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Education for parents regarding choking prevention and handling on children: a scoping review

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ABSTRACT

Choking is a pediatric emergency that threatens life. Choking occurs in 80% of under three-year-old children worldwide. Many children do not receive help since the aid provider fears causing harm due to the absence of choking case knowledge. Improving parent's knowledge can decrease choking risk in children that threatens life. This scoping review aimed to identify education provision regarding foreign body aspiration on children. This study was a scoping review with choking handling articles to identify education provisions regarding choking handling on children. Article search was carried out using internet databases, i.e., PubMed, Proquest, and Sciencedirect. The selection was performed using a PRISMA flow diagram. The search results obtained 1,081 literatures, title-screening excluded 948 articles and obtaining 98 articles to be tested for eligibility. The 91 articles with unrelated objectives were excluded. Seven remaining articles following the inclusion criteria were identified. Providing education for parents about choking prevention and handling on children is an essential component of the public health approach as video-based e-learning program, direct learning, installation of hazard warning of choking. Educational programs will be effective when utilizing various information sources and assigning additional healthcare providers tasks to educate parents and the community.

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1. INTRODUCTION

Choking conditions create an emergency condition in children because of foreign objects that enter the respiratory tract so that it can endanger lives and become a serious public health problem [1]. Choking is a cause of injury that often occurs in children under three years old and can result in morbidity and the fourth leading cause of death in the world in children [2]. One of the causes of accidental death that occurs at home and reaches 7% of sudden deaths in children aged three years is choking. Foreign objects due to food are a common cause of choking events. Choking occurs in 80% of under three-year-old children worldwide with a case increment in 1-2-year-olds, where the incidence reaches 0.6 cases per 100,000 children [3], [4]. Choking accounts for 5% of all deaths in children under four years of age in the United States and is the leading cause of death in children under six years of age occurring at home [5].

The 90% of children under five can experience death due to obstruction of foreign objects in the respiratory tract [6], [7]. At that age, children experience a developmental stage called the oral phase, wherein in this phase, the child can feel pleasure from oral stimulation through satisfying activities such as tasting and eating objects around them [8]. The severity depends on characteristics, such as form,

consistency, and size of objects or food [9]. Foreign bodies that are large and round can cause total airway obstruction and more rapid death [10].

Almost all choking conditions in children occur under adult supervision. It indicates knowledge from parents in child supervision is still lacking [11]. Many children do not receive help because potential helpers are afraid of causing harm by not studying choking cases, specifically providing help for children [12]. Research from Bentivegna *et al.* [13] reported that from 218 participants there was a positive change in mother's knowledge given after education related to prevention and treatment of choking in children using internet-based educational videos with p=0.001. Improving parental knowledge can play a pivotal role in decreasing choking risk in children that threatens life [5]. Therefore, a scoping review is necessary to observe education recommendation regarding choking prevention and handling on children. This review aimed to identify education for parents regarding choking prevention and handling on children.

2. RESEARCH METHOD

This study was a scoping review with choking handling articles to identify education concerning choking handling on children using study questions and PRISMA checklist. Furthermore, the scoping review data used a diagram encompassing identification, screening, eligibility selection, and inclusion criteria assignment. In the final stage, the review was performed by synthesizing literature.

2.1. Study question

The study question is, "How to provide an appropriate education for parents regarding choking prevention and handling on children?"

2.2. Strategy of relevant journal identification from title/abstract

The article search was limited to English articles accessed from internet databases of PubMed, Proquest, and Science Direct. The literature was published between 2010 and 2020 with keywords of choking, children, education, parents, prevention, and handling.

2.3. Document selection

The selection process utilized a tool, i.e., meta-analyses (PRISMA) and preferred reporting items for systematic reviews. Duplicates were deleted, while one author carried out the title and abstract screening. After the filtering process, full-text articles were read. The results were adjusted to inclusion and exclusion criteria, obtaining journals following the study question criteria. The articles discussed were articles with objectives relevant to the theme, i.e., discussing efforts to improve parent's knowledge in preventing and handling choking in children, a quantitative study, and having parents as the population. Meanwhile, the exclusion criteria were non-full-text and non-English articles. Articles fulfilling the inclusion criteria were systematically checked and collected.

2.4. Screening and eligibility

The screening is carried out by researcherswas performed by selecting journal articles relevant to the study objectives, eligibility, and similarities. The selection of included articles was a selection process based on existing inclusion and exclusion criteria. Through the screening results of 1,046 articles, 948 articles were issued so that 98 articles met the criteria and produced seven articles that matched the criteria.

