Effect of Educational Intervention on Mothers' Knowledge and Practices Regarding Choking Management from Foreign Body Aspiration for Their Children

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Abstract

Background: Foreign body aspiration is an emergency event in children, with the most serious complications being pneumonia, atelectasis and choking. Prevention and management of choking through educating children's mothers is the most important step in reducing its morbidity and mortality. **Aim:** The study was aimed to evaluate the effect of educational intervention on mothers' knowledge and practices regarding choking management from foreign body aspiration for their children. **Subjects and method:** A quasi- experimental research design was used in the present study. A convenient sample of sixty mothers with their children was collected from inpatient department and outpatient clinics of Ear, Nose and Throat of Tanta Main University Hospitals. **Tools:** Mothers' knowledge regarding foreign body aspiration structured interview schedule and Observational checklist of pediatric foreign body airway obstruction management. **Results:** The overall mean scores of mothers' knowledge and practices were higher immediately after educational intervention implementation than before implementation, with significant statistically difference. **Conclusion:** There was a significant improvement in mothers' knowledge and practices regarding choking management from foreign body aspiration after educational intervention implementation. **Recommendations:** Mothers continue to receive regular educational programs and practical trainings regarding choking first aid management to improve their knowledge and practices.

Keywords: Educational Intervention, Mothers' Knowledge and Practices, Choking Management, Foreign Body Aspiration, Children.

Introduction

Foreign Body Aspiration (FBA) is a critical pediatric problem that requires timely diagnosis and prompt management. It leads to either complete or partial airway obstruction and causes significant morbidity and or mortality **(Reyad et al., 2021 & Alshehri et al., 2019)**. It has been estimated that the vast majority 80% of pediatrics' foreign body aspiration episodes occur in children younger than 3 years with a peak prevalence between 1 and 2 years of age, during the toddler stage of development **(Rose & Dubensky, 2019).** The reason for this is due to numerous factors, including

anatomical structures of the pediatric airway, lack development of dentition, and immature swallowing coordination. Also, toddlers tend to explore the surrounding environment by placing all objects in their mouth and lack in the cognitive capacity to discriminate between eatable and non-eatable objects **(Dorterler, et al, 2019).**

Foreign body aspiration is predicted when a child has an acute choking event or severe coughing with respiratory distress. choking is an actual life-threatening emergency that needs immediate action for the young children to save their life, as it might cause unconsciousness in three to five minutes. Also, it can result in hypoxia, and brain ischemia that leads to death within few minutes **(Maalim Issack et al., 2021)**. Therefore, different types of foreign bodies that may cause aspiration in relation to child age should be highlighted for mothers for instance, food products especially nuts and seeds, are the most commonly aspirated airway foreign bodies 77% to 86% for infants and toddlers, whereas nonfood products are more frequently aspirated by older children. In addition, organic foreign bodies are most dangerous than inorganic ones because it can cause allergic or chemical bronchitis which lead to more bronchial obstruction **(Noujeim, 2023)**.

Clinical presentation is variable. The most frequent symptoms indicating a potential presence of a foreign body are; sudden onset of suffocation, coughing, stridor, cyanosis and/or dyspnea, followed by a latent asymptomatic period. **(Jan & Kamil, 2021)**. Unfortunately, the diagnosis of foreign body aspiration in children can be challenging as if the event is not witnessed as the majority of children in this category may not be able to explain the event with poor parents' supervision **(Hughes et al., 2020)**. Additionally, the risk of misdiagnosing the FBA is high due to parents might neglect the possible correlation between cough or fever and FBA **(Lee, 2020)**.

Pediatric nurses play a significant role for enhancing mothers knowledge to decrease the incidence of FBA and prevent its complications, through discussing its prevention tips for mothers and clarifying the contributed factors to the potential for FBA in the household as well as demonstrating the chocking management techniques. So, nurses are responsible for providing the mothers with comprehensive educational program about foreign body aspiration's prevention and management of choking for their children **(Behboudi et al., 2022, Anazi et al., 2022).**

Mothers of toddlers often spend most of their time at home and are in charge of supervising their children and may take inappropriate actions during the chocking event that lead the aspirated foreign body to deeper areas of the respiratory system due to their poor knowledge and practices **(Kumari et al., 2018 & Syan et al., 2022)**.

Significance of the study

Choking resulting from foreign body aspiration is a common cause of morbidity and mortality in children **(Antón Pacheco et al., 2021)**. As, in children younger than 3 years, 7% of sudden deaths are related to the presence of a foreign body in the respiratory tract also, choking accounts the fifth most common cause of unintentional deaths in the same age group. **(Brkic, 2018, Moslehi, 2019 & Bin Laswad et al., 2022)**. Previous studies indicated that most mothers have low levels of knowledge about choking hazards, primarily among children under the age of three years. (**Sarabi & Nosratabadi, 2022)**.

