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Prevalence of Choking and Awareness about Its Proper Management among the Residents of the United Arab Emirates: Cross-sectional Study

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Abstract Introduction: World Health Organization (WHO) reports show that choking is a leading cause of unintentional death complicated by respiratory tract obstruction in both children and adults. Objectives: We aimed to measure choking prevalence and the correct knowledge regarding its management in United Arab Emirates (UAE). Methods: A cross-sectional study was conducted among 404 adults ≥18 years across public places in the UAE. People with swallowing-related medical problems were excluded. Data about the prevalence, knowledge, and management of choking were collected using a self-administered questionnaire. Results: Among the participants, 43.3% (175) of adults experienced choking and 52.7% (212) witnessed a by-standing choking episode in an adult due to food. Only 23.7% (94) correctly knew that putting hands around the throat is the most appropriate sign of choking. Forty-seven percent (188) of participants correctly identified coins as the most dangerous item a child can choke on. Moreover, 62.7% (251) knew that choking management differs between children and adults where 63.0% (254) correctly chose applying pressure on the stomach for adults and 84.8% (341) correctly chose to hit on the back for children. Male gender, lower age, and lower education were identified as the factors associated with lower knowledge of choking. Conclusion: Altogether, the exact knowledge of choking and management techniques is insufficient. We recommend awareness campaigns, specifically targeting men, younger adults, and illiterate people.

Keywords Choking, Prevalence, Awareness, Knowledge, Management, UAE

1. Introduction

The World Health Organization (WHO) reports choking to be one of the leading causes of unintentional deaths in both adults and children. Correspondingly, the incidences and deaths from choking episodes due to food and foreign body respiratory obstruction were both on the rise in several countries. Iran, one of them, had choking attributed to 2.9% of fatalities annually [1]. As for the United States, 255 children below the age of 19 died from unintentional airway obstruction due to food or foreign bodies [2].

Furthermore, the United Kingdom reported an increase in choking deaths in adults by 17% where it was logged that 85% of the incidents were caused by food [3]. The choking dilemma remains under-recognized across the globe with only the United States and Sweden being morally aware of the issue with implementations of healthcare interventions to reduce the burden [4]. Data highlighting the importance of choking and its detrimental complications in the MENA region is scarce, specifically in the United Arab Emirates (UAE), thus further warranting the need for this study.

Choking, specifically on food items and foreign bodies, is known to be associated with poor, life-threatening outcomes in Tokyo, primarily poor neurological outcomes associated with loss of consciousness post-choking [5]. The study led to the reasoning that the interference of the bystanders at the choking emergency scene and their level of knowledge regarding the appropriate management maneuvers play an important role in determining the prognosis of a choking person [5]. Moreover, Thailand reported that 4.7% of children die each year because of suffocation due to choking [6]. Nothing similar has been reported in the UAE, therefore redirecting our study to fill this gap and react accordingly.

The aim of this research is to explore the choking prevalence, awareness level with regard to causes and presentations of choking, and management techniques to assess the need to implement educational campaigns leading to a reduction in incidents and fatalities in the future within the UAE.

2. Materials and Methods

2.1. Research Design

The cross-sectional method was implemented because the aim of our study was to measure the prevalence of choking amongst the communities of Sharjah, Abu Dhabi, and other parts of UAE which are a specific, localized community rather than a globalized one. Our goal was to generalize the results obtained from the emirates of Sharjah, Abu Dhabi, and other parts of UAE on the rest of the UAE population. The type of study chosen has permitted that in coherence with our findings.

2.2. Sampling and Data Collection

Our target population included residents in public areas in Sharjah, Abu Dhabi, and other parts of UAE. Our inclusion criteria were adults above the age of 18 years or legal guardians of children, who were English/Arabic speakers, to facilitate communication. Out of the participants chosen, we excluded those who had medical conditions related to choking. The method of sampling was convenient sampling, as we collected information by distributing questionnaires to available people.

Ethical approval was obtained from the ethics research committee before initiating data collection. We used a self-administered questionnaire that was developed by the authors, gathering knowledge, and sources from articles related to the topic chosen. Our questionnaire was divided into three sections, consisting of 18 questions with a mixture of open-ended and closed-ended questions and images assessing choking prevalence, knowledge about choking etiologies/presentation, as well as the proper management options among the participants. We pre-tested our questionnaire among our friends and families, and we estimated that it would take five minutes. We then distributed the questionnaires in public places such as parks, malls, and coffee shops while ensuring both consent and confidentiality.

