

Knowledge and misconceptions of choking and first-aid procedures among Syrian adults: A cross-sectional study

SAGE Open Medicine

Volume 12: 1–10

© The Author(s) 2024

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/20503121241249399

journals.sagepub.com/home/smo



Yahia Ranjous¹ , Abdulrahman Al Balkhi¹ , Ibrahim Alnader¹,
Majd Rkab¹, Jamal Ataya²  and Raed Abouharb¹

Abstract

Background: Choking is a critical emergency that occurs when foreign objects obstruct the airways. It commonly affects young children, older people, individuals with developmental disabilities, those with acquired or lifelong disability, and those with mental health conditions. Symptoms can vary, ranging from coughing to cyanosis.

Aim: Our study aims to evaluate Syrian adults' knowledge of choking and their understanding of first-aid procedures. Specifically, we will assess the prevalence of misconceptions in order to train community members and increase their level of knowledge about first aid for choking. Ultimately, our goal is to reduce deaths resulting from this critical condition.

Methods: This cross-sectional study aims to assess the knowledge and attitudes regarding choking among adults in Syria. The targeted population consists of Syrians aged between 18 and 45 years who reside in Syria. Data were collected through an online survey, disseminated via social media platforms from March to July 2022. Scores were computed to quantify levels of knowledge, with participants achieving a score of 16 or higher classified as having a high level of knowledge. The collected data were analyzed using descriptive statistics, Pearson's correlation coefficient, and chi-square tests.

Results: A total of 406 responded to the survey, with 246 (60.6%) scoring less than 16 points, indicating a low level of knowledge. Gender and place of residency were not correlated with knowledge level $p=0.249$, $p=0.913$, respectively). Participants employed in the medical field, those who had received training in first aid, and individuals with higher levels of education exhibited higher levels of knowledge. However, the level of knowledge was below expectations for these groups.

Conclusion: There should be an increase in the availability of first-aid courses to the public and improvements in hands-on training for physicians and medical trainees.

Keywords

Choking, aspiration, first aid, misconception, Heimlich maneuver

Date received: 19 October 2023; accepted: 8 April 2024

Introduction

Choking represents a critical medical emergency, typically resulting from the blockage of the respiratory airways by foreign objects.¹ In Japan, approximately 4000 fatalities occur annually due to food choking, with a notable concentration in January, coinciding with the consumption of Japanese rice cake during New Year's Day.² A retrospective study conducted in Vienna spanning the period from 1984 to 2001 revealed that a total of 273 adults succumbed to asphyxiation caused by food or foreign bodies. This distressing finding translates to an average of two fatalities per every 100,000 individuals in the population of Vienna.³ Choking poses a significant risk, especially among young children, with approximately 80% of cases occurring in children under the

age of 3. This vulnerability can be attributed to a combination of factors, including the limited development of chewing and swallowing patterns and their tendency to be highly mobile.⁴ Indeed, the most common causes of choking incidents in children are food items and nuts.⁴ Various objects, including small toys, balloons, and food, are among the primary causes of choking incidents in children.⁵

¹Faculty of Medicine, Damascus University, Damascus, Syria

²Faculty of Medicine, University of Aleppo, Aleppo, Syria

Corresponding author:

Abdulrahman Al Balkhi, Faculty of Medicine, Damascus University, Damascus, Syria.

Email: abdalrahman54321.balkhi@gmail.com



Creative Commons Non Commercial CC BY-NC: This article is distributed under the terms of the Creative Commons

Attribution-NonCommercial 4.0 License (<https://creativecommons.org/licenses/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access pages (<https://us.sagepub.com/en-us/nam/open-access-at-sage>).

For older people with chronic diseases, choking becomes a prominent risk factor. In a study conducted in the United States, choking accounted for a mortality rate of 21.6% among a sample of 76,534 adults aged 65 and above. This percentage was notably higher among patients with specific disorders such as schizophrenia, Parkinson's disease, Alzheimer's disease, stroke, mood disorders, oral cancer, and laryngeal cancer.⁶ Another study demonstrated that patients diagnosed with organic mental disorders have a choking incidence rate 3.4 times higher than other patients at Chutung Veterans General Hospital.⁷ Additionally, the rate of recurrent choking incidents among this group can reach up to 40.0%. Notably, patients administered higher dosages of hypnotic medication displayed a higher susceptibility to fatal choking incidents.⁷

Airway obstruction resulting from choking can be either partial or complete (total), each presenting distinct clinical characteristics and requiring specific management approaches.^{8,9} Symptoms associated with choking can vary significantly depending on the extent of the obstruction, ranging from coughing and breathing difficulties to cyanosis.¹⁰ Typical indicators and manifestations of choking encompass a range of signals, such as persistent coughing, challenges in breathing or vocalizing, cyanotic discoloration, and observable gestures like clutching or attempting to reach the throat. In pediatric instances, additional cues may include drooling or the presence of stridor.¹⁰ Notably, adults frequently present with the classical triad of paroxysmal cough, wheezing, and dyspnea, or alternatively, decreased air entry and breath sounds.¹¹ An intriguing facet of airway obstruction is encapsulated in the term "café coronary," denoting a cardiac arrest arising from airway blockage during eating, distinct from a myocardial infarction.¹¹

