British Journal of Medicine & Medical Research
4(8): 1739-1749, 2014

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Nutritional Knowledge, Attitude and Practice of Predominantly Female Preschool Teachers: Effect of Educational Intervention

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Authors' contributions

This whole work was collaboration between all authors. Finally all authors read and approved the final manuscript.

Original Research Article

Received 13th September 2013
Accepted 4th October 2013
Published 2nd January 2014

ABSTRACT

Aims: The study was designed to assess the changes in knowledge, attitude and practice (KAP) of preschool teachers before and after 3 months of attending a nutrition education intervention program.
Study Design: Place and duration of the study: Nine governmental and 13 private schools from 2 urban districts in Cairo, Egypt between September 2011 and March 2012. Methodology: We included 150 preschool teachers (149 female and 1 male) from 9 governmental and 13 private schools. The teachers filled a questionnaire regarding their KAP towards children nutrition. Re-evaluation was done using the same questionnaire 3 months after attending a nutrition education program.
Results: Initially private school teachers had significantly higher nutrition knowledge and attitude than governmental teachers (*P*=.012 and <.001 respectively). This difference was eliminated post intervention regarding knowledge (*P*=.06) but private school teachers still had significantly higher attitude by then (*P*=.001). Although no significant difference was initially detected in practice (*P*=.53), that of private school teachers was significantly better post intervention (*P*=.007). Finally all enrolled teachers showed significant increase in KAP scores after attending the nutrition education sessions (*P*<.001 for all the KAPs).
Conclusion: Nutrition KAPs are essential for preschool teachers and should thus be

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assessed and cyclically reinforced by educational programs.

Keywords: Attitude; knowledge; nutrition; practice; preschool; teachers.

1. INTRODUCTION

In both developed and developing nations, the prevalence of both childhood overweight and under nutrition are increasing rapidly and are perceived as major public health concerns [1]. Although no recent data can document which problem is more prevalent in Egypt, in 2002 Galal, [2] stated that in spite of the nutrition transition that favors the prevalence of obesity among Egyptian adults, rates of early childhood malnutrition remain stubbornly stable and relatively high.

Research indicates that health behaviors established during childhood often prove difficult to modify during adulthood [3]. Promoting healthy eating practices in young children has shown to benefit the health of children as well as later in life [1].

Teachers, due to their regular contact with children in the classroom environment, have the potential to affect nutrition behavior development and the broader school nutrition environment through their verbal and non-verbal messages, actions and practices [4]. Teachers who do not have an adequate nutrition background are unlikely to implement and support effective nutrition programs for preschool children [5]. Additionally, Galal et al. [6] reported that lack of awareness among teachers about the relationship of nutrition and cognitive function can lead to the misdiagnosis or delayed management of malnourished and scholastically challenged schoolchildren.

Research has shown that early childhood teachers generally hold beliefs that influence food preferences and eating behaviors among children [7]. However, studies have also found that although teachers believe they should play a role in malnutrition prevention among their preschoolers, they do not know how to implement the nutrition programs [8].

A research gap exists concerning teacher modeling, starting in the kindergarten classroom and beyond and the effect that modeling might have on children's dietary behavior development and the promotion of healthy school nutrition environments [9].

This work was thus designed to evaluate the nutrition knowledge, attitude and practice (KAP) of preschool teachers in Cairo and highlight the impact of nutrition education sessions. A secondary aim was to determine the difference in nutritional KAP between governmental and private preschool teachers.

2. SUBJECTS AND METHODS

This longitudinal interventional study addressed a sample of preschool teachers from urban Cairo. The research included only urban districts where teachers' lifestyle is expected to be similar especially physical activity and access to food markets.

The Egyptian governmental schools are primarily run by financial aid from the Ministry of Education, whereas the private schools provide an English medium curriculum and have independent private management.

Two urban districts were chosen for their close vicinity to the researchers. These were Heliopolis and the Fifth Settlement. The power calculation was conducted based on a previous study showing that private school attendants had better nutrition knowledge [10]. To detect a difference between the private school teachers and governmental school teachers groups with 95% power and with a significance level of $P<0.05$, approximately 120 participants were needed based on Atlman [11]. Thus the current study included 150 teachers. Seventy five were recruited from 13 private schools and 75 were recruited from 9 governmental schools.

