

# Parental awareness of pediatric foreign body aspiration in Taif city, Saudi Arabia

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## Abstract

**Background:** With an overall mortality rate of about 5-7%, foreign body aspiration is a prevalent cause of illness and mortality in children. Studies on aspirated foreign bodies in kids in the Makkah region of Saudi Arabia are nonexistent.

**Objectives:** The aim of this study was to evaluate parental awareness of pediatric FBA in Taif, Saudi Arabia.

**Methods:** This descriptive, cross-sectional study included interviewing participants and prompting them to fill in a questionnaire. The data obtained was analyzed using SPSS.

**Results:** A total of 424 individuals (parents) who participated in this study were divided into the following three study groups: illiterate, undergraduate, and postgraduates. All groups exhibited inadequate overall knowledge of pediatric FBA, with a knowledge score of 67%. Furthermore, a significant association was observed between educational background and knowledge about pediatric FBA (p-value= 0.039); postgraduate participants scored higher than those in the undergraduate group.

**Conclusion:** A significant number of parents exhibit low knowledge about pediatric FBA. However, most parents were aware of FBA management and prevention. We recommend that parents must be informed about the risks associated with pediatric FBA using several media platforms.

**Keywords:** Parental, awareness, pediatric, FBA, Taif, Saudi

## Introduction

Pediatric foreign body aspiration (FBA) is defined as the suffocation, asphyxiation, or inhalation of a solid matter by a child, that is retained in the upper or lower respiratory tract, particularly in the bronchi, trachea, larynx, or glottis (1).

FBA, a serious condition resulting in total or partial obstruction of the airway, affects children more than adults and adolescents, with a higher prevalence between the ages of one and three years (2). Reports suggest that children are highly prone to aspirating foreign bodies, because of the lack of molar teeth, inadequate swallowing-muscle control, and propensity to simultaneously speak and play while eating (3). However, the primary determinant of FBA was the lack of parental awareness of the risks associated with feeding small organic food items to preschoolers (4).

FBA is a common cause of morbidity and mortality in children, with an overall mortality rate of approximately 5–7%. Although anoxic brain injury and pulmonary hemorrhage are the principal and secondary cause of mortality in children, (5) FBA is the leading cause of unexpected death among infants under the age of one year (2). Moreover, FBA is the fifth most prevalent cause of accidental deaths in children aged 1–3 years, with complications presenting in 14.6–27.8% of patients (2).

The most common complications that occur with FBA include respiratory distress, recurrent pneumonia, pulmonary abscess, and neurologic impairment (2,5), with anoxic brain damage occurring in 2.2% of patients (1). The presentation of non-specific symptoms and lack of testimony of the aspiration incident are the factors that contribute to delayed diagnosis (6). Delay in symptom presentation, diagnosis, and treatment has been linked to increased likelihood of significant consequences (2). Additionally, diagnosis becomes complicated when there is no report of an aspiration event. The majority of signs and symptoms are nonspecific and might diminish rapidly. Only few cases report the classic triad of cough, choking, and unilateral wheezing or diminished breath sounds, whereas other patients may be asymptomatic (2). Therefore, effective measures should be determined to prevent aspiration or to allow early diagnosis and treatment (7,8). Although flexible bronchoscopy is highly helpful under certain circumstances, rigid bronchoscopy with forceps is the gold standard for FBA treatment (7).

There have been no studies on aspirated foreign bodies in children in the Makkah region of Saudi Arabia. Therefore, this study was conducted to address the high mortality rate and severity of complications associated with FBA resulting from a lack of awareness of pediatric FBA in parents. The objective of this study was to evaluate parental awareness of pediatric FBA in Taif, Saudi Arabia.

## Subjects and Methods

**Study design, setting and time:** This was a descriptive cross-sectional study done at Taif city in the Makkah Province of western Saudi Arabia in the time from May to August 2022. Taif city has a surface area of 13,840 km<sup>2</sup> and altitude of 1,700–2,500 m asl; the estimated population of Taif was 993,800, according to the census of 1435 (Hijri date) (9).

**Study participants:** the study included parents with children ≤3 years of age. We excluded unmarried participants, married participants who did not have children, and parents with children >3 years of age. The participants were interviewed in person and prompted to fill-out a questionnaire.

**Sample size:** To estimate the size of the sample size, the following formula was used:

$$SS = Z^2 \times P \times (1 - P) / e^2$$

where SS = sample size; Z = 1.96 (at 95% confidence level); P = “best estimation” of prevalence (size of affected population); e = margin of error, which was 5% (at 95% confidence level). Assuming the size of affected population was 50% (P) at 95% confidence interval (Z = 1.96) with a margin of error of 5% (e), the minimum representative sample comprised 385 individuals. The sample size was increased by 10% to 424 to compensate for non-responses.