In cases of partial obstruction, patients typically retain the ability to speak and cough, and first responders should encourage them to continue coughing without resorting to back blows.^{12,13} Conversely, complete obstruction poses a greater danger, rendering patients unable to speak or cough. In such instances, lifesaving measures encompass back blows and abdominal thrusts, commonly known as the Heimlich maneuver.¹² The primary objective of administering back blows is to alleviate the blockage with each blow.¹⁴

Various authoritative bodies such as the American Heart Association (AHA), European Resuscitation Council (ERC), and Australian Resuscitation Council advocate for the inclusion of back blows in the initial response to choking incidents.^{14,9,15} Additionally, both the ERC and AHA endorse the incorporation of back blows in conjunction with abdominal thrusts in a rotational manner.^{14,9} In contrast, the Australian Resuscitation Council discourages the use of abdominal thrusts and recommends alternating between chest and back blows exclusively.¹⁵ Some guidelines discourage the use of back blows for children over 1 year old, while others recommend tilting the patient forward before administering back blows to prevent the foreign object from moving deeper into

the airway.^{12,13,16} Abdominal thrusts, the other primary intervention for complete obstruction, may lead to complications such as internal organ rupture.¹⁷ Consequently, certain guidelines suggest replacing abdominal thrusts with chest thrusts as a safer alternative.¹⁸

Regrettably, many individuals lack knowledge about proper first-aid procedures and may resort to dangerous methods when faced with a choking incident. For instance, the instinct to perform a finger sweep often arises when rescuers are unfamiliar with fundamental first-aid principles. Nevertheless, this technique has the potential to dislodge the foreign body and exacerbate the situation.^{19–21} Other misconceptions include offering the patient water to drink or instructing them to halt their breathing. Some individuals may even attempt to hold a child upside down, a practice that can inadvertently push the obstructing object further down into the airways.²²

Several studies conducted in various countries, including Saudi Arabia, Turkey, Ethiopia, and Japan, have explored awareness and knowledge related to choking.^{23–33} Our literature review revealed a widespread lack of knowledge about choking in many countries. Notably, a study conducted in Saudi Arabia revealed that 61.3% of parents in the Al Qassim region and 65.4% of parents in Makkah possessed inadequate knowledge regarding choking, with 55.3% of parents in Al Qassim and 78.6% of parents in Makkah exhibiting unsatisfactory practices.^{26,27} In a study involving Turkish mothers, only 50% demonstrated an adequate level of knowledge regarding foreign body aspiration.³⁰ Furthermore, in Addis Ababa, a mere 37.6% of kindergarten teachers exhibited proficiency in choking initial aid procedures.³¹ Two additional studies conducted in Saudi Arabia, one targeting middle and high school students and the other targeting female university students, highlighted the low level of knowledge regarding choking.^{23,24} However, none of these studies have specifically examined the prevalence of misconceptions surrounding first-aid procedures for choking. Furthermore, no similar investigations have been conducted on this topic in Syria. These findings served as a strong motivation for us to investigate the level of knowledge regarding choking in Syria. Unfortunately, due to Syria's status as a developing country and the impact of ongoing wars on health infrastructure, there are no specific guidelines accredited for first-aid training in Syria. As a result, the general public must rely on emergency training courses held by the Syrian Red Crescent on a voluntary basis, where internationally approved guidelines are utilized. Given that choking is a serious and potentially fatal condition, we have observed the prevalence of incorrect habits within our community when dealing with it. This observation has motivated us to assess the knowledge of Syrian adults regarding choking and the necessary first-aid procedures.

Our study aims to evaluate this knowledge and investigate the prevalence of misconceptions about first aid for choking among Syrian adults. Ultimately, our goal is to train community members and enhance their understanding of first aid for choking, thereby reducing deaths resulting from

this critical condition. This research is of paramount importance in identifying gaps in knowledge and improving public education on this vital subject matter.

Methods

Study design

A descriptive cross-sectional study was carried out to evaluate the general knowledge pertaining to choking incidents and prevalent incorrect first-aid responses among adults in Syria. Due to challenges in reaching the entire Syrian population, the study was carried out using an electronic evaluation survey. We have used the Consensus-Based Checklist for Reporting of Survey Studies (CROSS) in performing the research steps.³⁴

Participants and data collection

We used a convenience sampling technique to recruit Syrian men and women between the ages of 18 and 45 years, residing in Syria. Data collection was facilitated through a structured, self-administered, and anonymous online survey designed using Google Forms. The questionnaire was initially created and published in Arabic, subsequently undergoing translation into English by experts. It was disseminated via various social media platforms from March to July 2022.

