

Childhood Obesity and Healthy Weight Program among Primary School Children

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Abstract

Background: Obesity has well documented adverse physical health consequences in both childhood and adulthood. Childhood obesity tends to persist until adulthood and thus potentially represents the beginning of a lifetime chronic process leading to different patterns and magnitudes of impairment in relation to the health-related quality of life. Over 10 percent or 3.6 million of Egyptian children are considerably overweight. It's particularly troubling because the extra pounds often start children on the path to health problems that were once considered adult problems: diabetes, high blood pressure and high cholesterol. **Aim of the Study:** assess the effect of primary prevention program of obesity among primary school children through: assessing knowledge & practices of primary school children related to obesity. **Subjects and Methods: Setting:** The study was conducted in four primary governmental school of El-Salam city, Cairo governorate **Size:** the sample composed of 144 primary school children chosen randomly through multistage sampling. **Tools:** Different tools were used for data collection of study and it was written in simple language to suit the understanding level of the studied primary school children **First tool:** Structured interviewing questionnaire, **second tool:** Anthropometric Measurements, physical assessment sheet **Results:** clarified that only few percentage of primary school children had good Knowledge preprogram while this improved to more than one third post program implementation related to their total knowledge about childhood obesity, there was highly statistically significant difference in post-program compared to pre-program according to their total practice related to childhood obesity. **Conclusions:** primary school children improved their knowledge and practice regarding childhood obesity after program implementation. **Recommendation:** primary prevention program must be provided for all primary school children to prevent childhood obesity risks.

Keywords: prevention program, healthy weight, childhood obesity.

Introduction

Obesity among school-age children has become the prevailing nutritional disease in the global context, posing a serious public health problem because it considered a risk factor for many morbidity and mortality issues later in adulthood (**Khairy et al., 2019**). The increased incidence of the disease in many developing countries has been particularly pronounced, placing significant and worsening burdens on the medical, psychological, social and economic infrastructure of less prosperous nations (**Ara et al., 2018**). The prevalence of obesity among school-age children requires urgent investigation, especially given that the premature development of obesity

comorbidities, previously considered adult diseases, such as type 2 diabetes and metabolic syndrome, is increasingly widespread among children (**Rendón-Macías et al., 2014**).

Obesity among school-age children occurs due to caloric imbalance and is affected by various behavioral factors, including unhealthy eating habits and dietary patterns, sedentary lifestyles and a lack of physical activity. Dietary intake and physical activity can also be affected by environmental factors related to parents, peer, school, and community, all of which can influence their weight status (**Riazi et al., 2017**).

In some cases, it may occur as a result of genetic causes, such as leptin

deficiency, medical causes, such as hypothyroidism and growth hormone deficiency, or as a result of the side effects of some drugs, such as steroids (*Khairy et al., 2019*). Obesity among school-age children has also been linked to other problems, such as impaired psychological health (*Ali et al., 2016*) or the limited development of peer relationships (*Black et al., 2018*).

Obesity has well documented adverse physical health consequences in both childhood and adulthood (*Liu et al., 2016*). There is also mounting evidence that obesity among school-age children and adolescence can have a damaging effect on HRQOL (*Bolton et al., 2019; Morrison et al., 2015; Zeller et al., 2017; Pratt et al., 2018*).

Childhood obesity tends to persist until adulthood and thus potentially represents the beginning of a lifetime chronic process leading to different patterns and magnitudes of impairment in relation to the health-related quality of life (*Khairy et al., 2019*).

A key group of professionals who are positioned to effectively assess and address quality of life in school-age children are school nurses (*Powell, 2016*). The National Association of School Nurses asserts that school nurses have the knowledge and experience to promote the prevention of obesity and address the needs of obese children in schools. A school nurse also collaborate with students, families, school personnel, and health care providers in the promotion of healthy weight and to identify overweight and obese children who may be at risk for emergent health problems.

A school nurse can refer to and follow-up with students who may need to see a health care provider, as well as educate and advocate for changes at both school and district level in order to promote a healthy lifestyle for all students (*NSNA, 2013*).

Given the proven difficulty of curing obesity, prevention could be a crucial strategy in the control of this epidemic. To date, the majority of approaches have

focused on changing the behavior of individuals towards diet and exercise. However, successful approaches to reduce obesity need to take into account the social and cultural context in which this health condition occurs (*Ismail et al., 2015*).

