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RESEARCH ARTICLE

ASSESSMENT OF MOTHERS KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS FOREIGN BODY ASPIRATION IN YOUNG CHILDREN ATTENDING WELL-BABY CLINIC IN AL ZAHER PRIMARY HEALTH CARE CENTER IN MAKKAH, SAUDI ARABIA, 2021

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ABSTRACT

Introduction: The timing has a critical role as an early diagnosis and proper management of foreign body aspiration can decrease the occurrence of complication and mortality. But prevention is the best way to protect the child from injuries and the awareness is the first important step in prevention. The aim of this study is to assess knowledge and behavior of mothers regarding FBA and the determinants of this knowledge in order to increase their awareness. **Methods:** This is a cross sectional study included mothers attending Al-Zaher primary healthcare center in Makkah. Inclusion criteria were mothers speak Arabic, mothers of children who don't have a serious or severe disease. Exclusion criteria were mothers cannot give informed consent or illiterate mothers. A self-administered questionnaire, that designed in the Arabic language and contained 14 Questions, were distributed to a random sample of the mothers. The descriptive statistics were calculated for qualitative variables. The questionnaire contains 16 questions about knowledge were summed into a total score that ranges from 0 to 16 and then dichotomized into poor and good knowledge. **Results:** A total of 281 mothers participated in the study. Among them 87% were Saudi and 13% were non-Saudi and about a third of the mothers were employed, were included in the study. Around two thirds of the mothers had bachelor or higher level of education whilst only 9.6% had less than high school education. About 30% of the included mothers had poor knowledge about foreign body aspiration. Healthcare providers were considered as the best source of information about FBA by 78.6% while social media was preferred by 16.4% of the mothers. Saudi nationality, young age, high education, and having first aid training were significantly associated with good knowledge about FBA. **Conclusion:** Knowledge about foreign body aspiration among mothers in Makkah was inadequate as about a third lack the essential knowledge about the problem that could be lethal. After adjustment of the confounding effect, nationality, age, and previous first aid training was significantly associated with knowledge about FBA.

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INTRODUCTION

Foreign body aspiration (FBA) is defined as the act of inhalation of foreign bodies into the person's airways [Rovin, 2020].

It is one of the main causes of unintentional childhood injury that can cause significant health consequence especially in those children younger than four years of age (Borse, 2008; Sehgal, 2002; Wu, 2018). It can be a life-threatening condition if it blocks the airway leading to impaired oxygenation, which eventually can cause death (Wu, 2018). In 2016 a retrospective

study conducted in the United State shows the mortality rate in pediatric inpatient with FBA about 2.5% (Johnson, 2015). In 2000 at United States there were about 17,537 children visited the ER for the treatment of choking that was associated with aspirated or ingested foreign body (Control, 2002). One retrospective study done in United States during 2009 to 2011 shows the annual inpatient cost related to pediatrics foreign body aspiration is almost \$12.8 million (Kim, 2015). The increase incidence of FBA in Children younger than 3 years are attributed to many anatomical and developmental reasons at this age most children are able to stand, they tend to explore their world via the oral route, and have the fine motor skills to put a small object into their mouths, narrow airways, immature mechanisms of both deglutition and airway protection, the lack of posterior dentition, access to improper foods, activity while eating. All of these are a risk factor for FBA (Ruiz, 2016; Pediatrics, 2001). The history has an essential role in the diagnosis of FBA (Lea, 2005; Haddadi, 2015). The clinical presentation ranges from asymptomatic to mild or severe symptoms and the most common reporting symptoms were cough, wheezing, choking, and/or dyspnea (Lea, 2005; Naragund, 2014; Passali, 2010). The time has a critical role as an early diagnosis and proper management can decrease the occurrence of complication and mortality (Metrangolo, 1999). But the prevention is the best way to protect the child from injuries (Passali, 2010). And the awareness is the first important step in prevention (Tan, 2000; Higuchi, 2013; Lalani, 2015).