The primary objective of this research was to evaluate the general knowledge and awareness of Syrian adults in Syria regarding choking incidents and identify prevalent incorrect first-aid responses. Inclusion criteria for this study included Syrian citizenship, no prior residency outside Syria exceeding 1 year, and an age range of 18–45 years. Conversely, exclusion criteria consisted of individuals below 18 or above 45 years of age, non-Syrian participants, and Syrians with a history of residing outside Syria for more than 1 year. The age bracket was specifically chosen due to the limited availability of samples beyond this range. This limitation primarily stems from lower social media activity levels among older age groups. Consequently, the study was confined to this particular sample, enabling us to extrapolate the findings to this demographic with a higher degree of accuracy. Participants were informed about the study's aims, and written informed consent was obtained from each of them, which included information about the potential benefits of their participation, both for themselves and the wider community. After obtaining their consent, participants completed a structured, self-administered, and anonymous online survey. Rigorous measures were taken to guarantee the confidentiality of all collected data, which was exclusively utilized for statistical analysis.

Questionnaire

The study was approved by the Ethical Committee of the Faculty of Medicine at Damascus University with serial

number (854). This study used a survey that was designed by trauma and first-aid specialists for this research, based on the latest Red Cross website and the established guidelines for first aid in cases of choking.^{12,13,16,22} In formulating its guidelines, Syria places significant reliance on the Red Cross and Red Crescent for first-aid protocols. Therefore, these references were deemed optimal for the construction of this survey, ensuring its suitability for the specific Syrian demographic. The questions reflected the common misconceptions prevalent in our society. A pilot study was conducted on 100 students, and the questionnaire was revised by deleting and modifying some options according to the preliminary statistical analysis. This selection was supported by similar studies and standard first-aid research. The survey was also tested for reliability using Cronbach's alpha test, which yielded an internal consistency of 0.809. This survey encompassed four distinct sections, each serving a specific purpose.

The first section aimed to gather sociodemographic data from participants, including nationality, current residence, age, gender, education level, and employment status. It consisted of nine mandatory questions, with two of them pertaining to the participant's field of study (medical or non-medical) and whether they had undergone any first-aid training. The second section assessed participants' general knowledge concerning choking. It covered aspects such as the definition of choking, its causes, and the age group in which it typically occurs. This section comprised 12 mandatory questions. The third section probed participants' beliefs regarding incorrect procedures and myths associated with choking. It featured five mandatory questions. The fourth section evaluated participants' knowledge of the correct protocol for rescuing a choking individual. This section consisted of seven mandatory questions.

To quantify the levels of knowledge, scores were computed by summing the points allocated for each item, with correct answers receiving one point each. For this study, the 16-point cut-off was used and those who achieved above 16 were considered to have a high level of knowledge. Descriptive statistics, including frequencies and percentages, were utilized to report demographic characteristics, overall levels of knowledge, and the interventions reported by the participants.

Statistical analysis

The data were exported from Google Forms, entered into Microsoft Excel worksheets, and imported into the Statistical Package for the Social Sciences (SPSS®) software version 17.0 (Chicago, USA) for analysis. Descriptive statistics were used to express the data as percentages. Correlations between variables were analyzed using Pearson's correlation coefficient, and the significance of correlations was assessed using the chi-square test for categorical variables. A *p*-value of less than 0.05 was considered statistically significant.

Sample size

The sample size was calculated using Cochran's sample size formula, considering a confidence interval of 95% (where $z=1.96$, $p=0.5$, $q=0.5$):

$$n = \frac{z^2 \cdot p \cdot q}{d^2} \approx 384$$

Results

Demographic factors

In total, 567 participants completed the online survey, but of these, 161 individuals were excluded due to non-Syrian nationality ($n=39$), residency outside Syria exceeding 1 year ($n=101$), and not meeting the age criteria ($n=21$). Therefore, only 406 surveys were included in the analysis. Among these, 156 (38.4%) were male, and 250 (61.6%) resided in urban areas. A significant majority of the participants (91.1%) had received a university or postgraduate level education, with only 8.9% having completed high school. Nearly half of the participants (44.8%) had affiliations with the medical field, either as healthcare professionals or medical students, and 22.7% reported having received first-aid training (Table 1).

Knowledge about the definition of choking

Regarding knowledge about choking, 317 participants (78.1%) correctly identified that choking happens when a foreign body enters the airways. On the other hand, 89 participants (21.9%) did not accurately understand its definition, with some mistakenly believing that the foreign body is lodged in the gastrointestinal tract. Almost half of the participants (194, 47.8%) incorrectly believed that only children were at risk of choking, while a similar proportion (200, 49.3%) recognized that mental illness could increase the risk. Moreover, only 169 participants (41.6%) correctly identified that a person could still be choking even if they were able to speak. This suggests that more than half of the sample had difficulty distinguishing between partial and complete airway obstruction. The incorrect responses have been summarized in "Other answers" section in Table 2, with the complete list of options available in the questionnaire.

Awareness regarding misconceptions about first-aid procedures

Table 3 presents the prevalence of beliefs in some of the most common incorrect first-aid procedures. The majority of participants correctly identified that inserting fingers into the mouth to extract a foreign body (288, 70.9%), offering the casualty a glass of water, and asking them to drink it (266,

Table 1. Sociodemographic data of the participants.