Worldwide In 2016 more than one-third of all school children were obese. Rates of school age children obesity have increased greatly between 1980 and 2016. It has more than doubled in school age children and tripled in adolescents in the past 20 years. Obesity is growing worldwide and becoming an emotional, psychological and financial burden on individuals and communities by becoming a leading risk for global health problems. It has affected both developed and developing countries, and people of all socioeconomic levels (*WHO, 2017*).

School nurses role are vital, to lower childhood obesity rates in school as support for school-based obesity prevention programs for risk factors and growing interest in providing primary and secondary preventive services for obesity among school children. Also support from the school and health provider community as the nurses role in delivering school-based obesity prevention is further developed and defined (*Stang et al., 2015*).

Significance of the study:

The twenty-first century has seen the issue of excessive weight in children. As it becomes a major health challenge, with global figures suggesting that as many as 42 million children are obese or overweight in countries around the world (*WHO, 2018*). The increased prevalence of this chronic condition in school-age children and adolescents in recent years has been especially pronounced in low and low middle-income countries (*WHO, 2018*) although wealthy countries are not exempt, with 31.8% of children in the United States being affected (*Ogden et al., 2016*),

particularly in low income households (*Levine, 2016*). Irrespective of context, childhood obesity is a multifactorial problem that can have an array of adverse effects upon the lives of young people, including upon the physical, emotional, and social aspects of their lives (*Ahuja et al., 2014*).

In order to design successful intervention strategies to manage childhood obesity, it is first necessary to understand how school-age children perceive obesity and its consequences (*Rendón-Macías et al., 2018*). Furthermore, given the complexity of the problem and the significant portion of time that children spend in school, the issue should be addressed in the school setting (*Powell, 2016*).

Aim of the study

This study aimed to: assess the effect of primary prevention program of obesity among primary school children through:

- Assessing knowledge & practices of primary school children related to obesity.
- Designing, implementing primary prevention program of obesity among primary school children.
- Evaluating the effectiveness of primary prevention program on knowledge & practices related to obesity among primary school children.

Hypothesis:

Primary prevention program will improve knowledge and practices related to obesity among primary school children.

Subjects and Methods:

Subjects and methods of this study were portrayed under four main domains as following:

1-Technical Design:

Research design:

Quasi experimental study design (one group pre and post-test) was conducted for this study.

Research setting:

This study was conducted in 4 primary governmental school of El-Salam city, Cairo governorate including: (El Hussien, Osman Ben AFAN, Atef El Sadat and Gamal Abdel Naser). These schools were chosen by a systematic random sample (select a random start at fixed interval) as interval(K) determining by divided the total number of primary governmental schools in El-Salam education management (N) = 32 schools, by the desired sample size (n)= 4 primary school. $K = \frac{\text{total number of primary school (N)}}{\text{desired sample size (n)}} = \frac{32}{4} = 8^{\text{th}}$ (every 8th school, one school was involved in sample).

Subjects of the study, sampling:

- **Type of sampling:** Multistage sampling was used as the following:
 - Stage one: selection of 4 primary governmental school by systematic random sample.
 - Stage two: selection of classroom from each grade from first to sixth by simple random sample.
 - Stage three: selection 10% of school children age (6-12yrs) from each class room by simple random sample.
- **Size of sampling:** sample was carried on (144) school children in four primary school calculated as the following: Average density of classroom equal 60 child, 10% of them was chosen randomly equal 6 child from each class room of six grade, so total number equal 36 school children in all grades in one school. Total number in four schools= 36 times 4= 144 primary school children.
 - **Exclusion criteria for sampling:**
 - All children found to be < 6, > 12 years of age.
 - Children whose exact birth date was not available.
 - Children without written informed consent.
 - Sick Children and whose with chronic diseases.

Tools of data collection:

Data will be collected by using the following tools:

❖ **First tool:** Structured interviewing questionnaire, to assess obesity among primary school children, the investigator designed questionnaire after reviewing the related literature and written in simple clear Arabic language, it included the following three parts:

- **Part I: Socio- demographic** data of primary school children.
- **Part II: primary school children knowledge related to obesity** about the following items: general knowledge related to childhood obesity, knowledge related to childhood obesity risk factors, knowledge related to healthy nutrition and finally knowledge related to health hazards and complication of childhood obesity as

❖ Scoring system for knowledge:

The total items of knowledge 25 questions the scoring system was followed according to school children answers calculated as the following: complete correct was scored 2, incomplete correct was scored 1, incorrect and did not know answers was scored zero for each items of knowledge.