The questionnaire content was meticulously chosen, based upon a comprehensive review of multiple literature sources on choking guidelines, to ensure its accuracy and relevance. We wanted to test our participants' knowledge about different choking management maneuvers in both adults and children, and their readiness to participate. Organizations like the Resuscitation Council, Red Cross, and American Heart Association have established guidelines outlining safe and efficient choking interventions [7-9]. The guidelines recommend the adequate choking management techniques for a choking infant (one year of age and lower) to be five back blows followed by five chest thrusts. As for a choking child (one year of age until puberty), the recommendation is five back blows followed by abdominal thrusts. Lastly, for adults (18 years or older), the recommendation is abdominal thrusts, also known as the Heimlich maneuver. To ease these options for our participants, we included visual photos inspired by the media shown in the guidelines with a description underneath. To ensure that the participants do not make life-threatening mistakes, while performing the maneuver mistakes common in the public, we included them as part of our answer choices [10]. As for choking management, a study in Saudi Arabia about first aid management of choking infants and older children reported varying non-promising results regarding the adequate management technique for infants below one year of age [11]. Therefore, when we enquired about choking management techniques in a child in our questionnaire, we capped it at one year, as it was the most relevant age, and further backed it up with descriptive images.

Special attention was given to children since they are the most susceptible to choking. We paid special attention to both the management of a choking infant and the knowledge of choking hazards in children in general. According to a study, the consumption of choking hazards in children under four is significantly associated with lower parental knowledge [12]. For that reason, we included a question exploring the most dangerous anticipated choking hazard in a child, below the age of four.

2.3. Data Analysis

Data was coded, entered, and analyzed using SPSS

(Statistical Package for Social Sciences) 25 software. As appropriate to the type of data analyzed, for univariate analyses descriptive statistics were used including measures to condense data (frequency and relative frequency), measures of central tendency (mean, median, and mode), and measures of variability (standard deviation). Bivariate analysis including Chi-square test was conducted to study relationship between variables. Level of significance was set at 5%. The age distribution amongst the groups was made based on the knowledge level per individual. To elaborate, this is to assess whether the younger age group (18-27) was better educated in terms of the internet and social media platforms and how that affected their knowledge regarding choking. Similarly, the older age group (28 and above) in terms of their previous life episodes.

3. Results

3.1 Choking Prevalence, Severity, and Frequency

The demographic characteristics of the study participants are shown in (Table 1). Choking prevalence, severity, and frequency results are displayed in (Figure 1a). Most of the participants witnessed someone choking in front of them which makes up 52.7% (212). As for the age of the choked person witnessed by the participants, 54.25% (115) witnessed those over the age of 18 years choking while 45.75% (97) witnessed those equal to and below the age of 18 years. Items choked on among 175 adults were recorded in (Figure 1b). Out of 42.9% (75) who choked on food, most of them (28%, 14) choked on carbohydrates.

Table 1. Demographic characteristics of 404 participants.

Demographics		
Variable	**Data**	**Value**
Gender	Male	46.75% (187)
	Female	53.25% (213)
	Female: male	1.14:1
Age	< 28 years	50.3% (199)
	≥ 28 years	49.7% (197)
	Mean	30.2
	Median	27
	Mode	20
	Standard deviation	10.4
	Range	45
	Minimum	18
	Maximum	63
	25^{th} percentile	21
	50^{th} percentile	27
	75^{th} percentile	35
Living place	Abu Dhabi	40.8% (165)
	Sharjah	44.8% (181)
	Other emirates	14.4% (58)
Educational level	Under bachelor's degree	34% (137)
	Bachelor's degree/higher	66% (266)

