Primary Prevention Program of Obesity among Primary School Children

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Abstract

Background: Childhood obesity is a serious medical condition that affects children and adolescents. 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, 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. ***Subjects and Methods:*** **Setting:** The study was conducted in four primary governmental school of El-Salam city , Cairo governorate including: (El Hussien, Osman Ben Afan, Atef El Sadat and Gamal Abdel Naser). **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, primary school children, childhood obesity*

Introduction

Childhood Obesity is defined as excess body fat leading to health impairment [(1) (2)]. For boys, obesity was defined as >20% fat mass (FM). For girls, the cut-off point for obesity was >25% [(3)]. However, FM is extremely difficult to measure in young children, because accurate techniques require a high degree of the subject compliance [(4)].

The ideal definition, based on percentage body fat, is impracticable for epidemiological use. The measurement of change in adiposity in children is challenging because of the effects of maturation and growth on lean muscle mass, fat mass, and hydration status [(5)]. Although less sensitive than skin fold thicknesses, the body mass index (weight/height²) is widely used in adult populations, and a cut-off point of 30 kg/m² is recognized internationally as a definition of adult obesity [(6)].

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Body mass index in childhood changes substantially with age. For many years, establishing an international definition of overweight and obesity among children based on pooled international data for BMI linked with adult obesity cut-off point, remained a big challenge [7].

There are many factors that influence food intake and energy expenditure in man. The following gives a brief account of these factors known to be involved in occurrence of obesity [8].

· Genetic Factors:

It is a matter of common observation that obesity runs in families. It has been suggested that this is probably due to transmission of an abnormal gene from parents to child [9].

· **Socioeconomic factors:**

Socioeconomic factors have been shown by most studies, to be correlated in one way or another, with overweight.

Obesity is common among poor women, perhaps because food rich in protein and fat are more expensive than starchy foods which provide the bulk of cheap meals [10].

§ **Psychological factors:**

Psychological disturbances, like obesity, are very common in our complicated world today. When both are present in the same individual one may aggravate the other . some obese children with a psychoneurosis or a personality disorder who are in happy find solace in cream buns and chocolates in the same way as others take alcohol or barbiturates and so they become more fat [10].

§ **Endocrine factors:**

Davidson, and passmore, (2018) [11] discussed the effect of endocrine factors on childhood obesity formation and declared that obesity in women commonly begins at children girls , puberty , pregnancy or in the menopausal period which suggests an endocrine factor. Cushing's syndrome arising from over secretion of adrenal cortical hormones is characterized by a special form of obesity, in which excess fat is laid down over the trunk and abdomen and usually not on the limbs [12].

§ Eating habits:

obesity may occur as a result of family customs in using concentrated high caloric foods and drinks, in having to maintain social relationships including rich party foods in addition to usual meals or, in eating excessive amounts of carbohydrate foods because they are cheaper than lower calorie fruits and vegetables [12].

Generally, the community health nurse is a generalist and serves all population groups working in the cline's setting not only utilizing principles of primary, secondary, and tertiary prevention but also serves population groups in clinics and schools. Moreover, nurses are largest segment of health care providers where, they have great opportunity to enhance client care, as well as impact health care delivery. The nursing profession has the holistic approach to client care, including a nursing process that fosters the participation and growth of clients and their significant others [13]

Comprehensive school health services are being developed to assist in meeting the needs of each community's population of children. Intervention at primary, secondary and tertiary prevention levels are incorporated through collaboration with a diverse group of educational personnel and health care providers in the community who have fewer financial resources. The school nurse can be a central person in coordinating services [14].

Significance of the problems:

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 [14].

Egypt has the highest percentage of obese adults worldwide as, Around 19 million Egyptians, or 35 percent of the adult population are obese – the highest rate across the globe .In addition, over 10 percent, or 3.6 million, of children are also considerably overweight [14].

Egypt, previous studies indicated that obesity is an important public health problem among school children as the prevalence of obesity among Egyptian children was 14.7 and 15.08% in boys and girls, respectively.

Furthermore, especially in Egypt, there is very little basic awareness of the problem of obesity, and so there are neither nationwide movements nor adequate documentation of initiatives dealing with obesity [15].

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= total number of primary school (N)/ desired sample size (n) =32/4=8th (every 8th school, one school was involved in sample).

Subjects of the study , sampling:

- ***Type of sampling*** :Multistage sampling was used as the following:

Ø Stage one: selection of 4 primary governmental school by systematic random sample.

Ø Stage two: selection of classroom from each grade from first to sixth by simple random sample.

