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Impact of health education on maternal knowledge regarding choking prevention and first aid in children, Riyadh, Saudi Arabia

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Abstract

Background: Choking is one of the leading causes of death among unintentional injuries in young children. Mothers are usually the first responders, and they must have a good knowledge about first aid. Multiple local studies showed low levels of FA awareness among parents. Public health programs in this field are scarce, and only a few studies have evaluated the efficacy of such strategies.

Aim: Evaluating the efficacy of an educational video in improving maternal knowledge on choking prevention and first aid.

Methods: A Quasi-experimental study was conducted among mothers visiting antenatal clinics at Al Wazarat health care center in Prince Sultan Military Medical City, Riyadh, Saudi Arabia. A total of 241 mothers participated in the study. Data was collected via a self-administrated questionnaire distributed pre and post-intervention. The intervention was through an educational video.

Results: There was a significant overall improvement in the level of maternal knowledge regarding choking first aid after the introduction of the educational video. The most commonly reported source of information was the mass media. Most preferred method to improve FA awareness was adding it to school curriculums.

Conclusion: Choking First aid awareness among mothers in Riyadh city is not satisfactory, particularly regarding actions to be done with a choked child. Educational video was effective in increasing the knowledge level in this regard.

Keywords: First aid, choking, knowledge, educational video, Saudi Arabia

Introduction

Accidents are a global community health problem, resulting in morbidity and mortality ^[1]. They can occur in a variety of situations; however, 40 percent of deaths and half of the injuries occur in and around the home, primarily among boys aged one to five years old ^[2]. Home injury prevention in children has become a critical goal for children's well-being and health promotion ^[3].

Young children are especially vulnerable to accidents because of their natural desire to explore their surroundings and their inability to recognize the dangers of their actions. Providing a safe environment, combined with First Aid (FA) knowledge, close supervision and setting safety limits, can reduce the risks ^[4]. The main goals of FA is to alleviate pain, promote healing, and reduce damage. Furthermore, the FA applied in the first minutes after an injury is critical to the victims because it determines the future course of the disease and the potential complications.

Children spend most of their time at home, and mothers are usually the ones assigned to their supervision. In these situations, mothers are usually the first responders, and in order to react properly, mothers must have a good knowledge about first aid. Early and appropriate intervention is important to reduce the risk and complications.

Choking is one of the leading causes of death among unintentional injuries in young children, and it continues to be a problem until the age of 14 ^[5]. Multiple local studies showed low levels of FA awareness among parents ^[6, 7, 8]. Despite the enormous burden placed on public health services as a result of food choking injuries, local public health programs in this field are scarce, and only a few studies have evaluated the efficacy of such strategies. Therefore, this study is aimed to evaluate the efficacy of an educational video in improving maternal knowledge on choking prevention and first aid.

Materials and Methods

Study Design and population

This is a Quasi-experimental study conducted among mothers visiting antenatal clinics at Al Wazarat health care center in Prince Sultan Military Medical City, Riyadh, Saudi Arabia. All mothers attending antenatal clinics for the oral glucose tolerance test (OGTT) were included, as they have enough time to conduct the education. We excluded all mothers with an obligatory BLS experience.

Data collection

Data was collected via a self-administrated questionnaire that has been taken and modified from two previous studies done by El Seifi O. *et al.* in 2018 ^[1] and Habeeb K. *et al.* in 2019 ^[6]. Permission to use the questionnaire was obtained from the authors. The questionnaire consisted of 2 sections, the socio-demographic data section, and the second was about knowledge regarding choking prevention and first aid. After questionnaire modification, it was translated back to English. Face validity of the modified questionnaire was done by three family medicine consultants. A total of 241 mothers participated in the study, 196 mothers were included, 31 were excluded and 14 dropped out. The questionnaire was distributed pre and post-intervention. The intervention was through an educational video that consists of 2 parts, concerning knowledge about choking prevention and performing first aid in infants and children. Facts about choking prevention were obtained from the American Academy of Pediatrics and the Centers for Disease Control and Prevention. First aid techniques were explained and demonstrated as per the recommendation of the Saudi Ministry of Health and American Heart Association BLS. Study carried no harm to the participants. Each study participant signed a consent form prior to questionnaire filling. Collected data is confidential and was used only for study purposes.