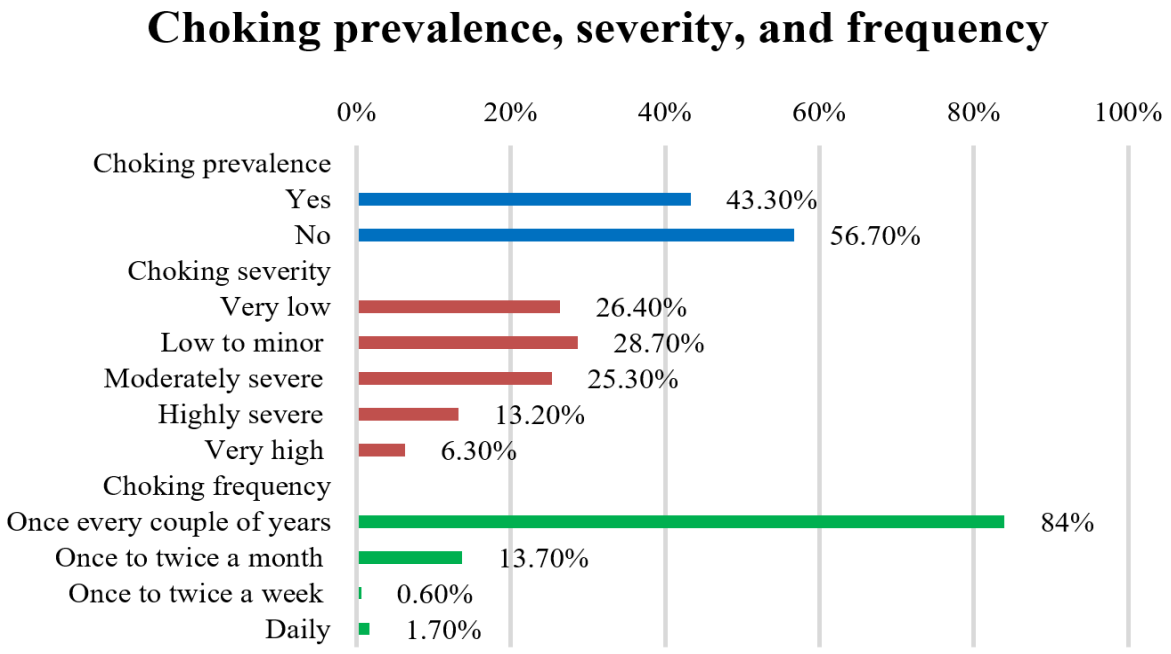

Figure 1a. Shows participants' choking prevalence, severity, and frequency

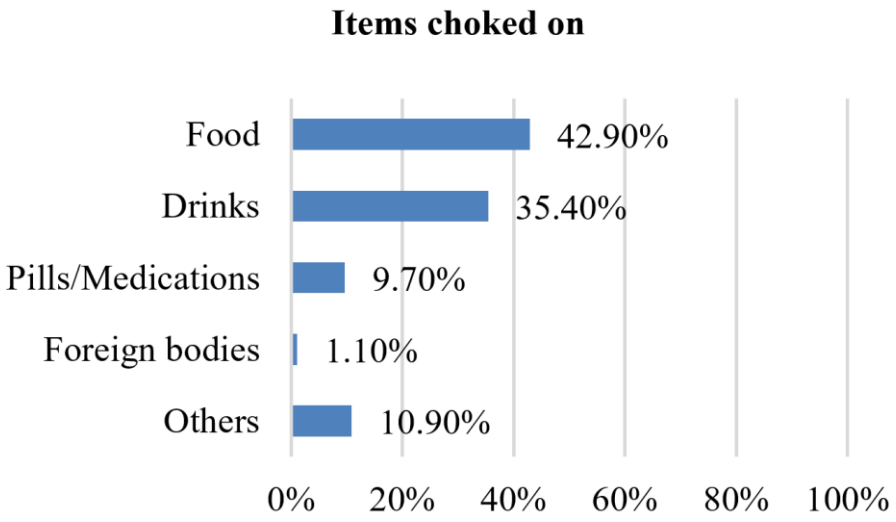

Figure 1b. The items our participants choked on

3.2. Choking Knowledge Level

For choking adults, only 23.68% (94) of our participants correctly identified the most appropriate sign that a choking person would experience during an episode. The results obtained were recorded in (Figure 2a). According to previous studies, comparisons and information priorly gathered, the most common and dangerous item a child may choke on is a coin [13]. Most of our participants, 47.0% (188) correctly identified that. The rest of the findings were recorded in (Figure 2b).

3.3. Awareness about the Management Strategy

The correct management for a choking adult is to perform the Heimlich maneuver to allow breathing once again, provided that the subject is still conscious. As for a choking child, gentle back blows are recommended [14]. To assess if the public of the UAE were aware of that, we included simple descriptions and images in our management section of the questionnaire. The results were recorded and shown in (Figure 3). We concluded that most of our participants (62.7%, 251) were aware that children and adults ought to be managed differently upon a choking episode. 84.8% (341) correctly identified that hitting on the back is the right way of managing a choking child and 63.0% (254) correctly chose applying pressure on the stomach for a choking adult.