Ø 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:***

Ø All children found to be < 6, > 12 years of age.

Ø Children whose exact birth date was not available.

Ø Children without written informed consent.

Ø Sick Children and whose with chronic diseases.

· Tools of data collection:

Data will be collected by using the following tools:

v **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 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 :

· Poor 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%.

v **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.

v 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 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 will complete the tool by the interviewing the primary school children.

- The investigator will visit 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 session was 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 (x^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

This study targeted a sample of 144 primary school children conducted in four primary school in E l - Salam city in the year 2019 -2020 .

Table (1): 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 ±SD	8.67±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 (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.

Figure (1): Distribution of primary school children's parents according to their Body Mass Index (N=144).

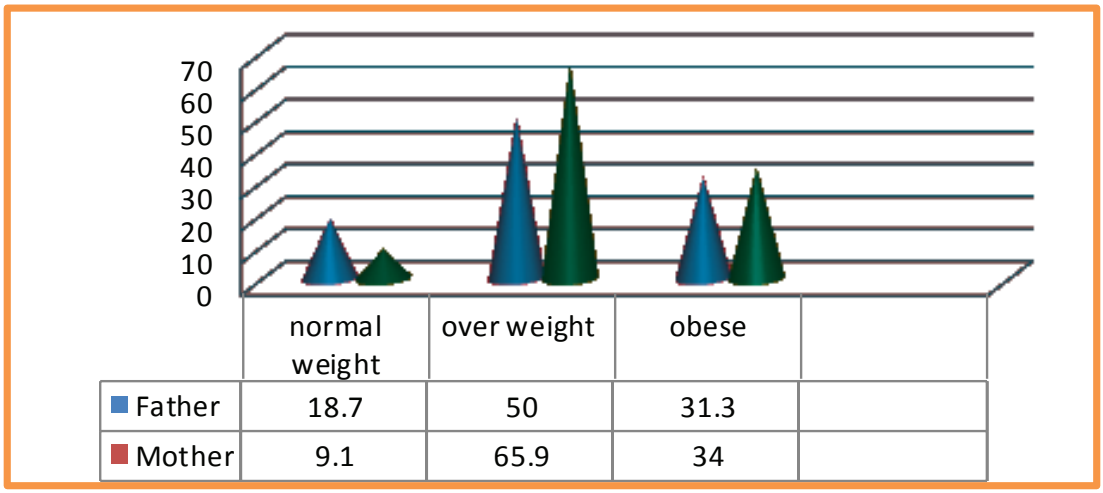
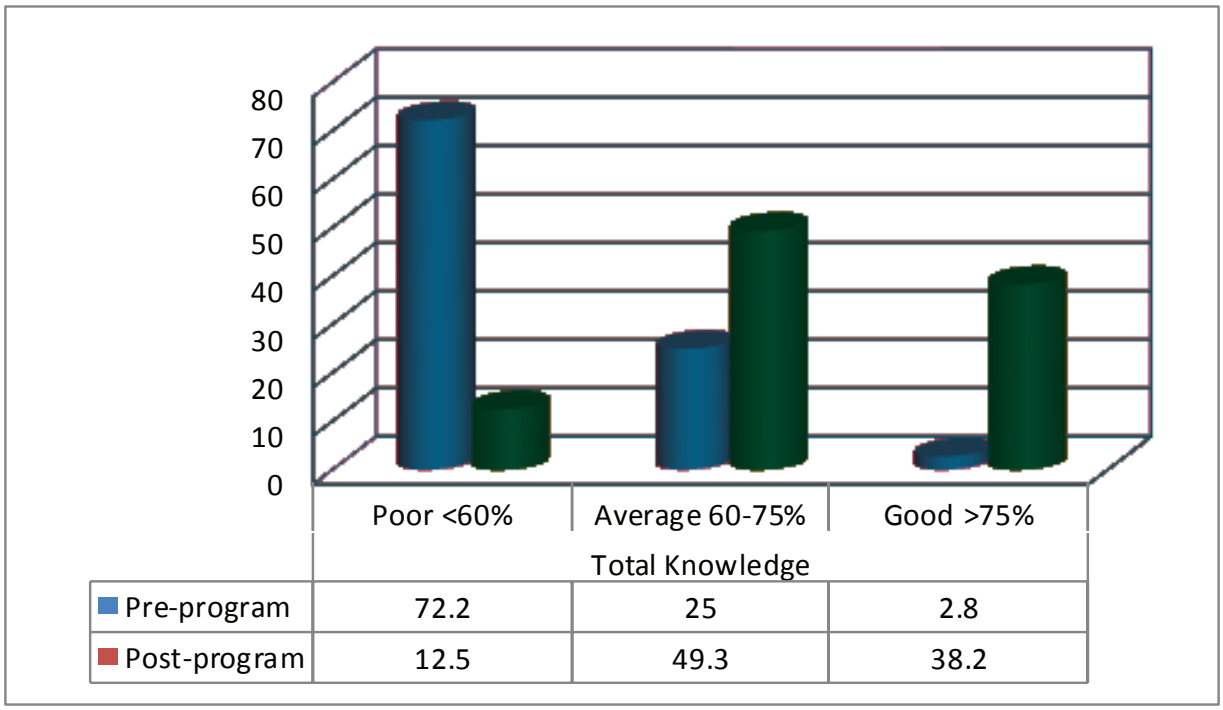


