MOTHERS' KNOWLEDGE ON FOREIGN BODY ASPIRATION

Original Article

YABANCI CİSİM ASPİRASYONU HAKKINDA ANNELERİN BİLGİ DÜZEYİ

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ABSTRACT

Backgrounds: Foreign body aspiration is among the leading causes of avoidable fatal childhood accidents. This study was performed to evaluate the mothers' knowledge on foreign body aspiration.

Materials and Methods: A survey was conducted on the mothers of 169 inpatients, between 1 month and 5 years of age, who were receiving treatment at the pediatrics department.

Results: Overall, 50% of the mothers that participated in thestudy, had adequate information on foreign body aspiration. Mothers, whowere at an advancedage, were working, or who were university graduates, had a significantly higher level of information on foreign body aspiration.

Conclusion: The educational level of the women should be increased, in order to enhance their awareness and their level of information on foreign body aspiration.

Key words: Foreign body aspiration, knowledge, mothers, children.

ÖZET

Amaç: Yabancı cisim aspirasyonu çocukluk çağının önlenebilir ölümle sonuçlanan kazaların başında gelmektedir. Çalışmamızın amacı yabancı cisim aspirasyonu hakkında annelerin bilgi düzeyinin belirlenmesidir.

Gereç ve Yöntem: Yaşları 1 ay-5 yaş arasında olan çocuk servisinde yatarak tedavi gören 169 olgunun annesine anket uygulandı

Bulgular: Çalışmaya katılan annelerin %50'si yabancı cisim aspirasyonu hakkında yeterli bilgi düzeyine sahipti. İleri yaş annelerin, çalışan annelerin ve üniversite mezunu olan annelerin yabancı cisim aspirasyonu hakkındaki bilgileri anlamlı olarak daha yüksek bulundu.

Sonuç: Toplumda yabancı cisim aspirasyonu hakkında farkındalığın ve bilgi düzeyinin arttırılabilmesi için öncelikle kadınların eğitim düzeyinin arttırılması gereklidir.

Anahtar kelimeler: Yabancı cisim aspirasyonu, bilgi düzeyi, anne, çocuk.

INTRODUCTION

Tracheobronchial foreign body aspiration is a significant cause of morbidity and mortality, particularly among children between 1 and 4 years of age (1). Patients presents with chronic respiratory complaints, as well as acute respiratory failure. The rate of mortality and anoxic cerebral injury, is reported to be 4% (2). Rapid diagnosis and treatment, significantly reduces the potential morbidity and mortality that is associated with foreign body aspiration (3-6). The most critical step in avoiding morbidity and mortality in foreign body aspiration, is prevention (7). The main issue in relation to prevention, is to increase the level of information and awareness among persons, who are in charge of child care. There is a limited number of trials in the literature, which investigate the parental level of information (8-10).

In this study, we aimed to investigate the mothers' level of information on foreign body aspiration.

MATERIALS AND METHODS

Study Population

The mothers of the children between 1 month and 5 years of age who were admitted to the pediatric wards with any diagnosis between May 2015 and August 2015 in Sisli Hamidiye Etfal Research and Training hospital-government hospital- were included in the study. Because there is no validated questionnaire for evaluating the knowledge of parents regarding foreign body aspiration, we developed an 9-item questionnaire using earlier data on the characteristics of foreign body aspiration cases.8-10 After obtaining the demographics such as age, gender, the number of children, diagnosis at admission, mother's occupation, level of education and income; the mothers were administered a survey questionnaire, which consisted of 9-closed end questions to assess the knowledge of mothers about foreign body aspiration. While literate mothers filled out the survey questionnaire on their own, illiterate mothers answered the questions, with the survey questions being read to them by the investigator. The number of inpatients being treated at the department was 265 during the study period; however 22 mothers were excluded from the study since their children were accompanied by relatives other than their mother, 12 mothers were excluded because they were unable to speak the homeland language, and 4 mothers were excluded because their children had foreign body aspiration, respectively. 58 cases were excluded due to failure to fully complete the survey. 169 cases filled out the survey and were included in the study. Informed consent was obtained from all the individuals that formed part of this study. Approval from the institutional research and ethics committees was also obtained.