Ethical approval

The study was conducted after taking the ethical approval from the Institutional Review Board (IRB) of Prince Sultan Military Medical City with the number of HP-01-R079 and approval for data collection was obtained from Al-Wazart health center.

Statistical analysis

Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean \pm standard deviation and categorical variables were expressed as percentages. The t-test and one-way ANOVA were used for continuous variables. The Chi-square test was used for

categorical variables. A p-value <0.05 was considered statistically significant.

Results

A total of 241 mothers participated in the study, 196 mothers were included, 31 were excluded and 14 dropped out, response rate was 81.33%. Participating mothers had a mean (\pm SD) age of 30.08(\pm 5.18) years, and more than half (52%) aged ≤ 29 years. More than half (54.6%) have 1-3 children and 46.4% had 1-3 children aged ≤ 4 years. The majority (84.7%) of the participating females were housewives, and 4.6% reported choking episodes of their children 2 months prior to the study [Table 1].

Almost two-thirds (66.3%) of the participating mothers are aware that choking is a main cause of death among preschool children and this percentage increased to 92.9% after the educational video. Prior to the intervention only 44.9% had knowledge about choking first aid, and the majority (78.1%) claim that mass media is their source of information. Most of the mothers (87.8%) know the number of the Saudi red crescent before education, and this percentage increased to 99% after education. 46.9% knew when to perform first aid in conscious infants in case of choking, and after the intervention the percentage increased to 75.5%. Prior to intervention 9.7% knew when to perform CPR in case of choked child, while the majority (44.4%) thought that performing abdominal thrusts (Heimlich maneuver) is the action to be done, however, unexpectedly after education the results did not differ significantly and increased to 13.8% and 80.1%, respectively. Heimlich maneuver was correctly chosen by 35.2% as the right approach in conscious choked child before the intervention and it increased to 68.4% after education. Before education 31.1% of mothers know when to introduce solid food to their children, and after education, the percentage became 91.3% [Table 2, 3, Figure 1].

The results revealed that, a significant change was observed in the awareness of risk of death in choking children, age of introduction of solid food, level of knowledge concerning choking first aid performance in the case of conscious infant. On the other hand, the knowledge level decreased after education regarding possible choking prevention methods that mothers could undertake in the case of choking. There were no significant changes observed in level of knowledge of Saudi Red Crescent number and first aid in case of a conscious choking child after education [Table 4].

There were insignificant associations between any of the participant characteristics and the level of knowledge about choking and first aids neither before nor after the educational video, P values were >0.05 [Table 5, 6].

Table 1: Characteristics of the participants (N=196)

Characteristics	Number	%	
Educational level	illiterate	2	1.0
	Primary school	2	1.0
	Intermediate school	6	3.1
	High school	80	40.8
	University and above	106	54.1
Age (Mean, SD)	30.08	5.18	
	≤ 29	102	52.0
	30-39	87	44.4
	≥ 40	7	3.6
Number of children(Mean, SD)	1.53	1.66	

	no children	65	33.2
	1-3	107	54.6
	4 or more	24	12.2
Occupation	Housewife	166	84.7
	Working	19	9.7
	Student	11	5.6
How many children do you have 4 years or younger	None	78	39.8
	1-3	91	46.4
	4-6	18	9.2
	more than 6	9	4.6
Have your children experienced choking in the past 2 months	Yes	9	4.6
	No	187	95.4
Have you ever attended a first aid course	No	196	100.0

Table 2: Frequencies and percentages of maternal knowledge on choking prevention and first aid before educational video

