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Improvement of Healthy Diet Related Knowledge among a Sample of Egyptian Women in Three Upper Egypt Governorates Using a Community Based Intervention

Marwa Salem*, Hanaa Yousof, Ola Abdelmoneim,

KasrAlAiny School of Medicine University in Cairo, Cairo, Egypt

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***Correspondence:** Marwa Salem. KasrAlAiny School of Medicine University in Cairo, Cairo, Egypt. E-mail: mr80002000@yahoo.com

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Abstract

BACKGROUND: Fostering a community-based approach is one of the United Nations Children's Fund (UNICEF) strategies to empower the public with the knowledge and tools required for improving the nutritional status.

AIM: The current study was conducted to assess the knowledge of mothers/caregivers towards a healthy, safe, and affordable diet and to cover the detected knowledge gap using a community-based approach.

METHODS: A pre-posttest experimental design was carried out at a community level at three Upper Egypt governorates: Assiut, Qena, and Sohag over six months from September 2017 till February 2018. In the preparatory phase, 22 non-governmental organisations (NGOs) were selected per governorate, and 15 trainers were prepared at the central level to train 40 trainees from each governorate. In the implementation phase, 11,000 women were approached, 6548 of them agreed to participate in the baseline knowledge assessment: 1774 women from Assiut, 2337 from Qena, and 2437 from Sohag.

RESULTS: A significant improvement in the participants' subtotal and total knowledge scores in all dimensions of nutrition education which are: food economics, food safety, and a healthy diet. The highest percent change was in Assiut 77.1 (69.3: 109.9), followed by Qena 54.9 (27.2: 93.3), and then Sohag 43.7 (31.6: 61.4) which was noticed among the participants from the 3 governorates.

CONCLUSION: This community-based approach was a successful intervention to deliver effective health education messages; thus, improving participants' knowledge regarding food safety, healthy diet, and food economics. It represented the success of NGOs to enhance health and nutrition literacy among the participating women living in underprivileged areas. It is recommended to encourage collaboration with NGOs to move the community towards healthy behaviours.

Introduction

The global burden of malnutrition remains unacceptably high, and the progress made for solutions is unacceptably slow. Children under five years of age face multiple burdens; 150.8 million are stunted, 50.5 million are wasted, and 38.3 million are overweight [1]. Adolescent malnutrition rates are on the rise, representing a major public health problem [2]. Obesity rates among adults are at record levels (38.9%). Also, millions of women are still underweight. Africa and Asia bear the greatest share of all malnutrition forms [1]. Despite the efforts adopted by Egypt to reach the second goal of sustainable development goals (SDGs), which is to end hunger, achieve food security, and improve nutrition, malnutrition rates in Egypt are still high. Among children under the age of five years, one in every five children is stunted. Also, wasting and underweight rates are 8% and 6%, respectively, and the incidence of anaemia is 27% [3]. The percentage of obesity and overweight among females (5-19 years of age), and even married women (15-49 years) are 36% and 85%, respectively. Also, the rate of anaemia among women in the reproductive age is 25% [4].

School-age children, adolescents, and adults all over the world, regardless of wealth, are eating too many refined grains and sugary foods and drinks, and not enough food that promotes health such as fruits,

vegetables, legumes, and whole grains. About a third (30.3%) of school-aged children do not eat any fruit daily, yet 43.7% of them consume soda every day [1]. Previous research assessing knowledge, attitude and practice of healthy habits among Egyptian families revealed that there is a lack of health literacy among caregivers, contributing to unhealthy decisions [5].

At the family level, improvement of malnutrition cannot be achieved without exploring the existing level of knowledge among mothers regarding healthy diet, then delivering nutrition-related messages. Also, understanding households' food safety practices are of great help to reduce food-borne diseases at home [6]. Fostering a community-based approach is one of the UNICEF strategies to empower the public with the knowledge and tools required to improve the nutritional status [1]. Therefore, the current study was conducted to assess the knowledge of mothers/caregivers towards a healthy, safe, and affordable diet and to cover the detected knowledge gap using a community-based approach.

