Evaluation of the Effectiveness of First Aid Training in Respiratory Tract Obstruction Due to Aspiration of Foreign Body in Children Given to Child Development Students*

Araştırma Research

Çocuk Gelişimi Öğrencilerine Verilen Çocukta Yabancı Cisim Aspirasyonuna Bağlı Solunum Yolu Tıkanıklığında İlk Yardım Eğitiminin Etkinliğinin Değerlendirilmesi*

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Abstract

Objective: This study aimed to evaluate the effect of the "First Aid in Respiratory Tract Obstruction Due to Aspiration of Foreign Body in Children" training given to Child Development Program students on their knowledge levels.

Method: In the data collection process, a questionnaire form, which was prepared based on the literature and finalized in line with expert opinions, was used to measure students' sociodemographic information and their knowledge levels of first aid in airway obstructions due to foreign body aspiration in children. The data was analyzed using SPSS (Statistical Package for the Social Sciences) 27.0 software. Before the analysis, the conformity of numerical data to normal distribution was evaluated using Kolmogorov-Smirnov, Shapiro-Wilk, Skewness, Kurtosis tests, as well as Histogram and Q-Q Plot graphs. In data analysis, the "Independent Sample t-test" was used for comparisons between two independent groups, and the "Paired Sample t-test" was used for intra-group comparisons. The statistical significance level was accepted as $p<0.05$ in all tests.

Results: Before the training, the students' mean knowledge score was determined to be 7.18±3.25; after the training, this score increased to 10.55±4.51. The mean difference was calculated as 3.37, and this difference was found to be statistically significant. Additionally, among the participants (n=66) who stated that they would intervene in cases of foreign body aspiration in children during their professional lives, the pre-test mean score was 7.31±3.32, while this score increased to 10.78±4.47 in the post-test. The results of the paired t-test showed that this increase was statistically significant.

Conclusion: Our study determined that first aid knowledge levels regarding airway obstruction due to foreign body aspiration significantly increased among students after the training. Additionally, a significant increase was observed in the students' motivation to intervene in a victim experiencing foreign body aspiration after the training.

Keywords: airway obstruction; first aid; foreign bodies; health education; respiratory aspiration

Özet

Amaç: Bu çalışmanın amacı, Çocuk Gelişimi Programı öğrencilerine verilen "Çocuklarda Yabancı Cisim Aspirasyonuna Bağlı Solunum Yolu Tıkanıklığında İlk Yardım" eğitiminin, öğrencilerin bilgi düzeyleri üzerindeki etkisini değerlendirmektir.

Yöntem: Veri toplama sürecinde, literatüre dayalı olarak hazırlanan ve uzman görüşü doğrultusunda son şekli verilen, öğrencilerin sosyodemografik bilgilerini ve çocuklarda yabancı cisim aspirasyonuna bağlı hava yolu tıkanıklıklarında ilk yardım bilgi düzeylerini ölçen bir anket formu kullanılmıştır. Verilerin analizi, SPSS (Statistical Package for the Social Sciences) 27.0 programı ile gerçekleştirilmiştir. Analiz öncesinde, sayısal verilerin normal dağılıma uygunluğu Kolmogorov-Smirnov, Shapiro-Wilk, Skewness (çarpıklık) ve Kurtosis (basıklık) testleri ile birlikte Histogram ve Q-Q Plot grafiklerinden faydalanılarak değerlendirilmiştir. Veri analizinde, iki bağımsız grup karşılaştırmalarında "Independent Sample t testi" ve grup içi karşılaştırmalarda "Paired Sample t testi" kullanılmıştır. Tüm testlerde istatistiksel anlamlılık düzeyi $p<0,05$ olarak kabul edilmiştir.