Survey

The questions of the survey, which we used to measure the mothers' level of information on foreign body aspiration, are presented below (mothers may give multiple answers to some questions).
1- Which foods can a child smaller than 3 years of age eat? Please circle the right choice or choices.
Walnut / hazelnut/ carrot / seeds / grapes / cucumber / none of them

2- Dou you give your child snacks like walnuts or hazelnuts?
Yes or No

3- Is your child in motion while he/she is eating?
Yes or No

4- Does anything get into the lungs?
Yes or No

5- If it does, how would you understand that? (she may mark multiple choices)
Acute-onset cough
Breathlessness
Change in color
Change in voice
Vomiting
Cannot be understood

6- If anything gets into the lungs, how dangerous is that?
Not dangerous
Mildly dangerous
May be fatal
I have no idea

7- What do you do to prevent this? (she may mark multiple choices)
I don't give him/her grainy foods
I supervise him/her
I feed him/her while he/she is sitting
I don't give him/her small objects
I do all of the above
I don't do anything special

8- What is its treatment?
I go to a medical center or hospital
I go to the emergency room
There is no need for treatment
I have no idea

9- Where did you get this information from?
TV
Physician
Newspaper
Others (relatives, friends, etc.)
I have no idea

10- Have you ever heard about such an event in your neighborhood?
Yes or No

Statistical Assessment

The NCSS (Number Cruncher Statistical System) 2007 (Kaysville, Utah, USA) software, was used to perform the statistical analyses. Descriptive statistical methods, were used to assess the study data (mean, standard deviation, median, frequency, and rate). Due to the fact that the values of the level of information related to foreign body aspiration didn't show a normal distribution, Kruskal Wallis test was used for the comparison of 3 or more groups, and Mann Whitney U test, was used to detect the group that caused the difference and for two-group assessments. The results were evaluated at a 95% confidence interval, with the significance being assessed at $p<0.05$.

RESULTS

A total of 169 mothers filled out the survey completely. The distribution of the descriptive characteristics of the subjects is given in Table 1. The children's age range was 1 month to 53 months; the mean age was 10.50±10.48 months, and the median age was 7 months. The mean age of the mothers was 27.63±5.45 years with a median age of 26 years.

While 39.6% (n=67) of the mothers were 25 years old or younger, 50.9% (n=86) were between 26 and 35 years of age and 9.5% (n=16) were ≥36 years of age. 32% of the mothers had a single child, 39.6% had 2, 17.2% had 3 children and 11.2% had 4 or more children. Reviewing the children's diagnoses at admission, 63% had been admitted due to respiratory complaints, while 36.1% had been admitted with other diagnoses. Questioning the occupations of the mothers, 14.8% (n=25) of the mothers were working, while 85.2% were housewives. Fourteen mothers were illiterate; 33.7% (n=57) were primary school graduates, 30.2% (n=51) were were secondary school graduates, 20.7% (n=35) were high school graduates, and only 7.1% were university graduates (n=12).

Questioning the level of income, nearly half of the mothers had a monthly income below 1000 TL. 37.4% (n=40) of them had an income between 1000TL and 2000 TL while only 16.8%, (n=18) had an income ≥ 2000 TL. (1 TL= 0.336 USD)

Table 2, shows the questions regarding the mothers' level of information on foreign body aspiration and their results. When the mothers were asked which foods a child younger than 3 years of age could eat, the answers in descending order were as follows: cucumber, grapes, carrot, hazelnut, walnut and seeds; only 18.9% of the mothers (n=32), indicated that none of these should be eaten.