		Number	%
Choking is an important cause of death for pre-school children	Yes	130	66.3
	No	13	6.6
	I don't know	53	27.0
Do you have any information about the first aid that should be followed in case of choking	Yes	88	44.9
	No	86	43.9
	I don't know	22	11.2
The phone number of Saudi red crescent is	997	172	87.8
	993	14	7.1
	995	3	1.5
	992	7	3.6
What should a mother follow to protect her child from choking	Making her child laugh while he is eating	6	3.1
	Avoid buying toys with small pieces	138	70.4
	Put huge amount of food in her child mouth.	9	4.6
	Observe her child during eating and playing.	177	90.3
8 months old infant is choking by a small toy, he is still conscious what are you going to do next	Insert your finger into the victims mouth looking for the toy and try to remove it.	42	21.4
	Hang him upside down by his feet until the toy comes out	60	30.6
	5 back slaps followed by 5 chest thrusts.	92	46.9
	Start cardiopulmonary resuscitation	2	1.0
You are in a restaurant and a 10 years old child choked with food, lost his consciousness, what are you going to do	Perform abdominal thrusts (Heimlich maneuver)	87	44.4
	Insert your finger into the victims mouth looking for the toy and try to remove it	8	4.1
	Start cardiopulmonary resuscitation	19	9.7
	Slap him on the back	82	41.8
while you are having your dinner, you see a 7 years old child choking and cannot talk but still conscious, what are you going to do	Give him some water to drink	74	37.8
	Perform abdominal thrusts (Heimlich maneuver)	69	35.2
	Encourage him to cough	46	23.5
	Ask him to take a deep breath	7	3.6
At what age are children able to chew and grind solid food like nuts and raw vegetables	1 year old	8	4.1
	2 years old	51	26.0
	3 years old	76	38.8
	4 years old	61	31.1
What is/are the sources of your Knowledge about choking first aid	Mass media	153	78.1
	Relatives	53	27.0
	Physicians	35	17.9
	Campaigns	63	32.1
	others	1	.5

Table 3: Frequencies and percentages of maternal knowledge on choking prevention and first aid after educational video

		Number	%
Choking is an important cause of death for pre-school children	Yes	182	92.9
	No	7	3.6
	I don't know	7	3.6
Do you have any information about the first aid that should be followed in case of choking	Yes	179	91.3
	No	14	7.1
	I don't know	3	1.5
The phone number of Saudi red crescent is	997	194	99.0
	995	1	.5
	992	1	.5
What should a mother follow to protect her child from choking	Making her child laugh while he is eating	24	12.2
	Avoid buying toys with small pieces	166	84.7
	Put huge amount of food in her child mouth.	13	6.6
	Observe her child during eating and playing.	178	90.8

8 months old infant is choking by a small toy, he is still conscious what are you going to do next	Hang him upside down by his feet until the toy comes out	47	24.0
	5 back slaps followed by 5 chest thrusts.	148	75.5
	Start cardiopulmonary resuscitation	1	.5
You are in a restaurant and a 10 years old child choked with food, lost his consciousness, what are you going to do	Perform abdominal thrusts (Heimlich maneuver)	157	80.1
	Start cardiopulmonary resuscitation	27	13.8
	Slap him on the back	12	6.1
while you are having your dinner, you see a 7 years old child choking and cannot talk but still conscious, what are you going to do	Give him some water to drink	2	1.0
	Perform abdominal thrusts (Heimlich maneuver)	134	68.4
	Encourage him to cough	55	28.1
	Ask him to take a deep breath	5	2.6
At what age are children able to chew and grind solid food like nuts and raw vegetables	1 year old	2	1.0
	2 years old	3	1.5
	3 years old	12	6.1
	4 years old	179	91.3
Evaluate the educational video	Excellent	193	98.5
	Good	2	1.0
	Fair	1	.5
In your opinion what's the best way to get first aid knowledge	Through school subjects	133	67.9
	Reading a book or leaflet about first aid	37	18.9
	Watching a Videos about first aid.	107	54.6
	Watching a Videos about first aid.	70	35.7
	As a part of pediatric or pregnancy follow up sessions	118	60.2

Table 4: The Efficacy of Educational Video In Improving Maternal Knowledge on Choking Prevention and First Aid