They were all subjected to preliminary test in the form of self administered questionnaire written in simple Arabic language based on Lin et al. [12] and Senekal et al. [13]. The questionnaires were completed in school.

The questionnaire was divided into four parts:

1- Inquiries about age, gender and whether the teacher's school provides a daily meal recess in the students' time tables.
2- The nutrition knowledge scale tackled seven items:
   a- Number of major nutrients composing a balanced meal
   b- Constituents of a balanced meal
   c- Physiological functions of sound nutrition
   d- Seven items related to sources of different food groups
   e- Six items handling the physiologic importance of different food groups
   f- Three items related to the adequate percent of macronutrients in a healthy meal
   g- Relationship between diet and disease

The formats of the scale were either true-false or multiple choices. One point was given to correct answers, zero otherwise. The total possible points were 20.

3- The nutrition attitude scale had four items with 3-point Likert-type format, the response items included "very important", "important" and "not important", with 3 points given to very important, 2 points to important and 1 point to not important. The maximum points for attitude were 12. The items included were:
   a- The importance of variation of nutrients in one meal
   b- The importance of washing hands before meals
   c- The importance of having breakfast
   d- Effect of malnutrition on students' activity status
4- Five practice questions with 3 point Likert-scale format. The response items included "often", "sometimes" and "seldom", with 3, 2 and 1 point for each of them respectively. The maximum score for practice was 15. The items discussed were:
   a- Participating in nutrition activities in class or in the school
   b- Discussing with students the healthy food choices they can choose from
   c- Noticing students' absence
   d- Asking students whether they had breakfast
   e- Talking about nutritious meals in class

After this preliminary test all enrolled teachers attended three verbal nutrition education group sessions, two hours each. They were held in the teachers' schools instructed by the researchers and laid stress on:

a. Definition of nutrition education.
b. Perception of student's and school role in nutrition education.
c. Essential food elements.
d. Balanced diet.
e. Diet, disease and malnutrition.
f. Importance of breakfast to children.
g. Nutritive value of food.
h. Requirements of different food elements per week.
i. Self opinions concerning: integration of nutrition education into other subjects.
j. Resources available and resources needed for nutrition education.
k. What does the teacher need to fulfill their nutrition task?
l. Effect of nutrition education on school children's health, cognitive and scholastic achievements.

All the teachers were expected to attend the intervention sessions whether they participated in the study or not.

Outcomes were assessed three months post intervention as a way to ensure that the data acquired through the sessions was still in use. Re-evaluation was carried out using the same self-administered questionnaire. The response rate was 100% and no drop outs occurred throughout the study.

2.1 Statistical Analysis

Standard computer program SPSS for Windows version 13.0 was used for data entry and analysis. Kolmogrov-Smirnov test was used to determine whether the data were parametric or not. All numeric variables were expressed as median and interquartile range. Comparison of different variables in various groups was done using Mann Whitney test. Chi-square test was used to compare frequency of qualitative variables among the different groups. Wilcoxon Signed Rank test was used to compare pre and post intervention results based on ranks. Spearman's correlation test was used for correlating variables. For all tests a probability (*P*) of less than 0.05 was considered significant.

3. RESULTS

The enrolled preschool teachers were 149 female and one male. Their ages ranged from 21 to 60 years. The majority of the participating teachers' were in the age range of 35 to 45 years (51.3%) while 42% were below 35 years. Only 5.33% were between 46 and 55 years old and two teachers (1.33%) were older than 55 years.

Presence of meal period during the school day was reported by 148 teachers (98.7%). Comparing private to governmental schools in this issue revealed no statistical significance (*P*=0.49).

Table 1 shows examples of the response to knowledge questions tackled in the questionnaire initially and after the nutrition education sessions. Regarding the attitude questions (not demonstrated) dramatic changes were obtained after the education program with one of the questions which is "In your opinion; variation of nutrients in one meal is" (93.3% chose very important compared to the initial 77.3%, 4.7% answered important instead of the initial 8% and 2% answered not important instead of the initial 14.7%).