Sociodemographic data	No	%
Gender		
Male	156	38.4
Female	250	61.6
Level of education		
High school education	36	8.9
University or postgraduate education	370	91.1
Place of residence		
Urban	250	61.6
Rural	156	38.4
Field of study or your work is in medical domain		
Yes	182	44.8
No	224	55.2
Having first-aid training		
Yes	92	22.7
No	314	77.3

65.5%) were incorrect procedures. Encouraging the casualty to cough was considered the correct response by 315 (77.6%) participants. However, only a minority of participants considered preventing the casualty from inhaling (144, 35.5%) or turning a child upside down and shaking them (163, 40.1%) to be incorrect procedures.

Knowledge about the correct first-aid procedures

Table 4 provides insights into the public's knowledge about the correct approach to assisting a choking person. A majority of participants (279, 68.7%) knew that they should bend the casualty forward before delivering back blows, while almost half (189, 46.6%) correctly selected the option of administering five blows before switching to another procedure. Additionally, 161 (39.7%) participants correctly identified a mistake in a photo demonstrating the Heimlich maneuver, as it depicted pressure being applied below the navel. Only 140 (34.5%) participants opted for applying the Heimlich maneuver 5–10 times.

The levels of knowledge and its correlation with other variables

Table 5 summarizes the levels of knowledge and their correlation with sociodemographic factors. Out of the participants, 160 (39.4%) scored 16 points or more, while 246 (60.6%) scored less than 16 points. No significant correlation was found between male and female participants ($p=0.249$) or between residents of urban and rural areas ($p=0.913$). However, individuals with a background or work experience in the medical field exhibited higher knowledge levels ($p=0.00$). Nonetheless, 85 out of 182 (46.7%) of these participants scored less than 16 points, indicating a low level of knowledge. Participants who had received first-aid training demonstrated considerably higher knowledge than those

Table 2. Answers regarding general awareness of choking.

Answers regarding general awareness of choking	No	%
The definition of choking		
Entry of a foreign body into the airways	317	78.1
Other answers	89	21.9
Which of the following categories are more likely to choke?		
Children	194	47.8
Children and elderly	142	35
Other answers	70	17.2
Choking by a foreign body is		
A serious condition which requires immediate intervention and may lead to death	372	91.6
Often transient and symptoms will disappear spontaneously	26	6.4
I do not know	8	2
Can movement and laughter while eating increase the risk of choking?		
Yes	400	98.5
No, there is no relation	2	0.5
I do not know	4	1
Does having a mental disease such as Parkinson, Alzheimer, and others predispose to increase the risk of choking?		
Yes	200	49.3
No, there is no relationship	62	15.3
I do not know	144	35.3
Can a small toy (like small cubes) cause choking for a small child?		
Yes, it can	387	95.3
No, it will not unless it is a big toy	14	3.4
I do not know	5	1.2
If you see someone eating and starts coughing with a whistling sound, and his/her face starts to turn red, then he/she asks you to bring a cup of water (that is he/she is still able to talk)		
The person is choking	169	41.6
This is not choking because the person is still breathing and talking	198	48.6
I do not know	39	9.6
If you see someone eating and talking, he/she stops talking suddenly, and his/her face starts turning gray and his/her lips blue, and he/she did not respond when you talked to him/her		
The person is choking	374	92.1
This is not choking because the person is not coughing	11	2.7
I do not know	21	5.2
If you see a case of choking by a foreign body and you want to intervene, what determines the method of your intervention (and you must take it into account): (more than one option can be chosen)		
Age of the casualty	188	46.3
Age and weight of the casualty	63	15.5
Other answers	155	38.2
If you did all the producers allocated to deal with a case of choking by a foreign body, but they did not work and the casualty started to lose consciousness. The correct action in your opinion is		
I continue talking to him/her in order to keep him/her conscious	40	9.9
I spill cold water on his/her head to try to wake him up	3	0.7
I expose the casualty to a strong stinging smell in an attempt to wake him up	13	3.2
I call ambulance immediately and do not do any of the previous actions	312	76.8
I do not know	38	9.4
When should you call the ambulance?		
When I face any case of choking by a foreign body and before attempting to remove it	84	20.7
When I perform one procedure and it did not succeed, for fear of wasting time with the rest of the procedures	165	40.6
When all necessary actions are taken and they fail	143	35.2
I do not know	14	3.4
What should you do until the ambulance arrives?		
I continue to perform first-aid producers	324	79.8
I do nothing and remain calm	29	7.1
I ask for help from anyone I see, regardless of their first-aid experience	31	7.6
I do not know	22	5.4

Table 3. Most common wrong first-aid responses.

