

Evidence Based Obesity Prevention Program among Primary School Students according to 100 Million Health Initiative

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Abstract:

Background: Childhood obesity considers a global health problem; 100 million health initiative was launched for early detection of non-communicable diseases such as obesity. **Aim:** This study aimed to evaluate the effect of evidence based obesity prevention program among primary school students according to 100 million health initiative. **Research design:** A quasi experimental design was carried in this study. **Setting:** This study was conducted at seven Governmental Primary Schools in Benha City. Schools selected randomly one from each sector from total 108 schools that distributed into 7 sectors. **Sample:** Systematic random sample was used to select 180 primary schools students. **Tools of data collection:** Three tools were used. **I:** A structured interview questionnaire which included demographic characteristics of the primary school students, family and medical history, knowledge regarding obesity and 100 million health initiative. **II:** Practices of primary school students regarding prevention of obesity. **III:** Attitude scale regarding prevention of obesity. **Results:** 10.0% of primary school students had good knowledge regarding obesity and 100 million health initiative pre-implementation of program which improved to 75.0% post- implementation of program, 9.4% of them had satisfactory practices regarding prevention of obesity pre-implementation of program which improved to 72.8% post-implementation of program and 27.8% of them had positive attitude regarding prevention of obesity pre-implementation of program which improved to 82.2% post-implementation of program. **Conclusion:** Evidence based obesity prevention program had a significant positive effect in improving knowledge, practices and changing attitude of primary school students. **Recommendations:** Continuing evidence based obesity prevention program for primary school students to increase their knowledge and practices to prevent obesity.

Keywords: Evidence based obesity prevention program, 100 million health initiative, Primary school students.

Introduction:

100 million health initiative was launched for early detection and reducing Non-Communicable Diseases (NCDs) such as obesity for more millions of Egyptian citizens due to 70% of deaths in Egypt are NCDs induced (The Arab Republic of Egypt Presidency, 2020). At the academic year 2021–2022, 10,837,000 primary school students have been screened for obesity,

anemia, and stunting, according to the Ministry of Health and Population. The government stated that the goal of the year is to screen about fifteen million Egyptian and non-Egyptian students at 29,444 private and public primary schools in Egypt (Egypt Today Staff, 2022).

Obesity is an excessive buildup of body fat that results in co-morbidities that have a negative impact on the health of obese

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people. Obesity determined as a Body Mass Index (BMI) above 95th percentile and overweight as BMI above 85th and below 95th percentile according to Centers of Disease Control and Prevention. In United States (US), the most common nutritional disease in school children is obesity. The incidence of obesity in school children has tripled in the US in current years, as stated by obesity society (**Abduelkarem et al., 2020**).

Childhood obesity is a worldwide health problem. As it is anticipated that there will be 250 million obese children worldwide by 2030, up from the present 150 million or one in five children (**World Obesity Federation, 2019**). Obesity has been ranked as one of the century's greatest health challenges. 20% of school age students in Europe are obese and the percentage reaches 30% in North America. It is estimated that 124 million children worldwide were obese in 2016. In recent years, obesity has rapidly increased in many developing nations, particularly in urban areas and among upper socioeconomic levels (**Kamel et al., 2020**).

Obesity of children has several risk factors. Children are more likely to gain weight because of the heredity factor since the body's chemical mechanisms that control weight are influenced by genes. The main factors that leading to obesity of children are unhealthy nutrition, physical inactivity, excessive exposure to energy dense foods and drinks more affordable, attractive, and easily accessible (**World Health Organization, 2022**).

The negative effects of obesity are overwhelming. Obese children are more risk to

have serious health problems that may be psychological, physical, and economic. The risk of having chronic conditions such as diabetes mellitus, heart diseases, cancer, arthritis, nonalcoholic fatty liver disease, respiratory diseases such as sleep disorders and hypertension increases with obesity. Additionally, obese children are more risk to experience psychological issues like (low self-esteem, depression, and eating disorders) (**Nelson, 2022**).

Evidence-based prevention programs are the best practice solutions that any community can implement. Evidence-based programs also ensure that prevention programs and policies that do no harm (**Prevention Action Alliance, 2022**). In clinical setting, pediatric primary cares providers are aware of the importance of evidence based practice. There are numerous clinical practice guidelines available now, ranging in strength and quality that offer evidence-based knowledge for prevention and treating childhood obesity. (**Polfuss et al., 2020**).

A crucial component in the prevention of obesity is childhood obesity prevention. Early childhood and school programs are important for preventing childhood obesity. The goals of programs should increase the nutritional value of food served to school students, including fruits and vegetables, increase fluid intake and reduce consumption of sugar-sweetened beverages, encourage physical activity, and reduce spending time on screens. Extra measures must be taken to prevent potential harm, especially the stigmatization and blaming of obese students. Primary schools are common settings for program as most students attend school, and

many schools already have the necessary facilities to carry out programs for students (**Berthold et al., 2020**).