**Data collection:** The participants were interviewed personally and prompted to fill-out a pretested Arabic questionnaire. Patients and auditors from two medical centers in Taif, including Prince Mansour Military Hospital and Alhada Armed Forces Hospital were surveyed from May to June 2022. The participants belonged to several departments, including maternity, pediatric, and vaccination departments; clinics, including ENT, pediatric, and family clinics; and waiting rooms. Finally, we ensured that all participants met the inclusion criteria and eliminated participants who met the exclusion criteria. To further ensure that all the participants were inhabitants of Taif, we determined their place of living.

A pretested Arabic questionnaire was used that was originally developed in English and used in a previous study conducted in Saudi Arabia [10]. The questionnaire was composed of two sections. The first section was designed to collate demographic data, including age, gender, educational background, number of children, age of each child, and any previous history of FBA within the family. The second section comprised 15 close-ended questions regarding parental awareness, clinical symptoms, management, and prevention of FBA.

Prior consent was obtained from the participants before the survey. After obtaining consent and ethical approval from Alhada Armed Forces Hospital, we interviewed the participants and prompted them to fill-out the 4 minute long questionnaire. The participants were instructed to avoid questioning the interviewee to prevent bias in their

responses. The participants were also ensured that the information provided as part of the survey would be used solely for research purposes. Furthermore, participants were not paid and were informed of their discretion to refuse to answer uncomfortable questions.

**Pilot study:** A pilot study was conducted on 10% of the total sample size to verify that the target group understood the questionnaire and provided suitable responses. However, the results of the pilot study were not included in the data analysis of the present study.

**Data analysis:** data was verified for completeness and ensured that all participants conformed to the inclusion criteria. Responses were first categorized based on the gender, educational background, awareness, and level of knowledge of the participants, and then analyzed using the software Statistical Package for the Social Sciences (SPSS version 23). Subsequently, results were tabulated and presented graphically.

## Results

The 424 participants included in the study were categorized into the following three groups: 271 (63.9%) constituted the postgraduate group, 137 (32.3%) comprised the undergraduate group, and 16 (3.8%) represented the illiterate group. The mean age  $\pm$  standard deviation (SD) of the participants was  $34.6 \pm 7.5$  years, with  $33.3 \pm 6.7$  years,  $36.6 \pm 7.9$  years, and  $39.7 \pm 11.9$  years being the mean age  $\pm$  SD of the postgraduate, undergraduate, and illiterate groups, respectively. A total of 262 (61.8%) participants were females and 162 (38.2%) were males. The number of participants with one, two, three, four, five, and six children were 105 (24.8%), 105 (24.8%), 85 (20%), 61 (14.4%), 43 (10.1%), and 25 (5.9%), respectively.

The youngest child of 171 (40.3%) participants was younger than one-year-old, and 5 (1.2%) participants had a one-year-old second child. The number of parents with youngest, second, and third child aged 1–2 years was 142 (33.5%) and 29 (6.8%), and 2 (0.5%), respectively. Approximately 111 (26.2%), 59 (13.9%), 9 (2.1%), and 1 (0.2%) participants had 2–3-year-old their youngest, second, third, and fourth child, respectively. The number of participants with second, third, fourth, fifth, and sixth child aged >3 years was 226 (53.3%), 203 (47.9%), 128 (30.2%), 68 (16%), and 26 (6.1%), respectively.

**Table 1:** Age of children of the participants: Approximately 20.5% of the participants reported a history of pediatric FBA, whereas 79.5% of the participants did not encounter pediatric FBA. Furthermore, 24.1%, 21.8%, 21.8%, 12.6%, and 9.2% participants reported that they had a son, father, mother, sister, or daughter with a history of FBA, respectively.

**Figure 1:** Relationship of the participants with FBA patients: Participants exhibited inadequate knowledge of pediatric FBA, with a knowledge score of 67%. The results of data analysis suggested that 75% illiterate,

66% undergraduate, and 76% postgraduate participants considered that peanuts could result in pediatric FBA. Moreover, the overall knowledge of the participants regarding the cause of pediatric FBA was inadequate, with a knowledge of 72%. Additionally, 75% illiterate, 69% undergraduate, and 75% postgraduate participants agreed with the statement, FBA is most frequently observed in children of ages 0–2 years, indicating inadequate overall knowledge of the epidemiology of pediatric FBA, with a score of 73%.

With an overall knowledge score of 69%, 63% illiterate, 72% undergraduate, and 71% postgraduate participants were in agreement with the statement, Peanuts should not be given to children < 3 years of age. Furthermore, 69% illiterate, 82% undergraduate, and 89% postgraduate participants believed that small toys can cause FBA in children < 3 years of age, indicating good overall knowledge (knowledge score: 80%) about the role of small objects in pediatric FBA. However, 31% illiterate, 29% undergraduate, and 28% postgraduate participants assumed that no supervision was required when toddlers were playing with small toys. This suggested that the participants did not understand the importance of parental supervision while children were playing, with an inadequate knowledge score of 29%. A majority of participants, i.e., 63% illiterate, 66% undergraduate, and 76% postgraduate participants, agreed with the statement, A child crying while holding a small toy is a cause of concern, indicating inadequate knowledge of the signs of pediatric FBA, with a knowledge score of 68%. Hard nuts are beneficial for toddlers, was agreed upon by 56% illiterate, 64% undergraduate, and 71% postgraduate participants, with an overall knowledge score of 64%. Nonetheless, 81% illiterate, 83% undergraduate, and 81% postgraduate participants understood that a child should not be prevented from walking or laughing while eating, suggesting good knowledge (knowledge score: 82%) of the activities that can result in pediatric FBA.