3. RESULTS AND DISCUSSION

The search results obtained 1,081 literature, with 30 articles from PubMed, 418 articles from Science Direct, and 633 articles from Proquest based on the keywords. These articles were gathered and screened. Title-screening excluded 948 articles due to the unsuitable title, duplicate article, and did not have a full text; hence, obtaining 98 articles to be tested for eligibility. A total of 91 articles were excluded since they are only theoretical reviews, opinions, articles, issues, systematic reviews, qualitative studies, and irrelevant study objectives. Therefore, articles relevant to the study question and following the inclusion criteria were seven.

Seven articles consist of two studies cross sectional study [14], [15], two studies retrospectives study [16], [17], one studies quasi experimental [13], one cohort study (prospective) with a design uncontrolled pre and post test [18], and one studies pre and post study with controlled group [19]. The search and literature selection flow diagram is presented in Figure 1. The summary of seven articles is presented in Table 1 (see Appendix).

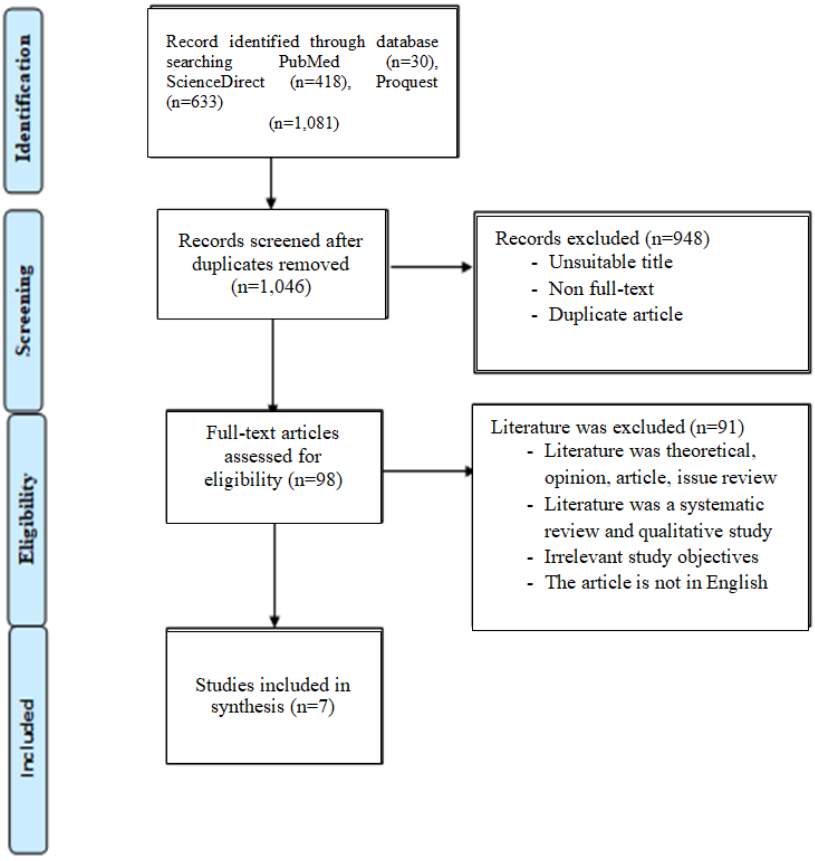

Figure 1. Flow diagram of the literature selection using PRISMA

Choking is a condition that increase morbidity and mortality among children. It requires awareness for the family. The objects that most often make children experience choking and shortness of breath that require emergency services are caused by coins, hot dogs, balloons, candy, marbles, and grapes [20], [21]. Cases that often occur and become a problem in public health but are often ignored, one of which is the case of choking [22].

The choking cases' diagnosis is often delayed, where in about some cases, the diagnosis is made after more than 24 hours [23], [24]. It can be prevented if parents/adults can identify the risk factors [23]. One of the factors associated with parents is they do not recognize the signs and symptoms of aspiration in children, such as sudden coughing and choking [25]. If the parents do not know that these symptoms are typical of a choking case, they will not suspect that their child has experienced choking even though they have noticed these symptoms [26]. Therefore, parents need to be educated about the causes and signs of choking [14], [27].