The total scoring of knowledge was classified according to the following:

- ✚ Inadequate knowledge if less than 60%.
- ✚ Average knowledge if 60-75%.
- ✚ Good knowledge if more than 75%.

- **Part III: It include checklist for assessing primary school children practices related to childhood obesity** consists of six main items include the following:

- First item: food practices
- Second item: Practices for handling fluids
- Third item: Sleep and rest practices
- Fourth item: Physical activities and exercise
- Fifth item: Electronic activities practices
- Sixth item: Behavioral activities

❖ Scoring system for practice:

The check list included six main items and 34 sub items, for check list practice items, predetermined according to literature review, done items was scored one and did not do items scored zero.

The total scoring of practice was classified according to the following:

- ✚ Inadequate practice if less than 60%.
- ✚ Adequate practice if more than 60%.

❖ **Second tool:** Anthropometric Measurements, physical assessment sheet for primary school children and laboratory investigation was conducted by trained school nurses and investigator.

- **Anthropometric measurements:** was conducted according to guidelines suggested by The WHO Expert Committee (2015).
- **Physical assessment** include the following item: Signs and symptoms of obesity, Vital signs of the primary school, physical assessment from head to toes of primary school children
- **Laboratory investigation of primary school children** as (random blood sugar, hemoglobin, total Cholesterol level).

Content validity:

Tools of study was reviewed by three expertise in community health nursing to test the content validity. content validity was checked before pilot study and actual field work.

Content reliability:

Was done by Cronbach's Alpha coefficient test which revealed that each of the two tools consisted of relatively homogenous items as indicated by the moderate to high reliability of each tool.

❖ Operational design

The operational design of the study entailed three main phases:

- ✓ Preparatory phase.
- ✓ Pilot study.
- ✓ Field work.

- **Preparatory phase**

A review of the past and current available related literature covering the aspect of the research problem was done by the investigator through using available articles, magazines, Internet, journals and text books in order to be acquainted with the research problem and develop the study data collection tools and prevention program.

- **Pilot study**

A pilot study was conducted for **10%** of total sample size equal **(14) primary** school children to evaluate the clarity of the tools and its reliability used according to the analysis of pilot study results. The modifications were done in the tool according to pilot study results in order to be more applicable and changes were fulfilled by correction, omission or addition of items, until the final shape of the tool was reached. The subjects of pilot study will be excluded later from main study sampling.

- **Field work:**

- A written consent was taken from every primary school children and their parents to share in the study.
- The investigator was started with introducing herself and explaining the aim of the study and program for the selected studied sample and assured that the data collected would be confidential
- The investigator completed the tool by the interviewing the primary school children.
- The investigator visited pre mentioned schools through school daytime to collect data from **7.30 am to 1 pm**, three days in the week Monday, Tuesday and Wednesday.
- Though six months duration of the program from the start till finishes the program and makes evaluation stage.
- The investigator Used different teaching methodology such as discussion, session demonstration, booklet and poster.

Program construction:

- **Primary Prevention program for primary school children was conducted in four phases:**

- **First phase: preparatory phase**

A review of recent, current, national and international related literature in various aspect of the problem was done at this phase its aim is to design and develop the study tools and to be acquainted with various aspects.

- **Second phase: assessment phase**

By using questionnaire based on the assessment phase. (Pretest) was done for (144) primary school children and (post test) was done after primary prevention program implementation.

- **Third phase: planning and implementation phase**

This phase at the planning and implementing the primary prevention program and its content according to its objectives, primary prevention program was designed to assess the knowledge, practices related to obesity among primary school children through using multiple session range from 4-6 session every session ranged from 1-2 hours and meeting the primary school children three days per week (individualized or group).

The program sessions were divided three session theory and three session practices every week and the teaching method was used the lecture group, discussion, and role-playing, teaching material was used is Arabic booklet and audiovisual materials.

General objective: to assess the knowledge, practices related to obesity among primary school children.

The program content was included the following:

- Meaning of school children obesity
- Causes of school children obesity
- Identify risk factors for school children obesity
- Detecting knowledge about obesity among primary school children and its consequences.