Thus the current study aimed to evaluate the effect of educational intervention on mothers' knowledge and practices regarding choking management from foreign body aspiration for their children.

Aim of the study

Evaluate the effect of educational intervention on mothers' knowledge and practices regarding choking management from foreign body aspiration for their children.

Research hypotheses.

H1. Implementation of educational intervention is expected to be improved mother's knowledge regarding choking management from foreign body aspiration for their children

H2. Implementation of educational intervention is expected to be improved mother's practices regarding choking management from foreign body aspiration for their children

Subjects and Method

Design: A quasi- experimental research design was used in the present study.

Setting: This study was conducted at inpatient department and outpatient clinics of Ear, Nose and Throat (ENT) of Tanta Main University Hospitals that affiliated to Ministry of Higher Education and Scientific Research. females are admitted to the female wards with their mothers. The outpatient clinic was present in the 1st floor of the comprehensive clinics of Tanta university and it was available all the days of the week.

Subject: A convenient sample of (60) mothers of children aged from one to three 3 years and having willingness to participate in the study was collected from the above previously mentioned setting. The sample size was calculated using Epi-Info software statistical package according to the total number of toddler children admitted per year to Ear, Nose and Throat department which is (330) child. The calculation is based on confidence level 95% with the margin of error 5%.

Tools of the study

Tool (I): Mothers' knowledge regarding foreign body aspiration structured interview schedule: It was developed by the researchers and adapted from the study done in Iran and Pakistan. Some modifications were done after extensive literature review **(Asif et al., 2021 and Behboudi et al., 2022)**. To assess mothers' knowledge regarding foreign body aspiration and was designed in Multiple Choice Questions (MCQ) form. It was composed of the subsequent parts:

Part(1):Socio-demographic characteristics of the studied mothers as age, marital status, educational level, occupation, place of residence, number of children, history of FBA in their children, history of death of any one of their children due to foreign body aspiration and source of mothers' information regarding choking management resulting from foreign body aspiration.

Part (2): Socio-demographic characteristics of children as age and birth order.

Part (3): Mothers' knowledge regarding foreign body aspiration, it consisted of 15 items such as meaning of foreign body aspiration, common airway parts that can be obstructed, common age of occurrence, risk factors, signs and symptoms, complications of foreign body aspiration, food items and non-food items that the child may aspirate, actions taken to prevent foreign body aspiration in children, actions taken when a

child has aspirated a foreign body and time should call the doctor or go to the hospital. Every item taken a score between 0 and 2. Correct and complete answers taken a score of (2), incomplete and correct answers taken a score of (1), while incorrect or unknown answers taken a score of (0) The total score for all items was (30).

Scoring system: The mothers' knowledge total score was calculated and classified into the following:

Less than 60% was considered low level of knowledge when total score ranged from 0-17, from 60 <70% was classified as moderate level of knowledge, when total score ranged from 18-20, while from 70–100% classified as high level of knowledge when total score ranged from 21-30.

Tool II: Observational checklist of pediatric foreign body airway obstruction management.

It was adapted after exploring the related recent literatures **(Voorde et al., 2021 & Skellett et al., 2021)** to evaluate mothers' practices regarding choking management from foreign body aspiration for their children. It consisted of 5 parts:

Part (1): When the child cough effectively, encourage the child to cough and continue monitoring the child condition. It includes 2 elements**.**

Part (2): When the child has ineffective cough, give back blows. It includes 6 elements.

Part (3): When back blows don't relieve the airway obstruction and the child is still conscious, give abdominal thrusts. It includes 11 elements.

Part (4): When the child with foreign body airway obstruction become unconscious, open airway and try rescue breaths. It includes 23 elements.

Part (5): Continue with pediatric basic life support (chest compression and cardiopulmonary resuscitation). It includes 10 elements.

The observational checklist sheet consisted of 5 parts, all included sub elements to assess, what the mothers decided to do in a case of chocking; each element was scored from 0-1. Done correctly and complete taken a score of (1). While, done incorrect or not done taken a score of (0) and 52 was the total of all the elements.

Scoring system: The overall score for mothers' practices was computed and categorized as; less than 70% was considered unsatisfactory practices, when the total scores ranged from 0-36 and from 70–100% was considered satisfactory practices, when the total scores ranged from 37-52.

Method

1-An official permission for data collection was obtained from the dean of the Faculty of Nursing, Tanta University addressed to the Tanta Main University Hospitals' ENT department administrators (inpatient and outpatient) after explaining the aim of the study to get their approval and cooperation for conducting this study.

1. Ethical and legal considerations

a. The study protocol was approved by the scientific research ethical committee at the Faculty of Nursing, Tanta University with code number (108/10/2022).
b. Mothers' written informed consent was obtained to participate in the study after clarifying the purpose and benefits of it and the participated mothers had the right to withdraw from the study at any time without providing a reason. **Validity of the tools:** Content validity was

ascertained by a jury of five experts professors in pediatric nursing.

