Effect of health education intervention on the prevalence of malnutrition among adolescent girls at El- Kharga City

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Abstract:
Background: Malnutrition remains a major health problem. Early identification and prevention of malnutrition will prevent a multitude of physical, emotional, social, and economic problems. **Aim of the study:** was to evaluate the effect of an educational intervention program in improving the knowledge and health status for malnourished girls in El-kharga City. **Subjects & Methods: Research design**: A quasi-experimental research design with pre-post tests was used to evaluate the effectiveness of nutritional education intervention on improving girls' knowledge and health status for them. **Setting:** the study was carried out at homes in the selected district in El-kharga City. **Subjects:** The study included 80 girls suffering from malnutrition; those were exposed to the health education intervention. **Tools of data collection**: Two tools were used to collect the necessary data (A) Structure interview questionnaire to collect data about demographic characteristics of study girls such as age, level of education, occupation……etc , and their knowledge about nutrition and their nutritional risk habits. (b) Assessment sheet to assess body mass index and level of hemoglobin. **Results:** revealed that the minority of studied group had limited satisfactory knowledge pre intervention assessment, which improved after the implementation of the educational program. There was also improvement in their nutritional health status by taking balanced diet also and decreasing the risky dietary habits. **Conclusion:** The studied group had limited knowledge regarding malnutrition before the educational program, which improved after the implementation program, but still more stress is needed for those vulnerable groups. **Recommendations:** The study recommended the following: health education to girls about balanced diet, and risky habits that lead to malnutrition should provided to them in all health care setting, booklet contain information about balanced diet blasé poster should be available in all health care setting and Future study in other ages to detect prevalence of malnutrition.

Keywords: Malnutrition, prevalence, educational intervention, Adolescents.

Introduction:

Adequate nutrition is a basic human need and a prerequisite for optimum health. [1] Malnutrition remains a major health problem with consequences that are too grave to be ignored. [2] Malnutrition is caused by an absence of food or nutrients or an over-abundance of food or nutrients. Malnutrition may be due to improper or inadequate food intake or may result from inadequate absorption of food.[3] Deficient supply of food, poor dietary habits, food faddism and emotional factors may limit intake. Certain metabolic abnormalities may also cause malnutrition. Malnutrition reduces work capacity and the immune system, both of which affect income generation. [4] Malnutrition weaknesses the body's resistance to infection because of lowered body temperature and decreased ability to produce antibodies, which require protein. [5]

There are 102 billion of adolescents between age of 10-19 in developing nations suffering from malnutrition and one half of all children and adolescents fail to achieve their full genetic growth potential due to the combined effects of inadequate nutrition and frequent illness.[6]

Malnutrition is still one of the major public health problems in Egypt, Egypt Demographic Health Services (EDHS) found that 25.4% of adolescence under weight and 40.8% over weight. [7]According to the last survey in El-Kharga city (2010) more than half of women were suffering from anemia, Vit D and calcium deficiency and most people in the same city suffering from iodine deficiency. [8]

Adolescence is a period of transition between child hood and adulthood. Adolescent girls from a crucial segment of the population and constitute, as it were, the vital bridge between the present generation and next. Malnutrition has many negative consequences that affect both the adolescent girls and the health services, such as delayed recovery from illness, poorer treatment outcomes, increased need for healthcare provision in the home, more frequent general practitioner (GP) visits, more hospital admissions, and longer hospital stays. [9]Health education is an important part of health care that is promoting healthy knowledge, and nutritional status. Early identification and prevention of malnutrition will prevent a multitude of physical, emotional, social, and economic problems. [10]

Significance of the Study:

More than 25,000 people die each day from malnutrition. Each year, more than 500,000 women, 99 percent of them in developing countries.[11] In addition, there are 102 billion of adolescents between age of 10-19 in developing nations suffering from malnutrition and one half of all children and adolescents fail to achieve their full genetic growth potential due to the combined effects of inadequate nutrition and frequent illness. Prevalence of malnutrition in adolescent girls ranged from 50-72 [6].