The sample secured a score of 54% on the knowledge of pediatric FBA symptomology. Approximately 75% illiterate, 74% undergraduate, and 79% postgraduate participants, exhibiting an overall score of 76%, considered sudden choking as a symptom of FBA, whereas 75% illiterate, 55% undergraduate, and 59% postgraduate participants, with an overall score of 63%, considered sudden coughing as a symptom of FBA. Moreover, 19% illiterate, 23% undergraduate, and 22% postgraduate participants believed that the absence of symptoms was a reassuring sign. This suggested that most of the participants were unaware of the symptoms of pediatric FBA and secured an overall score of 21%.

In contrast, the participants were aware of the management (knowledge score: 87%) and prevention (knowledge score: 86%) of pediatric FBA. Approximately 88% illiterate, 85% undergraduate, and 88% postgraduate participants were informed that FBA required immediate medical advice (knowledge score: 87%), whereas 75% illiterate, 91% undergraduate, and 92% postgraduate participants

participants agreed to informing the doctor about the change in health after FBA (knowledge score: 86%). Additionally, 75% illiterate, 87% undergraduate, and 88% postgraduate participants agreed that they required more education on FBA (knowledge score: 84%).

Table 2: Knowledge of participants with different educational background about FBA: Statistically significant association was observed between educational background and awareness of FBA (P-value = 0.039), with postgraduate participants scoring higher than undergraduate participants.

Table 3: Differences between undergraduate and postgraduate participants based on their knowledge of FBA: Regarding lack of knowledge about FBA, 19% illiterate, 17% undergraduate, and 19% postgraduate participants were unaware that a child should not be allowed to walk or laugh while eating, whereas 44% illiterate, 36% undergraduate, and 29% postgraduate participants did not know that hard nuts are beneficial for children. Although a child crying while holding a small toy is a cause of concern, 27% illiterate, 34% undergraduate, and 24% postgraduate participants assumed otherwise. Approximately 69% illiterate, 71% undergraduate, and 72% postgraduate participants believed that toddlers could play with small toys without parental supervision. In contrast, 31% illiterate, 18% undergraduate, and 11% postgraduate participants were unaware of the fact that small toys could cause accidents involving FBA. Moreover, 37% illiterate, 31% undergraduate, and 29% postgraduate participants assumed that peanuts could be provided to children of <3 years of age; 25% illiterate, 31% undergraduate, and 25% postgraduate participants were unaware that FBA was most frequently reported in children aged 0–2 years; and 25% illiterate, 38% undergraduate, and 24% postgraduate participants did not know that peanuts and other nuts could cause accidents involving FBA.

Figure 2: Lack of knowledge about FBA in the three groups of participants: The absence of clinical symptoms following choking was a reassuring sign— was not known to 81% illiterate, 77% undergraduate, and 78% postgraduate participants, while 25% illiterate, 45% undergraduate, and 41% postgraduate participants did not know that sudden coughing was one of the symptoms of FBA. Few participants, i.e., 25% illiterate, 26% undergraduate, and 21% postgraduate participants, were unaware of the fact that sudden choking was one of the symptoms of FBA.

Figure 3: Lack of knowledge about the clinical symptoms of FBA in the three groups of participants: Approximately 25% illiterate, 13% undergraduate, and 9% postgraduate participants were not aware that increased awareness of FBA was required to improve its understanding. Similarly, 25% illiterate, 9% undergraduate, and 8% postgraduate participants exhibited no necessity of informing the doctor if a child with a history of FBA was unwell. Furthermore, 12% illiterate, 15% undergraduate, and 25% postgraduate participants exhibited no knowledge of immediate medical intervention if a child developed FBA.

Figure 4: Lack of knowledge about FBA management and the need for generating awareness for FBA prevention in the three groups of participants: The most preferred mode of generating parental awareness (36.6%) was media platforms, followed by maternity appointments, educational campaigns, and pamphlet distribution, which were preferred by 25.9%, 24.3%, and 13.2% of the participants, respectively.