2. **Reliability of the tools:** The study tools were tested by the pilot subjects. The test of reliability (Cronbach's alpha) was 0.899 for tool (I) and 0.745 for tool (II).
3. **A pilot study** was carried out on six mothers (10%) to test the tool for its clarity, applicability, feasibility and the necessary modification were done. Pilot study subjects was excluded from the actual sample of the study.
4. **The researcher was collecting the data for six months** started from the beginning of March to the end of August 2023. The researcher was available 2 days (Wednesday and Thursday) per week alternatively in the previously mentioned settings on morning shift from 9-12 am.
5. **Interview schedule** was filled in the clinical area by the studied mothers in presence of the researcher (Tool I). Part (1 & 2) was filled before the educational intervention while part (3) was filled before & immediately after the educational intervention.
6. **Observational checklist** was filled by the researcher to assess mothers' practices regarding choking management before & immediately after the educational intervention (Tool II).
7. **The present study was conducted at four phases of educational intervention**:

1) Assessment Phase

It was carried out by the researcher for all study subjects to collect socio-demographic data of mothers and their children Tool (I) part (1&2) and to assess mothers' knowledge regarding foreign body aspiration before implementing the educational intervention using Tool (I) part (3). Observational checklist of pediatric foreign body airway obstruction management was filled by the researcher before implementing the educational intervention using Tool (II). The researcher conducted an interview with mothers and their children. The researcher greeted the mothers who meet the inclusion criteria of the studied sample at the start of the interview, introduced herself, clarified the study purpose, the duration, and took their written consent.

2) Planning Phase

Educational intervention content was prepared and planned according to the mothers' needs assessment and based on literature review, which includes the following:

- Setting specific objectives.
- Preparation of the content and suitable teaching materials such as (video, power point presentations, printed booklet with illustrated pictures and simulated child mannequin).
- The educational intervention program was translated into Arabic.
- Different teaching methods was used including lectures, group discussion, demonstration and re-demonstration

3) Implementation Phase

The studied mothers were divided into 2 main groups. One group from the inpatient and the other group from the outpatient. Each group of them contain 30 mother and then each group is divided into 10 subgroups, each subgroup contains 3 mothers. The educational intervention was carried out for each subgroup separately through conduction of successive educational sessions. Each session was started by feedback about the previous educational sessions' content and a summary

about what had been discussed previously. Five educational sessions were included in the study. The time of each session was 30-45 minutes. Mothers attended the five sessions (two theoretical and three practical sessions).

The educational program sessions were carried out as follows

The first session

It was focused on creating good communication between researcher and mothers. Each mother was given explanation related to knowledge of foreign body aspiration in their children as meaning, common age of occurrence, risk factors, signs and symptoms and complications.

The second session

It was focused on providing knowledge on types of objects that cause foreign body aspiration in children, actions taken to prevent foreign body aspiration in children, actions taken when a child has inhaled a foreign body and time should call the doctor.

The third session

It was emphasized on practical management of choking when the child cough effectively or ineffectively and is still conscious. The researcher used a simulated mannequin for demonstration and re-demonstration of back blows followed by Heimlich's maneuver.

The fourth session

It was focused on practical management of choking when the child with foreign body airway obstruction become unconscious as technique of opening airway by using head tilt, chin lift maneuver, and giving rescue breaths by using simulated mannequin.

The fifth session

It was focused on practical management of choking by chest compression and cardiopulmonary resuscitation based on European Resuscitation Council guidelines. The researcher used a simulated mannequin in order to demonstrate the necessary steps including; achieving head-tilt chin-lift, accessing the nose and mouth, viewing chest movements, accessing the correct depth of chest compressions. Each mother was also asked to perform 100-120 compressions per minute with a ratio of 30 compressions for 2 breaths and the execution rate of compressions was noted.

4) Evaluation Phase

Evaluation of educational intervention on mothers' knowledge and practices was carried out using the same assessment tools (Tool I part 3 & Tool II). Each mother was evaluated immediately after the implementation of educational intervention (post-test) and was compared to (pre-test).

Statistical Analysis

Data were fed to the computer and analyzed using IBM SPSS software package version 20.0 (Armonk, NY: IBM Corp). Qualitative data were described using number and percent. The Kolmogorov-Smirnov test was used to verify the normality of distribution. Qualitative data rwere described using range (minimum & maximum), mean and SD. Significance was judged at P- value <0.05.