- Determining practices about obesity prevention among primary school children.

Finally: the evaluation phase

This phase aimed to evaluate the effect of prevention program to improve school children knowledge and practices related to obesity, a post-test similar to the pre-test was administered to the study subjects immediately after completion of the primary prevention program and follow up after three months.

Administrative design

- First approval was obtained from the authorities of the faculty of nursing Ain Shames University.
- A written letters was sent to the director of the El- salam educational management include the aims of the study.
- Official permissions were obtained from El- salam educational management authorities.

Ethical consideration

Informed consent was taken from the primary school children to participate in the study after explaining the objectives of the study, it will haven't any harmful effects on them, the information would be confidential and they could withdraw from the study at any time.

Statistical design

Recorded data were analyzed using the statistical package for social sciences, version 20.0 (SPSS Inc., Chicago, Illinois, USA). Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

The following tests were done:

- Chi-square (χ^2) test of significance was used in order to compare proportions between qualitative parameters.
- Pearson's correlation coefficient (r) test was used to assess the degree of association between two sets of variables
- The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:
 - **Probability (P-value):**
 - P-value ≤ 0.05 was considered significant.
 - P-value ≤ 0.001 was considered as highly significant.
 - P-value > 0.05 was considered insignificant.

Results

Table (1): shows that the mean age of the studied primary school children was 8.67, regarding gender 52.8% of them were male, regarding class room grade 50% of them were equal first to third primary and fourth to sixth, regarding residence 45.1% of them were urban, regarding number of sibling 66.6% of them had less than 3 siblings, as well as daily pocket money 63.9% of them take 5-10 LE.

Table (2): Indicates that there was statistically significant differences. Which affect the marked improvements about their general knowledge related to childhood obesity, with p-value < 0.05 S. after implementation of program.

Table (3): reveals that there was statistically significant difference in post-program compared to pre-program according to their food practice related to childhood obesity, with p-value < 0.001 S.

Table (1): This study targeted a sample of 144 primary school children conducted in four primary school in E 1 - Salam city in the year 2019 -2020. distribution of primary school children according to their demographic data (N=144).

Demographic characteristics of primary school children	No.	%
Sex		
Male	76	52.8
Female	68	47.2
Age (years)		
6 years - 8 years	72	50.0
9 years - 12 years	72	50.0
Mean \pm SD	8.67 \pm 1.99	
Class room grade		
First to third primary	72	50.0
Fourth to sixth primary	72	50.0
Residence		
Slums	40	27.8
Urban	65	45.1
Rural	39	27.1
Number of sibling		
< 3 siblings	96	66.6
3-5 siblings	25	17.4
> five sibling	23	16
Daily Pocket money (LE)		
<5 LE	38	26.4
5-10 LE	92	63.9
>10 LE	14	9.7

Table (2): Distribution of primary school children according to their general knowledge related to obesity through pre-program and post-program intervention (N=144).

General Knowledge related to obesity		Pre-program		Post-program		Chi-square test	
		No.	%	No.	%	X ²	p-value
Meaning of childhood obesity	Incorrect	98	68.1	16	11.1	105.374	<0.001**
	Incomplete correct	34	23.6	60	41.7		
	Complete correct	12	8.3	68	47.2		
Signs and symptoms of obesity	Incorrect	118	81.9	13	9.0	164.752	<0.001**
	Incomplete correct	26	18.1	72	50.0		
	Complete correct	0	0.0	59	41.0		
Diagnosis of childhood obesity	Incorrect	124	86.1	18	12.5	162.905	<0.05*
	Incomplete correct	20	13.9	70	48.6		
	Complete correct	0	0.0	56	38.9		
Prevention of childhood obesity	Incorrect	98	68.1	12	8.3	122.021	<0.05*
	Incomplete correct	43	29.9	80	55.6		
	Complete correct	3	2.0	52	36.1		

p-value >0.05 NS; *p-value <0.05 S; **p-value <0.001 HS

Table (3): Distribution of primary school children according to their practice related to childhood obesity regarding food practice through pre-program and post-program. (N=144).