Community Health Nurses (CHNs) are crucial to the prevention and management of obesity. CHNs can help students to maintain a healthy weight to avoid obesity, reduce the burden of diseases, improve quality of life and preventing and treating obesity. School nurse can encourage students and families to adopt healthy living habits. CHNs can conduct health screenings examinations (weight, height, and BMI), assessing school students for potential obesity risk factors, and making early referrals to health care professionals for additional evaluation, and treatment (**Abo – Elmaty et al., 2021**).

Significant of the study:

In Egypt, obesity is a significant public health problem, and its impacts extend beyond just the health aspect to include the population's ability to work. This has a serious impact on the foundations of the Egyptian economy. Moreover, promoting the health and well-being of the population is a current political interest which is demonstrated by the most recent "100 million healthy lives" massive initiative that involved measuring the height and weight of millions of Egyptians citizens. According to 100 million health initiative declared that there are 39.8% of Egyptians that are obese. The prevalence of obesity might differ by gender, region, and socioeconomic level. Obesity is a leading cause in several NCDs. so, preventing obesity can help reduce NCDs, which will help reach the sustainable development goals for 2030 (**Sedky et al., 2021**).

Obesity leads to premature deaths were estimated about 4.7 million annually. It was ranked fifth between the most common causes of death in 2017, accounting for 8.4% of all mortality globally. Egypt ranks the 18th of the highest occurrence of obesity in the world. Non-communicable diseases are accountable for approximately 71 percentage of all death (**Aboulghate et al., 2021**).

Egypt has been considered as the nation with the highest rate of obesity worldwide with a percentage above 35% (19%) of the population. Childhood obesity may have contributed to adult obesity because of increasing the likelihood of being obese in adulthood by about five times compared to non-obese children (**Kamel et al., 2020**). Childhood obesity rates are alarming in the country. Data shows that 80 percent of children in some nations are obese. This issue is particularly concerning in high-income countries like Cairo, Egypt (**World Health Organization, 2022**).

Aim of study:

The aim of study was to evaluate effect of evidence based obesity prevention program among primary school students according to 100 million health initiative.

Research hypothesis

Evidence based obesity prevention program will raise knowledge, enhance practices, and modify attitude of primary school students.

Subjects and Method:

Study design:

This study was conducted using a quasi-experimental design.

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Setting:

The study was carried out at seven Governmental Primary Schools in Benha City which named; Taha Hussein, Huda Sharawi, Abd el Menem Reyad, Ebn Khaldon, El Imam Mohammed Abdu, El Thowra, and Anas Ebn Malek). Schools selected randomly one from each sector from total 108 schools that distributed into 7 sectors.

Sample:

A systematic random sampling was utilized in the study; the total number of primary school students at the previously mentioned settings who are enrolled in the six grades and accept to participate in the study was 1800 students. Students were placed in a list with a serial number, and then the starting point was randomly selected, and then every 10th of students were taken to be in the sample. Students were chosen were 180 primary school students.

Tools for data collection:

Three research tools were utilized to obtain the data:

Tool I: A structured interview questionnaire:

It was prepared by researchers using a literature review and was composed of three parts in a straightforward, understandable Arabic language.

First part: Contained demographic characteristics of primary school students as age, gender, residence, fathers' level of education, fathers` job, mothers` level of education and mother's job.

Second part: Included family and medical history of primary school students as family history of obesity and suffering from any health problems.

Third part: Included knowledge about obesity adapted from **Ahmed et al., (2022)** and 100 million health initiatives. This part included 9 closed ended questions in form multiple choice questions related to meaning, types, causes and risk factors, diagnosis, treatment, complications, prevention of obesity, aim and services of 100 million health initiative.

Scoring system:

The calculation of the students' knowledge scoring system as follow;; 2 score for correct complete answer while 1 score for correct incomplete answer and 0 for don't know answer. A mean score was calculated by combining the item scores and dividing the result by the number of items. These scores were modified into a % score. The total knowledge score was considered good if the score of total knowledge was >75% (> 14 points), while considered average if it was 50% - 75% (9- 14 points) and considered poor if it was <50% (<9 points).

Tool II: Included practices of primary school students regarding prevention of obesity and included two parts.

First part: Included reported practices for prevention of obesity adapted from **Hamad et al., (2021)**. It was composed of 24 items and categorized into four main dimensions as: Nutrition (15 items), activity and exercise (3 items), rest and sleep (3 items) and using of social media (3 items).

Second part: Observational checklist for primary school students' demonstration of anthropometric measurements and BMI adopted from **Niedzwiecki et al., (2020)**. It contains 14 steps (5 steps for measuring height, 6 steps for weight and 3 steps for BMI).

Scoring system:

Each question has two options: Done and not done. These were given respectively 1, 0. The sum of the item scores was divided by the number of items to get the level score and a percent score was developed from these scores. The total of practices scores was considered satisfactory if the score was sixty percent and more (≥ 22 points) and considered unsatisfactory if it was less than sixty percent (< 22 points).