Methods

Study design, period, and setting

This study adopted a pre-posttest experimental design and was carried out at a community level in three of Upper Egypt governorates: Assiut, Qena, and Sohag. The study spanned over six months from September 2017 till February 2018.

Preparatory phase (at central level)

- Selection of governorates: Three of Upper Egypt governorates: Assiut, Qena, and Sohag were purposefully selected according to the Central Agency for Population Mobilization and Statistics (CAPMAS) definition of poverty [7].

- Creating a Core training team:

Three Public Health staff members participated in the following:

- Preparation of a training manual for a healthy diet, food safety, and food economics according to the international standards adopted from My Plate [8], [9], [10].

- Conducting training for 40 members at the central level (Cairo governorate):

- Holding a three-day training of trainers (TOT) workshop by the research team for forty trainees. The selection was open to women with a minimum of 12 years of education and who are willing to spend 20 hours in the week for the project.

- The first day was an orientation about the project objectives, principles of TOT, and basic communication skills.

- The second day was an orientation about the healthy diet.

- The third day was an orientation about food economics and food safety.

- Finally, a Core Training Team was formed at the central level, composed of 15 members out of 40 trainees after post-intervention assessment. The assessment included a passing score of 80% and a health education presentation to evaluate the knowledge gained and soft skills acquired after attending the workshops.

Preparatory phase (At the governorate level)

- Orienting the governors and governorate leaders of the three purposefully selected governorates by sending them faxes about the project objectives and asking them to nominate the most actively participating NGOs in their governorates. The governors and their deputies were oriented about the importance of promoting inter-sectoral cooperation and coordination with the NGOs to promote healthy nutrition.

- After nomination, the project management team visited the nominated NGOs to assess their capabilities and willingness to participate in the training activities and define places for implementing the proposed training in addition to delivering women HE classes. Accordingly, 22 NGOs were selected per governorate.

- Contacting the selected non-governmental organisations in Assiut, Qena, and Sohag to nominate staff to participate as trainers after receiving a TOT. Forty trainers were selected for each governorate. The selection was open to men or women with a minimum of 12 years of education and willingness to spend 20 hours in the week for the project.

- In each of the selected governorates, the Central Core Team implemented a two-day workshop attended by 40 participants from the governorate. The training covered communication skills and healthy nutrition. The trainee's completed pre- and post-tests, and, accordingly, 15 trainees were selected and added to the final central core team.

- Women aged17-69 years were recruited from different parts of each governorate using the NGOs registries; then they were personally approached and invited to participate in disseminating the messages received through the whole village. Out of 11,000 women approached, 6548 agreed to participate: 1774 women from Assiut, 2337 from Qena, and 2437 from Sohag.

Baseline assessment

A pre-tested structured interview questionnaire was used to collect data from the study participants. It included two sections:

i) Socio-demographic characteristics: age, family size, education, and occupation.

ii) Nutrition knowledge of study participants: knowledge questions (13 questions) were classified into three categories: healthy diet (6 questions), food economics (4 questions), and food safety (3 questions). The questions were coded, so that true answers were given a score of 1, while wrong answers or answering with I don't know were given a score of 0. The total raw score (if all answers are correct) was 13. Per cent score was calculated by dividing the raw score over 13 (maximum achievable score) and then multiplying the result by 100. Questions used in this section were adopted from the available literature [8], [9], [10].

The same tool was used in the post-intervention phase to assess the change in the participants' knowledge.

Content of the questionnaire was validated by four faculty members who are experts in nutrition, and the required modifications were done. Reliability was tested using internal consistency, and a Cronbach's Alpha ranging from 0.82 to 0.92 was found for the 13 knowledge questions in the 3 subtotal and total scores.

A pilot test was performed to test the clarity of the questions by interviewing 25 women (not included in the study). The required modifications were applied.

Intervention phase

The health education sessions (Table 1) were in the form of PowerPoint presentations, posters, and flashcards covering the knowledge gaps evolved from the baseline assessment in the pre-intervention phase. Regarding healthy diet, food safety, and food economics, the content was adopted from the available literature [8], [9], [10].