Results

Table (1) shows that 51.7% of the studied mothers were between 20 < 30 years old with mean of age 27.82 ± 7.29. About more than half of them 55% had secondary education. Regarding occupation, it was found that more than two thirds of the studied mothers 70% were not working and nearly three quarters of them 73.3% were living in rural areas. According to the history of aspiration, it was seen that 35% of their children had positive aspiration history and about more than half of the aspirated children 52.4% had aspirated once a time while one third of them

33.3% had aspirated twice. From the aspirated children, about more than one quarter of them 28.6% had choked and from those choked children, one child dies.

The majority of the studied mothers 88.3% had no information on how to manage choking compared to only 11.7% of them had information with 57% of them obtained this information from social media. Also, it was found that more than two fifth of the studied children 41.7 were between twenty-four to less than thirty months of age with mean of age 25.45 ± 6.25 months. Moreover, slightly more than one third of them 38.3% were at the second birth order in the family.

Table (2) presents that, the overall mean scores of mothers' knowledge immediately after educational intervention implementation was 28.17 ± 3.47 compared to 8.0 ± 7.06 before and the differences were statistically significant. Also, the mean scores of all sub-items of mothers' knowledge immediately after implementation were higher than before, with statistically significant difference.

Figure (1) shows that, most of the studied mothers 91.7% had high levels of knowledge immediately after implementation of the educational intervention while, before implementation the majority of them 86.7% had low levels. There were statistical significant differences regarding levels of mothers' knowledge before and immediately after implementation.

Table (3) illustrates that, the total mean scores of mothers' practices significantly increased from 2.42 ± 4.64 before educational intervention implementation to 44.43 ± 12.49 immediately after implementation. Concerning the sub-items of practices, the mean scores immediately after implementation were higher than before implementation, with statistically significant difference.

As regards **figure (2)** the majority of the studied mothers 86.7% had satisfactory practical levels while only 13.3% had unsatisfactory practical levels immediately after implementation compared to all of them 100% had unsatisfactory practical levels before implementation. There were statistical significant differences regarding levels of mothers' practice before and immediately after implementation.

Table (4) illustrates a positive significant correlation between mothers' total knowledge scores and their total practices scores before and immediately after implementation. ($P<0.001^{*}$).

The relation between level of mothers' knowledge regarding foreign body aspiration and their socio-demographic characteristics was illustrated in **table (5).** It was clear that, there were significant statistical relations between educational level, place of residence, a previous information on how to manage choking and the level of mothers' knowledge before educational intervention implementation. While after implementation, the relation was statistically significant between educational level only and mothers' knowledge.

Table (6) clarifies the relation between level of mothers' practices regarding choking management from foreign body aspiration for their children and their socio-demographic characteristics. Statistically significant relations were identified between mothers' educational level, a previous information on how to manage choking and the level of mothers' practices regarding choking management from foreign body aspiration after educational intervention implementation.

Table (1): Percentage Distribution of Studied Mothers and their Children Regarding Socio-demographic Characteristics.

Socio-demographic characteristics	(n=60)	
	No.	%
Mothers age in years:		
< 20	7	11.7
20 < 30	31	51.7
30 < 40	17	28.3
≥ 40	5	8.3
Mean ± SD	27.82 ± 7.29	
Education Level:		
Illiterate	3	5.0
Primary education	13	21.7
Secondary education	33	55.0
University education	11	18.3
Occupation:		
Work	18	30.0
Not working	42	70.0
Place of residence:		
Rural	44	73.3
Urban	16	26.7
Marital Status:		
Married	56	93.3
Divorced	3	5.0
Widowed	1	1.7
Number of children		
1	14	23.3
2	26	43.3
≥ 3	20	33.3
History of foreign body aspiration in their children:		
Yes	**21**	**35.0**
No	39	65.0
Numbers of aspiration in their children		
Once	11	52.4
Twice	7	33.3
Three times or more	3	14.3
History of choking in the aspirated children		
Yes	**6**	**28.6**
No	15	71.4
History of death of any one of their children due to choking resulting from foreign body aspiration		
Yes	1	16.7
No	5	83.3
Having information on how to manage choking resulting from foreign body aspiration in children:		

Yes	**7**	**11.7**
No	53	88.3
Source of information		
Health workers	1	14.3
Social media platforms	4	57.1
Relatives /friends	2	28.6
Child age:		
12 < 18 month	8	13.3
18 < 24 month	11	18.3
24 < 30 month	25	41.7
30 - ≤ 36 month	16	26.7
Mean ± SD	25.45 ± 6.25	
Birth order:		
First child	17	28.3
Second child	23	38.3
Third child	20	33.3

Table (2): Mean Scores of Studied Mothers' Knowledge Regarding Foreign Body Aspiration Before and Immediately after the Educational Intervention. (n=60)