Tool III: Scale to measure attitude of primary school students regarding prevention of obesity, adapted from **Wasfy et al., (2008)**. Three categories Likert scale (Agree, Uncertain and Disagree), was rendered in Arabic which included (10 points).

Scoring system:

Attitude scale scores were calculated as 2, 1, and 0 for agree, uncertain and disagree respectively. The total attitude score was considered positive if the score was sixty percent and more (≥ 12 points) and considered negative if it was less than sixty percent (12 points).

Content Validity:

Tools of data collection were investigated for their content relevance by five academics in Community Health Nursing at Faculty of Nursing, Benha University, who

were chosen to assess the clarity and examine the tools' content validity, relevance, completeness, understanding and applicability. The opinion was elicited regarding the layout, format, and sequence of the questions and all of their feedback was taken into account, and the tools were considered to be reliable from the experts' perspective.

Reliability:

The researchers used reliability for tools to verify the internal consistency of the tools by administering the same tools to the same sample under identical circumstances. The internal consistency reliability of each tool item was evaluated using Cronbach's alpha coefficient. Knowledge reliability was .985, practices reliability was .989, and attitude reliability was .963. This shows that the study tools have a high degree of reliability.

Ethical consideration:

Before performing the interview, permission was verbally gained from each primary school student, and they were also given a brief explanation of the study's aim. They were also informed that all data collected would be kept private and utilized just for the study. In order to maintain confidentiality and anonymity, names were not requested on the forms. Additionally, they were made aware of their ability to withdraw the study at any time and without justification.

Pilot study:

In the aforementioned settings, a pilot trial was carried out on 10% (N=18) of the studied school students to assess the study tools' clarity and appropriateness for finishing the questionnaires. According on the findings of the pilot study, the necessary adjustments

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were performed prior for data collection by excluding unnecessary or redundant questions and making changes. The main study sample included school students who participated in the pilot study.

Evidence based obesity prevention program:

Four phases were used to carry out the current study.

1. Assessment phase: The researchers created the program after doing a comprehensive review of relevant literature. It was modified and altered based on the outcomes of the pre-assessment tools. In order to assure their cooperation, the researchers visited the chosen settings prior to the program's implementation to explain the nature and objectives of the study and discuss the work plan.

2. Development phase: Based on the actual findings of the pre-program assessment, the program was created.

An objective of the program: Was to evaluate the effect of evidence based obesity prevention program among primary school students according to 100 million health initiative.

Contents of program: Included meaning of obesity, types, causes and risk factors, diagnosis, treatment, complications, prevention of obesity, and aim and services of 100 million health initiative.

- Practices for prevention of obesity which include nutrition, activity and exercise, rest, and sleep, and using of social media.
- Practices for demonstration of anthropometric measurements and BMI.

Teaching methods:

The same teaching methods and content from an evidence based obesity prevention program were utilized by all students, which were (lecture, brainstorming, discussion, demonstration and re-demonstration).

Teaching aids: Appropriate teaching materials were developed especially for the sessions, such as videos, booklet, colored posters and real equipment.

3. Implementation phase: Collection of data was done from the mid of October 2021 to the mid of December 2021 (First term) and from mid of February 2022 to the mid of April 2022 (Second term). The researchers were available two days per week (Sundays and Mondays) from 9 am- 12 mid-day. The school student who fulfilled the criteria was invited to participate after providing students with a simple and full evaluation of the aim and process of the study, and the student who agreed was interviewed using the questionnaire sheet. The time of interviewing needed for each student range between 30- 45 minutes. Teaching module was designed based on level of student's knowledge and the practices. This program was provided in six sessions (3 theoretical and 3 practical). Time for each was 30- 45 minutes. Each session began with a summary of the previous one's objectives and those for the next one. Learning was improved during program sessions via discussion, inspiration, and reinforcement. All students collaborated with the researchers.

4. Evaluation phase:

The effectiveness of this program was assessed by comparing knowledge, practices, and attitudes of primary school students before

and after the implementation of an evidence based obesity prevention program. The post-test questionnaire used for this evaluation had the same format as the pre-test questionnaire.

Statistical analysis:

Data were checked before entering the computer. This was done by tabulating the data after it had been analyzed using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics (as mean, standard deviation, frequency and percentages) were applied. The statistical tests were used as Paired (t) test was used to compare mean scores between the same sample at various study phases, Chi square was used to determine the distribution of numbers and percentages, and Spearman correlation test (r) was used to determine the relation between the total score of knowledge, practices, and of attitude. When $p \leq 0.001$, a level value was regarded to be highly significant while significant when $p \leq 0.05$, and insignificant when $p > 0.05$.

Results:

Table (1): Shows that; 66.7% of the studied students aged 11 years and more with mean was 11.305 ± 4.85 , 60.6% of them were female, and 96.1% of them lived in urban areas. Also, the table shows that 57.2 % of students` fathers had university education, and 94.4% of them worked. Regarding to their mothers` educational level 48.3% of them had university education. 76.1% of mothers were housewives.