Nearly half of the mothers indicated that they give their children snacks such as hazelnuts and walnuts. Based on the information given by the mothers, 66.9% (n=113) of the children, are in motion while they are eating. When asked if anything could get into the lungs of the children, 84% (n=142) of the mothers, responded positively. When asked how they would understand such an event, the three leading answers were change in color, breathlessness and acute-onset cough. Four percent of the mothers, reported that they wouldn't be able to understand such an event.

When asked how dangerous it would be if anything got into the lungs, 81.1% (n=137) of the mothers knew that this could be fatal. However, 13% (n=22) indicated that they have no idea. 6% (n=10) of the mothers, reported that this is not dangerous or mildly dangerous.

When the mothers' level of information on preventing foreign body aspiration was questioned, 55% (n=93) of them indicated that they continuously supervise their child, 47.9% (n=81) indicated that they feed their child in a sitting position, 33.7% (n=57) of them, reported that they don't give their children toys with small fragments, and 27.2% (n=46), indicated that they don't feed their children with grainy foods. When asked about the treatment, 85.8% (n=145) of them said that they would go to the emergency room, 12.4% (n=21) indicated that they would go to a medical center or hospital. One mother said that no treatment would be needed, while 2 mothers indicated that they have no idea.

Since the mothers responded to the survey questions determining their level of information on foreign body aspiration, with multiple answers, the mothers who answered all the questions correctly, were assigned the highest score of 13, with the lowest score being 0. Subsequently, these scores were converted to a 100-point scale. Those mothers who got a score of 13 were assessed over a 100. In our study, the lowest number of correct answers was 4, while the highest was 12 questions. Accordingly, the score obtained based on the 100-point scale, ranged between 30.80 and 92.30, with a mean value of 54,84±14,59 (a high score indicated a high level of information, while a low score, indicated a low level of information).

Table 3 questioned the source of getting information, and the status of being heard about such an event in their neighborhood. The percent of mothers who got the information about foreign body aspiration from TV, newspapers, relatives, and friends are as follows; 65.1% (n=110), 26% (n=44), 8.9% (n=42), and 24.9% (n=42), respectively, while 5.9% (n=10), reported they had no idea. Nearly 25% of the mothers, indicated that they heard about such an event in their neighborhood.

The descriptive characteristics of the mothers including their age, the number of children, their occupation, their educational status, and being heard such an event in their neighborhood, and the scores corresponding the mothers' level of information on foreign body aspiration were compared in Table 4. Accordingly, the mothers, who were at an advanced age, were working or who were university graduates, had a significantly higher level of information on foreign body aspiration (p=.004, p=0.04 and p=0.001, respectively). However, no association was observed

between the number of children, and being heard such an event in their neighborhood, and the scores corresponding the level of information.

Age (month); *Mean±SD (median)*	10.50±10.48 (7)
Mother's age (year); *Meant±SD (median)*	27.63±5.45 (26)
≤25 years; *n(%)*	67 (39.6)
26-35 years	86 (50.9)
≥ 36 years	16 (9.5)
Number of children; *n(%)*	
1 child	54 (32.0)
2 children	67 (39.6)
3 children	29 (17.2)
4 children and more	19 (11.2)
Diagnosis at admission; *n(%)*	
Respiratory complaints	108 (63.9)
Others	61 (36.1)
Occupation of mothers; *n(%)*	
Housewife	144 (85.2)
Working	25 (14.8)
Education of mothers; *n(%)*	
Illiterate	14 (8.3)
Primary School	57 (33.7)
Secondary School	51 (30.2)
High School	35 (20.7)
University	12 (7.1)
Monthly income, TL*; *n(%)*	
<1000 TL	49 (45.8)
1000-2000 TL	40 (37.4)
>2000 TL	18 (16.8)

*1 TL= 0.336 USD

Table 1. Socio-demographics of the study subjects.