Table 1. Examples of the response to knowledge questions tackled in the questionnaire, initially and after the nutrition education sessions

Question	Correct answer initially Number (%)	Correct answer after intervention Number (%)	Wrong answers initially Number (%)	Wrong answers after intervention Number (%)	Remarks
What is the number of major nutrients composing a balanced meal	13 (8.7)	93 (62)	137 (91.3)	57 (38.0)	
What are the constituents of balanced meal?	43 (28.7)	95 (63.3)	107 (71.3)	55 (36.7)	
What is the physiological function of a balanced diet?	131 (87.3)	133 (88.7)	19 (12.7)	17 (11.3)	
What is the percent of carbohydrates in a balanced meal?	5 (3.3)	16 (10.7)	145 (96.7)	134 (89.3)	
What is the percent of fat in a balanced meal?	22 (14.7)	32 (21.3)	128 (85.3)	118 (78.7)	
What is the percent of proteins in a balanced meal?	3 (2.0)	14 (9.3)	145 (96.7)	136 (90.7)	This question was not answered initially by 2
What are the signs of malnutrition in children?	140 (93.3)	141 (94.0)	10 (6.7)	9 (6.0)	

After attending the nutrition sessions, all teachers recruited in the study had significantly better KAP (Table 2). Table 2 also demonstrates that governmental school teachers showed significant improvement in knowledge, attitude and practice after attending the educational session while private school teachers showed significant improvement in knowledge and practice with non significant increase in attitude.

On comparing the initial knowledge of private and governmental school teachers, private school teachers had significantly better knowledge than governmental school teachers which was eliminated post intervention. On comparing the attitude of the teachers, private school teachers had significantly better attitude. Moving to nutrition practice, no difference was found initially between both teachers' groups; yet a significantly better practice was detected among private school teachers in comparison to the governmental school ones after the education program (Table 3).

Table 2. Initial and post intervention nutritional KAP of enrolled teachers

		Pre intervention mean+/-SD [median (IQR)]	Post intervention mean+/-SD [median (IQR)]	Z	*P*
Knowledge	All teachers	15.25±2.21 [15.00(3.00)]	16.86±2.65 [17.00 (3.00)]	-9.540	0.000
	Governmental	14.84±2.49 [15.00(3.00)]	17.25±9.766 [16.00(4.00)]	-6.303	0.000
	Private	15.67±1.796 [16.00(2.00)]	17.19±2.038 [17.00(2.00)]	-7.199	0.000
Attitude	All teachers	10.52±0.88 [11.00(1.00)]	10.83±0.54 [11.00 (0.00)]	-4.932	0.000
	Governmental	10.16±1.00 [11.00(2.00)]	10.71±0.653 [11.00(0.00)]	-4.604	0.000
	Private	10.88±0.544 [11.00(0.00)]	10.95±0.364 [11.00(0.00)]	-1.890	0.06
Practice	All teachers	10.42±1.72 [10.00(3.00)]	11.47±1.65 [12.00 (2.00)]	-8.383	0.000
	Governmental	10.40±2.06 [10.00(3.00)]	11.53±1.918 [11.00(3.00)]	-4.939	0.000
	Private	10.44±1.307 [10.00(1.00)]	11.84±1.231 [12.00(1.00)]	-6.813	0.000

Table 3. Nutrition KAP of governmental and private preschool teachers

	Governmental school teachers (n=75) mean+/-SD [median(IQR)]	Private school teachers (n=75) mean+/-SD [median(IQR)]	Z	*P*
Initial knowledge	14.84±2.50 [15.00(3.00)]	15.67±1.80 [16.00(2.00)]	-2.525	0.01
Post intervention knowledge	16.53±3.13 [16.00 (4.00)]	17.19±2.04 [17.00 (2.00)]	-1.838	0.07
Initial attitude	10.16±1.00 [11.00(2.00)]	10.88±0.54 [11.00(0.00)]	-5.416	0.000
Post intervention attitude	10.71±0.65 [11.00 (0.00)]	10.95±0.36 [11.00 (0.00)]	-3.304	0.001
Initial practice	10.40±2.07 [10.00(3.00)]	10.44±1.31 [10.00(1.00)]	-0.625	0.53
Post intervention practice	11.09±1.92 [11.00 (3.00)]	11.84±1.23 [12.00 (1.00)]	-2.714	0.007

Teachers` age correlated positively with the initial knowledge but with no statistical significance (r=0.081 and p=0.322), while a significant positive correlation was detected after attending the educational session (Fig. 1). Additionally, the teachers' knowledge showed a significant positive correlation with their practice at the start of the study and after attending the session (Figs. 2 and 3).