Table (2): Represents that; 59.4% of the studied students had no family history of obesity. 46.7% of them did not suffer from any health problems, while 41.1% of them

suffer from respiratory system problems (dyspnea- tonsillitis - sore throat).

Table (3): Reveals that; there were highly statistically significant differences between all items of the studied students` knowledge about obesity and 100 million health initiative pre and post implementation of program $p < 0.001$.

Figure (1): Illustrates that; 10.0% of studied students had good total knowledge preprogram implementation which improved to 75.0% post program implementation, while 62.2% of them had poor total knowledge preprogram implementation and reduced to 8.9% post program implementation.

Table (4): Clarifies that, the mean score of total students` reported practices regarding prevention of obesity at pre-program implementation was 3.933 ± 6.231 and improved to 18.338 ± 8.541 post program implementation. Also, there was highly statistically significant difference in students` practices regarding prevention of obesity post program implementation.

Figure (2): Shows that; 5.7% of studied students had satisfactory practices regarding their demonstration of anthropometric measurements and BMI pre implementation of program which improved to 65.1% post implementation of program, while 94.3% of them had unsatisfactory practices at pre implementation of program compared by 34.9% post implementation of program.

Figure (3): Illustrates that; 9.4% of studied students had satisfactory practices regarding prevention of obesity pre implementation of program which improved

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to 72.8% post implementation of program, while 90.6% of them had unsatisfactory practices at pre implementation of program compared by 27.2% post implementation of program.

Table (5): Shows that; there were highly statistically significant differences between all items of the studied students` attitude about prevention of obesity pre and post implementation of program ($P = 0.000$).

Figure (4): Demonstrates that; 27.8% of studied students had positive attitude

regarding prevention of obesity pre implementation of program which improved to 82.2% post implementation of program, while 72.2% of them had negative attitude regarding prevention of obesity at pre implementation of program compared by 17.8% post implementation of program.

Table (6): Reveals that there were highly positive statistically significant correlations between students` knowledge, practices and attitude regarding prevention of obesity at pre and post implementation of program.

Table (1): Distribution of the studied students regarding their demographic characteristics (n=180).

Demographic characteristics	No.	%
Age / years		
11-	120	66.7
12+	60	33.3
$\bar{x} \pm S.D$ 11.305± .485		
Sex		
Male	71	39.4
Female	109	60.6
Residence		
Urban	137	96.1
Rural	7	3.9
Fathers` educational level		
Basic education	3	1.7
Secondary education	70	38.9
University degree	103	57.2
Postgraduate studies	4	2.2
Fathers` occupation		
Working	170	94.4
Not working	10	5.6
Mothers` educational level		
Basic education	5	2.8
Secondary education	81	45.0
University education	87	48.3
Postgraduate studies	7	3.9
Mothers` occupation		
Working	43	23.9
Housewife	137	76.1

Table (2): Distribution of the studied students regarding their family and medical history (n=180).

Family and medical history	No.	%
Family history of obesity		
Yes	73	40.6
No	107	59.4
* Suffering from any health problems:		
None	84	46.7
Headache or dizziness	12	6.7
Respiratory system problems (dyspnea - tonsillitis - sore throat)	74	41.1
Urinary system problems (frequent urination - burning in urine)	3	1.7
Diseases of the digestive system	10	5.6
Anemia	39	21.6
Endocrine diseases such as diabetes mellitus	1	0.6

* Answers are not mutually exclusive

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Table (3): Distribution of the studied students' knowledge regarding obesity and 100 million health initiative pre and post program implementation (n=180).

Knowledge	Preprogram implementation						Post program implementation						X ²	p-value
	Complete& correct answer		Incomplete & correct answer		Don't know		Complete& correct answer		Incomplete& correct answer		Don't know			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Meaning of obesity	15	8.3	67	37.2	98	54.4	116	64.4	53	29.4	11	6.1	148.9	0.000**
Types of obesity	0	0.0	30	16.7	150	83.3	92	51.1	58	32.2	30	16.7	180.9	0.000**
Causes and risk factors of obesity	40	22.2	83	46.1	57	31.7	162	90.0	13	7.2	5	2.8	168.3	0.000**
Diagnosis of obesity	20	11.1	70	38.9	90	50.0	108	60.0	58	32.2	14	7.8	117.1	0.000**
Treatment of obesity	28	15.6	44	24.4	108	60.0	135	75.0	29	16.1	16	8.9	141.5	0.000**
Complications of obesity	10	5.6	50	27.8	120	66.7	138	76.7	12	6.7	30	16.7	187.9	0.000**
Prevention of obesity	21	11.7	89	49.4	70	38.9	146	81.1	26	14.4	8	4.4	177.3	0.000**
Aim of 100 million health initiative	8	4.4	60	33.3	112	62.2	123	68.3	45	25.0	12	6.7	183.7	0.000**
Services of 100 million health initiative	10	5.6	63	35.0	107	59.4	137	76.1	33	18.3	10	5.6	199.5	0.000**