Most common wrong first-aid responses	No	%
Inserting the fingers of the hand into the casualty's mouth and trying to extract the foreign body		
Correct	91	22.4
Wrong	288	70.9
I do not know	27	6.7
Bring a glass of water and ask the casualty to drink it		
Correct	80	19.7
Wrong	266	65.5
I do not know	60	14.8
Encourage the casualty to cough		
Correct	315	77.6
Wrong	36	8.9
I do not know	55	13.5
Preventing the casualty from inhalation until the ambulance arrives, for fear of the foreign body withdrawing toward the respiratory tract more		
Correct	113	27.8
Wrong	144	35.5
I do not know	149	36.7
Turn the child upside down and shake him		
Correct	183	45.1
Wrong	163	40.1
I do not know	60	14.8

who had not ($p=0.00$). Nevertheless, 39 out of 92 (42.4%) of the trained participants were classified with a low level of knowledge. Finally, participants with higher education levels (university or postgraduate) displayed better knowledge compared to those with a high school education or lower ($p=0.001$). Nonetheless, 155 out of 370 (41.9%) of these highly educated participants had a low level of knowledge.

Discussion

This research aims to assess the extent of knowledge within the Syrian community concerning incidents of choking and the accurate execution of initial lifesaving aid procedures. Choking poses a life-threatening emergency situation that can rapidly lead to cerebral ischemia and fatality within minutes.⁵ Prompt intervention through correct initial aid procedures is crucial for rescuing choking victims, especially when emergency medical services or transportation to a healthcare facility may be delayed. Nevertheless, the application of incorrect initial aid techniques has the potential to worsen the situation and inflict further harm upon the affected individual.^{19–21} Our findings in this study indicate a significant lack of basic knowledge regarding choking and requisite initial aid response. Among the study participants, 246 individuals (60.6% of the sample) scored below 16 points, indicating a notably low level of knowledge. These results align with a comparable study targeting Saudi parents, where 55% exhibited a moderate level of awareness, while 39% exhibited a low level of awareness.²⁵ Similarly, a separate study conducted in Saudi Arabia revealed that

61.3% of parents in the Al Qassim region and 65.4% of parents in Makkah possessed inadequate knowledge regarding choking, with 55.3% of parents in Al Qassim and 78.6% of parents in Makkah exhibiting unsatisfactory practices.^{26,27} In a study involving Turkish mothers, only 50% demonstrated an adequate level of knowledge.³⁰ Furthermore, in Addis Ababa, 37.6% of kindergarten teachers exhibited proficiency in choking initial aid procedures.³¹ Collectively, these findings show variable levels of knowledge in different communities about choking—a potentially fatal incident that can be resolved with simple first-aid procedures.

In our study, we observed no statistically significant correlations between the gender or geographic location of the participants and their levels of knowledge pertaining to choking. Similar research conducted in Saudi Arabia has yielded varying results. Specifically, studies conducted in Riyadh have indicated that males tended to exhibit superior scores in terms of accurate responses and overall awareness levels, both among students and parents.^{23,25} Conversely, investigations targeting parents in the Al Qassim region and Makkah city have indicated that females displayed heightened levels of knowledge in this domain.^{26,27}

Our study revealed that participants possessing university or postgraduate education, those employed in the medical field, and individuals who had undergone first-aid training exhibited statistically higher knowledge levels. These findings align with the outcomes of three related studies conducted in both Turkey and Saudi Arabia, emphasizing the existence of elevated knowledge levels among individuals with higher educational backgrounds.^{25,26,29} Nevertheless, it

Table 4. Awareness of the correct way to perform first aid.

Awareness of the correct way to perform first aid	No	%
If you want to give the casualty blow on the back to expel the foreign body, how do you do the procedure?		
The first method: first I Make the casualty bend forward and then start hitting	279	68.7
The second method: I start hitting directly without any change in the position of the casualty, of course, for fear of increasing the condition	21	5.2
There is no difference between the two methods	17	4.2
I do not prefer the procedure of hitting on the back, and it is not the best method, as it is a harmful and ineffective method	57	14
I do not know	32	7.9
You started hitting the casualty's back. How many blows do you hit?		
A blow to a maximum of two blows so that the casualty does not suffer	47	11.6
Approximately 5 blows	189	46.6
7–10 blows	53	13.1
I do not know	117	28.8
What should you do if the back-hitting procedure did not work?		
Turn to another emergency procedure	312	76.8
I increase the force of the blows, as perhaps my previous strikes were not strong enough	28	6.9
I asked the casualty to wait for the ambulance, I did my part	30	7.4
I do not know		
Turn to another emergency procedure	36	8.9
Heimlich maneuver is an emergency procedure that involves applying pressure to the abdomen to remove the foreign body. Based on your knowledge, is it applied correctly in the adjacent image?		
Yes, I don't see anything wrong with the picture	167	41.1
No, there is a mistake in the execution of the maneuver	161	39.7
I don't know, I don't have any information about Heimlich maneuver	78	19.2
How is the pressure applied in the Heimlich maneuver?		
Below the navel to the back and top	35	8.6
Below the navel to the back and below	6	1.5
Above the navel to the back and top	272	67
Above the navel to the back and below	13	3.2
I do not know	80	19.7
How many times do you apply pressure in Heimlich maneuver?		
Once at most, it is a violent procedure and it can exhaust the casualty	21	5.2
Approximately 5–10 times until the choking stops	140	34.5
Depending on whether he is a child or not. The number of times varies according to the age of the patient	127	31.3
I do not know	118	29.1
Which of the following categories we avoid applying pressure on their abdomen, instead, we apply to their chest (more than one option can be chosen)?		
Pregnant women, children under the age of a year, and obese people	19	4.7
Other answers	387	95.3

is important to acknowledge that a study conducted in Dammam city, Saudi Arabia, did not identify any substantial disparities in choking-related knowledge between participants who had completed high school and those who had attained a college-level education.²⁸