Mothers' knowledge	Before	Immediately after	t-test	p- value
	Mean ± SD.	Mean ± SD.		
Meaning of foreign body aspiration	0.70 ± 0.67	1.90 ± 0.30	12.701*	<0.001*
Common airway parts that can be obstructed	0.47 ± 0.62	1.85 ± 0.36	14.077*	<0.001*
Common age of the occurrence	0.67 ± 0.71	1.97 ± 0.18	13.547*	<0.001*
Risk factors	0.70 ± 0.72	1.90 ± 0.30	11.644*	<0.001*
Signs & symptoms	0.70 ± 0.77	1.85 ± 0.36	9.912*	<0.001*
Complications	0.45 ± 0.62	1.82 ± 0.39	13.565*	<0.001*
Food items that the child may aspirate	0.65 ± 0.76	1.97 ± 0.18	12.882*	<0.001*
Non-food items that the child may aspirate	0.90 ± 0.77	1.95 ± 0.22	10.291*	<0.001*
Most dangerous: food or non-food items	0.03 ± 0.26	1.83 ± 0.56	23.043*	<0.001*
Reason for this danger	0.25 ± 0.47	1.78 ± 0.52	15.897*	<0.001*
Actions taken to prevent foreign body aspiration in children	0.63 ± 0.66	1.88 ± 0.32	12.898*	<0.001*
First aid measures if a conscious child aspirates a foreign body and able to cough effectively	0.55 ± 0.75	1.90 ± 0.30	12.446*	<0.001*

First aid measures if the child aspirate a foreign body and is still conscious, but unable to cough effectively	0.32 ± 0.60	1.83 ± 0.42	14.453*	<0.001*
First aid measures if the child aspirate a foreign body and has lost consciousness	0.13 ± 0.39	1.75 ± 0.54	15.991*	<0.001*
Time should call the doctor or go to the hospital	0.85 ± 0.73	1.98 ± 0.13	11.409*	<0.001*
Overall	8.0 ± 7.06	28.17 ± 3.47	18.171*	<0.001*

p: p value for comparing between **before** and **immediately after**
*: Statistically significant at p ≤ 0.05

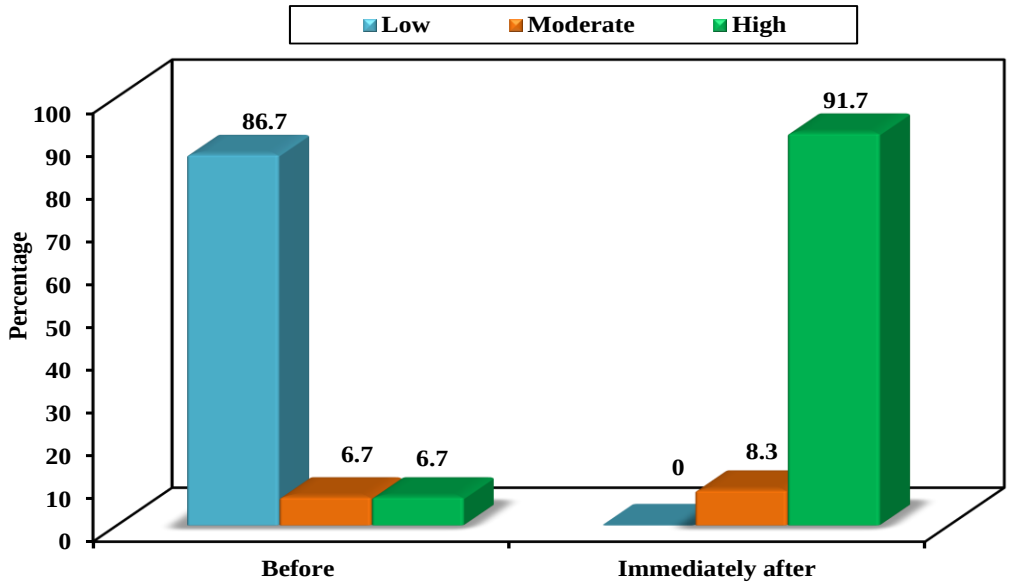

Figure (1): Total Level of Studied Mothers' Knowledge Regarding Foreign Body Aspiration

Table (3): Mean Scores of the Studied Mothers' Practices Regarding Choking Management from Foreign Body Aspiration for their Children (n=60)

Mothers' practices	Before	Immediately after	t-test	p-value
When the child coughs effectively Mean ± SD.	0.53 ± 0.72	1.92 ± 0.28	14.508*	<0.001*
When the child remains conscious but has ineffective coughing. Mean ± SD.	1.08 ± 1.99	5.73 ± 0.52	16.313*	<0.001*
When back blows don't relieve the airway obstruction, and the child is still conscious Mean ± SD.	0.30 ± 1.32	9.25 ± 3.05	19.205*	<0.001*
When the child becomes unconscious Mean ± SD.	0.40 ± 1.21	19.17 ± 6.22	20.065*	<0.001*
Continue with pediatric basic life support (chest compression and cardiopulmonary resuscitation). Mean ± SD.	0.10 ± 0.44	8.37 ± 2.97	19.919*	<0.001*
Total score Mean ± SD.	2.42 ± 4.64	44.43 ±12.49	20.568*	<0.001*