() highly statistically significant at (p<0.001)**

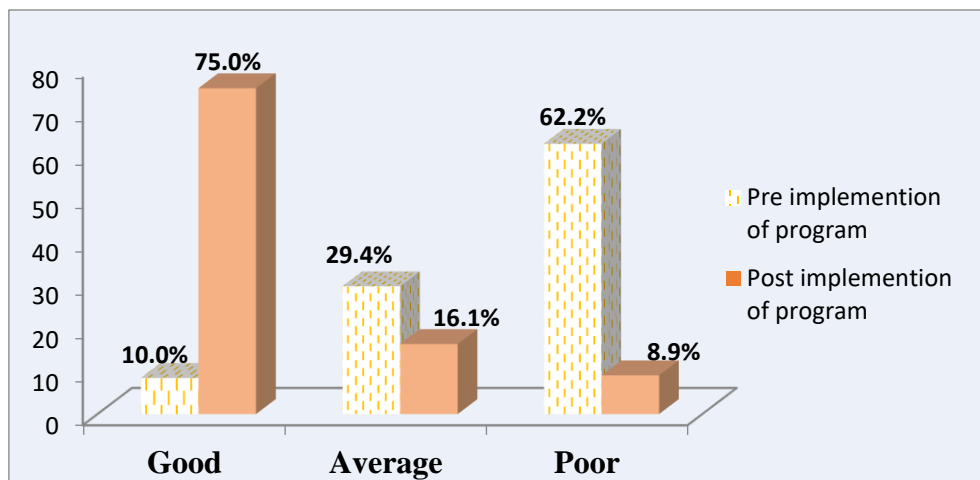


Figure (1): Percentage distribution of the studied students regarding their total knowledge regarding obesity, and 100 million health lives initiative pre and post implementation of program (n= 180).

Table (4): Mean scores of primary school students` reported practices regarding prevention of obesity between pre and post implementation of program (n=180)

Practices dimensions	Max score	Pre program	Post program	Paired t-test	p-value
		Mean +SD	Mean +SD		
Nutrition	15	2.388± 3.830	11.3444±5.4908	22.019	.000**
Exercise	3	.8056± .95190	2.6667±.79804	23.770	.000**
Rest and sleep	3	.5667± 1.1291	2.3222±1.1801	16.672	.000**
Using social media	3	.1722± .65014	2.005± 1.355	17.320	.000**
Total reported practice	24	3.933 ±6.231	18.338±8.541	22.551	.000**

() highly statistically significant at (p<0.001).**

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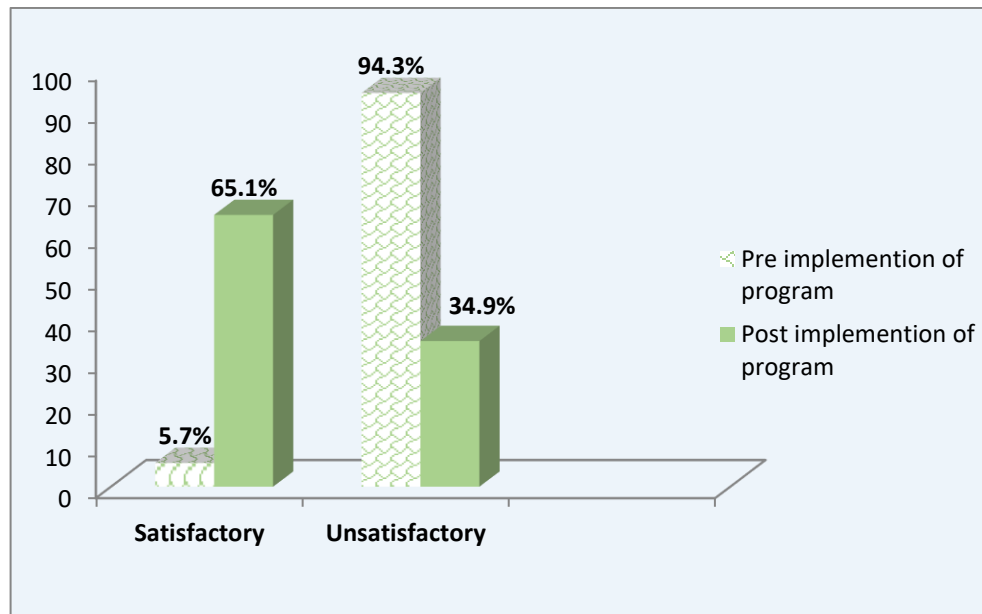


Figure (2): Percentage distribution of the studied students regarding their demonstration of anthropometric measurements and BMI pre and post implementation of program (n= 180).