Figure 5: Modes of generating awareness in the participants

Table 1: Age of the participant's children

Age	Youngest child	2 <sup>nd</sup> child	3 <sup>rd</sup> child	4 <sup>th</sup> child	5 <sup>th</sup> child	6 <sup>th</sup> child
< 1 year	171 (40.3%)	5 (1.2%)				
1 – 2 years	142 (33.5%)	29 (6.8%)	2 (0.5%)			
2 – 3 years	111 (26.2%)	59 (13.9%)	9 (2.1%)	1 (0.2%)		
> 3 years		226 (53.3%)	203 (47.9%)	128 (30.2%)	68 (16%)	26 (6.1%)
Not found		105 (24.8%)	210 (49.5%)	295 (69.6%)	356 (84%)	398 (93.9%)
<b>Total</b>	<b>424 (100%)</b>	<b>424 (100%)</b>	<b>424 (100%)</b>	<b>424 (100%)</b>	<b>424 (100%)</b>	<b>424 (100%)</b>

Figure 1: Relationship of the participants to the patient having history of FBA

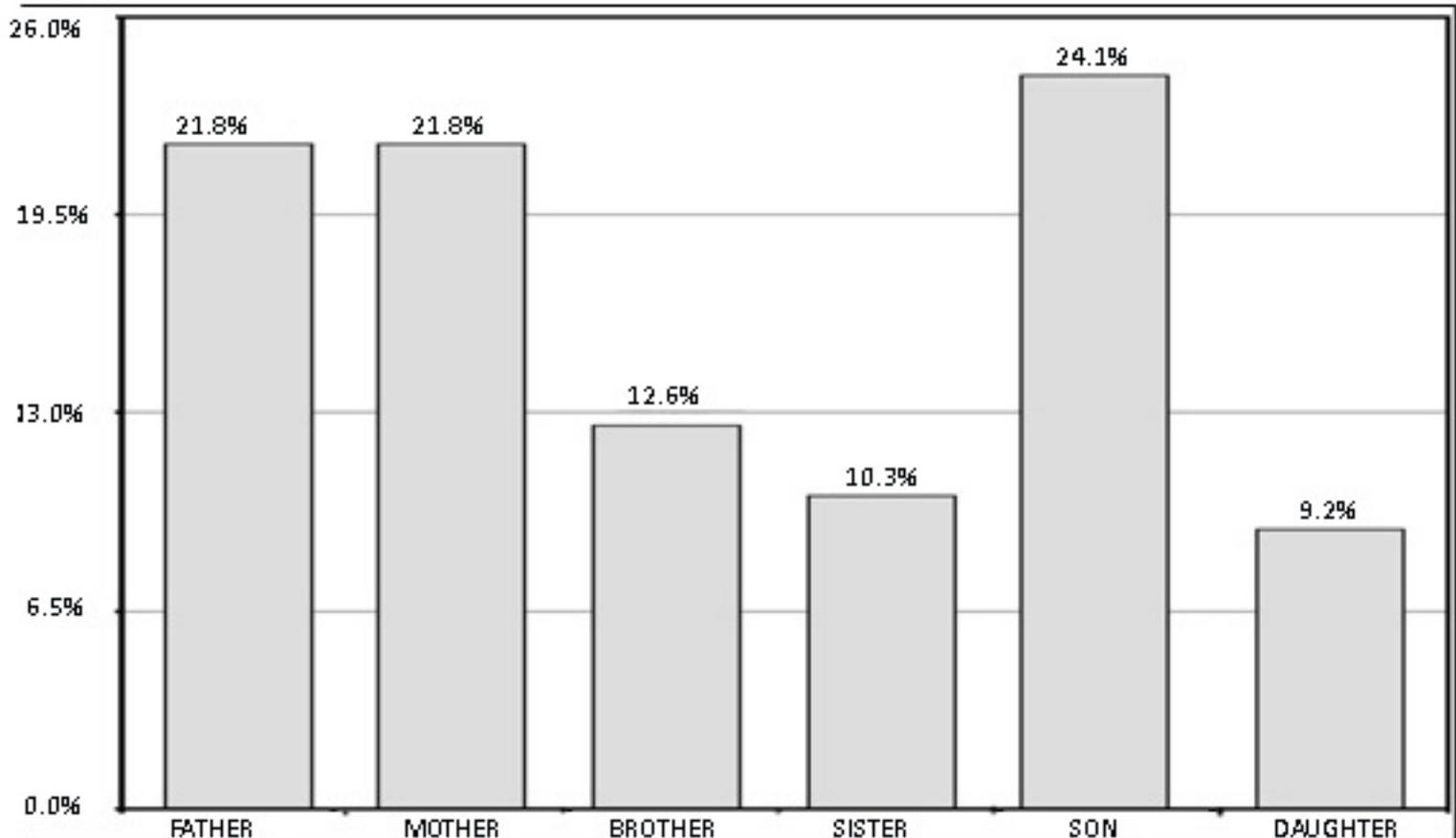


Table 2: General Knowledge of foreign body aspirate stratified by educational level