Two sessions, in the form of group meetings, were conducted over one day. Each session lasted for 60 minutes with a 15-minute break in-between. After the second session, participants were encouraged to ask any questions in case they needed to. The average number of participants in each session was 25; with one instructor for each group and using the same educational materials for all groups. Health education materials were simplified, modified, and designed in the Arabic language to be suitable for the Egyptian culture [8], [9], [10].

Table 1: Summary of the standardised health education intervention about healthy diet, food safety, and food economics for women at NGOs

	Contents
Overview	Pre-test (baseline assessment) Introduction to the session Orientation about the objectives and possible impact of the research
Session I	Food Economics Food Safety
Session II	Healthy diet
Recap	*Recap and take-home messages*

Post-intervention assessment

Participants (n = 6548) who attended the sessions and responded to the pre-test questionnaire before the educational intervention were contacted after 3 months (using their phone numbers) and invited for another interview at the NGOs for a post-test. Out of the 6548 women included in the pre-test and educational intervention, 750 were lost and did not attend the interview, making a total of 5798 participants in the post-test (11% non-response rate).

Data Management and Statistical Analysis

Pre-coded revised data were entered into the Statistical Package of Social Science (SPSS) version 21.0 (SPSS Inc. IBM, U.S.A.). For categorical data, frequencies and percentages were used for expression. For numerical data, mean and standard deviation were used for normally distributed data, while the median and interquartile ranges were used for data that were not normally distributed. Comparison between groups was made using the chi-square test for qualitative variables and Analysis of Variance (ANOVA) test for quantitative variables which were normally distributed. Non-parametrical Kruskal-Wallis test was used for quantitative variables which were not normally distributed. Comparison between pre- and post-intervention scores was performed using the McNemar's test for qualitative data and Wilcoxon's signed test rank test for quantitative data that were not normally distributed. The 3 subtotal and total knowledge scores were computed for each group of questions where correct answers received one point, while incorrect or did not know answers received nil. P-value ≤ 0.05 was considered statistically significant.

Ethical considerations

The Ethical Review Committee at the Faculty of Medicine, Cairo University revised and approved the study protocol. All participants were treated according to the Helsinki Declaration of biomedical ethics. Informed consent forms were obtained from the study participants after proper orientation regarding the study objectives and data confidentiality. Women were informed of their right to withdraw from the study at any stage.

Results

Table 2 shows the socio-demographic characteristics of the study participants. The mean age was 35 ± 8. The median (Q1: Q3) family size was 5 (4: 6). The majority of participants were housewives. About two-fifths of them were illiterate; about one quarter could read and write, more than a tenth had primary and preparatory education, and one quarter had secondary education or higher.

Table 2: Socio-demographic characteristics of the enrolled participants

	Assuit N = 1774	Qena N = 2337	Souhag N = 2437	Total 6548	p
Age					
(mean ± SD	34.53 ± 7.83	35.41 ± 8.71	34.96 ± 7.29	35.02 ± 8.2	0.008
Range	(17-69)	(17-69)	(18-67)	(17-69)	
Family Size					
Median (Q1: Q3)	5 (4:6)	5 (4:6)	5 (4:6)	5 (4:6)	0.041
Occupation					
Housewife	1704 (96)	2104 (90)	2311 (94.83)	6119 (93.4)	< 0.001
Works	70 (4)	233 (10)	126 (5.17)	429(6.6)	
Education					
Illiterate	746 (42.1)	1026 (43.9)	608 (25.1)	2380 (36.3)	
Reads and writes	459 (25.9)	382 (16.3)	867 (35.6)	1708 (26.1)	< 0.001
Primary & preparatory	169 (9.5)	404 (17.3)	224 (9.2)	797 (12.2)	
Secondary and Higher	400 (22.5)	525 (22.5)	738 (30.1)	1663 (25.4)	

Table 3 shows that there was a significant improvement in the percentage of correct answers to all questions among the study participants in the 3 governorates after the intervention. The improvement in the percentage of correct answers to the question about the adequate amount of water (question 3) among participants in Qena was not statistically significant.

