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Basic choking education to improve parental knowledge

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ABSTRACT

Objective: To evaluate the effect of an educational intervention on parental knowledge of choking hazards and prevention.

Methods: A quasi experimental study was performed utilizing an internet based educational video intervention for parents with a child 6 months to 4 years old presenting to a Pediatric Otolaryngology clinic at a Level 1 pediatric hospital. Following the clinic visit, participants were sent a choking video (intervention) or general safety video (control) with a pretest and posttest knowledge survey (via email). An additional posttest knowledge survey was sent 30 days later as a surrogate measure for knowledge retained over time. Frequencies, chi square test, Independent *t*-test and McNemar's test were used for statistical analyses.

Results: 202 participants viewed the video and completed both the pretest and immediate posttest knowledge survey. Average change in total knowledge scores from the pretest to immediate posttest was statistically significant between the intervention ($\mu = 1.88$, $\sigma = 1.20$) and control group ($\mu = 0.14$, $\sigma = 1.05$); $t(200) = -10.99$, $P < .001$. This finding was consistent when assessing change from the pretest to 30 day posttest between the intervention ($\mu = 1.41$, $\sigma = 1.32$) and control group ($\mu = 0.17$, $\sigma = 1.41$); $t(118) = -4.95$, $P < .001$. A majority of the knowledge questions (5 of 7) showed a significant change in score from the pretest to immediate posttest ($P = .001$-$.027$). Additional analyses revealed accuracy on 4 of 7 knowledge questions significantly changed from the pretest to 30 day later posttest ($P < .001$- $.002$).

Conclusion: The brief educational video overall improved parental knowledge of choking hazards and prevention immediately after the video and 30 days later. Importantly, improved parental knowledge may decrease rates of choking among children.

1. Introduction

Choking with asphyxiation is a major cause of morbidity and mortality for children, particularly ages 3 years and younger [1–7]. In 2016, 255 children ages 0–19 years old died from an incident involving obstruction of the respiratory tract by food or nonfood objects in the United States (CDC Wonder, *unpublished data*, 2018). Even more children visited the emergency department (ED) for a nonfatal food related choking incident, at a rate of 20.4 (95% CI: 15.4–25.3) per 100,000 visits from 2001 to 2009 [1]. The true incidence of nonfatal choking is likely higher considering those who do not seek medical care [8].

Both food and nonfood objects pose a choking threat to children. Particular food items of concern include hot dogs, peanuts, grapes, seeds, popcorn, candy, meat, and carrots [2,5,9,10]. Nonfood choking items, such as latex balloons, lithium "button" batteries and coins, also pose a serious threat [11–13]. Children specifically are at increased risk of choking because they lack mature mastication and swallowing capacities and have smaller airway diameters compared to adults [2,5,14,15]. They also lack the cognitive ability to identify edible and inedible objects, distract easily, and participate in mouthing behaviors (putting objects in their mouths) while exploring the environment [16,17].

Choking is largely a preventable cause of injury and death. Pediatric physicians play a crucial role in counseling parents on choking prevention [2]. Pediatricians are largely recognized as a frequent and trusted source of health information and have a responsibility to promote choking prevention during wellness visits [2,18]. Importantly, parental knowledge of food hazards has been shown to be protective

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against child exposure to choking hazards [19]. However, the existing limited literature demonstrates that knowledge among parents and caregivers about injury prevention is lacking. We are aware of only one study that evaluated knowledge of choking hazards in the United States among parents [19]. This study showed that there were significant lapses in parental knowledge and behavior for protecting children against choking hazards, specifically for food items [19]. Consequently, a need exists to increase parental education regarding choking hazards so that injuries and death can be prevented among children.

Educational interventions on choking prevention are necessary to address gaps in parental knowledge and have been shown to decrease injury rates. In both Greece and Israel, evaluation of population level educational campaigns resulted in a decrease of choking incidence [20,21], suggesting that primary prevention approaches can be effective for this issue. To our knowledge, no studies have evaluated the effect of an internet based educational video intervention on parental knowledge of choking hazards and prevention. Our study was designed to determine if an educational video intervention could increase knowledge of parents recruited in the pediatric Otolaryngology setting.

2. Methods and materials

2.1. Study design

From October 2015 to September 2017, a quasi experimental study was conducted to assess the effect of an internet based educational video on parental knowledge of choking hazards and prevention. This study was approved by the Institutional Review Board at Connecticut Children's Medical Center. A convenience sample of participants was recruited at two Otolaryngology clinic locations (Hartford and Farmington, CT) at Connecticut Children's Medical Center. Inclusion criteria included being an English speaking parent or legal guardian of a patient ages 6 months to 4 years who possessed a valid email address. Participants were recruited in person by research assistants using a script and were offered a $25 gift card to a coffee shop upon completion of the 30 day post test survey.