		Pre-Intervention		Post-Intervention		P-value
		Number	%	Number	%	
Choking is an important cause of death for pre-school children	Wrong	66	33.67	14	7.14	<0.001*
	Correct	130	66.33	182	92.86	
The phone number of Saudi red crescent is	Wrong	24	12.24	2	1.02	0.102
	Correct	172	87.76	194	98.98	
What should a mother follow to protect her child from choking?	Wrong	19	9.69	30	15.31	<0.001*
	Correct	177	90.31	166	84.69	
8 months old infant is choking by a small toy, he is still conscious what are you going to do next?	Wrong	104	53.06	48	24.49	0.005*
	Correct	92	46.94	148	75.51	
You are in a restaurant and a 10 years old child choked with food, lost his consciousness, what are you going to do?	Wrong	177	90.31	169	86.22	<0.001*
	Correct	19	9.69	27	13.78	
while you are having your dinner, you see a 7 years old child choking and cannot talk but still conscious, what are you going to do?	Wrong	127	64.80	62	31.63	0.218
	Correct	69	35.20	134	68.37	
At what age are children able to chew and grind solid food like nuts and raw vegetables?	Wrong	135	68.88	17	8.67	0.019*
	Correct	61	31.12	179	91.33	

* Significant p value

Table 5: Mean score of the maternal knowledge on choking prevention and first aid before educational video by characteristics of the participants

		Mean	SD	P value
Age	<=29	3.50	1.12	0.070
	30-39	3.84	1.12	
	>=40	4.14	1.57	
Educational level	illiterate	3.50	0.71	0.946
	Primary school	3.00	0.00	
	Intermediate school	3.67	1.21	
	High school	3.68	1.11	
	University and above	3.69	1.20	
Occupation	Housewife	3.64	1.14	0.429
	Working	4.00	1.15	
	Student	3.64	1.29	
How many children do you have 4 years or younger	None	3.82	1.13	0.453
	1-3	3.58	1.18	
	4-6	3.67	1.08	
	more than 6	3.33	1.12	
Have your children experienced choking in the past 2 months	Yes	3.56	1.13	0.753
	No	3.68	1.15	
Number of children	no children	3.68	1.09	0.152
	1-3	3.58	1.17	
	4 or more	4.08	1.18	
Overall		3.67	1.15	

* out of 7

Likert scale was used for 7 questions with two points for every question (0 for wrong, 1 for correct) and the range for the total score from 0 to 7

Table 6: Mean score of the maternal knowledge on choking prevention and first aid after educational video by characteristics of the participants

		Mean *	SD	P value
Age	<=29	5.16	0.92	0.157
	30-39	5.33	0.86	
	>=40	5.71	0.95	
Educational level	illiterate	5.00	0.00	0.142
	Primary school	6.00	0.00	
	Intermediate school	5.50	0.55	
	High school	5.08	0.85	
	University and above	5.37	0.94	
Occupation	Housewife	5.23	0.92	0.763
	Working	5.37	0.76	
	Student	5.36	0.81	
How many children do you have 4 years or younger	None	5.27	0.88	0.429
	1-3	5.30	0.92	
	4-6	5.22	0.81	
	more than 6	4.78	0.97	
Have your children experienced choking in the past 2 months	Yes	5.00	0.71	0.384
	No	5.27	0.91	
Number of children	no children	5.22	0.87	0.632
	1-3	5.24	0.94	
	4 or more	5.42	0.78	
Overall		5.26	0.90	

* out of 7

Likert scale was used for 7 questions with two points for every question (0 for wrong, 1 for correct) and the range for the total score from 0 to 7