Which foods can a child smaller than 3 years of age eat?	n (%)
Walnut	60 (35.5)
Hazelnut	64 (37.9)
Carrot	88 (52.1)
Seeds	16 (9.5)
Grapes	105 (62.1)
Cucumber	112 (66.3)
None of the above	32 (18.9)
Dou you give your child snacks like walnuts or hazelnuts?	
Yes	84 (49.7)
No	85 (50.3)
Is your child in motion while he/she is eating?	
Yes	113 (66.9)
No	56 (33.1)
Does anything get into the lungs?	
Yes	142 (84.0)
No	27 (16.0)
If it does, how would you understand that?	
Acute-onset cough	79 (46.7)
Breathlessnes	80 (47.3)
Change in color	94 (55.6)
All 3 symptoms above	36 (21.3)
Choking	29 (17.2)
Vomiting	35 (20.7)
All of the above	4 (2.3)
Cannot be understood	7 (4.1)
If anything gets into the lungs, how dangerous is that?	
Not dangerous	4 (2.4)
Mildly dangerous	6 (3.6)
May be fatal	137 (81.1)
I have no idea	22 (13.0)
What do you do to prevent this?	
I don't give him/her grainy food	46 (27.2)
Superivse child all the time	93 (55.0)
I feed him/her while he/she is sitting	81 (47.9)
I don't give him/her small objects	57 (33.7)
All of the above	15 (8.8)
I don't do anything special	-
What is its treatment?	
I go to a medical center or hospital	21 (12.4)
I go to the emergency room	145 (85.8)
There is no need for treatment	1 (0.6)
I have no idea	2 (1.2)

Table 2. Mother's knowledge on foreign body aspiration.

Where did you get this information from?; *n(%)*	
TV	44 (26.0)
Physicians	110 (65.1)
Newspapers	15 (8.9)
Others (relatives, friends, etc)	42 (24.9)
I have no idea	10 (5.9)
Have you ever heard about such an event in your neighborhood?; *n(%)*	
Yes	42 (24.9)
No	127 (75.1)

Table 3. Responses to questions regarding source of getting information, and being heard such an event in their neighborhood.

		Scores corresponding mother's level of information about foreign body aspiration		***p***
		Mean±SD	**Min-Max (median)**	
Mother's age (year)	**≤25 years**	52,0±13,6	30,80-84,60 (53,8)	***[a]0,04****
	26-35 years	56,07±14,5	30,80-92,30 (53,8)	
	≥ 36 years	60,10±18,6	30,80-92,30 (57,6)	
Number of children	**1 child**	55,11±14,9	30,80-92,30 (53,8)	***[a]0, 43***
	2 children	52,81±13,7	30,80-92,30 (53,8)	
	3 children	57,55±16,1	30,80-84,60 (53,8)	
	4 children and more	57,06±14,3	30,80-92,30 (53,8)	
Occupation of mother	**Housewife**	53,89±14,0	30,80-92,30 (53,8)	***[b]0,04****
	Working	60,29±16,5	30,80-92,30 (61,5)	
Education of mother	**Illeterate**	52,19±13,5	30,80-84,60 (53,8)	***[a]0,00****
	Primary school	51,41±12,9	30,80-92,30 (53,8)	
	Secondary school	55,80±15,4	30,80-84,60 (53,8)	
	High school	54,71±13,3	30,80-76,90 (53,8)	
	University	70,49±14,6	38,50-92,30 (69,2)	
Heard the occurence of foreign body aspiration in neighborhood	**Yes**	55,85±15,7	30,80-92,30 (53,8)	***[b]0,60***
	No	54,50±14,2	30,80-92,30 (53,8)	

[a]One-Way ANOVA Test *[b]Student T Test* **p<0,05* ***p<0,01*

Table 4: The relationship between the scores corresponding mother's level of information about foreign body aspiration and socio-demographics.