According to the last survey in El-Kharga City (2010) more than half of women are suffering from anemia, calcium deficiency and most people in the same city are suffering from iodine. [8]

Aim of the study:

The aim of the current study was to**:** evaluate the effectiveness of an educational intervention program in improving the knowledge and health status for malnourished adolescent girls.

Study Hypothesis:

A statistically significant improvement in adolescent girls' knowledge and health status toward malnutrition will be achieved after the intervention, compared to pre intervention.

Subjects and methods:
Research design:

A quasi-experimental research design with pre-post tests was used.
Study setting:

The study was carried out at homes in the selected district in El-kharga City.
Study subjects:

80 adolescent girls taken from homes included in the study. A multistage cluster random sample was used to choose the study population consisted of 80 family randomly selected from the above mentioned setting, included 120 adolescents girls between 11-18 years, and according to nutritional assessment (through physical appearance assessment, anthropometric measurements and laboratory investigation), The study included 80 girls suffering from malnutrition, and participated in the study with 10-15% added to the sample size considered as dropout to the study sample. Those were exposed to the health education intervention.
Tools of Data collection:

Two tools were used to collect the necessary data:

Tool (1): An interview questionnaire: It was designed to collect data about demographic data, nutritional habits, dietary intake for girls and girls' knowledge about nutrition and malnutrition. Scoring system, correct complete answer scored two degrees, while one degree for an incomplete answer, and zero for did not know or wrong answer. Knowledge was considered satisfactory if the percent score was 50% or more and unsatisfactory if less than 50%.

Tool (2): Assessment sheet: It composed of three parts. Part one for observe general appearance of the study girls. The score for this part was scored (1) if yes, while the no scored (0). Part two for height and weight were obtained for each girl to calculate body

mass index as an indicator of the degree of malnutrition. Part three for Laboratory investigations. A blood sample was taken for measuring total blood calcium, level of hemoglobin and thyroid stimulating hormone (TSH, T3 and T4). According to the test results detected who are suffering from anemia, who have hypocalcaemia or hypo or hyperthyroidism.

Content validity:

Validity of the tools was tested by five experts in community health medicine and nursing. Reality of the tools: test and retest of the tools to be sure from the questionnaires be measurable, relevant and comprehensive.

Pilot study:

A pilot study was conducted on 10% of subjects and those were excluded from the main study sample to test the applicability of the tools, and the necessary modifications were done accordingly.

Field work:

Approval from responsible in Ministry of Health in El-Khraga and oral consent from the participants to involved in the study.

Assessment phase: It included collection of baseline data through interviewing using the developed questionnaire forms, and assessment sheet, which covered all items related to malnutrition prevention and control.

Planning phase (program design): The investigators developed an educational program based on pertinent literature, and in the light of the findings of the assessment phase. Detected needs, requirements and deficiencies were translated into aim and objectives of the educational protocol sessions in the form of booklet Contents. The teaching methods were lectures, discussions, brain storming, and demonstration. Data show and handouts were used as teaching media. Time plan was established and the subjects were divided into 6 groups (10-12 girls). Each group of subjects attended 6 sessions, the program included six sessions 4-5 hours. The first session covered introduction and

knowledge about the meaning and prevalence of malnutrition. The second session was to provide knowledge about nutrition such as; definition, nutrition groups, importance for every group and the types of food containing it. The third session involved the clinical manifestations and types of malnutrition. The fourth session continuing acquires knowledge related to types of malnutrition and how we can treat it. The fifth session involved healthy food habits and the relationship between physical activities and good nutrition. The sex session include nutritional recommendations according to the World Health Organization and normal Body Mass Index.

Implementation phase: The booklet was implemented in the form of sessions. The length of each session was different according to girls' responses, time available, and the content of each session. To ensure that the subjects understand the booklet content, each session started by a summary about what was given through the previous session and objectives of the new one, taking into consideration the use of simple language to suit the educational level of students; motivation and reinforcement techniques as praise recognition during the session were used to enhance motivation and learning. Data were collected during 6 month from November 2011 to April 2012.