Notwithstanding their higher knowledge compared to the remainder of the participant cohort, 85 out of 182 (46.7%) participants from the medical field, 39 out of 92 (42.4%) who had received first-aid training, and 155 out of 370 (41.9%) with higher educational qualifications scored below 16 points, indicative of a low level of knowledge. These findings accentuate the necessity of improving the existing first-aid training, not merely within the general populace but

also among medical practitioners and those enrolled in first-aid programs.

In our survey, certain myths and incorrect procedures were intentionally included to assess their prevalence among the participants. One such erroneous practice is the finger sweep technique, a commonly employed but incorrect intuitive approach for addressing choking incidents. Unfortunately, this method can exacerbate the obstruction by inadvertently dislodging the foreign body or even causing harm to the rescuer, as indicated in prior research.^{19–21} Our study, in line with a study conducted in Addis Ababa, found that 29.1% of participants were unaware of the inadvisability of inserting their fingers into the victim's mouth to extract the foreign body.³²

Table 5. Correlation between levels of awareness and sociodemographic factors.

Correlation between levels of awareness and sociodemographic factors	High level of awareness	%	Low level of awareness	%	p-Value*
All sample	160	39.4	246	60.6	
Gender					
Male	67	16.5%	89	21.9%	0.249
Female	93	22.9%	157	38.7%	
Level of education					
High school education	5	1.2%	31	7.6%	0.001
University or postgraduate education	155	38.2%	215	53.0%	
Place of residence					
Urban	98	24.1%	152	37.4%	0.913
Rural	62	15.3%	94	23.2%	
Field of study or your work is in medical domain					
Yes	97	23.9%	85	20.9%	0.00
No	63	15.5%	161	39.7%	
Having first-aid training					
Yes	53	13.1%	39	9.6%	0.00
No	107	26.4%	207	51.0%	

P: Pearson X2 test * $p < .05$ (significant).

Notably, the situation was worse in Saudi Arabia, with 50.0% of parents in Riyadh, 77.1% in Al Qassim region, and 79.4% in Makkah indicated their intention to employ the finger sweep technique.^{25–27}

Another common misconception related to choking involves the practice of offering water to the afflicted individual. This misunderstanding arises from an inaccurate definition of choking. Remarkably, 21.9% of our study participants were unfamiliar with the precise definition of choking, with some erroneously believing that the foreign body is lodged in the gastrointestinal tract. Consequently, 34.5% of participants were unaware that providing water is not an effective intervention for choking. These findings align with two related studies, both of which reported comparable levels of inadequate knowledge regarding water provision during choking incidents. Specifically, 55.1% of Saudi parents in Riyadh and 43.8% of kindergarten teachers in Addis Ababa acknowledged a propensity to offer water to a choking child.^{25,31}

Another misguided intervention involves suspending a choking child by their feet and hanging them upside down. Surprisingly, in our study, 59.9% of participants failed to recognize this as an incorrect procedure, which aligns with the Riyadh study, where 64.6% of parents held a similar perception.²⁵

The recommended initial response for a choking patient with complete obstruction who cannot cough is the administration of back blows.¹² However, two studies conducted in Saudi Arabia revealed inadequate awareness regarding the appropriate application of back blows. In these studies, 90.6% of parents in the Al Qassim region and 68.4% of parents in Makkah expressed their intent to administer back blows even if the patient was capable of speech.^{26,27} In our

study, only 68.7% of participants were aware of the necessity to position the patient forward before delivering back blows. These research findings collectively underscore the imperative of imparting accurate training on the correct method for rescuing a choking individual while dispelling prevailing misconceptions among the general populace. The disconcerting outcomes of these studies may be attributed to the inadequate availability of public training courses, coupled with the limited recognition among the public regarding the significance of such training. Additionally, the absence of pertinent educational materials within school curricula and the inadequacy of practical training within medical faculties in Syria may also contribute to this predicament. Notably, our study disclosed that 42.4% of participants who had undergone first-aid training exhibited low level of knowledge. Similar results were obtained in a Saudi study conducted in Madinah City, where only 12.8% of mothers, despite more than one-third of them having attended first-aid courses, demonstrated proper knowledge in dealing with choking incidents.³⁵ These findings prompt critical inquiries concerning the effectiveness of first-aid courses and underscore the pressing need for their enhancement.

Some recommendations that can be useful to improve the general knowledge about choking include using modern simulation training rather than traditional theoretical instructions. For example, augmented reality and virtual reality simulations can enhance recall and recognition of choking symptoms and the correct response procedures. Moreover, displaying informative posters containing comprehensive information and instructions pertaining to the symptoms and management of choking in key locations, such as kindergartens, elderly care facilities, restaurants, and cafes, would

serve as visual reminders and reinforce essential knowledge in environments where choking incidents commonly occur.