Bulgular: Eğitim öncesinde öğrencilerin ortalama bilgi düzeyi skoru 7,18±3,25 olarak belirlenmiştir; eğitim sonrasında ise bu skor 10,55±4,51'e yükselmiştir. Ortalama farkın 3,37 olduğu hesaplanmış ve bu farkın istatistiksel olarak anlamlı olduğu saptanmıştır. Ayrıca, iş hayatında çocuklarda yabancı cisim aspirasyonu geliştiğinde müdahale etmek istediğini belirten katılımcıların (n=66) ön test ortalama skoru 7,31±3,32 iken, son testte bu skorun 10,78±4,47'ye yükseldiği belirlenmiştir. Paired t-testi sonuçları, bu artışın istatistiksel olarak anlamlı olduğunu ortaya koymaktadır.

Sonuç: Araştırmamızda, yabancı cisim aspirasyonuna bağlı hava yolu tıkanıklığına yönelik ilk yardım bilgi düzeylerinin, verilen eğitim sonrasında öğrenciler arasında belirgin bir artış gösterdiği belirlenmiştir. Bunun yanı sıra, eğitim sonrasında öğrencilerin yabancı cisim aspirasyonu yaşayan bir kazazedeye müdahale etme motivasyonlarında da anlamlı bir artış saptanmıştır.

Anahtar Sözcükler: havayolu tıkanıklığı; ilk yardım; yabancı cisimler; sağlık eğitimi; respiratuar aspirasyon

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Introduction

Foreign body aspiration (FBA) is a pediatric emergency characterized by partial or complete airway obstruction, which can lead to death if not properly managed (1,2). According to the literature, FBA is most commonly observed in children under three. This is explained by the fact that children in this age group explore their surroundings using their mouths, cannot chew food sufficiently, have incomplete swallowing control, have an underdeveloped epiglottis, and tend to talk while eating. Objects that may cause FBA include balloons, small toys, candy, grapes, nuts, and various liquids (3,4).

Families, caregivers, and teachers in close contact with children play a crucial role in preventing FBA and reducing related mortality. Individuals responsible for child care should recognize objects that pose a risk of aspiration and ensure that these objects are kept out of children's reach (5). Additionally, it is essential to assess the child correctly and apply the appropriate intervention without panicking in the case of FBA (6).

Although interventions for complete and partial airway obstruction differ, incorrect application of these interventions can cause a partial obstruction to progress into a complete obstruction, further complicating the situation. In the case of complete obstruction, there is no airflow to the lungs; the child cannot speak or breathe, places their hands on their neck, experiences panic, and exhibits cyanosis. In this situation, the Heimlich maneuver, developed by Dr. Henry Heimlich, should be applied. In partial obstruction, the airway is not completely blocked; the child can cough and speak, and a whistling sound (stridor) may be heard during breathing. In such cases, the cough reflex should be encouraged to expel the foreign body, as hitting the patient on the back may worsen the condition. Therefore, the child should be encouraged to continue coughing and closely monitored to determine whether the partial obstruction progresses into a complete obstruction. If the foreign body cannot be removed after complete obstruction and respiration ceases, Basic Life Support (BLS) should be initiated immediately (7,8).

Due to the risk of disability and death caused by oxygen deprivation, correct intervention in the first few minutes is critically important (9). Therefore, Basic Life Support (BLS) and related first aid interventions should be performed by trained healthcare professionals or certified first aiders under the supervision of the Ministry of Health to ensure they are applied correctly and appropriately for different age groups, preventing incorrect interventions (10). However, although the first-aid training provided to child development students increase their basic awareness, it is essential to encourage these students to receive professional first-aid training and certification to ensure the correct and effective application of first-aid interventions. In this context, developing educational models aimed at improving not only students' knowledge levels but also their competence in practical applications is of great importance.

In schools and nurseries where children are present, distinguishing between partial and complete obstruction, teaching correct intervention techniques, and enhancing the effectiveness of these training through education provided to child development students are key objectives. Students' willingness and initiative to intervene can be increased through structured educational models.

Materials and Methods

1. Purpose and Design of the Study

This study is a one-group pre-test/post-test design study conducted to determine the effect of the training on "First Aid in Respiratory Tract Obstruction due to Foreign Body Aspiration in Children" given to the students of the Child Development Program on their knowledge level. Within the study's scope, the training's effect on the level of knowledge was evaluated with the tests applied to the same group of students before and after the training.