Evaluation phase: The evaluation of the educational sessions was done immediately after its implementation by comparing the changes in girls' level of knowledge through applying the same tools of pre program then repeating the use of the same tools after program intervention to evaluate subjects' knowledge, dietary intake, physical and laboratory assessment.

Administrative and ethical considerations:

Permission to conduct the study was obtained by submission of official letters from the Directorate of Health Affairs forwarded to the Ministry of Health including the aim of the study to

obtain their permission to make laboratory investigations. After approval of the Directorate of Health, official letters were addressed to the directors of El-Kharga General Hospital and to make laboratory investigation at El-Kharga General Hospital clinic to studied group. Each girl who agreed to participate in the study was interviewed individually after explaining the purpose and methods of the study to obtain consent for participation in the study. Participants were informed about the purpose of the study and that voluntary participation and confidentiality were ensured. They were also informed about their right to refuse to participate or withdraw at any time without giving any reason.

Statistical design:

Data entry and statistical analysis were done using the statistical package for social sciences (SPSS), version 14.0. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, and means and standard deviations for quantitative variables. Quantitative categorical variables were compared using chi-square test, whenever the expected values in one or more of the cells in a 2×2 tables was less than 5. Statistical significance was considered at p-value <0.05.

Results:

Table (1): The mean ages of girls were 15.29±2.98 years, and 43.75% of their mothers had secondary education. As regards families' income, more than half of the sample (55.0%) had insufficient income.

Table (2): indicates that minorities of studied group ate balanced diet pre education intervention compared to the majorities of them post program. According to physical appearance assessment, also the table reveals that low percentages of studied group have a healthy physical appearance pre program compared to the majorities of them having a healthy physical appearance post program intervention.

Concerning types of malnutrition all studied group were suffering from malnutrition, and changed to majorities of them improved to normal nutritional status post program. In addition, Comparison of total score knowledge about adequate nutritional among girls it was unsatisfactory knowledge about adequate nutrition pre program which improved to be majorities of them having satisfactory knowledge post program. As regard hemoglobin test.

Figure (1): Reveals that the majority (5%& 75%) of girls were suffering from mild and moderate anemia pre/program which improved to more than two thirds (67.5%) of them having normal hemoglobin post program.

Table (3): Describes anthropometric measurements in girls with mean weight 55.16±20.29 kg pre program to 51.40±20.58 kg post program with significance difference (P<0.001). Also, BMI measurements in girls with statistically significance difference (P<0.02). Regarding correlation matrix between knowledge about adequate nutrition, dietary intake and factors affecting of malnutrition.

Table (4): Shows statistically significant correlations between the prevalence of malnutrition, and knowledge, dietary intake and factors of malnutrition at pre/ post program (p=0.000).

Discussion:

Malnutrition denotes impairment of arising health either from deficiency or excess or imbalance nutrients on the body. Maternal mortality in developing countries is about 50 times that in developed countries. The highest rates are the result of poor health status of adolescent girls who are married off even before their attaining full maturity. Malnutrition among adolescent girls is a wide spread due to deficit diet. Studies on their gestation performance have shown that high incidence of toxemia, miscarriage, and premature deliveries occurs among undernourished adolescent pregnant women.[12]

The current study showed that all the studied group suffering from malnutrition were distributed between mild, moderate and severe malnutrition with moderate the highest and none of them normal pre health education program intervention. This finding improved to normal nutritional status for the majority of them post intervention. The study hypothesized that an educational program would improve their nutritional status and the findings lead to acceptance of this research hypothesis. In a similar study carried out by Shaheen and Tawfik [13] in Egypt, malnutrition was prevalent among three governorates - Cairo, Qualyobia and Beheria - which represent an urban, a semi-urban and a rural communities, respectively. This result was supported by Leenstra and Kuilein [14] in western Kenya Overall, 12.1 and 2.0% were mild and severely malnutrition, respectively; in adolescent girls.

