moreover, this could be explained by inadequate absorption owing to presence of inhibitors such as phytate and polyphenols in plant-based foods, which are the most cited inhibitors of iron **(Gibson*et al*., 2006)**. This result agreed with **Saleh*et al*., (2020)** whoshowed that iron intake was highthan RDA and also was in line with the Nigerian study by **Ejazand Latif, (2010)**, which reported increased intake of iron in stunted studied group diets. In the other hand this finding was in contrast to the study carried by **(Khatib and, Elmadfa ,2009)** on Bedouin preschool children in Jordon that recorded low iron intake in (25.2%) and presence of anemia among (57.3%) of them. These confrontations could be explained by low intake of animal protein sources, which may result in reduced bioavailability of iron **(Prentice *et al*., 2013)**.

Regarding vitamin intake, results agreed with study by **(Blosset *al*., 2004).**which record reduced intake of vitamin C, which explained their food pattern, where grain wheat maize was the main diet with reduced intake in the form of vitamin C-rich fruit and vegetables, predominantly in areas, where the diet is based on cereal staples.

The present study finding was in contrast to another study **Saleh *et al*., (2020)** which listed that the percentage of children whom meeting the RDA of vitamin C intake was higher because of the food pattern and adequate dietary intake of vitamin C-rich fruit and vegetables.

Conclusion

Diet and healthy lifestyle modifications are the first line of control and dealing with short stature and play an essential role in linear growth.Nutritional intervention including a suitable diet and healthy life style (encouraging daily physical activities and useful exercises that help in stretching) to change unhealthy behaviors may improve height and nutritional status among school-aged children.

Recommendation:

-Spreading nutritional awareness and planning health programs for school aged children directed to the family through all available mass media.

- Establish effective prevention and treatment interventions for young children.

-Healthy nutritional education should be a part of school health programs to prevent short stature in school-aged children.

-Food canteens and other school facilities should ensure the availability of more healthy options (such as fruits and vegetables), as wellas encourage regular physical activity practices.

- Giving school children the skills necessary to be more aware of what a healthy diet / lifestyle means would enable them to make better food choices throughout their lives.

- Encouraging consumption of diets rich in vegetables and fruits; choose whole-grain, high-fiber foods; dairy products and eggs daily ,consume fish at least twice a weekespecially diet rich vitamin A include liver, milk, and egg yolks. Dark green leafy vegetables such as spinach, also, yellow and orange fruits (mangoes, apricots) and vegetables (pumpkins, squash, carrots)

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