*: Statistically significant at $p \leq 0.05$

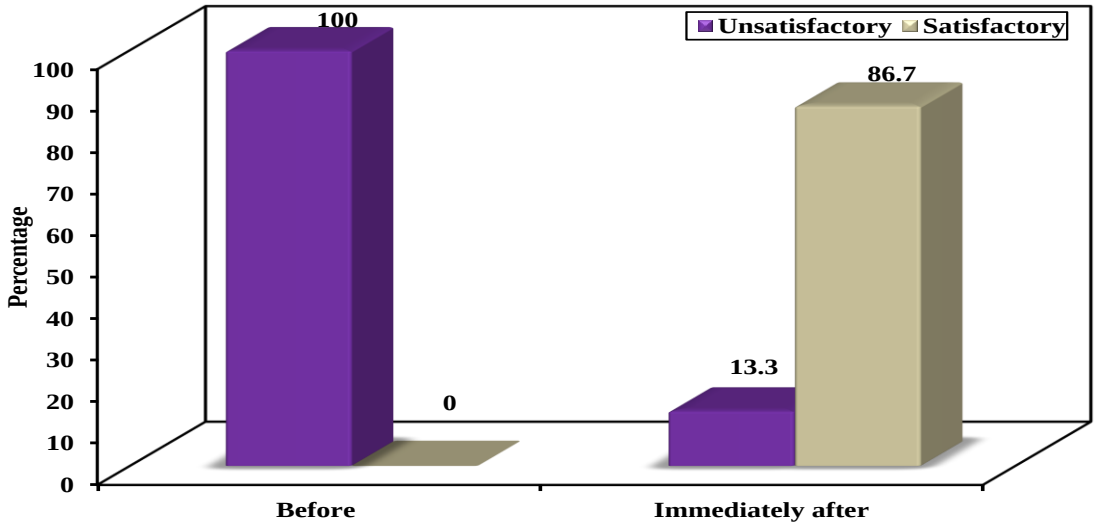

Figure (2): Practical Levels of Studied Mothers Regarding Choking Management from Foreign Body Aspiration for their Children.

Table (4): Correlation Between Total Knowledge Scores and Total Practices Scores of the Studied Mothers Before and Immediately After Educational Intervention Implementation.

	Total Knowledge Scores			
	Before		Immediately after	
	R	P	r	P
Total Practice Scores	0.708*	<0.001*	0.958*	<0.001*

r: Pearson coefficient
*: Statistically significant at $p \leq 0.05$

Table (5): Relation between levels of Mothers' knowledge and their Socio-demographic Characteristics.

Socio-demographic characteristics	Mothers' knowledge regarding foreign body aspiration											
	Before						Immediately after					
	Low		Moderate		High		Low		Moderate		High	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Mother's age												
< 20	7	100	0	0.0	0	0.0	0	0.0	0	0.0	7	100
20 - < 30	26	83.9	3	9.7	2	6.5	0	0.0	3	9.7	28	90.3
30 - < 40	14	82.4	1	5.9	2	11.8	0	0.0	1	5.9	16	94.1
≥ 40	5	100	0	0.0	0	0.0	0	0.0	1	20.0	4	80.0
χ^2(p)	2.084 (p=0.975)						1.794 (p =0.615)					
Educational Level:												
Illiterate	3	100	0	0.0	0	0.0	0	0.0	2	66.7	1	33.3
Primary education	13	100	0	0.0	0	0.0	0	0.0	1	7.7	12	92.3
Secondary education	31	93.9	2	6.1	0	0.0	0	0.0	1	3.0	32	97.0
University education	5	45.5	2	18.2	4	36.4	0	0.0	1	9.1	10	90.9
χ^2(p)	16.320* (p=0.002*)						8.649* (p =0.018*)					
Place of residence:												
Rural	42	95.5	2	4.5	0	0.0	0	0.0	4	9.1	40	90.9
Urban	10	62.5	2	12.5	4	25.0	0	0.0	1	6.3	15	93.8
χ^2(p)	11.684* (p=0.002*)						0.124 (p =1.000)					
History of aspiration in their children:												
Yes	21	100	0	0.0	0	0.0	0	0.0	3	14.3	18	85.7
No	31	79.5	4	10.3	4	10.3	0	0.0	2	5.1	37	94.9
χ^2(p)	4.112 (p=0.098)						1.499 (p =0.332)					

Having information on how to manage choking resulting from foreign body aspiration in children:												
Yes	0	0.0	3	42.9	4	57.1	0	0.0	2	28.6	5	71.4
No	52	98.1	1	19	0	0.0	0	0.0	3	5.7	50	94.3
χ^2(p)	35.011* (p =<0.001*)						4.249 (p =0.099)					

p: p value for comparison between the studied categories
*: Statistically significant at p ≤ 0.05

Table (6): Relation Between Level of Mothers' Practices Regarding Choking Management from Foreign Body Aspiration for Their Children and their Socio-demographic Characteristics.