Parents should prevent choking among their children, such as screaning risky foods that children should not eat (for example nuts) [28]. Excessive activity while eating, such as laughing, walking, and crying when handling toys or other small materials, increase choking risk in children, but many parents are less awere about it [29]. Choking cases occur due to the lack of knowledge of the children's parents and caregivers, so it is realized that the community's knowledge regarding this matter must be improved [30], [31]. Parents and caregivers need to be knowledgeable in order to recognize food and non-food objects that can cause choking in children [32]. Providing education for parents is an essential component of the public health approach [13].

In its development, the available evidence on how to increase parental knowledge about the dangers and prevention of choking is still limited [33]. There needs to be developed evidence of the importance of health care providers providing education for choking children. The lack of research in choking for infants and children has resulted in the highlighting of the provision of education for parents [34]. The problem of children experiencing choking and parental anxiety adds encouragement to the broad application of strategies to improve parental skills in recognizing and understanding choking [32]. Several efforts can be performed as education for parents, including: video-based e-learning program, direct learning, and installation of hazard warning of choking, either directly or through objects.

3.1. Video-based e-learning program

The American Heart Association argues that self-instruction exercise is a cost-effective and resource-effective lay-people learning process for many populations [35]. Effective basic life support in children is very dependent on the success of initial treatment or the implementation of first aid and the duration of hypoxia so that it becomes a significant relationship in the survival chain [36]. The video-based e-learning program is the provision of choking procedures for children and the provision of cardiopulmonary resuscitation (CPR) based on European Resuscitation Council guidelines recorded on video and then given free access for parents who participate in the program [37], [38]. The result was that parents are expected to demonstrate the procedure adequately. Media that can be used such as pillow mannequins in order to demonstrate the necessary steps, accessing the nose and mouth, including head-tilt chin-lift, viewing chest movements, accessing the nose and mouth, the correct depth of chest compressions, face up for a chest thrust when choking, and positioning the baby head lower than the body in a prone position to backslaps [39]. Each participant was also asked to perform 100-120 compressions per minute with a ratio of 30 compressions for 2 breaths and the execution rate of compressions was observed [18], [37].

According to Bentivegna *et al*. [13], internet-based educational video interventions in both the short (direct) and long term (30 days) could increase parental knowledge. As a start, several questions were asked about parental knowledge to evaluate video provision. Computer-based video interventions are effective for public education because less face-to-face time is required and the potential to provide more in-depth and customizable content. It has been shown to promote factors other than child safety and health to the prevention of choking [15].

3.2. Direct learning

Direct learning can be provided to parents and educators using several stages [40]. The training-based intervention for choking in children is currently the most feasible and realistic way to reach as many families as possible [41], [42]. Choking education interventions in children can be provided by experienced people such as professional trainers in schools through three intervention strategies: targeting parents, teaching staff, and health service staff [43], [44]. Interventions that can be given include: i) learning from professional trainers on how to prevent choking cases early on and safe feeding to avoid choking cases [45]; ii) heimlich manuver training to handle foreign body aspiration on children (secondary prevention) that is demonstrated by a certified trainer from Italian society of pediatric emergency medicine (SIMEUP) [46]; iii) remote learning through Massive Open Online Course (MOOC) to strength learning content. Choking hazard education programs in children have the potential to reduce exposure to choking hazards by reducing subsequent choking morbidity and mortality [19], [38].

3.3. Installation of hazard warning of choking

Learning to use media is only limited in a long time, for that it is necessary to put labels on both food and non-food objects related to choking hazard warnings and written notification. As a result, many parents do not realize that they are exposing their children to choking hazards [47]. Therefore, according to Nichols *et al*. [15], instructions are needed on recognizing food and non-hazardous foods. Evaluations are assessed with an appropriate ability to identify food or non-food choking hazards. There needs to be a success from public and private consumer education efforts to make parents aware of household items that pose a choking risk [29]. Websites discussing choking are widely available for primary care providers and parents to choose appropriate informational options [27]. An effective education program will introduce the prevention and management of choking cases in the community [48].

Educational programs will be most effective if they use multiple sources of information [49]. It can be achieved by giving out posters or leaflets and giving the health care provider additional tasks to provide education for parents and the community [50]. Educational programs in the mass media and food warning labels on hazardous foods that can cause choking in children are additional educational modalities [51]. These educational measures' effectiveness will be influential when parents also obtain information from educated friends, family, and social media [15], [29]. This scoping review has limitations including research articles that are in accordance with the review topic in the last five years are limited and cannot be accessed because they are paid and general research variables result in a long screening process. The results obtained require cross-sector collaboration between the government, health workers, caregivers, and parents so as to increase the need for the latest evidence with better research quality.