For future research, we propose including a larger number of participants from all age groups to form a more representative sample. Interviewing medical personnel to gain insights into their decision-making processes when confronted with choking incidents will provide helpful qualitative data, facilitating a deeper understanding of their knowledge gaps related to choking and appropriate first-aid responses. Employing open-ended questions will help to elucidate the participants' misconceptions and areas of knowledge deficit. Additionally, it is important to identify the problems with first-aid courses and medical training programs for medical students. This could be accomplished through comparative analyses, evaluating the differential impact of training on knowledge acquisition between standard first-aid courses and enhanced programs featuring more hands-on training tailored to diverse emergency scenarios. Lastly, we recommend that future research explore levels of knowledge concerning accurate first-aid procedures and prevalence of misconceptions across a spectrum of emergency situations, including drowning, car accidents, epileptic seizures, burns, and others.

Limitations

This study has certain limitations that necessitate caution in generalizing the findings. We did not inquire about the recency of the participants' training or whether they completed it. The survey did not ask whether the participants had faced choking incidents and how they reacted to it. Moreover, the use of an electronic survey distributed through social media platforms may have introduced sampling bias, as it might not have captured the perspectives of all Syrian individuals, particularly older participants who may be less active on such platforms. Furthermore, the relatively high proportion of participants from the medical field or with first-aid training may potentially lead to an overestimation of awareness levels within the wider community. Consequently, it is plausible that the true level of awareness could be lower than what our study observed. Lastly, we restricted the inclusion criteria to participants between 18 and 45 years old. This eliminated the elderly population, who compose an important part of the Syrian society with a higher risk of choking.

Conclusion

The results of this study indicate that the Syrian populace lacks sufficient knowledge pertaining to choking. To address this, we recommend enhancing first-aid training, with a particular focus on practical instruction and correcting prevalent misconceptions. Furthermore, these courses should be more accessible to different classes of the Syrian community. Lastly, public health initiatives and preventive measures regarding choking should be enhanced, along with the promotion of first-aid training.

Acknowledgements

We would like to thank Dr. Rateb Al Balkhi for his valuable help with the statistical analysis.

Author contributions

YR wrote the Discussion, AAB wrote the results and the tables, IA wrote the methods, AAB wrote the introduction. All authors participated in reviewing the literature, preparing the survey, and collecting the data. RA and YR supervised the conduct of the study. All authors read and approved the final manuscript.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

Ethics approval

Ethical approval for this study was obtained from the Ethical Committee of the Faculty of Medicine at Damascus University with serial number (854).

Informed consent

Written informed consent was obtained from all the participants.

Trial registration

Not applicable.

ORCID iDs

Yahia Ranjous  <https://orcid.org/0009-0005-1681-2198>

Abdulrahman Al Balkhi  <https://orcid.org/0009-0005-1405-3714>

Jamal Ataya  <https://orcid.org/0000-0003-4848-6719>

Supplemental material

Supplemental material for this article is available online.

References

1. Salih AM, Alfaki M and Alam-Elhuda DM. Airway Foreign bodies: a critical review for a common pediatric emergency. *World J Emerg Med* 2016; 7(1): 5–12.
2. Taniguchi Y, Iwagami M, Sakata N, et al. Epidemiology of food choking deaths in Japan: time trends and regional variations. *J Epidemiol* 2021; 31(5): 356–360.
3. Berzlanovich AM, Fazeny-Dörner B, Waldhoer T, et al. Foreign body asphyxia: a preventable cause of death in the elderly. *Am J Prev Med* 2005; 28(1): 65–69.
4. Guazzo E and Burns H. Paediatric inhaled airway foreign bodies: an update. *Aust J Gen Pract* 2019; 48(4): 171–174.
5. Gardner H, Baum C, Dowd M, et al. Policy statement-prevention of choking among children. *Pediatrics* 2010; 125: 601–607.
6. Wu WS, Sung KC, Cheng TJ, et al. Associations between chronic diseases and choking deaths among older adults in the