METHODS

This is a cross sectional study included mothers attending Al-Zaher primary health care center in Makkah which is located in western region in Saudi Arabia. Al-Zaher PHC is one of more than 80 PHC centers in makkah contains several clinics such as antenatal care clinic, general family medicine clinic, chronic disease clinic and well-baby clinic. The study was conducted in the well-baby clinic from 1st to 30th JULY 2021. Mothers of children from all nationalities who attended the well-baby clinic at Al Zaher primary health care in Makkah during the study period. Inclusion criteria were mothers speak Arabic, mothers of children who don't have a serious or severe disease. Exclusion criteria were mothers cannot give informed consent or illiterate mothers. The sample size was 281 mothers and the statistical power was calculated using G Power software.

Based on confidence level of 95% and effect size of 0.02, a posteriorly calculated power was 0.92 which is adequate for this study. The researcher divided Makkah Geography into (East, West, north, and South) and selected the north of Makkah randomly, there were 12 PHC in the north. The researcher selected from them Al-Zaher PHC randomly. By using systematic sampling random the researcher took every second mother. A self-administered questionnaire was adopted from Khalid A. Alshehri *et al.* (2019), which was adopted from Higuchi *et al.* (2013) and two articles published by Singh *et al.* (2010) and Ozdogan *et al.* (2015) with the addition of two questions regarding first aid in FBA and some modification in demographics data to be suitable with the research objectives. The Questionnaire designed in the Arabic language and contained 14 Questions divided into three parts. The first part about demographics data and the previous first aid training or any experience with FBA, the second part assessing the mother's knowledge and attitude toward FBA and the third

part about the practice of first aid in FBA. After getting the approval from the ministry of health and Al-Zaher PHC director. The Questionnaire was distributed to every second mother in waiting area before they enter the WBC the researcher explained the aim of the study to the mother and take a consent. The data were prepared and entered to Statistical Package of Social Sciences (SPSS, Version 26). The descriptive statistics were calculated for qualitative variables.

The questionnaire contains 16 questions about knowledge of FBA were summed into a total score that ranges from 0 to 16. Answering more than 10 questions correctly was considered as a good level of knowledge while answering 10 questions or less was considered as a poor level of knowledge. Chi-square test was used to detect significant differences between groups at 0.05 level of significance. Permissions from higher authorities in ministry of health and joint program of family medicine were obtained. All information was kept confidential and only used for the study purpose.

RESULTS

A total of 281 mothers participated in the study, who attended the well-baby clinic at Al-zaher primary health care center in Makkah were included in this study. The majority of the mothers (75.8%) aged between 20 and 40 years old and 54.1% had 2-5 children.

Table 1. Demographic characteristics of the respondents

(n = 281)		
Characteristics	Frequency (n)	Percentage (%)
Age groups		
<20	8	2.8
20-30	92	32.7
31-40	121	43.1
>40	60	21.4
Nationality		
Saudi	244	86.8
Non-Saudi	37	13.2
Education		
Primary or less	9	3.2
Intermediate	18	6.4
Secondary	53	18.9
University level or higher	201	71.5
Number of children		
1	93	33.1
2-5	152	54.1
>5	36	12.8
Employment		
Yes	94	33.5
No	187	66.5

About 87% were Saudi while 13% were non-Saudi and about a third of the mothers were employed. Regarding education, around two thirds of the mothers had bachelor or higher level of education whilst only 9.6% had less than high school education (Table 1).

Regarding knowledge, about 30% of the included mothers had poor knowledge about foreign body aspiration. Table 2 shows the distribution of the items related to basic knowledge about foreign body aspiration. One third of the mothers have experienced foreign body aspiration and 29.5% have treated someone who had foreign body aspiration.