3.4. Comparison of Demographics in Relation to Choking Incidence, Choking Knowledge, and Management Using Chi-Square Analysis

After data collection and recording findings, we performed multiple statistical tests using SPSS 25 software, mainly the Chi-Square as it perfectly suited the methodology used. Each demographical field was recoded and compared to the three main parameters of our study and the findings were shown in (Table 2). Exclusions were applied to those who answered no or chose the incorrect option as aforementioned per each parameter. Data was then further compared, interpreted, and assessed to draw conclusions based on the P-value significance.

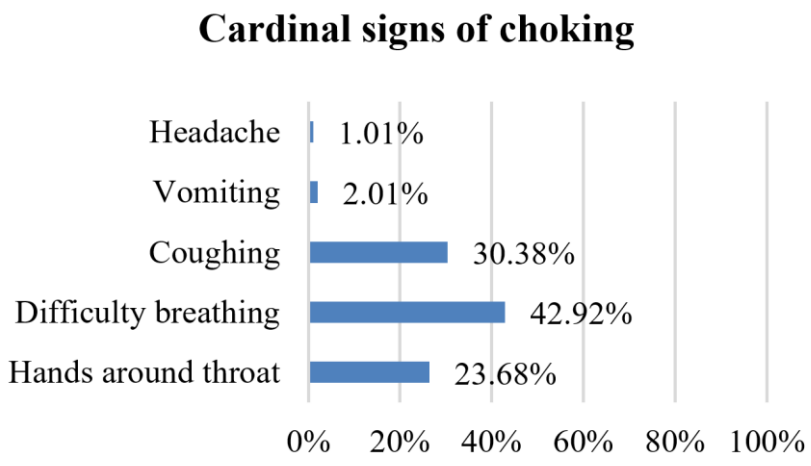

Figure 2a. The knowledge level of participants regarding choking in adults

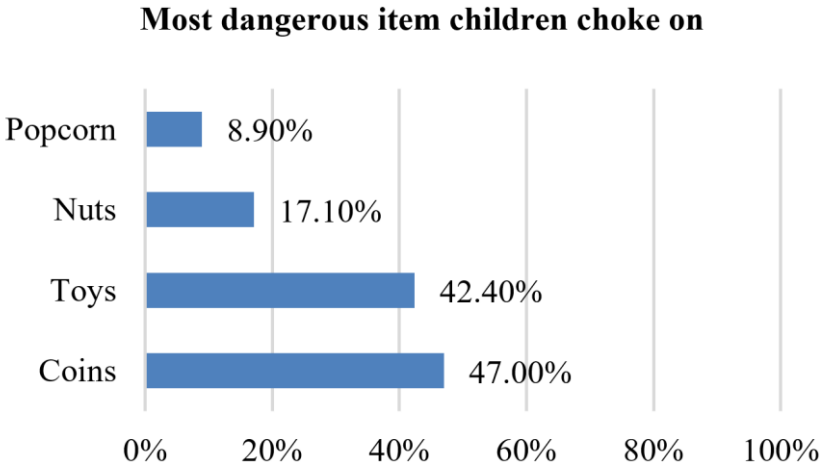

Figure 2b. The knowledge level of participants regarding choking in children

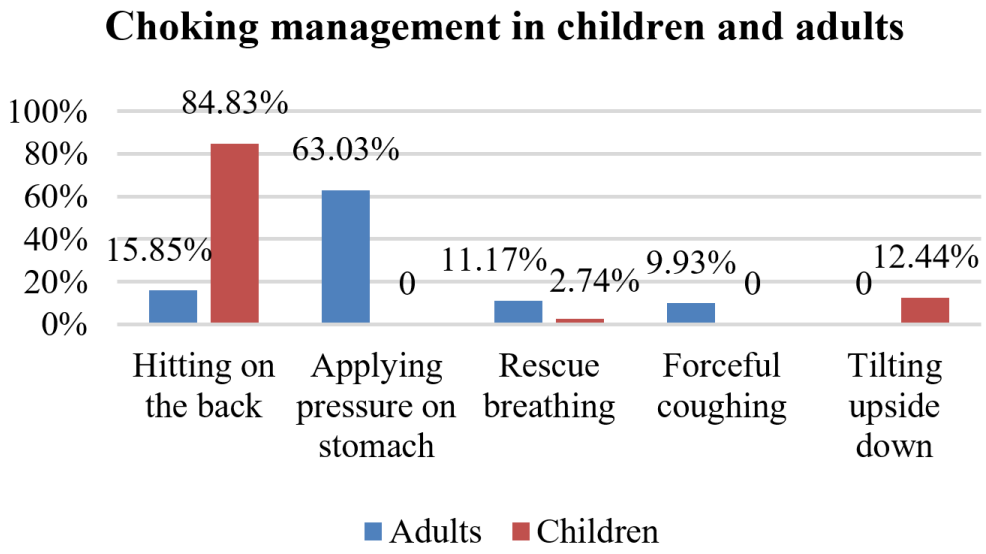

Figure 3. The appropriate management choking maneuver the participant's chose

Table 2. Comparison of demographics in relation to choking prevalence, choking knowledge, and management.

Demographics in choking prevalence, knowledge, and management					
Demographics	**Experienced choking**	**Proper choking knowledge**		**Correct choking management**	
		Adults	**Children**	**On self**	**On others**
Age					
< 28 years	48.7 %	36.5 %	41.9 %	5.60 %	42.4 %
≥ 28 years	38.6 %	32.8 %	52.3 %	11.9 %	42.1 %
P-value*	**0.041**	**0.439**	**0.039**	**0.029**	**0.940**
Gender					
Male	41.7 %	33.0 %	44.1 %	8.20 %	36.2 %
Female	44.6 %	37.0 %	49.3 %	9.00 %	46.7 %
P-value*	**0.561**	**0.407**	**0.298**	**0.776**	**0.035**
Emirate					
Abu Dhabi	34.5 %	30.5 %	47.9 %	8.60 %	46.0 %
Sharjah	48.1 %	37.6 %	42.8 %	7.80 %	37.2 %
Other Emirates	53.4 %	41.8 %	55.2 %	10.7 %	43.1 %
P-value*	**0.010**	**0.211**	**0.237**	**0.795**	**0.249**
Educational level					
Below bachelor's	51.1 %	38.3 %	46.0 %	9.00 %	43.0 %
Bachelor's/above	39.5 %	33.8 %	46.8 %	8.40 %	41.1 %
P-value*	**0.026**	**0.376**	**0.878**	**0.842**	**0.726**

A value < 0.05 indicates a significant level of association between two variables being compared. *Pearson Chi-Square; significance set at 0.05; all values included.

4. Discussion

4.1. Choking Incidence