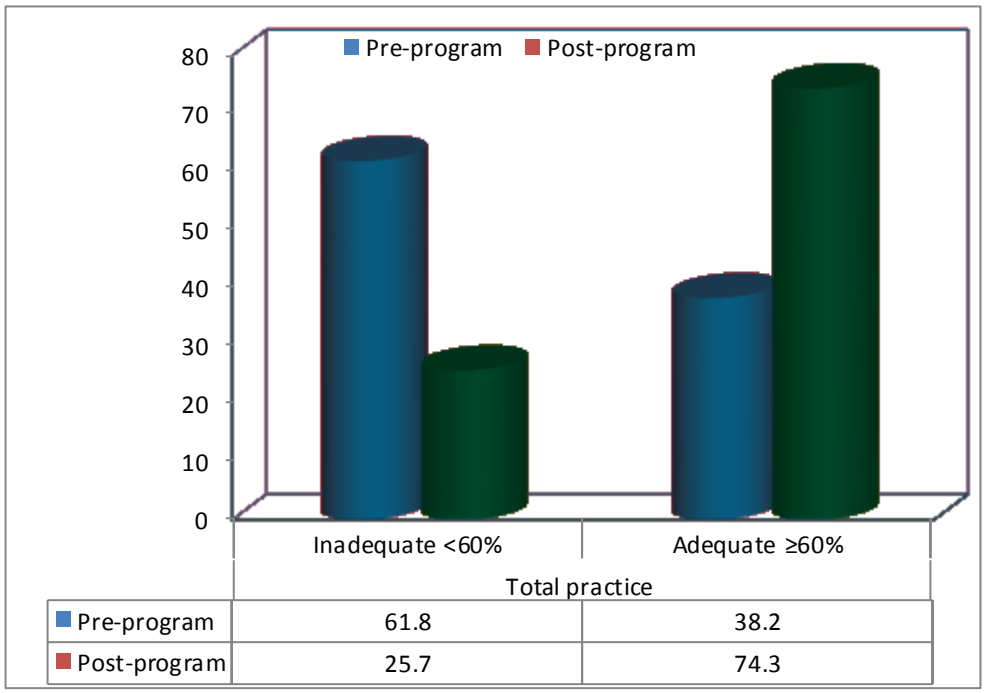
Figure (1): reveals that body mass index of 50.0% of studied sample fathers were Overweight while 65.9% of their mothers were Overweight .As well as 31.3% of studied sample fathers were obese while 34% of their mothers were Obese.

Fig. (2): The relation between pre-program and post-program of primary school children according to their total knowledge about childhood obesity.



This figure clarifies that only 2.8% of primary school children had good Knowledge preprogram while this percentage improved to 38.2% post program related to their total knowledge about childhood obesity.

Figure (3): The relation between preprogram and post program total practice about obesity of primary school children . (N=144)



Figure(3): shows that, 61.8% of inadequate total practices of primary school children preprogram improved to74.3% post program so, there was 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, X^2 *116.156*

Table (2): Distribution of primary school children according to their anthropometric measurements related to body mass index between pre-program and post-program.