Socio-demographic characteristics	Level of Mothers' practices							
	Before				Immediately after			
	Unsatisfactory		Satisfactory		Unsatisfactory		Satisfactory	
	No.	%	No.	%	No.	%	No.	%
Mother's age								
< 20	7	100.0	0	0.0	0	0.0	7	100.0
20 < 30	31	100.0	0	0.0	3	9.7	28	90.3
30 < 40	17	100.0	0	0.0	4	23.5	13	76.5
≥ 40	5	100.0	0	0.0	1	20.0	4	80.0
χ^2(p)	–				2.968 (p=0.323)			
Education Level:								
Illiterate	3	100.0	0	0.0	3	100.0	0	0.0
Primary education	13	100.0	0	0.0	5	38.5	8	61.5
Secondary education	33	100.0	0	0.0	0	0.0	33	100.0
University education	11	100.0	0	0.0	0	0.0	11	100.0
χ^2(p)	–				24.502* (p <0.001*)			
History of aspiration in their children:								
Yes	21	100.0	0	0.0	3	14.3	18	85.7
No	39	100.0	0	0.0	5	12.8	34	87.2
χ^2(p)	–				0.025 (p=1.000)			
Having information on how to manage choking resulting from foreign body aspiration in children:								
Yes	7	100.0	0	0.0	0	0.0	7	100.0
No	53	100.0	0	0.0	8	15.1	45	84.9
χ^2(p)	–				23.145 *(p=<0.001*)			

p: p value for comparison between the studied categories
*: Statistically significant at p ≤ 0.05

Discussion

Foreign body aspiration is a common respiratory emergency event that can have serious consequences if rapid intervention is not made. The most dangerous complication of FBA is choking, which has been identified to be a major cause of death in children, particularly in those under the age of three **(Kiliçaslan et al., 2021)**. Mothers have been considered as the children's primary caregiver. Hence, increasing mothers' knowledge and practices through well education on how to deal appropriately with the choking could help substantially lower the mortality **(Syan et al., 2022)**

The current study results showed that, more than half of the studied mothers had completed secondary education. It could be due to the majority of them were from rural areas. This result was in line with a study conducted in El-Beheira Governorate, Egypt by **(Sabry et al., 2022)** who found that more than two fifths 45.1% of the studied mothers had secondary education. This contradicted with the study done by **(Al Anazi et al., 2022)** in which, more than half of the studied mothers had higher education.

The current study findings regarding residency revealed that nearly three quarters of the studied mothers were living in rural areas. This result was in in same line with **(Kumbhekar et al., 2022)** who found that about three quarters of the studied mothers were living in rural areas. In contrast, the study conducted by **(Ghmaird et al., 2021)** mentioned that, about more than three quarter of studied mothers were from urban areas. Also, the findings of the current study revealed that, the studied mother's children who had positive aspiration history of FBA were 35%. This may be due to lack of mother's educational programs about choking prevention. This finding was in agreement with **(Bin Laswad et al., 2023)** who reported that about one quarter of participants' children had experienced FBA. Similarly results of the study done in Islamabad by **(Asif et al., 2021)** who mentioned that nearly 25% of the studied mothers faced a child with choking.

In this study, in spite of the importance of FBA and chocking management topics, the majority 88.3% of the studied mothers had no information on how to manage choking. This may be attributed to very strong influence of mother's education as only 18.3 % of the mothers had university education. This was in accordance with **(Elfeshawy et al., 2022)** who showed that, the majority of the studied mothers 85.5% didn't have any previous training about FBA. Also, this disagreed with **(Bin Laswad et al., 2023)** who found that more than half of the participants 60.8% had heard or read about FBA.

In addition, the current study revealed that social media platforms were the main source of information among the studied mothers. This could be explained by the powerful effect of social media on public these days. This result was in accordance with **(Asif et al., 2021)** who reported that the most commonly cited sources of FBA information were the media. On the contrary, **(Ali and Mahmoud, 2020)** represented that over half of the mothers, their source of knowledge about choking management was from relatives, neighbors, and friends. Also, **(Alshehri et al., 2019)** who stated that the doctor was the best source of FBA information as reported by high school students in a study investigated the

awareness of the first aid management of foreign body aspiration among students.