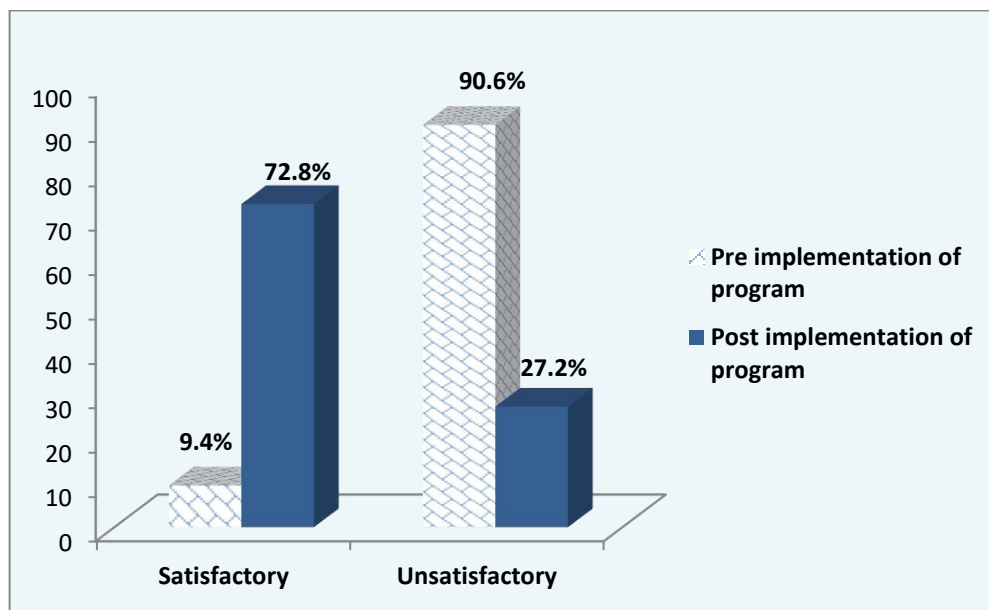


Figure (3): Percentage distribution of the studied students regarding their total practice regarding prevention of obesity pre and post implementation of program (n= 180).

Table (5): Distribution of the studied students` attitude regarding prevention of obesity pre and post program implementation (n=180).

Attitude	Preprogram implementation						Post program implementation						X ²	p-value
	Agree		Uncertain		Disagree		Agree		Uncertain		Disagree			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
It is good to perform physical activity to prevent obesity.	50	27.8	62	34.4	68	37.8	128	71.1	43	23.9	9	5.0	82.82	0.000**
Obesity is considered a problem for children.	14	7.8	39	21.7	127	70.6	134	74.4	34	18.9	12	6.7	192.7	0.000**
Eating unhealthy foods is dangerous for children and causes obesity.	19	10.6	21	11.7	140	77.8	112	62.2	28	15.6	40	22.2	122.5	0.000**
Obese child is seen as not being healthy.	20	11.1	60	33.3	100	55.6	144	80.0	13	7.2	23	12.8	172.2	0.000**
Overweight child is unhappy.	13	7.2	110	61.1	57	31.7	129	71.7	45	25.0	6	3.3	163.3	0.000**
Obese children suffer from bullying.	80	44.4	60	33.3	40	22.2	160	88.9	18	10.0	2	1.1	83.66	0.000**
It is useful to take enough sleep 6-8 hours to prevent obesity.	50	27.8	50	27.8	80	44.4	142	78.9	20	11.1	18	10.0	96.16	0.000**
It is important to avoid excessive using of social media to prevent obesity.	3	1.7	97	53.9	80	44.4	108	60.0	52	28.9	20	11.1	148.9	0.000**
Obese child is less stronger than not obese child	30	16.7	30	16.7	120	66.7	119	66.1	29	16.1	32	17.8	104.1	0.000**
Obesity causes psychological problems like depression	13	7.2	113	62.8	54	30.0	128	71.1	45	25.0	7	3.9	159.2	0.000**

(**) highly statistically significant at (p<0.001)

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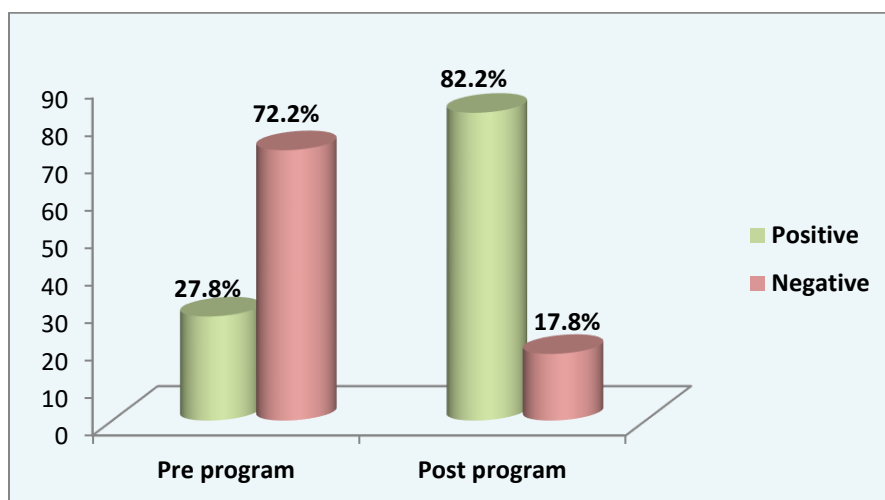


Figure (4): Percentage distribution of the studied students regarding their total attitude regarding prevention of obesity pre and post implementation of program (n= 180).