Questions	Illiterate group	Under-graduate group	Post-graduate group	Overall knowledge	Knowledge	
					Inadequate	Good
<b>General knowledge (8)</b>						
Pea nuts could cause FBA	75%	66%	76%	72%	x	
FBA is most frequently seen in 0–2 yrs.	75%	69%	75%	73%	x	
Pea nuts should not be given to children < 3 yrs.	63%	72%	71%	69%	x	
Small toys can cause FBA in children < 3 yrs.	69%	82%	89%	80%		x
No supervision is needed when toddlers are playing	31%	29%	28%	29%	x	
Child crying while holding a small toy is not recommended	63%	66%	76%	68%	x	
Hard nuts beneficial to toddlers	56%	64%	71%	64%	x	
Child should not be allowed to walk or laugh while he/she is eating	81%	83%	81%	82%		x
<b>Total</b>	<b>64%</b>	<b>66%</b>	<b>71%</b>	<b>67%</b>	<b>x</b>	
<b>Clinical presentation (3)</b>						
Sudden choking symptom of FBA	75%	74%	79%	76%		x
Sudden coughing symptom of FBA	75%	55%	59%	63%	x	
Absence of symptoms is a reassuring sign	19%	23%	22%	21%	x	
<b>Total</b>	<b>59%</b>	<b>51%</b>	<b>53%</b>	<b>54%</b>	<b>x</b>	
<b>Management (2)</b>						
FBA requires immediate medical advice	88%	85%	88%	87%		x
Inform treating doctor about change in health after FBA	75%	91%	92%	86%		x
<b>Prevention (1)</b>						
More education is needed for FBA	75%	87%	91%	84%		x
<b>Total</b>	<b>79%</b>	<b>88%</b>	<b>90%</b>	<b>86%</b>		<b>x</b>

**Table 3: Difference between under-graduate and post-graduate participants regarding their knowledge of FBA**

	Education level	N	Mean	Std. Deviation	P-value
Percent of true answer	Under-graduate	137	0.6747	0.1699	0.039*
	Post graduate	271	0.7116	0.1701	

\*P-value was calculated using independent sample t-test.

Figure 2: Lack of FBA general knowledge among the three studied groups (illiterates, undergraduate and post-graduate)