Regarding physical assessment, a minority of the studied group had healthy physical assessment pre program. This may be normal to find malnourished girls having unhealthy physical assessment related to the effect of nutritional status on body functions. After implementation of the health educational program the study results indicated that the studied group, who were exposed to the health education and received medical treatment, their unhealthy physical assessment had decreased at the end of the health educational intervention from a minority of them to the majority of them having a healthy physical assessment. The decrease of unhealthy physical assessment was found to be statistically significant between the study groups.

On the same line, a study carried out by Martines [15] in France, showed that 28.0% had unhealthy physical assessment, followed by those with grade II obesity (19.2%), obesity grade I (13.86%) and finally grade III obesity (11.46%) pre educational Martines' program also reported that the nurses' team being in the forefront of the health

system can contribute to increasing the quality of life that he is monitoring, after the implementation of educational program related to food and eating behavior. The food investigation on food groups showed no significant differences between the two years of study configuring same eating behavior. On the other hand, the study analysis done by White [16], in Australia revealed significant correlations with healthy assessment and nutritional status scores before and after malnutrition.

Concerning the dietary intake and food habits, the present study results revealed that the majority of studied group suffering from malnutrition had unbalanced diet and bad diet habits. These may be attributed to that the majority of studied group had no enough knowledge about adequate dietary intake and the factors of bad food habits that lead to malnutrition and they look for these as a normal phenomena as other people in the community do.

On the other hand, in Egypt, although indicators of girls health have improved, the current rates for malnutrition in adolescents and children are still unacceptably high, especially in rural Upper Egypt with a high level of stunting due to insufficient household food security, inadequate feeding and caring practices and high infection rates (WHO) [17.] Recently Deakin [18], in Australia, mentioned that one in four adolescents buys unhealthy takeaway food every day or even a few times a day. This finding was supported by Khumalo [19], in which 92%, show the poor food intake that was being taken in both areas in Ngwavuma and Manguza and that resulted to malnutrition in family.

The results indicated that the majority of studied group who used to take unbalanced diet and had bad food habits improved at the end of the health educational intervention to be a majority of them having a balanced diet and having a good food habits with highly statistically significant differences. From researcher view this

may be attributed to that all the bad food habits and inadequate dietary intake mentioned in explanations given in the intervention program to all became consistent with the nutritional culture of people in Egypt, where the present study finding took place and these food habits revealed post intervention educational program decreased among participants.

This result was supported by Brady [20], deriving too much of one's diet from a single source, such as eating almost exclusively corn or rice, can cause malnutrition. This may either be from a lack of knowledge about proper nutrition, or from only having access to a single food source. On the same line, the study conducted by Obeid [21] in Sharjeh, indicated 34%of adolescence take unhealthy eating .Finally, the present study result indicated change in dietary habits as well as decreased risky nutritional habits which supported the study hypothesis regarding the impact of the educational program on decreasing risky dietary habits and increasing adequate intake of dietary elements.

Regarding to knowledge about adequate nutrition the current study results showed a minority of studied group's knowledge had satisfactory knowledge pre program intervention which improved to be the majority of them having satisfactory knowledge after the educational program intervention.

The difference and improvement of knowledge from unsatisfactory knowledge for the majority of studied group pre program intervention to the majority of them having satisfactory knowledge post program related to the interactive participation from the studied groups, and the feeling of their need to know the right information about adequate diet to improve their knowledge and to be healthy and other members of their families beside the attractive presentation of the intervention program.

On the same line, the study conducted by El-Sabban [22], in Kuwit,

on the overall nutrition knowledge score rated areas of knowledge, dietary habits, attitudes, and interest in nutrition information findings improvement of nutritional knowledge and so nutritional status with high significance between pre and post educational program. There was nutritional knowledge correlation with positive dietary behaviors or attitudes. Similar results were found in Iran by Mousa [23], which showed improvement of knowledge and attitude scores for the test and control mothers before and after the education intervention program. Tested mothers gained significantly better values than controls ($P<0.05$).