One of the best strategies to manage foreign body aspiration's chocking in children is to start a targeted educational programs to increase mothers' knowledge. The present study revealed that, the majority of the studied mothers had low level of knowledge before educational intervention implementation. This may be attributed to that most of the studied mothers were from rural area, housewives with secondary education and not received any previous educational programs about choking prevention. This was in harmony with **(Kumar et al., 2019)** who mentioned that the majority of the studied mothers (95%) had inadequate knowledge scores of pre-tests. On the other hand, **(AlShakhs et al., 2018)** reported that 60.3% of parents were aware of aerodigestive foreign bodies in pediatrics.

It is noteworthy that, after conducting the educational intervention, the overall mean scores and the level of mothers' knowledge were higher than before. These results supported with **(Behboudi et al., 2021)** who concluded that mothers' knowledge mean scores increased after educational interventions. Likewise, (**Sarabi & Nosratabadi, 2022)** mentioned that mothers in the intervention group had poor knowledge about first aid of choking before education intervention while their knowledge was improved after the intervention.

In addition, familiarity with choking's management is also of particular importance. Unfortunately, all the studied mothers in the present study had unsatisfactory practical level before educational intervention implementation. Compared to the majority of them had satisfactory practical levels immediately after implementation. As before implementation of program, the researchers found that the studied mothers, didn't know how to handle choking properly, particularly when using chest thrust technique and do certain incorrect actions like; giving the children plenty of water to drink and patting them on the back. In addition, mothers know Heimlich maneuver but do not understand how to do it. This was in alignment with **(Syan et al., 2022)** who revealed that, most of the studied mothers 88 % had unsatisfactory practices' level regarding prevention and first aid of chocking before mobile education compered to one hundred percent of them had satisfactory practices' level after. Also, this was in accordance to **(Elfeshawy et al., 2022)** who indicated that nearly all 95.5% of mothers have FBA poor practice management before the implementation of health education. While, after one month of the implementation nearly all 93.6% of them had a good FBA practice management.

The current study found that there was a significant difference in mothers' overall mean scores of knowledge and practices before and immediately after educational intervention implementation. This was in alignment with **(Ali and Mahmoud, 2020)** who reported that there was a significant difference between mothers' total mean knowledge and reported practice regarding prevention and first aid of mechanical airway obstruction among children, before and after supportive strategy. This may be resulting from a thorough assessment of the mothers' educational needs, good preparation of the content that would fulfill and satisfy their needs, as well as using appropriate teaching materials as printed

booklet. In this regards, booklets can be stored to be read again and can offer more thorough information, attractive designs, and lots of photographs to attract the interest of the mothers. This was supported by **(Ratiyun et al., 2023)** who found that there was an increase in knowledge of parents after being given health education with booklet, so that information on booklets is very effective for increasing knowledge of mothers.

The study also clarified that there were significant positive correlations between mothers' knowledge and their practices before and immediately after educational intervention implementation. According to the researchers, this has associated with the significance and efficacy of educational intervention implementation that is commonly associated with improving mother's knowledge leads to improve their practices.

Furthermore, the study revealed statistically significant relations between mothers' educational level, a previous information on how to manage choking and their level of practices regarding choking management. This means, a highly educated mothers who had previous information on how to manage choking, had satisfactory level of practice compared to those who hadn't. This finding came in agree with **(Zedain et al., 2022)** who reported a highly significant relation between mother's safety practices and education. Similarly results of the study done by **(Almutairi and Alharbi, 2021)** demonstrated that mothers who having heard about FBA resulted in significantly higher practice scores.

In the present study statistically significant relations were identified between mothers' educational level and their level of knowledge before and after educational intervention implementation. This might be attributed to that educated mothers significantly maintain the safety precautions at home and put dangerous things, small particles out of the reach of children. This agreed with **(Almutairi and Alharbi, 2021)** who discovered that there were certain sociodemographic characteristics of parents are positively correlated with the level of knowledge. This result disagreed with **(Soares et al., 2020)** who found that no significant association was observed between participant's knowledge about FBA and sociodemographic characteristics. Other study **(Al Anazi et al., 2022)** also, reported that the knowledge level wasn't significantly associated with any of the participants' characteristics neither before nor after the educational video.

Conclusion

Based on the findings of the present study, it can be concluded that:

There was a significant improvement in mothers' knowledge and practices regarding choking management from foreign body aspiration after educational intervention implementation. Also, there were positive significant correlations between mother's knowledge and their practices before and immediately after implementation.

Recommendations

Considering the findings of this research, the following recommendations are suggested:

1. Dissemination of educational programs and practical trainings, through social media platforms by using a new educational technology such as mobile application regarding choking management.
2. Mothers continue to regular receive educational programs and practical

trainings regarding choking first aid management to improve their knowledge and practices.

3. Increasing awareness of the community for choking prevention for different children's age group through mass media as T.V and videos by displaying it in public areas such as schools, hospitals.
4. Continuous follow up for the effect of educational programs on mothers' knowledge and practices regarding choking first aid in future similar studies.

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