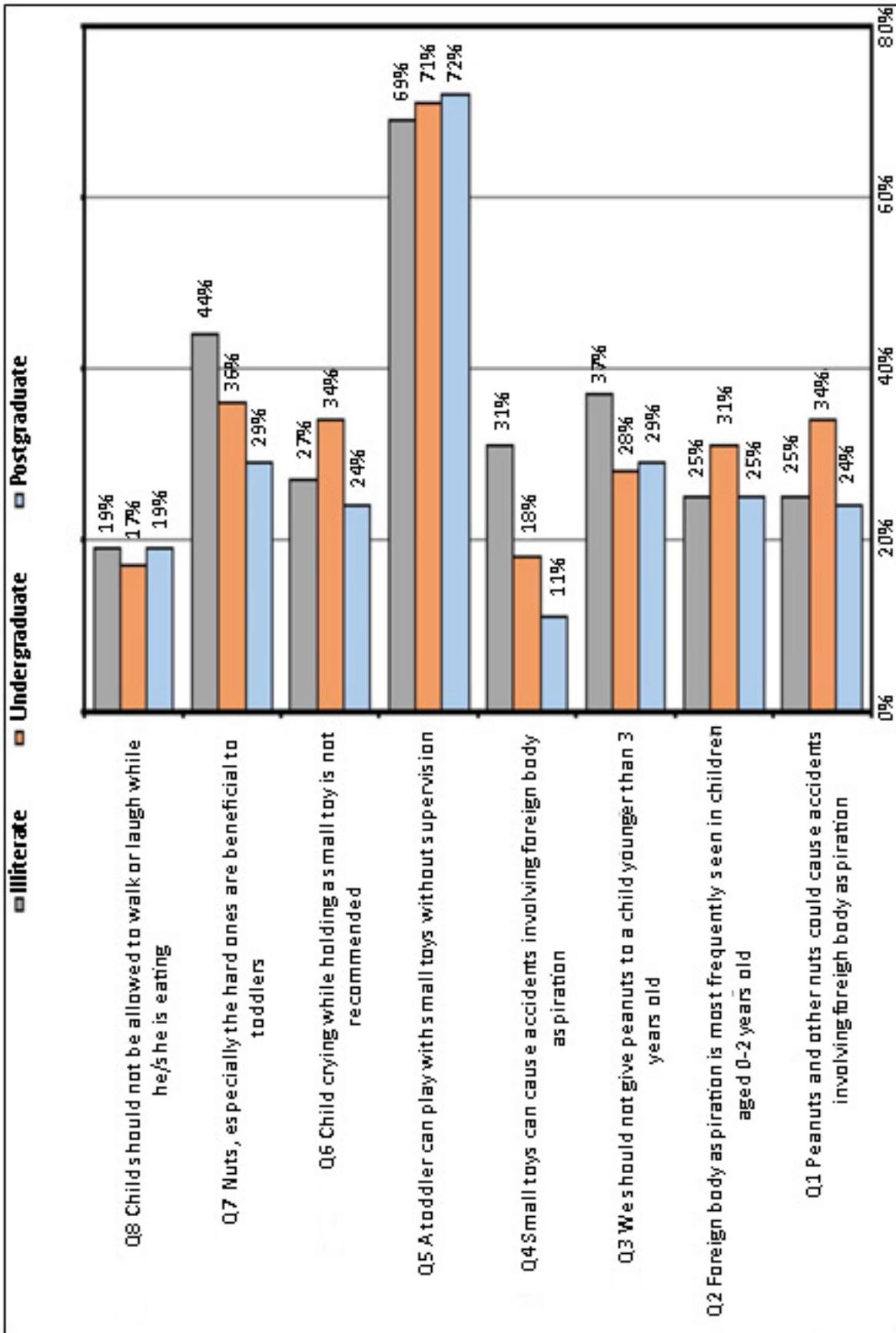


Figure 3: Lack of knowledge about the clinical presentation of FBA among the three studied groups (illiterates, under-graduate and post-graduate).