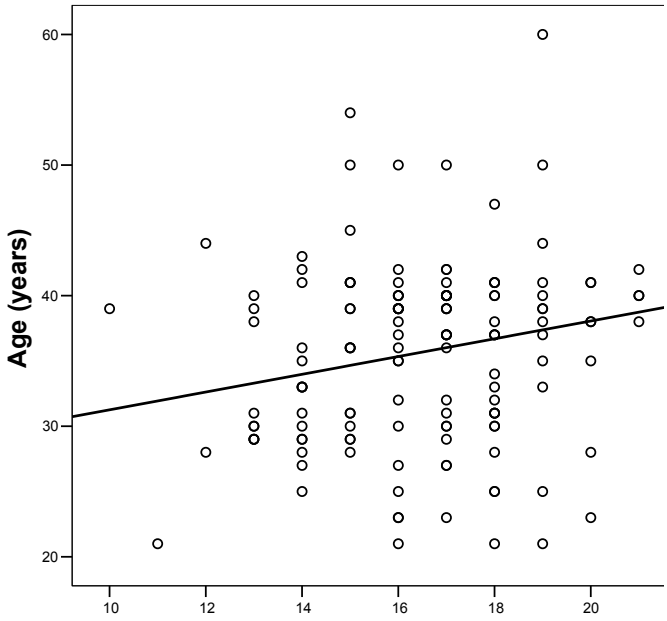

Fig. 1. Correlation between teachers' ages and their post intervention nutritional knowledge

r= 0.204 and P= 0.012.

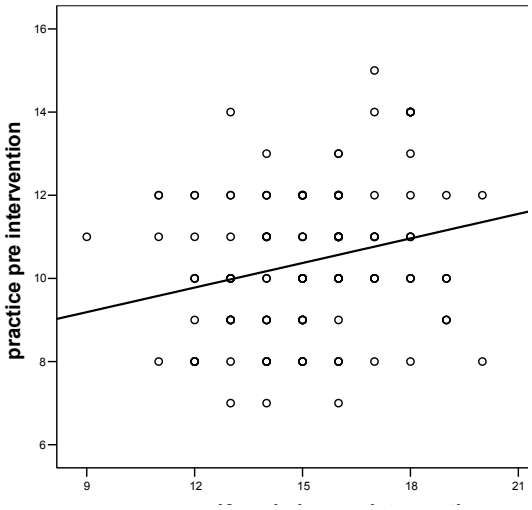

Fig. 2. Correlation between the initial teachers' knowledge and practice

r= 0.246 and P= 0.002.

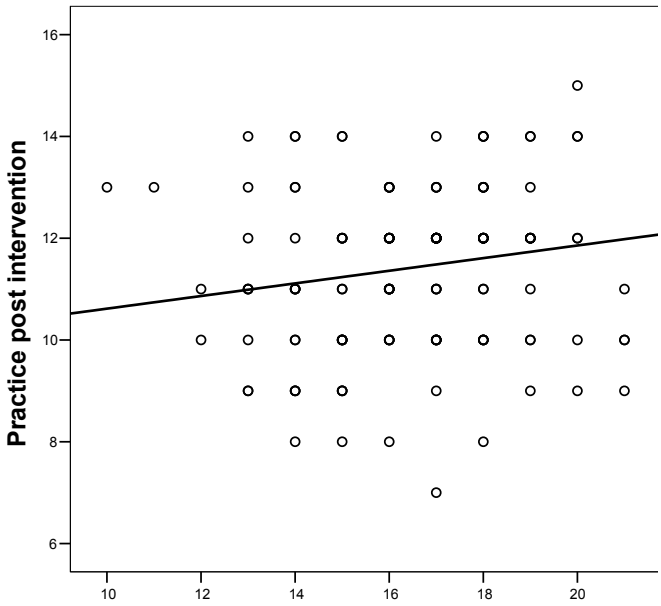

Fig. 3. Correlation between the post intervention knowledge and practice of preschool teachers

r= 0.217 and P= 0.008.