Participants were asked to view an educational video and complete three knowledge surveys: (1) pretest, (2) immediate posttest, and (3) 30 day posttest. Within 72 h of the consent and enrollment in the office, participants received an email containing a link to the pretest survey involving 7 knowledge questions (Table 1). After completion of the pretest survey, participants viewed either the choking video (intervention) or a general safety video (control). The first 25 participants were assigned to the intervention group as a pilot intervention. Afterwards, participants were assigned to study groups in alternating blocks of ten people per condition. Immediately following the video, participants were directed to complete the posttest survey asking the identical 7 knowledge questions. Thirty days later, a link to the second posttest survey was emailed to participants. Beginning January 2017, we began sending reminder emails if a survey was incomplete at any time point. The reminder emails were sent one week after the send date of the initial email.

Table 1
The 7 item survey regarding knowledge of choking hazards and prevention.

Q1. At what age are children able to chew and grind solid food like peanuts and raw vegetables? (A: 4 years old)
Q2. Which is the most dangerous food as a potential choking hazard? (A: Hot dog)
Q3. Why are 20 mm lithium "button" batteries so dangerous? (A: They get stuck in the upper esophagus and may cause a hole leading to death or permanent injury)
Q4. Why are latex balloons so dangerous? (A: A piece may wrap tightly over the voice box blocking the ability to breathe)
Q5. Which of these fruit shapes is most dangerous for kids? (A: Whole grapes)
Q6. Which is the most common food choking item? (A: Peanuts)
Q7. Which of the following is the most useful sizing tool to determine if an object is a choking hazard for a child under 4 years old? (A: Toilet paper roll)

The choking video used in this study was 5 min long and taken from a preexisting set of anticipatory guidance videos for use in pediatric primary care (See Video) [22]. The video is publically available and involves two mothers discussing the dangers of choking hazards in a kitchen setting. The video was designed to address the major choking hazards as identified by the AAP [2]. The video addresses each of the seven knowledge questions in the administered survey. The full survey with multiple choice answers and video can be found in the Appendix (Table A1). The control group viewed a 1 min educational video on general childhood safety from a national childhood safety organization that is publically available online ("*Imagine*") [23].

Supplementary video related to this article can be found at https://doi.org/10.1016/j.ijporl.2018.08.002.

2.2. Data analysis

Frequency distributions were calculated on answers to the knowledge questions of the three surveys. Multiple choice answers were recoded into values of "correct" and "incorrect" to access accuracy. Missing values for individual unanswered questions were coded as incorrect, assuming the participant did not know the correct answer. If none of the seven questions were answered, the survey was considered incomplete. Total knowledge scores of the survey were calculated, for a possible score range of 0–7. Average change in total knowledge score was calculated from the pretest to immediate posttest and 30 day posttest. Independent t tests were performed to compare the average change in total knowledge score from baseline between the two study groups. McNemar's test was performed to assess the relationship between pretest and posttest accuracy (immediate and 30 day) on each of the 7 knowledge questions. A p value of $< .05$ was considered statistically significant for all tests. All analyses were performed using the IBM SPSS Statistics for Windows, version 24.0. (Armonk, NY).

3. Results

A total of 418 parents were enrolled in the study. Out of those enrolled, 218 participants completed the pretest (52%), and 202 of 218 (93%) individuals who completed the pretest also viewed the video and finished the immediate posttest survey. Thirty days later, 120 participants (59%) completed the third posttest survey (Fig. 1).

Baseline knowledge, as assessed by the pretest knowledge survey, varied considerably by question asked (Table 2). Questions with the lowest percent correct for both intervention and control groups included topics of what age children can chew and grind food (Q1, 22% and 25%) and the sizing tool for determining a choking hazard (Q7, 15% and 12%). In contrast, questions with the highest percent correct covered topics of the most dangerous food (Q2, 72% and 71%) and fruit shape (Q5, 94% and 92%) for choking (Table 2). Knowledge scores increased for 6 of the 7 questions from the pretest to immediate posttest for the intervention group (Table 2). The one question with a decrease in score was regarding the dangers of latex balloons (Q4). Chi square analysis revealed no significant differences in baseline knowledge were observed between the study groups (P = .43–.93).

Independent *t*-test analysis revealed average change in total knowledge score ($\Delta_{\text{knowledge score}}$) from the pretest to immediate posttest was statistically significant between the intervention ($\mu = 1.88$, $\sigma = 1.20$) and control group ($\mu = 0.14$, $\sigma = 1.05$); $t(200) = -10.99$, $P < .001$, two tailed (Fig. 2). This finding was consistent when evaluating the average change from pretest to 30 day posttest between the intervention ($\mu = 1.41$, $\sigma = 1.32$) and control group ($\mu = 0.17$, $\sigma = 1.41$); $t(118) = -4.95$, $P < .001$, two tailed (Fig. 2).

McNemar's test revealed a significant change in pretest versus immediate posttest accuracy for 5 of the 7 knowledge questions of the survey, P = .001-.027 (Table 3). Questions with a significant change included topics of what age a child can chew and grind food (Q1), the most dangerous food as a choking hazard (Q2), the dangers of lithium