DISCUSSION

Children have a higher risk of foreign body aspiration, compared to adults. Eighty percent of the cases of foreign body aspiration, occur in children below 3 years of age, and are most commonly reported, in those below 2 years of age (11-14). Based on the report by the CDC (Center for Disease Control), it is among the leading causes of fatal home accidents, in children between one and four years of age (between 2000 and 2006) (1). Children in this age group, are continuously in motion to discover their surroundings, and since their fine motor skills have started developing, they put everything into their mouth, but can't fully chew them, due to undeveloped molar teeth. In addition, feeding them hard, grainy food at an early age, the habit of feeding in motion, playing with toys with small fragments, narrow airways and presence of bigger siblings at home, increase the risk of foreign body aspiration (15). Another reason, is the under-supervision of the children who have a risk of playing with small objects. In fact, 50%-80% of the foreign body aspirations, occur under the supervision of the parents (16,17). Based on the results of our survey, which questioned the mothers' level of information, 50% of the participating mothers had adequate information. Mothers, who were at an advanced age, were working or who were university graduates, had a significantly higher level of information.

Symptoms associated with foreign body aspiration, vary, depending on the size, shape, natüre of the foreign body, the time elapsed, and the site blocked by the foreign body. While foreign body aspiration may be fatal, it may also lead to non-specific symptoms, such as cough, wheezing, fever or dyspnea. A large object may obstruct the trachea, thereby leading to asphyxia or death, or a small object may block the small airways and lead to wheezing, cough and eventually atelectasis, post-obstructive pneumonia, bronchiectasis or pulmonary abscess. Prompt diagnosis is particularly important in small children. The studies have demonstrated that children taken to the hospital 2 days after the aspiration, had a 2-fold higher rate of complications, compared to those, who were taken earlier (18).

Both the health personnels, and the families, may remain inadequate in recognizing foreign body aspiration (19). The failure of the family to sufficiently recognize the seriousness of the condition, is an important factor that leads to a delayed diagnosis. Increasing the awareness of the doctors and particularly the families, would significantly reduce mortality (20). Studies have shown that, 25%-28% of the families were unable to define the findings of foreign body aspiration (8,9). In a survey study carried out by Singh et al, 46% of the individuals who were in charge of child care, indicated that foreign body aspiration could not be noticed in children, while this rate was 4% in our study (10). Around 80% of the mothers in our study, are aware of that something could get into the lungs of their children, and that this could be fatal; but only 23% report that children below 3 years of age, shouldn't eat grainy foods. Approximately, half of the mothers give their children walnuts and hazelnuts. In a study conducted by Nichols et al, the level of information was reported to be 52%, for the families of children below 4 years of age, with regards to foods and non-food substances of aspiration risk.21 A study investigating the awareness of the families on hazelnut aspiration revealed that families, irrespective of their occupation, didn't have adequate information on the age at which to start giving grainy snacks to their children (22). In our study, we observed that while the mothers knew about foreign body aspiration and were aware that they had to take their child to the doctor without delay, they didn't have adequate information on the appropriate foods, and the ideal eating habits for their children. Half of the mothers participating in the survey, answered all the questions on foreign body aspiration correctly.

Foreign body aspiration is avoidable. Most of the cases occur in families in low socioeconomic levels, uneducated families, and careless families. Therefore, educating the families on foreign body aspiration, is the most important step in avoiding foreign body aspiration (23). The mothers that participated in our study, had socioeconomic levels, and an educational status, below average. Approximately, 25% of the mothers have heard about the occurence of foreign body aspiration in their surroundings.