Table 2. Distribution of the items related to basic knowledge about foreign body aspiration

Items	Frequency (n)	Percentage (%)
Have you experienced FBA?		
Yes	94	33.5
No	187	66.5
Have you taken any first aid course?		
Yes	100	35.6
No	181	64.4
Have you treated anyone with FBA?		
Yes	83	29.5
No	198	70.5
It is possible for a child to get choked by a foreign body.		
Correct statement	273	97.2
Wrong statement	2	0.7
I don't know	6	2.1
It is possible for a child to get choked by small toy.		
Correct statement	257	91.5
Wrong statement	9	3.2
I don't know	15	5.3
It is possible for a child to get choked by almond or equivalent.		
Correct statement	73	26.0
Wrong statement	184	65.5
I don't know	24	8.5
Allowing the child to walk and laugh while eating is a safe action.		
Correct statement	19	6.8
Wrong statement	251	89.3
I don't know	11	3.9
How dangerous is swallowing a foreign body by the child?		
Lethal	203	72.2
Dangerous	44	15.7
Not very dangerous	23	8.2
I don't know	11	3.9
At which age the child is more prone to get choked?		
Less than 3 years old	204	72.6
From 3 to 5 years old	53	18.9
From 6 to 11 years old	4	1.4
From 12 to 18 years old	1	0.4
I don't know	19	6.8

Table 3. Practices of prevention and management of foreign body aspiration among the mothers

Characteristics	Frequency (n)	Percentage (%)
What is the best Method to prevent FBA among children?		
Removal of swallowable FB from play areas	186	66.2
Continuous monitoring of the child	53	18.9
Child education	40	14.2
None	2	0.7
How to treat FBA among children?		
Try to remove the FB by myself	200	71.2
Taking the child, immediately, to the nearest hospital	78	27.8
I don't know	3	1.1
What to do if a child, aged less than one year, have FBA?		
Back slaps and chest thrusts	140	49.8
Taking the child, immediately, to the nearest hospital	41	14.6
Abdominal thrusts (the Heimlich maneuver)	74	26.3
Neck slaps	12	4.3
I don't know	14	5.0
What to do if the child, aged one year or more, have FBA?		
Back slaps and abdominal thrusts (the Heimlich maneuver)	205	73.0
Chest pressing	17	6.0
Taking the child, immediately, to the nearest hospital	34	12.1
Neck slaps	11	3.9
I don't know	14	5.0

About 36% have taken a first aid courses and 72.2% knew that foreign body aspiration could be lethal. Regarding knowledge, 97.2% and 91.5% of the mothers thought that it is possible for a child to get choked by foreign body or small toy, respectively. However, only 26% thought that it is possible for a child to get choked by almond or equivalent. Allowing the

child to walk and laugh while eating is a safe action was considered as a wrong statement by 89% of the mothers. About 73% of the mothers considered age less than 3 years old as the age of the highest risk of foreign body aspiration. Practices of prevention and management of foreign body aspiration among the mothers are demonstrated in table 3. The best Method to prevent FBA among children was removal of swallowable FB from play areas (66.2%), followed by continuous monitoring of the child and child education which were reported by 19% and 14% of the mothers, respectively. About treatment of foreign body aspiration among children, 71.2% of the mothers said they will try to remove the FB by themselves, while 27.8% said they will take the child, immediately, to the nearest hospital. Moreover, only a half of the mothers knew that back slaps and chest thrusts are the treatment of choice if a child, aged less than one year, have FBA. However, 73% knew that back slaps and abdominal thrusts (the Heimlich maneuver) are the treatment of choice of children older than one year old. Table 4 presents the findings of the knowledge of signs and source of knowledge about foreign body aspiration. Sudden interruption of the breathing and sudden cough were named as signs of child choking by 80.4% and 58.7% of the mothers.