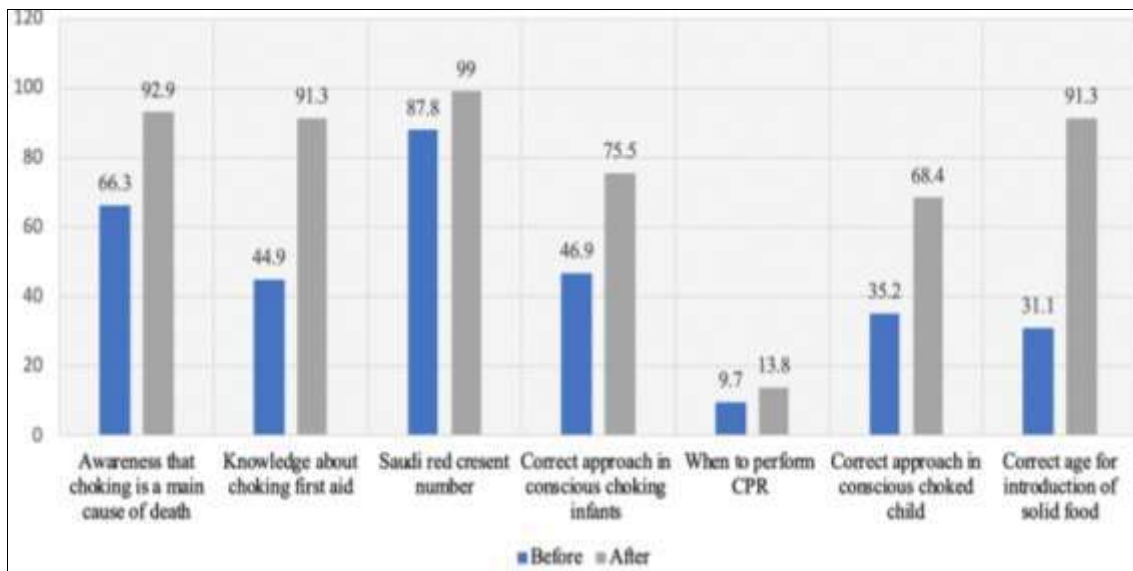


Fig 1: Percentages of maternal knowledge on choking prevention and first aid before and after educational video

Discussion

43.9% of mothers believed that they did not have sufficient information about choking first aid in this study. A study conducted by Aljohani A. *et al.* during 2016 in Al-Madinah Al-Munawarah city about Knowledge and practice of first aid among parents attending primary health care centers revealed that only 12.8% of mothers know how to react properly in case of choking [7]. Likewise, A study done in Riyadh in 2020 by Habeeb KA *et al.* about Saudi parents' awareness regarding home injuries including choking showed that 82% of the participants had no prior FA training experience [6]. These findings highlight the gap in FA knowledge faced in the kingdom of Saudi Arabia and it proves the importance for FA awareness for health care authorities and policymakers. In this study there was a significant overall improvement in

the level of maternal knowledge regarding choking first aid after the introduction of an educational video. Similarly, an educational interventional study conducted by El Seifi O. *et al.* in Egypt 2016 among Egyptian rural mothers regarding home injuries including choking was found that the level of knowledge increased 34.8% afterwards [1]. Comparably, a recently published study that addressed the effect of education using a mobile application on knowledge and decision of Iranian mothers about prevention of foreign body aspiration and to relieve choking in children showed that the mean knowledge score of participants increased after educational interventions [9]. Also, consistent with the comparative findings of the knowledge measured after providing the educational video and the statistically significant increase of scores, other studies also reported a significant increase in the knowledge scores of participants

after using educational software ^[10, 11].

The knowledge level wasn't significantly associated with any of the participants' characteristics neither before nor after the educational video. In comparison, another study found that higher education levels were associated with better knowledge as well as maternal employment status ^[6]. In addition, a previous similar local study showed that educational level and the number of children were factors that significantly correlated with the level of the knowledge about FA ^[7].

The current study found that the most commonly reported source of information was the mass media. Similar findings were obtained in studies conducted in Egypt ^[12] and India ^[13]. Even in a previous study conducted in Riyadh, Saudi Arabia, the main source of first aid information among parents was mass media ^[14]. These findings emphasized the importance of mass media in disseminating information about first aid to the general public. As a result, the quality of the information in the media must be carefully monitored. As with any study, the current study has its limitations: First, there was a delay in data collection because of COVID19 pandemic. Second, results of this study may not be generalized as the sample was restricted to one area of Saudi Arabia. Third, the information collected was self-reported which may lead to reporting bias. Fourth, time restriction to assess the long term effect of the educational video. Despite these limitations, this study is the first interventional study to assess maternal choking first aid knowledge done in Saudi Arabia.

Conclusion

First aid of choking among mothers in Riyadh city is not satisfactory, particularly regarding actions to be done with a choked child. Educational video was effective in increasing the knowledge level in this regard. Mass media was the main source of information regarding first aid.

Recommendations

1. This video can be used to increase public awareness regarding choking first aid by displaying it in public areas (ae. schools, hospitals etc.).
2. The mass media can be used to raise the level of awareness among the general population.
3. Assessment of long-term effect of educational programs on maternal knowledge regarding choking first aid in future similar studies.

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