4. DISCUSSION

The results of the current study show that the nutrition education intervention yielded significant improvements in nutrition knowledge, attitude and practice of preschool children`s teachers which highlights its benefit for this target group. Similar findings were reported by Shi-Chang et al. [14] who did a nutrition intervention program for three primary and three secondary school students, their families and school staff. Results of pre- and post-intervention survey one and half year apart showed improvements in nutrition knowledge, attitudes and practice among all target groups, with primary school students achieving the greatest knowledge gains. Additionally, Sharma et al. [5] underscored the importance of providing nutrition education and wellness opportunities to teachers to better enable them to teach nutrition education to their students and to improve their own health.

The present study also demonstrates that the change in nutrition knowledge is concomitant with changes in dietary attitude and practice as shown by the significant positive correlations detected between nutrition knowledge of enrolled teachers and their practice, whether initially or post intervention. This finding indicates that nutritional knowledge is integral to the achievement of healthful dietary behaviors and consequently in the improvement of diet quality [15]. Chen and associates in 2010 [16] also reported that implementation of a coordinated health promoting program on nutrition and diet was positively correlated with schoolteachers' nutrition knowledge and dietary intake.

In the current study, the initial private school teachers' knowledge and attitude were significantly better than governmental preschool teachers. On the other hand, Ofovwe and Ofili [17] found no difference in knowledge and attitude among 29 public school teachers and 104 private school teachers in Nigeria.

In the contemporary work, knowledge, attitude and practice improved significantly in governmental preschool teachers after attending the nutritional education session, while private preschool teachers showed significant improvement in the knowledge and practice only. Regarding private school teachers' attitude, there was apparent improvement evidenced by the rise of the mean score from 10.88 to 10.95 with near significant difference (*P*=0.06).

Private preschool teachers had better initial knowledge and attitude compared to governmental teachers. In Egypt, private schools provide an English medium curriculum that requires proper command of the English language. Since most of the health and nutrition information available through the internet is written in English, private school teachers may tend to learn these things on a more subconscious level [16]. Similar results were reported by Shah et al. in 2010 [10]. Though private preschool teachers had better nutrition knowledge, only few practiced healthy behavior. A sizeable gap between knowledge and behavior was previously reported in several researches [10,19-21].

In the present study, a positive correlation was found between teachers' ages and knowledge which was significant after attending the educational session. This points to the fact that experience, which increases by age, adds to the nutritional knowledge which even makes grasping more data a much easier task. Contrary to this finding, Lin et al. [22] reported that young (age 19-30) and prime adults (age 31-44) have better nutrition knowledge than that of middle adults (age 45-64), while prime adults hold a more positive attitude than young adults.

5. CONCLUSION

Nutrition education significantly improved the KAP of all enrolled teachers. Private school teachers had an initial better knowledge compared to those working in governmental schools, but the difference was eliminated after the interventional session. This session also improved the practice of the private school teachers more than the governmental ones. Teachers' knowledge correlated positively with their ages and practices after the interventional session.

6. LIMITATIONS

Since the questionnaire used in the current study requested factual information in most of its parts, it was probably an appropriate tool apart from probing sensitive issues as the attitudes. Additionally, no comparisons could be done between the KAP of male and female teachers since not enough male preschool teachers were enrolled. Anthropometric measurements of the teachers were not taken which could have been a great reflection of their own nutritional status and life style.

7. RECOMMENDATIONS

The implementation of a nutrition program involving scientifically precise yet practical and motivating information addressing preschool teachers seems mandatory to enhance their nutrition practices and maximize their ability to convey the message to the students.

CONSENT AND ETHICAL APPROVAL

The study protocol and the informed written consent were approved by the Ethical Committee, Faculty of Medicine, Ain Shams University. The researchers provided a covering letter inviting the teachers to participate in the study with an explanation of the purpose of the study prior to handing the questionnaire. Before collecting any data, the participants signed the informed consent form.

ACKNOWLEDGEMENTS

The authors acknowledge the effort done by Professor Dr Ehab El-Hakeem who helped in the statistical analysis of the data.

COMPETING INTERESTS

The authors did not receive any funding nor did they have any conflict of interest.

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Peer-review history:
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http://www.sciencedomain.org/review-history.php?iid=380&id=12&aid=2933