The most commonly reported sign of foreign body aspiration was difficulty in breathing which was reported by 89% of the mothers while cough and cyanosis were reported by 54.4% and 74.4%, respectively. Uncommon signs, such as vomiting and cough with blood, were reported as common sign of choking by 19.6% and 14.2%. crying is not a sign of choking but it was reported as a common sign of choking by about 40% of the mothers. Regarding source of knowledge, healthcare providers were considered as the best source of information about FBA by 78.6% while social media was preferred by 16.4% of the mothers. Association between respondents' characteristics and knowledge about foreign body aspiration as illustrated in table 5. Saudi nationality, young age, high education, and having first aid training were significantly associated with good knowledge about foreign body aspiration among the mothers. However, number of children, previous exposure to FBA, and helping someone who had FBA were not significantly associated with mothers' knowledge about foreign body aspiration. Findings of the backward-stepped logistic regression are summarized in table 6. At the last step, only 3 variables remain significant as predictors of knowledge about foreign body aspiration. Nationality, age, and previous first aid training were significantly associated with knowledge. Being Saudi was associated with 1.7 times higher odds to have a good knowledge about FBA than non-Saudis. Mothers at 20-30 years old had 3.2 more odds to have a good knowledge about FBA than those who aged more than 40 years old. Having a previous training on first aid was associated with two times higher likelihood to be more knowledgeable about FBA than mothers who had no training.

DISCUSSION

Foreign body aspiration is considered as a severe public health problem affecting children, particularly those younger than 3 years old. It is one of the leading causes of death among under-3-children (Altkorn, 2008). To reduce the risk of death and complications associated with FBA, development of prevention and early intervention strategies is important. Improving knowledge of child's caregivers about FBA, especially mothers, is essential in the prevention of choking injuries.

Table 4. Knowledge of signs and source of knowledge about foreign body aspiration

Item	Frequency (n)	Percentage (%)
Sudden interruption of the breathing is a sign of child choking		
Correct statement	226	80.4
Wrong statement	19	6.8
I don't know	36	12.8
Sudden cough is a sign of child choking		
Correct statement	165	58.7
Wrong statement	62	22.1
I don't know	54	19.2
What are the most common signs of foreign body aspiration?		
Cough	153	54.4
Holding of the neck	142	50.5
Cyanosis	209	74.4
Difficulty in breathing	250	89.0
Difficulty in talking	169	60.1
Cough with blood	40	14.2
Vomiting	55	19.6
Crying	112	39.9
What is the best source of information about FBA?		
Healthcare providers (doctors, nurses and others)	220	78.6
Social media or websites	46	16.4
Friends or family	12	4.3
TV or radio	2	0.7

Table 5. Association between respondents' characteristics and knowledge about FBA

Characteristics	Knowledge about foreign body aspiration		Chi-square	P value
	Poor knowledge	Good knowledge		
Nationality				
Saudi	63	181	14.70	<0.001*
	25.8%	74.2%		
Non-Saudi	21	16		
	56.8%	43.2%		
Age				
<20	2	6	10.81	0.013*
	25.0%	75.0%		
20-30	16	76		
	17.4%	82.6%		
31-40	43	78		
	35.5%	64.5%		
>40	23	37		
	38.3%	61.7%		
Education				
Primary or less	3	6	13.73	0.003*
	33.3%	66.7%		
Intermediate	10	8		
	55.6%	44.4%		
Secondary	23	30		
	43.4%	56.6%		
University level or higher	48	153		
	23.9%	76.1%		
Number of children				
1	23	70	1.78	0.398
	24.7%	75.3%		
2-5	50	102		
	32.9%	67.1%		
>5	11	25		
	30.6%	69.4%		
Have you taken any first aid course?				
Yes	18	82	10.54	0.001*
	18.0%	82.0%		
No	66	115		
	36.5%	63.5%		
Have you experienced FBA?				
Yes	26	68	0.35	0.562
	27.7%	72.3%		
No	58	129		
	31.0%	69.0%		
Have you treated anyone with FBA?				
Yes	21	62	1.20	0.276
	25.3%	74.7%		
No	63	135		
	31.8%	68.2%		

Table 6. Logistic regression with predictors of the knowledge about foreign body aspiration