Table (6): Correlation matrix between primary school students` total knowledge, total practices, and total attitude regarding prevention of obesity through the program phases (n=180).

Phases	Total		knowledge	Practice	Attitude
Pre-program	knowledge	r	1	.868	.978
		P	--	.000**	.000**
	Practice	r	.868	1	.821
		P	.000**	----	.000**
	Attitude	r	.978	.821	1
		P	.000**	.000**	----
Post-program	knowledge	r	1	.959	.952
		P	----	.000**	.000**
	Practice	r	.959	1	.943
		P	.000**	----	.000**
	Attitude	r	.952	.943	1
		P	.000**	.000**	----

Discussion

Prevention of obesity is a global public health interest, and there is growing evidence that obesity has negative short- and long-term effects on health and well-being. Initial preventive efforts are likely to have optimal effects when begin in early childhood. The important time point for obesity prevention interventions is from birth to starting primary school when parent and child are being established diet and activity behavior (**Brown et al., 2019**).

The aim of this study was to evaluate the effect of evidence based obesity prevention program among primary school students according to 100 million health initiative. Evidence based obesity prevention program was expected to be effective method for prevention of obesity among primary school students made evident significant improvement in students` knowledge, practices, and attitude.

Regarding to demographic characteristics of the studied students, the results of the current study revealed that, two thirds of the studied students were 11 years old with mean was $11.305 \pm .485$, three fifths of the studied students were female and most of them lived in urban areas. These finding results were incongruent with **Hamad et al. (2021)**, who reported that 71.0 % of the students were age 12 years old and 85.3% of them were male. However, 81.3% of students lived in city.

The results of the present study revealed that more than half of the students` fathers had university education and most of them worked. As regards the education level of students` mother, the current study revealed that; slightly less than half of students` mothers had university education and more than two thirds

were housewife. These findings agreed with **Karki et al. (2019)**, who reported that 51.8% of students` fathers had university education, 96.5% of them were worker, 40% of students` mothers had university education and 57% of mothers were unskilled workers or housewives.

As regards family and medical history, the present study revealed that; slightly less than three fifths of the studied students had not family history of obesity. This finding was congruent with **Abduelkarem et al. (2020)**, who found that majority of studied students had no family history of obesity.

Concerning knowledge of the studied students, the results of the current study revealed that; there were highly statistically significant differences between all items of the studied students` knowledge about obesity and 100 million health initiative pre and post implementation of program ($P = 0.000$). These findings were consistent with **Ahmed et al. (2022)**, who reported that there were statistically significant differences in knowledge that affect the improvements about general knowledge regarding obesity post program implementation. Also, these findings were congruent with **Parmar (2020)**, who found that there was highly significant increasing in knowledge regarding obesity and its complications after implementation of the educative supportive intervention. This might be due to effect of the program which succeed to improve students` knowledge.

The present study revealed that; less than quarter of studied sample had complete correct answer regarding causes of obesity preprogram and improved to most of studied students had complete correct answer post program. This

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finding agreed with **Geetha et al. (2020)**, who reported that 0.9% of the children had insufficient knowledge regarding causes of obesity and increased to 95% of children had sufficient knowledge after educational intervention implementation.

The present study showed that; less than tenth of the studied students had complete correct answer about meaning of obesity, and less than tenth of the studied students had complete correct answer about complications of obesity preprogram. These findings disagreed with **Gunagi et al. (2020)**, who reported that less than half of the studied students defined obesity correctly and less than three quarters of them were aware about obesity effects on health. This difference might be due to studied students` lack of awareness due to their young age.

The present study illustrated that; more than three fifths of studied students had complete correct answer about meaning, most of studied students had complete correct answer about causes, three quarters of studied students had complete correct answer about complications and majority of studied students had complete correct answer about prevention of obesity post program. These results were consistent with **Miky et al. (2022)**, who stated that more than three quarters of student had adequate knowledge about definition, predisposing factor, complication, and prevention of obesity post program. This might be due to the spread of the 100 million health initiative helps the studied students in acquiring knowledge for obesity.

Regarding total knowledge level of the studied students, the findings of the present study showed that; three fifths of the studied students had poor total knowledge preprogram while three quarters of the studied students had good total knowledge post program. This result was compatible with **Geetha et al. (2020)**, who reported that 99.4 percentages of students had insufficient knowledge regarding obesity pre intervention, and 97.8 percentages of students had sufficient knowledge regarding obesity post intervention. This might be due to preventive program on obesity had positive impact in increasing knowledge among selected school students.

Regarding reported practices of studied students, the current study revealed that, there were highly statistically significant differences in students` practices regarding prevention of obesity post program implementation. This finding agreed with **Ahmed et al. (2022)**, who found that there was highly statistically significant difference in post-program implementation compared to pre-program regarding to students` total practices for obesity prevention. This might be due to evidence based prevention program had a significant positive effect in improving practices of primary school students regarding prevention of obesity.