Death due to asphyxia following aspiration of a foreign body, is the fifth most common cause of mortality from unintentional injuries in the US, and it is the leading cause of mortality from unintentional injuries, in children under one year of age (24). In a study, Singh et al, reported that 46% of the cases would go to the doctor, while 3.2% didn't know what to do (10). As for our study, 85% of the mothers reported that they would go to the emergency room, and 12% would go to the doctor, while 2.5% indicated that there was no need or treatment, or they didn't know what to do. While mothers need to get their information on foreign body aspiration from their doctors, around 70% of the mothers in our study had obtained information from the doctors, with 20% and 8% obtaining information from their relatives or friends, and having no information on the subject, respectively. There are many studies in the literature, emphasizing the importance of training both the medical staff, and the parents in order to prevent foreign body aspiration (25-27). In a study by Celik et al, after receiving training on foreign body aspiration, 231 students studying at the department of child development of two high schools, were observed to have a significantly increased level of information. Accordingly, the nurses are recommended, to give this training and counseling to people, who are in charge of childcare (25). In another study, it has been reported that the incidence of foreign body aspiration, could be reduced by 35%, using public health training programs (26). In a study by Karatzanis et al, it was suggested that training programs can reduce the number of bronchoscopies, and the incidence of foreign body aspiration (27). In a study performed in Philadelphia, the parents of children below 5 years of age, taking children with acute unintentional injury sustained at home to the emergency room, were reported to be more successful in taking in-house safety measures suited to children, after receiving relevant training (28).

The limitations of our study includes the conduct of the study at a single center, the absence of a reliability and validity study for the survey we used, and the sample size. Although we developed the questionnaire by referring the results of published articles on foreign body aspiration, a validated questionnaire to assess the knowledge of parents on this subject is needed. The exclusion of the non-Turkish-speaking mothers and the conduct of the survey by the investigator for the illiterate mothers, may have prevented an accurate measurement of the information. Finally, the mothers may not have responded in a healthy manner, due to the stress they were experiencing, since they were staying at the hospital, with their children.

CONCLUSION

Since foreign body aspiration in children is an avoidable condition, preventive medicine should be provided by pediatric physicians and family physicians, and training of the families is very important. The awareness on foreign body aspiration, needs to be enhanced by training the society, especially the mothers, via both visual and verbal tools in order to reduce mortality and prevent complications. The target population should be the women primarily. The higher the educational status of the women, the higher the welfare of the public would be.