Concerning laboratory investigations such as, hemoglobin test the present study result demonstrated that, the majority of girls suffering from anemia distributed from mild, moderate and severe anemia respectively. Because of the studied group didn't took enough quantities or qualitative food these lead to malnutrition and normally it is sometimes associated with anemia.

As regards the WHO (2006) [17] report in Egypt, prevalence of anemia was found to be 21.4% , 23.4% and 13.0% respectively for mild, moderate and severe anemia. According to the National Nutrition Surveillance (NNS)[24] 50% of women aged 15-20 years whose hemoglobin level was tested were found to be anemic. The current study is also in agreement with Sultan [25] study in the United Arab Emirates whose results overall prevalence of anemia in female was 26.7% and the majority (88.4%) of the 69 anemic had mild anemia, whereas 7.2 % were moderately anemic and 2.3% of Emirati students were severely anemic. Sultan concluded that anemia is a major public health problem with 42.3% prevalence among female in non-industrialized countries and 10.3% in industrial countries.

As well, Kakunted [26],in Kenya reported that 45% of girls had pre-existing knowledge on good indigenous food sources of iron. After nutritional

education women demonstrated more knowledge on iron food sources. More than 40% of the girls improved in knowledge on iron and vitamin C-rich foods.

Regarding body mass index, the present study result revealed, highly statistically significant difference (P<0.001), of the study group in weight pre program intervention and after intervention. The study showed that less than half and less one quarter of girls (11-18y) were under and overweight respectively pre program intervention. After implementation of the health educational intervention, the results indicate that, the studied group, which was exposed to the health education program, with under or overweight had changed at the end of the health educational intervention. The decrease of the rate of under and overweight was found to be statistically significant in the studied groups. However, the difference between pre and post program intervention was highly statistically significant (p<0.001).

This finding was similar to that of the Elzanaty[7] who found that 5% of never-married males aged 10-19 and 6% of never-married females aged 10-19, in Egypt may be classified overweight, and 25.4% of the same group were underweight. The BMI values for an additional 15% of males and 19 % of females fall between the 85th and 95th percentiles, indicating that they were classified as at risk of becoming overweight. As well, the current study finding was in the same line with Khatab [27] in six countries of Africa to women aged 15-49 years, some 51.3% of women in Bangladesh are underweight, about half of whom are moderately or severely underweight, with a BMI below 16.99 kg/m^2.

Concerning correlation matrix between knowledge, dietary intake and factors of malnutrition about prevalence of malnutrition pre-post health education intervention, the current study result showed statistically significant correlations between

knowledge, dietary intake and factors of malnutrition at pre and post program (p=0.000). As well, Mshookri,[28] study in Oman revealed the association between dietary adequacies, nutritional knowledge can be due to increase risk of malnutrition. Program performed to help the Omani healthcare decision makers to develop better-tailored nutrition interventions which are more suitable for the Omani community gave a better result in community

Conclusion:

The study concludes that an educational program based on needs assessment can be effective in improving girls' knowledge and practices related to adequate nutrition and food health habits.

Recommendations:

In the light of the findings of the current study, the following recommendations are suggested:

- Teach the girls about the importance of taking balanced diet and good nutrition habits in all life stages to prevent occurrence of malnutrition.
- Providing booklet contain information about balanced diet and method of preventing malnutrition.
- Future study in other ages to detect prevalence of malnutrition.