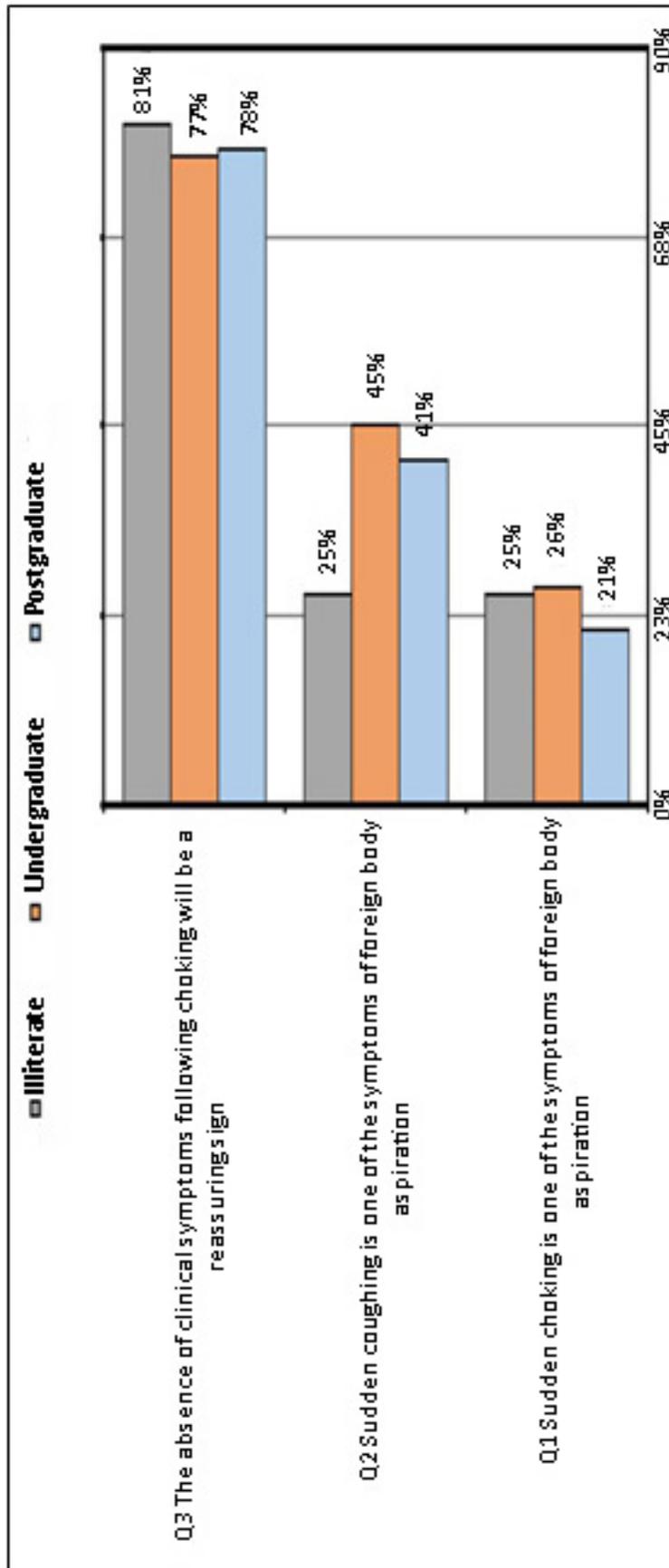
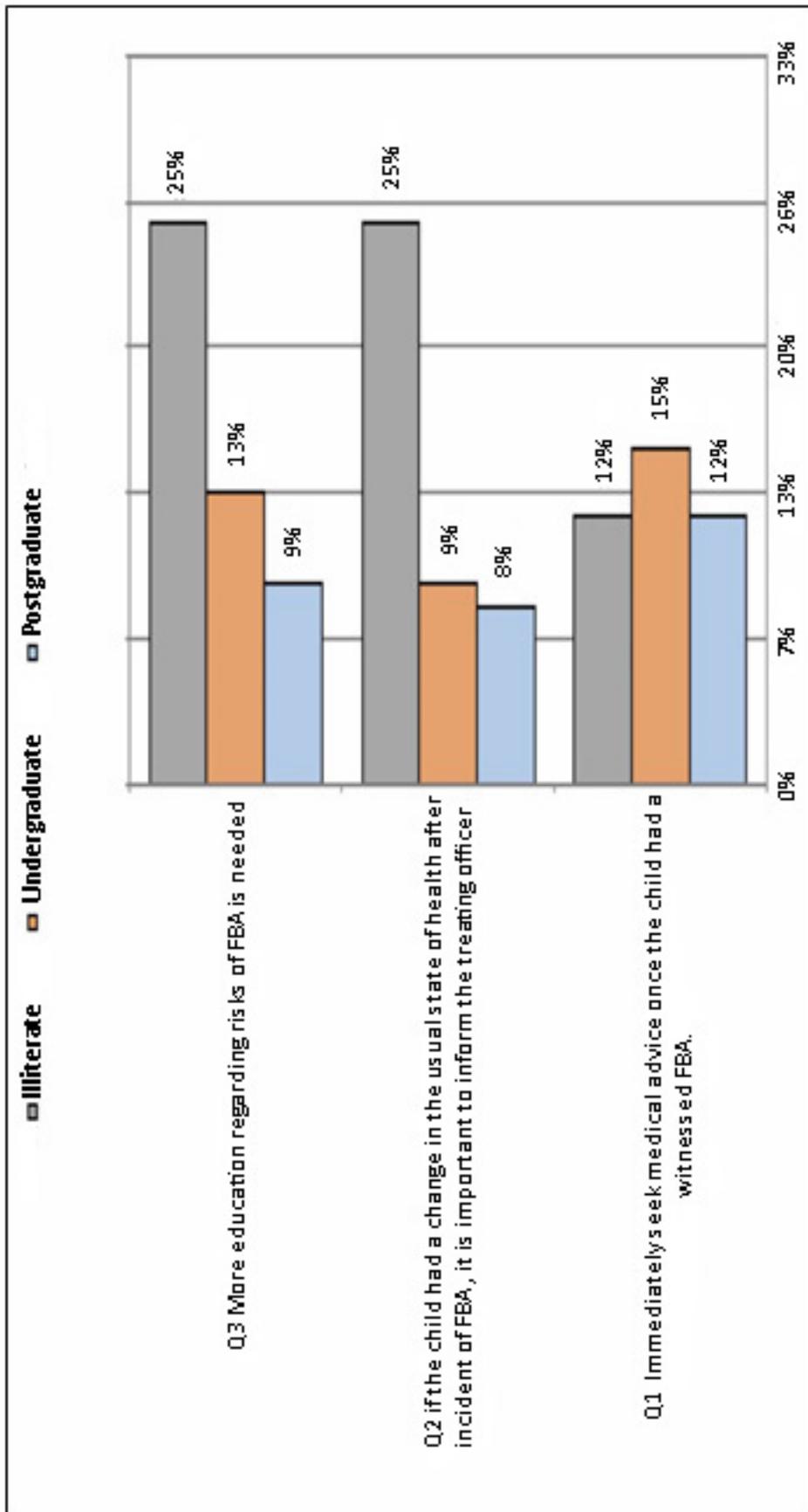
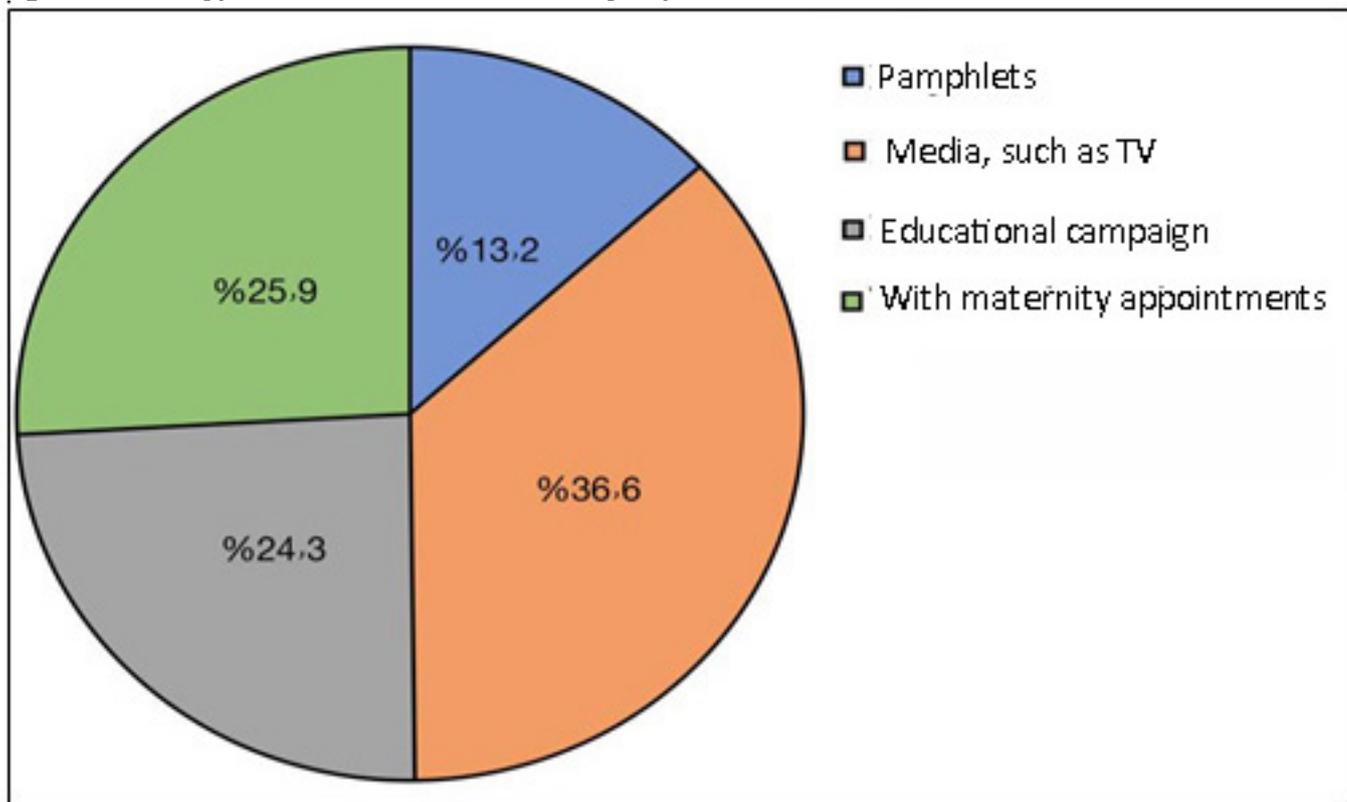