Anthropometric measurement:		Pre-program		Post-program		Chi-square test	
		No.	%	No.	%	x2	p-value
Body weight (Kg)	≤20 kg	8	5.6	6	4.2	10.032	0.039*
	20-30 kg	84	58.3	98	68.1		
	>30-40	48	33.3	38	26.4		
	>40 kg	4	2.8	2	1.4		
Height (cm)	≤110 cm	11	7.6	9	6.3	0.493	0.920
	>110-120 cm	53	36.8	50	34.7		
	>120-130 cm	55	38.2	57	39.6		
	>130 cm	25	17.4	28	19.4		

Cont... **Table (2): Distribution of primary school children according to their anthropometric measurements related to body mass index between pre-program and post-program.**

Classification of weight BMI for age and sex	Underweight (5th percentile)	9	6.3	5	3.5	12.220	0.016*
	Normal weight (5th - 85th percentile)	80	55.6	98	67.4		
	Over weight (>85th -95th percentile)	33	22.9	31	21.5		
	Obesity(>95th percentile)	22	15.3	10	6.9		

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

Table2 : reveals that primary school children, regarding body weight 58.3% of them were from 20-30kg, regarding height 38.2% of them were from >120-130cm preprogram , this percentage changed to 68.1% ,39.6% respectively after implementation of program .

Also shows that 22.9% of primary school children were Over weight (>85th -95th percentile) preprogram ,changed to 21.5% after program .Also clarifies that 15.3% of them were Obesity(>95th percentile) preprogram changed to 6.9% after program.

This table shows that, there was statistically significant difference in post-program compared to pre-program according to their classification of weight BMI for age and sex , with p-value <0.05 S.

Discussion

The current study was carried out to evaluate the effect of primary prevention program on knowledge and practices related to obesity among primary school children . As 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 [2],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 disagreement with [3] who reported that in a study about Overweight and obesity in the Eastern Mediterranean Region and shows that the students aged 25 or older are at high risk and those over 30 years are at extra ordinary risk, also in contrast to [4] in a study about Socioeconomic status and obesity," Epidemiologic Reviews,: which revealed that more than one third of students affected by obesity were over age, with mean age of thirty years, which indicated that obesity and age increased the risk .

This finding agrees with the results of the study about overweight and obesity among school Children in Jordan: Prevalence and Associated Factors by [5] who find that the daily pocket money was associated with

overweight, while family monthly income associated with obesity.

The current m study findings disagree with [6] who studied obesity and relation with family size cross-sectional USA study reported that the prevalence of obesity in the United States is lower among those of small family number and stated that there exists a negative correlation between family size and obesity prevalence for student. This could be due to the fact that smaller families had better food availability.

The current study finding revealed that body mass index of half of studied sample fathers were Overweight while slightly less than two thirds of their mothers were Overweight .As well as less than one third of studied sample fathers and mothers were obese **Figure (1).**

This finding congruent with [7] who studied (Prevalence and factors associated with body mass index in Brazilian children aged 9-11 years) , And found that there was significant associations of individual, family, and school/family environment factors in children. Therefore, the aim of this study was to assess the individual anthropometric and behavioral, family, and school/family environment factors associated with BMI in children aged 9-11 years.

This current study clarified that only few numbers 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. **Figure. (2)**

This findings is in the same line to (A study to assess the effectiveness of Educative supportive interventions on Knowledge, regarding Obesity among primary school children in selected schools of Mehsana city) carried out by [17] who stated that After given educative supportive intervention, half of school children had improve the knowledge. That was an effective technique in inducing the total knowledge level of primary school children regarding obesity.

Childhood obesity is determined by both genetic and environmental factors. With a dramatic increase in childhood overweight and obesity, knowledge and attitudes of the children themselves towards childhood obesity need to be placed on the frontline. Most studies have focused on knowledge and perception of parents/caregivers and health care professional about child obesity. The present study is among few that have focused on assessment of knowledge about child obesity and perceptions about body weight among primary school children and also implementation of prevention program to improve their knowledge .

the relation between primary school children total knowledge may related to obesity and dietary habits. Knowledge only not enough to change behaviors, we need also strong motivates. This may be due to less of health educations program conducted by health care providers to prevent childhood obesity.

The current study result revealed that primary school children, regarding body weight more than half of them were from 20-30kg, regarding height more than one third of them were from >120-130cm preprogram , this percentage changed to more than two thirds and more than one third respectively after implementation of program .

Also showed that less than one quarter of primary school children were Overweight (>85th -95th percentile) preprogram ,changed to 21.5% after program .Also clarifies that more than one tenth of them were Obesity(>95th percentile) preprogram changed to less than one tenth after program implementation .

This table showed that, there was statistically significant difference in post-program compared to pre-program according to their classification of weight BMI for age and sex , with p-value <0.05 S. **table 2**

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, X^2 *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 .

Ethical Clearance: The study was approved from ethical and research committee faculty of nursing Ain Shams University, Egypt.

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Conflict of Interest – Nil

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