- USA: a cross-sectional study using multiple cause mortality data from 2009 to 2013. *BMJ Open* 2015; 5(11): e009464.
7. Hwang SJ, Tsai SJ, Chen IJ, et al. Choking incidents among psychiatric inpatients: a retrospective study in Chutung Veterans General Hospital. *J Chin Med Assoc* 2010; 73(8): 419–424.
 8. Austin M, Armstrong VJ, Ambulance (England) SJ, et al. *First aid manual: the authorised manual of St. John Ambulance, St. Andrew's first aid and the British Red Cross*. London: Dorling Kindersley, 2014, p. 288.
 9. Olasveengen TM, Semeraro F, Ristagno G, et al. European resuscitation council guidelines 2021: basic life support. *Resuscitation* 2021; 161: 98–114.
 10. Pavitt MJ, Nevett J, Swanton LL, et al. London ambulance source data on choking incidence for the calendar year 2016: an observational study. *BMJ Open Respir Res* 2017; 4(1): e000215.
 11. Duckett SA, Bartman M and Roten RA. Choking. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing, <https://www.ncbi.nlm.nih.gov/books/NBK499941/> (2023, accessed 19 September 2022).
 12. Perkins GD, Handley AJ, Koster RW, et al. European resuscitation council guidelines for resuscitation 2015: section 2. Adult basic life support and automated external defibrillation. *Resuscitation* 2015; 95: 81–99.
 13. A WFA-First-Aid-E-Manual-V-6.3-Mar-2021.pdf, <https://cdn.australiawidefirstaid.com.au/wpcontent/uploads/2021/04/29205857/AWFA-First-Aid-E-Manual-V-6.3-Mar-2021.pdf> (accessed 7 May 2023).
 14. Upendrababu V. *Current changes in adult basic life support: based on recent guidelines of AHA*, 2018.
 15. Australian and New Zealand Resuscitation Councils. *ANZCOR guideline 4—Airway*, <https://resus.org.au/guidelines/> (2016).
 16. Berg MD, Schexnayder SM, Chameides L, et al. Part 13: pediatric basic life support. *Circulation* 2010; 122(18_suppl_3): S862–S875.
 17. Ebrahimi M and Mirhaghi A. Heimlich maneuver complications: a systematic review. *Eurasian J Emerg Med* 2019; 18: 157–165.
 18. New Zealand Resuscitation Council. *ANZCOR Guidelines*, <https://www.resus.org.nz/healthcare-resources/guidelines/> (accessed 7 May 2023).
 19. Abder-Rahman H. Infants choking following blind finger sweep. *J Pediatr (Rio J)* 2009; 85: 273–275.
 20. Kabbani M and Goodwin SR. Traumatic epiglottitis following blind finger sweep to remove a pharyngeal foreign body. *Clin Pediatr (Phila)* 1995; 34(9): 495–497.
 21. Hartrey R and Bingham RM. Pharyngeal trauma as a result of blind finger sweeps in the choking child. *J Accid Emerg Med* 1995; 12(1): 52–54.
 22. British Red Cross. First aid for a child who is choking, <https://www.redcross.org.uk/first-aid/learn-first-aid-for-babies-and-children/choking-child> (accessed 9 May 2023).
 23. Alshehri KA, Alharbi AA, Yaghmoor BE, et al. Awareness of the first aid management of foreign body aspiration among students: a cross-sectional study. *J Educ Health Promot* 2019; 8: 220.
 24. Halawani LM, Alghamdy SD, Alwazae MM, et al. Knowledge and attitude of Saudi female university students about first aid skills. *J Fam Community Med* 2019; 26(2): 103–107.
 25. Habeeb KA and Alarfaj G. Saudi parents awareness regarding burn, choking, and drowning first aid in children. *J Fam Med Prim Care* 2020; 9(3): 1370–1375.
 26. Bin Laswad BM, Alsulaimani HM, Alomairi MM, et al. Parental knowledge and practices related to foreign body aspiration in children in Makkah, Saudi Arabia. *Cureus* 2023; 15(2): e34816.
 27. Almutairi AT and Alharbi FS. Parental knowledge and practices toward foreign body aspiration in children in the Al Qassim region of Saudi Arabia. *J Fam Med Prim Care* 2021; 10(1): 199–204.
 28. Al-Qudehy Z, Al-Sheif H and Al-Qudaihi G. Parental knowledge of foreign body aspiration: a comparative study between Saudis and other nations. *J Otolaryngol-ENT Res* 2015; 2: 00008.
 29. Kiliçaslan Ö, Türen B, Özkan A, et al. Foreign body aspiration in children: a survey based study. *Balıkesir Med J* 2021; 5: 144–150.
 30. Ozdogan S, Sahin G, Avci O, et al. Mothers' knowledge on foreign body aspiration. *YMJ* 2015; 11(36): 935–944.
 31. Maalim Issack A, Jiru T and Wubetie Aniley A. Assessment of knowledge, attitude and practice on first aid management of choking and associated factors among kindergarten teachers in Addis Ababa governmental schools, Addis Ababa, Ethiopia. A cross-sectional institution-based study. *PLoS One* 2021; 16(7): e0255331.
 32. Ganfure G, Ameya G, Tamirat A, et al. First aid knowledge, attitude, practice, and associated factors among kindergarten teachers of Lideta sub-city Addis Ababa, Ethiopia. *PLoS One* 2018; 13(3): e0194263.
 33. Higuchi O, Adachi Y, Adachi YS, et al. Mothers' knowledge about foreign body aspiration in young children. *Int J Pediatr Otorhinolaryngol* 2013; 77(1): 41–44.
 34. Sharma A, Minh Duc NT, Luu Lam Thang T, et al. A consensus-based checklist for reporting of survey studies (CROSS). *J Gen Intern Med* 2021; 36(10): 3179–3187.
 35. Al-Johani AAS, Sabor S and Aldubai SAR. Knowledge and practice of first aid among parents attending Primary Health Care Centers in Madinah City, Saudi Arabia, A cross sectional study. *J Fam Med Prim Care* 2018; 7(2): 380–388.