Table 3: Percent of correct answers among the study participants

Question	Assuit N = 1576			Qena N = 2064			Souhag N = 2158			Total N = 5798		
	Pre	Post	P	Pre	Post	P	Pre	post	P	Pre	Post	P
Beans with chickpeas are better than beans with rice	399 25.32 %	1257 79.76%	< 0.001	747 36.1 9%	1231 59.6 4%	< 0.0 01	731 33.8 %	2002 92.7 %	< 0.0 01	1877 32.37 %	4490 77.44 %	< 0.001
Measuring portions by hand and is inaccurate and is wasting	465 29.5 %	1371 86.99%	< 0.001	789 38.2 3%	1260 61.0 5%	< 0.0 01	828 38.3 7%	1778 82.3 9%	< 0.0 01	2082 35.91 %	4409 76.04 %	< 0.001
3 cups of water are adequate	1626 80.08 %	1515 96.13%	< 0.001	1688 81.7 8%	1706 82.6 6%	0.2 22	1437 66.5 9%	1933 89.5 7%	< 0.0 01	4387 75.66 %	5154 88.89 %	0.001
Frequent hand washing is a waste of time	1290 81.85 %	1515 96.13%	< 0.001	1570 76.0 7%	1676 81.2 0%	0.0 02	1712 78.3 3%	1948 90.2 7%	< 0.0 01	4572 78.85 %	5139 88.63 %	< 0.001
Leafy vegetables should be washed with running water alone	348 22.08 %	1485 94.23%	< 0.001	553 26.7 9%	1689 81.8 3%	< 0.0 01	532 24.6 5%	1891 87.6 3%	< 0.0 01	1433 24.72 %	5065 87.36 %	< 0.001
Potato and rice meal are a balanced meal since potato is a vegetable and rice is carbohydrate	726 46.07 %	1476 93.65%	< 0.001	911 44.1 4%	1745 84.5 4%	< 0.0 01	628 29.1 0%	1888 87.4 9%	< 0.0 01	2265 39.07 %	5109 88.12 %	< 0.001
Natural ghee is the best type of fat for cooking because it tastes good	348 22.08 %	1433 90.93%	< 0.001	475 23.0 1%	1802 87.3 1%	< 0.0 01	1286 59.5 9%	1439 66.6 8%	< 0.0 01	2109 36.37 %	4674 80.61 %	< 0.001
It is essential to separate raw food from cooked food	1127 71.51 %	1325 84.07%	< 0.001	1421 68.8 5%	1592 77.1 3%	< 0.0 01	1597 74.0 %	1999 92.6 3%	< 0.0 01	4145 71.49 %	4916 84.79 %	< 0.001
Healthy clean food should be expensive	901 57.17 %	1376 87.31%	< 0.001	1206 58.4 3%	1725 83.5 8%	< 0.0 01	1148 53.2 0%	1833 84.9 4%	< 0.0 01	3255 56.14 %	4934 85.10 %	< 0.001
Food helps in building tissues, provides the body with energy, protects from diseases	1272 80.71 %	1367 86.74%	< 0.001	1632 79.0 7%	1829 88.6 1%	< 0.0 01	1629 75.4 9%	2089 96.8 0%	< 0.0 01	4533 78.18 %	5285 91.15 %	< 0.001
Can a serving of cottage cheese substitute a serving of meat?	337 21.38 %	1335 48.71%	< 0.001	456 22.0 9%	1772 85.8 5%	< 0.0 01	567 26.2 7%	1990 92.2 2%	< 0.0 01	1360 23.46 %	5097 87.91 %	< 0.001
Iodized salt is just the same like the non-iodized salt	1133 71.89 %	1401 88.90%	< 0.001	1164 56.4 0%	1283 62.1 6%	< 0.0 01	1471 68.1 6%	1745 80.8 6%	< 0.0 01	3768 64.99 %	4429 76.39 %	< 0.001
Can leftover food be used to prepare a new meal the next day?	427 27.09 %	1378 87.44%	< 0.001	862 41.7 6%	1647 79.8 0%	< 0.0 01	692 32.1 0%	1993 92.3 5%	< 0.0 01	1981 34.17 %	5018 86.55 %	< 0.001