Table (1): Distribution of socio demographic data of studied groups pre/ post program (n=80)

Socio Demographic Data	No.	%
Girls age (in years n=80)		
▪ 11-	39	48.75
▪ 16-18	41	51.25
Mean ± S.D	15.29±2.98	
Mother education		
▪ Read & write	5	6.25
▪ Basic education	15	18.75
▪ Secondary education	35	43.75
▪ University	25	31.25
Father Job		
▪ Farmer / worker	25	31.25
▪ Employer	22	27.5
▪ Free work	29	36.25
▪ Other	4	5.0
Income		
▪ Not enough	44	55.0
▪ Enough	34	42.5
▪ Enough & more	2	2.5

Table (2): Comparison between balance dietary intak, physical appearance assessment, types of malnutrition and total score of knowledge among studeid group (n.=80)

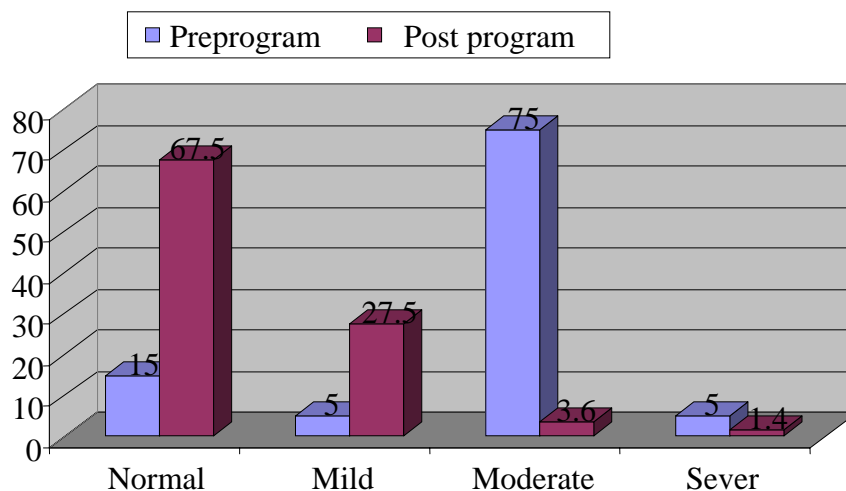| Items	Pre-program		Post- program		X^2 Test	P value
	No	%	No	%		
1-Balance dietary intake						
▪ Balanced	7	8.7	65	81.2		
▪ Unbalanced	73	91.3	15	18.8	37.56	0.001
Mean ±SD	0.52±0.62		5.830±3.81			
2-Appearance physical assessment						
▪ Healthy	22	27.5	68	85.0	1.09	0.001
▪ Unhealthy	58	72.5	12	15.0		
3- **Types of Malnutrition**						
▪ Normal	0	0	57	71.3		
▪ Mild	5	6.3	13	16.2	10.10	0.00
▪ Moderate	56	70.0	8	10.0		
▪ Sever	19	23.8	2	2.5		
Mean ±SD	0.88±0.79		0.39±0.54			
4-Total Score of Knowledge						
▪ Satisfactory	16	20.0	73	91.5	6,32	0.00
▪ Un satisfactory	64	80.0	7	8.5		

(*) Statistically significant at p<0.05

Figure (1): Hemoglobin test for girls

Table (3): Anthropometric measurements of girls 11-18 years pre-post program (n=80)

Anthropometric Measurements	Pre- program		Post-program		X^2 Test	p-value
	No.	%	No.	%		
Weight "kg"	55.16±20.29		51.40±20.58			P<0.001**
Height "cm"	150.9±12.42		142.79±25.12			P<0.375 n.s
BMI (kg/m^2)						
Under weight	35	43.7	6	6.7	6,32	
Normal weight	27	33.7	66	82.5	U=0.37	P<0.02*
Over weight	18	22.6	8	10.0		

(*) Statistically significant at p<0.05   (U) Mann Whitney test

Table (4): Correlation matrix between knowledge about adequate nutrition, dietary intake and factors affecting of malnutrition pre/post program (n=80).

Variables	Prevalence of malnutrition	
	Pre Health Education	Post Health Education
Knowledge	R= -0.22 P= 0.02	R= -0.321 P= 0.001
Dietary intake	R= -0.48 P= 0.000	R= -0.248 P= 0.013
Factors of malnutrition	R= -0.10 P= 0.310	R= -0.355 P= 0.000

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فى منازل في حي مختار في

مدينة الخارجة .