The findings of the present study showed that, the mean score of total student exercise practice was $.8056 \pm .95190$ preprogram implementation and improved to $2.6667 \pm .79804$ post program implementation. This finding was consistent with **Kurniawan et al. (2022)**, who reported that mean score of total student practices of exercise was

2.49±0.55 preprogram and improved to 2.63±0.63 post program. This might be due to children in the school age will have a desire to engage in activities and practice different exercises.

The studied students had highly statistical significant differences in nutrition and exercise practices regarding obesity. These results were congruent with **Abdollahi et al. (2019)**, who reported that there was a significant improving in the mean scores of studied children for the nutrition practice and physical exercises after educational intervention. This might be due to level of education of studied students` parents support them in promoting their practices.

The present result revealed that; less than tenth of studied students had satisfactory practices regarding their demonstration of anthropometric measurements and BMI pre implementation of program which increased to almost two thirds of students post implementation of program. This might be due to the positive effect of the demonstration and re-demonstration of procedure and the students` interest for application of self-measuring height and weight and knowing what ether they are in stage of obesity or not.

Regarding to total practices of the studied students, the current research demonstrated that; less than tenth of studied students had satisfactory practices preprogram and improved to more than two thirds post program regarding prevention of obesity. This finding was symmetrical with **Ismail et al. (2021)**, reported that 38.2% of students had adequate total practices preprogram increased to 74.3% post program implementation. This could be because of provision of the preventive

educational program for primary school students had a positive effect on enhancing their practices.

The finding of the current study illustrated that, most of studied students had unsatisfactory practices regarding prevention of obesity preprogram. This finding was congruent with **Ali, (2022)**, who reported that 74% of studied children had inadequate practices regarding prevention of obesity.

Regarding attitude, the present study revealed that; more than three quarters of the students disagreed that eating unhealthy foods is dangerous for children and causes obesity pre implementation of program. This conclusion contradicted with **Omotola (2017)**, who reported that less than three quarters of students agreed that consuming unhealthy nutrition is risky to children. This difference might be due to the poor level of knowledge of studied students before implementation of program which affected on their attitude.

Regarding total attitude, the findings of the current study demonstrated that; less than three quarters of students had negative attitude regarding prevention of pre implementation of program. This finding was in accordance with **Njelekela et al. (2015)**, who reported that majority of studied children had negative attitude regarding prevention of obesity.

The results of the current study showed that, more than one quarter of studied students had positive attitude pre implementation of program which increased to more than three quarters post implementation of program. This finding agreed with **Swain & Kathuria (2020)**, who reported that 68.7% of subjects had positive attitude preprogram and increase

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to 77.41% post program. This might be as a result of the students' knowledge development following program implementation, which modified students' attitude.

Concerning correlations between the studied students total knowledge, total practices and total attitude, the findings of the current study showed that, there were highly positive statistically correlations between students' knowledge, practices and attitude regarding obesity at pre and post implementation of program. This could be due to knowledge served as the cornerstone for practices and had a favorable effect on both their behavior and attitudes.

Conclusion:

Evidence based obesity prevention program was succeed in increasing knowledge, improving health practices and changing attitude of school students regarding obesity. Minority of studied primary school students had good knowledge regarding obesity and 100 million health initiative pre-program implementation which improved to three quarters post-program implementation. Minority of primary school students had satisfactory practices regarding prevention of obesity pre implementation of program which improved to more than two thirds post implementation of program. More than one quarter of school age children had positive attitude regarding prevention of obesity pre implementation of program which improved to majority post implementation of program.

Recommendations:

- Continuing evidence based obesity prevention program for school students to

increase their knowledge and practices.

- Distribution of different instructional booklets and brochures for school students including preventive measures of obesity.
- Further researches are needed on large samples among school students to prevent obesity and its complication.

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برنامج الوقاية من السمنة المبني على الأدلة بين طلاب المدارس الابتدائية وفقاً لمبادرة 100 مليون صحة

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تعتبر مشكلة السمنة في مرحلة الطفولة مشكلة صحية عالمية، حيث تم إطلاق مبادرة 100 مليون صحة للكشف المبكر عن الأمراض غير المعدية ومنها السمنة. لذلك هدفت هذه الدراسة الى تقييم أثر برنامج الوقاية من السمنة المبني على الأدلة لدى طلاب المرحلة الابتدائية وفقاً لمبادرة 100 مليون صحة. وقد أجريت هذه الدراسة في سبع مدارس ابتدائية حكومية في مدينة بنها على 180 طالب من الصف السادس الابتدائي. حيث خلصت الدراسة بأن برنامج الوقاية من السمنة المبني على الأدلة له تأثير إيجابي كبير في تحسين المعلومات والممارسات وتغيير اتجاهات طلاب المدارس نحو الوقاية من السمنة. كما أوصت الدراسة بإستمرار برامج الوقاية من السمنة القائم على الأدلة لطلاب المدارس الابتدائية لزيادة معلوماتهم وممارساتهم للوقاية من السمنة.