Food practices		Pre-program		Post-program		Chi-square test	
		No.	%	No.	%	x2	p-value
Follow up weight regularly	Not done	107	74.3	37	25.7	68.056	<0.001**
	Done	37	25.7	107	74.3		
Avoid foods that cause weight gain	Not done	108	75.0	23	16.0	101.172	<0.001**
	Done	36	25.0	121	84.0		
Never eating pickles frequently	Not done	106	73.6	27	18.8	87.189	<0.001**
	Done	38	26.4	117	81.2		
Regularity of healthy meals per day	Not done	91	63.2	41	28.5	34.965	<0.001**
	Done	53	36.8	103	71.5		
Eating fruits and vegetables between meals	Not done	81	56.2	27	18.8	43.200	<0.001**
	Done	63	43.8	117	81.2		
Never eating chocolate, sweets and bonbons.	Not done	87	60.4	30	20.8	46.769	<0.001**
	Done	57	39.6	114	79.2		
Never eating fatty meal at dinner	Not done	90	62.5	36	25.0	41.143	<0.001**
	Done	54	37.5	108	75.0		
Never eating fast food frequently	Not done	93	64.6	18	12.5	82.455	<0.001**
	Done	51	35.4	126	87.5		
Maintain eating breakfast regularly	Not done	66	45.8	28	19.4	22.805	<0.001**
	Done	78	54.2	116	80.6		

p-value > 0.05 NS; *p-value < 0.05 S; **p-value < 0.001 HS

Discussion

Regarding socio demographic characteristics, The present study showed that, the mean age of the studied primary school children was 8.67, regarding gender, slightly more than half of studied sample were male., regarding residence, less than half of them were urban, regarding number of sibling, more than two thirds of them had less than 3 siblings, as well as daily pocket money, less than two thirds of them take 5-10 LE **Table (1)**.

This finding was agreed with *Adewale, (2019)*, who studied (Socio-demographic factors associated with overweight and obesity among primary school children in semi-urban areas of mid-western Nigeria). And found that the mean age of the studied primary school children was 8.5, and also found that more than half of studied sample were male. The current study findings showed that there was statistically significant differences. Which

affect the marked improvements about their general knowledge related to childhood obesity, with p-value < 0.05 S. after implementation of program.

These findings was congruent with *Megan et al. (2017)* who studied (Childhood Obesity Prevention Program of school-Aged Children: Randomized Controlled Trial) in Australia and stated that that there was highly statistically significant differences. Which affect the marked improvements about their general knowledge related to childhood obesity after implementation of prevention program.

In my opinion changes to school food and dietary practices that lead to improved dietary behavior are a powerful strategy to reverse the childhood obesity epidemic. As poor dietary practices are major contributors to the development of chronic non-communicable diseases as obesity. Most chronic diseases in adulthood originate from dietary practices which are mainly formed during childhood.

The current study finding agreed by *Lynne et al. (2019)* who studied (Positive

feeding practices and food preferences in early childhood - a primary prevention program for childhood obesity) and this study showed that There is correlational evidence linking parenting style and early feeding practices to Australian child eating behaviour and weight status. A focus on early feeding is consistent with the national focus on early childhood as the foundation for life-long health and well being. As the program showed increased infant/child practices food intake of, fruit and vegetables (frequency and variety).

There is no evidence available about the efficacy or effectiveness of such an approach for childhood obesity prevention, as food practices and dietary habits although there is a growing body of evidence that community-based approaches can be effective. Evaluations of community-based health promotion programs are challenging.

Conclusion

The current study findings and research hypothesis concluded that, implementation of primary prevention program for primary school children was efficient in improving primary school children knowledge regarding childhood obesity, with highly statistical significant differences between pre and post prevention program. with p-value <0.05 S.. There were highly statistically significant difference in post-program compared to pre-program according to their total practice related to childhood obesity. with p-value <0.001 HS, X² 116.156

There was statistically significant difference in post-program compared to pre-program according to their classification of weight BMI.

Recommendations

In the light of these findings it can be recommended that:

- The primary prevention program for primary school children regarding obesity must be

provided for all primary school children to improve their knowledge and practice.

- An orientation program for all parents to improve their knowledge about childhood obesity
- Distribution of different illustration instructional booklets and brochures for primary school children using simple information including preventing childhood obesity
- Official and policies support for school including modification of curriculums to meet primary school children needs regarding childhood obesity.
- Further researches are needed to study the childhood obesity prevention to find out the suitable solution to prevent this problem.

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