Predictor	Comparison group	Reference group	Lower limit (95% C.I)	Odds ratio	Upper limit (95% C.I)	p value
Nationality	Saudi	Non-Saudi	1.702	3.662	7.878	0.001*
Age groups	-	-	-	-	-	0.024*
	<20	>40	0.351	1.910	10.382	0.454
	20-30	>40	1.424	3.145	6.945	0.005*
	31-40	>40	0.646	1.277	2.523	0.482
Have you taken first aid courses?	No	Yes	0.259	0.484	0.904	0.023*

It is important to understand risk factors, early signs, and ways of prevention and first aid for foreign body aspiration. This study aims to evaluate current knowledge about FBA and expected mothers' behavior in case of accidents. In the current study, only 36% have taken a first aid course despite 72.2% knew that foreign body aspiration could be lethal. Similar low training levels were found in other studies from Riyadh and Madinah regions where 18% and 34.6% had training on first aid for FBA, respectively (Habeeb, 2020; Ala'a, 2018). About 64.6% were found unaware about where to attend first aid courses which may explain why the training level is very low. Even among students in Jeddah city, only 23% attended training course about FBA (Alshehri, 2019). However, the majority showed willingness to participate in first aid courses (Habeeb, 2020). This could encourage public health leaders to conduct educational campaigns for recognition, prevention and management of foreign body aspiration. In Poland, the participation rate in first aid courses among mothers was much higher (74%) in comparison to that reported in the current study (Karys, 2016). More than a half of Polish mothers received first aid course at work (Karys, 2016).

Regarding knowledge, about 30% of the included mothers had poor knowledge about foreign body aspiration. A study among parents from Riyadh region found low to moderate knowledge about FBA in 94% of the parents (Habeeb, 2020). About 91.5% of the mothers thought that it is possible for a child to get choked by small toy, respectively. Lower levels of knowledge were reported among parents from Eastern region in Saudi Arabia where 80% agreed that a child to get choked by small toy (Al-Qudehy, 2015). A high percentage of correct response to the same question (94%) was reported among students in Jeddah city (Alshehri, 2019). In Nigerian caregivers of children, 68.4% knew that FBA is more common among children, however, only 14% knew that toys could be aspirated by the child (Mahmud, 2017). In the current study, only 26% of the mothers thought that it is possible for a child to get choked by almond or equivalent which is much lower than 67% that was found among parents from Dammam city [25]. Numerous studies found that peanuts one of the common cause of foreign body aspiration [15,27]. The current study found that allowing the child to walk and laugh while eating was considered as unsafe by 89% of the mothers. A lower proportion of parents in Dammam city (76%) thought that allowing the child to walk and laugh while eating was considered as unsafe (Al-Qudehy, 2015). The results of the present study revealed that about 73% of the mothers considered age less than 3 years old as the age of the highest risk of foreign body aspiration. Similar results were reported in parents from Dammam city as 70% said that FBA commonly occur in 0-2 years old (Al-Qudehy, 2015). Regarding symptoms of FBA, the participants in this study said that sudden interruption of the breathing and sudden cough are signs of child choking as reported by 80.4% and 58.7%.