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REFERENCES

1) *Centers for Disease Control and Prevention. CDC Childhood Injury Report: Patterns of Unintentional Injuries Among 0-19 Years Old in The United States, 2000-2006.Atlanta: National Center for Injury Prevention and Control,Centers for Disease Control and Prevention;2008. p.1-109.*
2) *Kim IA, Shapiro N, Bhattacharyya N. The national cost burden of bronchial foreign body aspiration in children. Laryngoscope 2015;125(5):1221-4.*
3) *Bittencourt PF, Camargos PA, Scheinmann P,de Blic J. Foreign body aspiration: clinical, radiological findings and factors associated with its late removal. Int J Pediatr Otorhinolaryngol 2006;70(5):879-84.*
4) *Cohen S, Avital A, Godfrey S, Gross M, Kerem E, Springer C. Suspected foreign body inhalation in children: what are the indications for bronchoscopy? J Pediatr 2009;155(2):276-80.*
5) *Metrangelo S, Monetti C, Meneghini L, Zadra N, Giusti F. Eight years' experience with foreign body aspiration in children: what is really important for a timely diagnosis? J Pediatr Surg 1999;34(8):1229-31.*
6) *Tan HK, Brown K, McGill T, Kenna MA, Lund DP, Healy GB. Airway foreign bodies (FB): a 10-year review. Int J Pediatr Otorhinolaryngol 2000;56(2):91-9.*
7) *Passali D, Lauriello M, Bellussi I, Passali GC, Passali FM, Gregori D. Foreign body inhalation in children: an update. Acta Otorhinolaryngol Ital 2010;30(1):27-32.*
8) *Higuchi O, Adachi Y, Adachi YS, Taneichi H, Ichimaru T, Mother's knowledge about foreign body aspiration in young children. Int J Pediatr Otorhinolaryngol 2013;77(1):41-4.*
9) *AlQudehy Z, Al-Sheif H, Al-Qudaihi G. Parental knowledge of foreign body aspiration: A comparative study between Saudis and other nations. J Otolaryngol ENT Res 2015;2(1):00008.*
10) *Singh A, Ghosh D, Samuel C, Bhatti W. Pediatric foreign body aspiration: How much does our community know? J Indian Assoc. Pediatr Surg 2010;15(4):129-32.*
11) *Rothmann BF, Boeckman CR. Foreign zodies in the larynx and tracheobronchial tree in children. A review of 225 cases. Ann Otol Rhinolaryngol 1980;89(5):434-6.*
12) *Eren S, Balci AE, Dikici B, Doblan M, Eren MN. Foreign body aspirati on in children: experience of 1160 cases. Ann Trop Paediatr 2003;23(1):31-7.*
13) *Burton EM, Brick WG, Hall JD, Riggs W Jr, Houston CS. Tracheobronchial foreign body aspiration in children. South Med J 1996;89(2):195-8.*
14) *Mu L, He P, Sun D. Inhalation of foreign bodies in Chinese children: a review of 400 cases.Laryngoscope 1991;101(6):657-60.*
15) *Committee on Injury, Violence, and Poison Prevention. Prevention of choking among children. Pediatrics 2010;125(3):601-7.*
16) *Göktas O, Snidero S, Jahnke V, Passali D, Gregori Dl. Foreign body aspiration in children: field report of a German hospital. Pediatr Int 2010;52(1):100-3.*
17) *Gregori D. The Susy Safe Project. A web-based registry of foreign bodies injuries in children. Int J Pediatr Otorhinolaryngol 2006;70(9):1663-4.*
18) *Shlizerman L, Mazzawi S, Rakover Y, Ashkenazi D. Foreign body aspiration in children: the effects of delayed diagnosis. Am J Otolaryngol 2010;31(5):320-4.*
19) *Foltran F, Ballali S, Rodriguez H, Sebastian van As AB, Passali D, Gulati A, et al. Inhaled foreign bodies in children: a global perspective on their epidemiological, clinical, and preventive aspects. Pediatr Pulmonol 2013;48(4):344-51.*
20) *Rizk H, Rassi S. Foreign body inhalation in the pediatric population: lessons learned from 106 cases. Eur Ann Otorhinolaryngol Head Neck Dis 2011; 128(4):169-74.*
21) *Nichols BG, Visotcky A, Aberger M, Braun NM, Shah R, Tarima S, et al. Pediatric exposure to choking hazards is associated with parental knowledge of choking hazards. Int J Pediatr Otorhinolaryngol 2012;76(2):169-73.*
22) *Domnech Tarrega AB, Carazo Palacios ME, Moratalla Jaremo T, Gutierrez San Roman C, Vila Carbo JJ. Is the awareness of the risk of nuts aspiration related to the occupation of parents? Cir Pediatr 2014; 27(4):169-72.*
23) *Centers for Disease Control and Prevention. Non fatal choking-related episodes among children - United States,2001. MMWR Morb Mortal Wkly Rep 2002;51(42):945-8.*
24) *National Center for Injury Prevention and Control. WISQARS leading causes of death reports, 1999-2007. June 2010. http://webapp.cdc.gov/ (last accessed 10 September 2015).*
25) *Celik N, Arikan D. The effect of the training given to the child development students about foreign body aspiration upon their knowledge levels. Int J Pediatr Otorhinolaryngol 2013;77(11):1811-7.*
26) *Sadan N, Raz A, Wolach B. Impact of community educational programmes on foreign body aspiration in Israel. Eur J Pediatr 1995;154(10):859-62.*
27) *Karatzanis AD, Vardouniotis A, Moschandreas J, Prokopakis EP, Michailidou E, Papadakis C, et al. The risk of foreign body aspiration in children can be reduced with proper education of the general population. Int J Pediatr Otorhinolaryngol 2007;71(2):311-5.*
28) *Posner JC, Hawkins LA, Garcia-Espana F, Durbin DR. A randomized, clinical trial of a home safety interventions based in an emergency department setting. Pediatrics 2004;113(6):1603-8.*