The demographics collected from our participants were compared to the choking incidents reported to obtain a better idea of each variable and the effect it has on choking. Choking incidents were more common in females compared to males with a ratio of 1.2:1 (95:78). This was the opposite of another study conducted in Vienna in which the choking incidents were more common in males with the same ratio reported (1.2:1) [15].

When the demographics were compared to the choking incidence as shown in (Table 2), the results significances varied. Those who were under 28 years were found to choke less, making age a variable that may affect choking. When the living location was assessed, the difference was distinguishable; the highest (53.4%, 31) reported in Emirates other than Abu Dhabi and Sharjah; the vast majority being in Dubai. This indicates that the living location in the UAE played a role in the different choking incidents reported. Education level was also involved and those who were better educated (above bachelor's) were found to choke less. As for gender, no relationship was found in line with choking incidents.

4.2. Choking Knowledge

In Saudi Arabia, researchers concluded that 60.3% of legal guardians of children were aware of the potency of dangerous items surrounding a child, such as coins, button batteries, and small toys that can cause choking [16]. According to another study that was conducted to assess participants' knowledge of non-food hazards in children under 4 years, participants ordered foreign objects from the most to the least dangerous and the results showed the majority chose coins (97%), followed by marbles (94%), small batteries (93%), and small toy parts (93%) [12]. In another study that was conducted in Ethiopia among Kindergarten teachers, the majority (50.9%) knew that coins had the most potential for causing a choking hazard while whole grapes (16.5%) and popcorn (4.9%) were the least to cause it [17]. Upon comparing the statistics to our study, we found out that around half of our participants were knowledgeable enough regarding the dangerous items a child may choke on, mainly coins and toys accounting for 47.0% (188) and 42.40% (171), respectively. This difference in knowledge level among populations in different countries can be explained mainly due to different educational and awareness programs regarding the matter. This emphasizes the need to enforce educational programs in the UAE as well regardless of the adequate choking knowledge the population has.