Slightly different findings were found among parents from Dammam city with 74% and 68% thought that sudden interruption of the breathing and sudden cough are signs of child choking (Al-Qudehy, 2015). They found that a quarter of the parents in Dammam were unfamiliar with symptoms of FBA (Al-Qudehy, 2015). However, sudden cough was the lowest reported feature as a sign of FBA among students in Jeddah city as only 33% responded by yes (Alshehri, 2019). In Japan, a study found that 27.7% of the parents were unaware about symptoms of foreign body aspiration (Higuchi, 2009). Crying is not a sign of choking but it was reported as a common sign of choking by about 40% of the included mothers. This finding indicates a lack of essential knowledge about FBA as 27.8% considered FBA as non-lethal episode. Among students in Jeddah city, only 58% of males and 51.7% of females perceived FBA as a lethal incident (Alshehri, 2019). This is crucial since older sibling can save the life of the child in the absence of parents. In the present study, the healthcare providers were considered as the best source of information about FBA by 78.6% while social media was preferred by 16.4% of the mothers. Similar response was found in students from Jeddah city (Alshehri, 2019). Among parents from eastern region in Saudi Arabia, combination of multiple sources such as pamphlets, mothers education, and social media was considered the best method to acquire knowledge about FBA (Al-Qudehy, 2015). About treatment of foreign body aspiration among children, 71.2% of the mothers said they will try to remove the FB by themselves, while 27.8% said they will take the child, immediately, to the nearest hospital. Almost all parents from Dammam city considered immediate medical help as the best way to manage FBA (Al-Qudehy, 2015).

Although there is a high awareness about the urgency of medical intervention, in practice delay in the diagnosis of FBA is commonly reported even in the first world countries. In Japan, diagnosis of FBA were delayed by >24 hours in 50% of the patients despite of the presence of symptoms such as choking and sudden coughing in the majority of cases (Higuchi, 2009). Delay in the diagnosis for more than a week and a month was reported in 29% and 10% of cases, respectively, which might be associated with irreversible lung damage and serious complications including death (Kaur, 2002). In the current study, only a half of the mothers knew that back slaps and chest thrusts are the treatment of choice if a child, aged less than one year, have FBA. A higher percentage was found in parents who recruited from well-baby clinics in Riyadh city, as about 78% knew that back slaps are the first aid for infants (Habeeb, 2020). In Polish mothers about a half describe correctly and in details how to manage FBA among children. They said 5 hits over the inter scapular region should be applied to manage choking among children, but only 4% knew that five abdominal thrusts are required if the first intervention fails (Karys, 2016).

Knowledge about first aid of children older than one year old was better among the mothers who included in this study with 73% knew that back slaps and abdominal thrusts (the Heimlich maneuver) are the treatment of choice. A slightly lower percentage was found among parents who recruited from well-baby clinics in Riyadh city as 67.7% were aware about the first aid procedures for FBA (Habeb, 2020). The findings of this study revealed that a high educational level was significantly associated with good knowledge about foreign body aspiration among the mothers. Similarly, level of education was a significant predictor for knowledge about FBA among children caregivers in Nigeria (Mahmud, 2017). However, the level of education was not a significant predictor for knowledge about FBA among parents in Dammam city (Al-Qudehy, 2015). Conduction of health educational campaigns and first aids courses targeting mothers with low educational level is recommended based on the findings of the present study. The findings of logistic regression showed that only 3 variables remain significant as predictors of knowledge about foreign body aspiration. Nationality, age, and previous first aid training were significantly associated with knowledge. Being Saudi was associated with 1.7 times higher odds to have a good knowledge about FBA than non-Saudis. Mothers at 20-30 years old had 3.2 more odds to have a good knowledge about FBA than those who aged more than 40 years old. Having a previous training on first aid was associated with two times higher likelihood to be more knowledgeable about FBA than mothers who had no training. Limitation of this study includes a lack of validated questionnaire in the literature, which designed to assess knowledge about foreign body aspiration. Moreover, assessment of assumed behavior of mothers in case of choking of their children is not the same as assessment of the practices regarding FBA. For example, practical examination of the mothers in a plastic model will be more accurate in the assessment of mothers' practices.

CONCLUSION

Knowledge about foreign body aspiration among mothers in Makkah was inadequate as about a third lack the essential knowledge about the problem that could be lethal. Exposure of first aid courses is very low among the mothers and there is a need to plan for effective strategies to train mothers on first aid, particularly for their children. Only a half of the mothers knew the treatment of choice if a child, aged less than one year, have FBA, however, the treatment of a child older than one year was better. After adjustment of the confounding effect, nationality, age, and previous first aid training was significantly associated with knowledge about FBA.

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