Table 4 depicts the significant improvement in participants' subtotal and total knowledge scores in the three dimensions of nutrition education: food economics, food safety, and a healthy diet. This was noticed among participants from the three governorates. The lowest baseline subtotal and total knowledge score were that of food economics.

Table 4: Percent of subtotal and total knowledge scores before and after nutrition education among the study participants

	Assuit		Qena		Souhag		Total	
	Pre Median (IQR)	Post Median (IQR)	Pre Median (IQR)	Post Median (IQR)	Pre Median (IQR)	Post Median (IQR)	Pre Median (IQR)	Post Median (IQR)
Food Economics	31.9 (26.3:37.8)	91.9 (80.9:99.5)*	36.1 (31.2:45.9)	72.9 (66.6:83.8) *	30.9 (26.4:49.9)	86.9 (81.5:93) *	33.2 (27.7:45.9)	84.8 (74.8:93.9) *
Food Safety	61.3 (55.4:66.3)	92.7 (88.9:100) *	52.8 (48.9:66.3)	83.3 (66.7:91.7) *	59.5 (48.3:66.8)	91.1 (81.9:98.2) *	57.6 (50.4:66.7)	91.3 (77.8:99.4) *
Healthy diet	59.7 (53.5:66.3)	93.5 (89.3:99) *	58.8 (48.6:65.8)	81.2 (69.5:93.9) *	58.7 (46.3:70.9)	85.3 (82.1:89.9) *	59.4 (50.3:67)	88.6 (79.7:93.9) *
Total	49.9 (47.0:55.8)	94.3 (87.3:97.7) *	48.4 (42.1:56.7)	78.6 (65.3:88.5) *	61.5 (52.5:69.6)	87.5 (83.5:93) *	53.4 (47.1:61.5)	87.5 (81.1:93.6) *

IQR: interquartile range; *indicates a statistically significant difference between pre scores and post scores.

Table 5 shows percent change in participants' subtotal and total knowledge scores. The highest percent change in all governorates was that in food economics, followed by the percent change in a healthy diet, then in food safety in Assiut and Qena. Comparison among the 3 governorates revealed that the highest total knowledge percent change occurred in Assiut, followed by Qena, then Souhag.

Table 5: Percent change of subtotal and total nutrition knowledge scores among the study participants

scores	Assuit	Qena	Souhag	Total
	Median (IQR)	Median (IQR)	Median (IQR)	Median (IQR)
Food Economics	166.7 (125.5:287.2)	95.4 (27.8:166.8)	188.6 (75.4:242.1)	144.3 (79.7:225.5)
Food Safety	44.7 (32.1:63.6)	33.4 (13.5:93.4)	61.0 (36.5:79.8)	48.4 (29.0:71.7)
Healthy Diet	48.4 (39.4:69.7)	42.0 (15.1:63.9)	48.5 (23.2:88.9)	47.3 (30.8:68.5)
Total	77.1 (69.3:109.9)	54.9 (27.2:93.3)	43.7 (31.6:61.4)	58.8 (36.3:84.4)

The lowest percent change was the change in food safety in Qena. By asking the women participated in the study about the impact of the workshop on their family feeding practice, about 90% reported that their family feeding practice was improved, while 10% reported little or no improvement (untabulated data). The best-improved dimension in the families' feeding practices was reported to be food safety in more than two-thirds of the women who reported improvement, healthy diet in about one fifth, and food economics in one-tenth of these women (Figure 1).