Figure 4: Lack of knowledge about FBA management and need for further education for better prevention among the three studied groups (illiterates, under-graduate and post-graduate).



**Figure 5: What type of educational method that you prefer?**

## Discussion

Based on socio-demographic characteristics, approximately two-thirds (63.9%), one-third (32.3%), and extremely few (3.8%) participants constituted the postgraduate, undergraduate, and illiterate groups, respectively. The mean age of the participants was found to be  $34.6 \pm 7.5$  years, with more than half of the participants (61.8%) being females and more than one-third (38.2%) of participants being males. Moreover, one quarter of the participants (24.8%) each had one and two children, whereas half of the participants had more than two children. These findings are similar to those of AlQudehi et al., wherein most participants were females and undergraduates (10).

Less than half (40.3%) of the participants had the youngest child of age less than 1 year, one-third (33.5%) had the youngest child of 1–2 years of age, and approximately more than one quarter (26.2%) had the youngest child aged 2–3 years old, whereas the remaining participants had the youngest child of more than 3 years of age. Similar findings have been reported by KiliÇaslan et al., wherein children aged between 1–3 years were more likely to be affected by FBA (11).

In this study, 20.5% of the participants reported a history of FBA, with peanuts and toys being the most common causes. These findings are in disagreement with those of Yalçın et al., wherein >90% participants exhibited a history of FBA (12).

The overall knowledge of FBA was inadequate, and the participants secured a knowledge score of 67%. The scores of illiterate, undergraduate, and postgraduate participants were 64%, 66%, and 71%, respectively, which were consistent with those indicated by Almutairi et al., who reported an overall knowledge score of 61.3% (6).

The overall score for knowledge about clinical symptoms was 54%, which was considered inadequate. Regarding knowledge of clinical symptoms, illiterate, undergraduate, and postgraduate participants scored 59%, 51%, and 53%, respectively. Similar results were obtained by Alsheiri et al., who also reported inadequate knowledge about clinical symptoms of FBA in the sample (5).

In contrast, an overall knowledge score of 86–87% suggested that the participants were aware of the management and prevention of FBA. These findings did not agree with those of Sarabi et al., who suggested that only 16% of the participants exhibited good knowledge of the management and prevention of FBA (13).

Most participants (36.6%) preferred media platforms, followed by maternity appointments, educational campaigns, and pamphlets, to generate parental awareness. We also observed a statistically significant association between educational background and knowledge about FBA. These results were consistent with those of Aluko et al (14).

The findings of this study could be limited by the possibility of multiple interpretations based on inaccurate information supplied by the participants.

## Conclusion

A considerable number of parents lacked adequate knowledge about FBA. However, most parents exhibited good knowledge regarding FBA management and prevention.

## Recommendations

Parents, particularly mothers, must be educated about the risk factors associated with FBA, including age, playing with small toys, and hard food items, which must not be presented to children without supervision. The role of media must be emphasized to raise awareness of various aspects of FBA, including its signs and symptoms and primary management and prevention.

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