According to Mayo Clinic, the most common cardinal sign of choking is putting hands around the throat [18], where only 23.7% (94) of our participants chose so. It is concerning that a small number of our participants recognized the most common sign of choking. Some of the answers given shown in (Figure 2a) may correlate with choking but may also be ignored or differentiated by something else. Different populations, socioeconomic status, sample size, dietary habits, and education levels may account for the discrepancy in our results from those published studies. Nevertheless, a choking incident needs to be recognized by the public first, to intervene and manage accordingly, therefore reducing the incidence.

When the demographics were compared to the choking knowledge of our participants regarding both children and adults as shown in (Table 2), the results and their significances varied. None of the gender, location of living, nor the education level played a role in the differences in the results obtained. As for age, those above 28 years showed significantly more knowledge about choking in children compared to those below 28 years. As for choking in adults, the knowledge level did not appear to be affected by age showing almost no significant difference between both age categories.

4.3. Choking Management

The population's awareness towards the appropriate choking management (Heimlich maneuver) can be lifesaving. For that reason, we wanted to explore whether our participants knew how to correctly manage both a choking adult and a child. 84.8% (341) of our participants knew the correct management of a choking child, however, a significant amount still chose options shown in (Figure 3) that may exacerbate a choking episode in a child and therefore increase the risk. A study in Italy was conducted to tackle the issue behind the continuous increase in child choking incidents [4]. It was suggested that the number might be reduced through increased effective preventative education programs [4]. The choking prevention "CHOP" study program being investigated by the country has proven to be effective in reducing the incidents [4]. This has provided sufficient evidence that similar educational programs may be attempted in the UAE, as it may also lead to a major decrease in incidents.

A cross-sectional study was conducted in Saudi Arabia, exploring first aid management maneuvers for multiple emergencies [11]. When participants were asked about the options to manage a choking infant, below 1 year of age, it was reported that 64.6% chose hanging a child upside down by the feet trying to expulse a toy out of his/her mouth, which can be extremely dangerous, according to the study [11]. Following up on that, we also found that 12.4% (50) of our participants chose that option. Another study that was carried out in the same region, observed that only 34.9% of people knew how to deal with a choking child under the age of 1 year [16]. When compared to our results, we concluded that our population was much more educated about managing a choking infant compared to other populations in different countries.

We decided to separate self-management from the management being done on others when it came to choking management as shown in (Table 2) as many people may not be able to take quick action on themselves if they ever experience an episode. This may be due to the brief panic or anxiety encountered upon the episode [19]. Many people, according to a study also experienced what's known as choking phobia [20] which may affect their self-management decision which ideally should be applying pressure on their stomach using their fists and bending over a hard surface [18], where only 8.50% (34) of our participants chose that.

When we compared our participants' demographics to the percentages who chose the correct choking management to be applied to themselves and other people in case of a choking incident, the results and their significances varied. For the age, a higher percentage of those who were above 28 years chose the correct management procedure to carry out on themselves compared to those below 28 years making the difference quite significant. As for management on others, there was almost no difference between the age groups making the difference insignificant. As for gender, there was no significant difference between males and females who chose the correct management to be applied to themselves, however, significantly more females chose the correct management to be applied on others compared to males. Nor the living location or the educational level were significant towards the management on both self and others. All values are displayed in (Table 2).

5. Conclusions

Our results indicated that the prevalence of choking is on the rise. We found that females, people under the age of 28 years, and people with an educational level below bachelor's degree tend to choke more frequently than others. This observation raises the suspicion that lower age and education are associated with a higher risk of choking. Conversely, people with advanced age and education exhibit fewer choking episodes. The relevance of age may be explained by a higher chance of being married and having children with advancing age. Thus, the parents are more likely to know the health emergencies, such as choking than unmarried and younger people. Similarly, having a higher education is more likely associated with common health hazards than having lower or no education. Lastly, women were more aware of choking than men, which may be attributed to a higher interaction with children and a higher knowledge of common health hazards to children.

Limitations

The limitations of our study were mainly due to the limited access to many people in our community and the convenience sampling method we used.

Recommendations

We recommend awareness campaigns about the knowledge and management of choking, specifically targeting men, younger adults, and illiterate people.

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Conflict of Interest

None to declare.

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