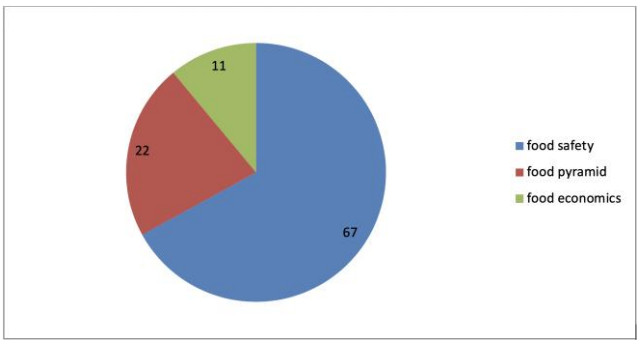

Figure 1: Percent of best improvement as reported by the study participants

Discussions

In the current study, a community-based approach was implemented to deliver nutrition education messages to participating women living in underprivileged areas in three Upper Egypt governorates (Assiut, Qena, and Sohag). People living in these areas suffer more in terms of poverty and malnutrition. A baseline assessment of their knowledge gap in nutrition was performed, followed by nutrition education intervention. A significant improvement in the participants' knowledge was noticed after the intervention. The current study focused on improving women's knowledge about healthy food selection, food safety, and food security which are the main factors of malnutrition [11]. During the last years, food prices and insecurity have been steadily increasing in Egypt, leading to the complexity of malnutrition [12], [13]. Therefore, it was essential to educate the participants about the elements of an affordable diet through the current intervention.

Community-based health promotion program is considered as a low-budget, feasible, and sustainable method to change health knowledge and practice in regions where the health system has restricted resources [14], [15]. Similar to the current study findings, other studies from developing countries proved that the community-based integrated approach targeting maternal education is one of the most important strategies to improve maternal and child survival [16], [17]. Investing in malnutrition is one of the core investment strategies recommended by the World Health Assembly Resolution [18], [19].

The current study showed a significant improvement in the knowledge of participating women after the intervention in areas of food economics, healthy diet, and food safety. This coincides with the findings of other studies [20], [21], [22] where health education interventions had improved the participants' knowledge significantly.

Despite the increasing public concern about food safety, food-related risks and diseases are increasing. This shows that domestic food handlers still lack adequate food safety knowledge, leading to incorrect food-handling practices [23]. In this study, food safety knowledge among Upper Egypt females was 57.9%. A similar study in Saudi Arabia showed that Saudi Arabian females experienced poor knowledge of food-handling practices (passing rate of 30.4%). Another study in six faculties and institutions of Alexandria University assessed food safety knowledge and practices among 270 working women, showing that the mean score percentage of the total safety knowledge of the participants was 67.4 [24].

In conclusion, this community-based approach was a successful intervention to deliver effective health education messages, leading to the improvement of participants' knowledge regarding food safety, healthy diet, and food economics. It represented the success of non-governmental organisations to enhance health and nutrition literacy among the participating women living in underprivileged areas. It is recommended to encourage the collaboration of non-governmental organisations to move the community towards healthy behaviour.

Limitations

Governmental support would have a better effect on improving the nutritional habits of the communities. Greater opportunities would be available to reach the served communities, e.g. mothers coming to primary health care centres to receive family planning or vaccination services.

Further planning is required to ensure the sustainability of the provision of health and nutrition literacy, and, accordingly, moving the community's attitude and behaviour towards healthy nutrition.

Significance of public health

Recent estimates show that malnutrition is a major public health problem in Egypt. Improving nutrition awareness among women is essential for understanding and meeting their families' nutritional needs. Very serious areas of concern are the deprived and vulnerable places where the resources are limited, and food prices are steadily increasing. The current study utilised a community-based approach to assessing nutrition knowledge among women in three deprived Upper Egypt governorates. The detected knowledge gap was covered by a nutrition education intervention which focused mainly on educating the participating women how to plan healthy, safe, and affordable diets for their families. This intervention resulted in a significant improvement in nutrition knowledge among these women. Adopting a similar approach on a larger scale will strengthen the capacity of the community to meet their nutritional needs. Cooperation between the governmental and non-governmental organisations will have a tremendous effect on fighting malnutrition.

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