4. CONCLUSION

Education on choking case prevention and handling on children is effective for parents/caregivers. Education can be delivered through various methods, e.g., using education videos with steps of choking prevention on children that is easily and repeatedly accessible for continuous learning for parents, direct

learning through training for parents as the first responder conducted in a school by a certified trainer, and support from the government or food producer by putting hazard warning of choking or through education media such as mass media, posters, and others. Educational programs will be effective when utilizing various information sources. It also can be achieved by assigning additional healthcare providers tasks to educate parents and the community.

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APPENDIX

Table 1. Results of data extraction

No.	References	Year of publication	Method	Objective	Result
1	[14]	2012	Cross sectional study using a knowledge questionaire	To evaluate maternal knowledge regarding foreign body aspiration (FBA) and determine factors related to minimal knowledge	The 4.3% of mothers did not understand that small toys are the cause of choking in children, 20.2% did not know that peanuts and other nuts can be the cause, and 48.1% did not know that they should not give peanuts to under three-year-old children. Regarding clinical signs, 27.7% of mothers did not know that sudden choking and coughing are symptoms indicating choking. Many mothers were lacking knowledge about choking. To prevent choking, a proper introduction to parents, especially mothers of children under 12 months and mothers of first children, is needed.
2	[16]	2016	Retrospective study	To explain complications generated by foreign body aspiration on children. To analyze the importance of education so that parents realize aspiration risks.	The best treatment was prevention through improving the education of parents and caregivers. Many mothers were less aware of the incidence of aspiration of foreign bodies in children. Therefore, it is essential to offer appropriate information, especially to mothers with children under 12 months. Quick diagnosis and direct control through a particular team are vital in ensuring proper assistance for children who experience choking.

Table 1. Results of data extraction (*continued*)

No.	References	Year of publication	Method	Objective	Result
3	[13]	2018	Quasi experimental design	To analyze the effect of educational interventions on the dangers of choking on knowledge and prevention of choking in children	The mean value of the change in knowledge scores from pretest to posttest between the control group (μ= 0.14, =1.05) and the intervention group (μ=1.88, =1.20); t(200)=-10.99, p<0.001. Questions related to knowledge obtained 5 out of 7 questions showed a significant change in score from pretest to posttest (p=0.001-0.027). Increasing parental knowledge could reduce the incidence of choking in children.
4	[18]	2019	Cohort study (Prospective) with a design uncontrolled pre and post test	To assess the implementation of the e-learning program in handling choking babies using a baby pillow mannequin	The implementation of an e-learning program using a pillow mannequin has an effect on parents' confidence in helping children when choking and CPR (p<0.001). More than 90% showed the baby's correct position when choking, correctly identified the ratio of chest compressions to breaths, and performed chest compressions to the required depth. The self-learning program combined with the baby pillow mannequin allows parents to learn the procedure when the baby is choking and to show support for basic life support.
5	[19]	2019	Pre and post study with controlled group	Setting up a pilotarrangement for a family community to learn how to prevent choking on food in children and to increase knowledge about nutrition in children, this is called the choking prevention project (CHOP)	Providing educational interventions about food choking in children is very important for parents before the child is six months old and consuming foods that have a solid texture and are better if given when the mother is still pregnant. The implementation of the CHOP intervention in the family can minimize the incidence of choking trauma cases in children and increase the knowledge of caregivers and parents about child nutrition.
6	[17]	2019	Retrospective study	To identify the effect of hazard warning on the number of foreign body aspiration (FBA) in Israel	Ninety children came to the hospital complaining of foreign body aspiration. Forty-six (51%) of the patients were men, and the mean age was 3.5 years. The objects that most often cause aspiration were various types of nuts and seeds.
7	[15]	2012	Cross sectional study	To evaluate parental knowledge on hazards of choking from food and non-food	This study had 492 respondents. Parental knowledge regarding choking dangers due to food for children 42%; 76% take care when eating, correct action= 25%, 62% know CPR, 57% always cut food into smaller pieces. Information on choking hazard due to objects other than food is obtained from i.e., internet (25%), physicians (67%), books/magazines (40%), family/friends (52%), and the Parental knowledge about dangerous foods causing choking conditions in children was still lacking. From these results it is known that education for parents about choking in children needs to be improved again.