2. Place of the Study, Population, and Sample

The population of this study consists of 180 students studying in Bursa Uludağ University İnegöl Vocational School Child Development Programme in the 2023-2024 academic year. A power analysis was conducted using the G*Power 3.1 program to determine the required sample size. Since there was no similar study, an average effect size of 0.5 (Cohen's d) was assumed. Based on these parameters, it was determined that at least 64 students were needed to achieve sufficient statistical power (80%).

In the sample selection process, students who had previously received first-aid training were excluded from the study. Since second-year students had already completed a first-aid training course as part of their curriculum, only first-year students were eligible for participation. Those who voluntarily agreed to participate were included in the study among these students. As a result, 83 first-year students who met the inclusion criteria were enrolled in the study. However, the data of 11 students who did not participate in the post-test or withdrew from the study for various reasons were excluded. Consequently, the study was completed with 72 students.

Inclusion Criteria: First-year students who could read and write Turkish, were actively enrolled in the Child Development Programme, had not received first aid training before, and voluntarily agreed to participate in the study were included in the sample.

Exclusion Criteria: Students who had previously received first aid training (i.e., second-year students) and those who could not participate regularly in the training sessions and tests due to health-related reasons were excluded from the study.

3. Data Collection Tools of the Research

In this study, a data collection form was prepared to collect the data. The form includes two descriptive questions to determine the demographic characteristics of the participants, 10 questions to measure attitudes and knowledge levels, and 20 knowledge questions formed as a result of the literature review (11-14). The questions measuring the level of knowledge were organized in a way to be answered with the options "True", "False", and "Don't know". In the pre-test and post-test evaluations, a "1" point was given for each correct answer, a "-1" point for incorrect answers, and a "0" point for the "I don't know" answer. With this method, the highest score obtained from the section measuring the level of knowledge was determined as "20". During the preparation process of the form, the opinions of two experts in the field were consulted.

4. Collection of Research Data

The research data were collected between May 24, 2024, and July 1, 2024. The data were obtained through a pre-prepared information collection form. In the first stage of the research, a pre-test was applied to determine the current knowledge levels of the Child Development Program students. After this test, students were given first-aid training on solid body aspiration in children and infants.

The training was carried out under the following headings:

What is Foreign Body Aspiration?
The definition of foreign body aspiration and the most commonly encountered objects in children.

Symptoms of Respiratory Tract Obstruction:
Symptoms of partial and complete obstruction.

Application Process to the Emergency Department:
The importance of medical intervention after first aid, ambulance calls, and referral processes to the emergency department.

Emergency Intervention Techniques:
Heimlich maneuver for children, back blows, and chest compression techniques for infants; explanation of which interventions should be applied in which situations.

Applied First Aid Training:
The training was based on theoretical knowledge transfer and included skills training. Intervention techniques were demonstrated by instructors, and students were allowed to practice individually. Instructors also provided one-on-one coaching. Students practiced first aid skills on mannequins in an applied manner.

The training lasted a total of 5 hours, with 2 hours of theoretical education and 3 hours of practical application.

After the skills training was completed, it was assessed whether there was any change in students' willingness to intervene in such cases. The willingness of students to intervene before and after the training was compared.

After the training, a post-test was administered to the participants, and the change in their knowledge levels was evaluated six weeks later. All data were collected face-to-face in the classroom environment.

5. Ethical Aspects of the Research

Ethics committee permissions for the research were obtained from Bursa Uludağ University Non-Interventional Ethics Committee (2024-04/08.05.2024) and institutional permission from İnegöl Vocational High School (E-50631952-900-3056/26.04.2024). Ethical rules were followed in the research. No personal information was requested from the students, and they were asked to use a pseudonym instead of their names to keep their identities confidential. The anonymity of the data was preserved by ensuring that they used the same nickname in the post-test. All participants were explained the purpose and scope of the study, that they could participate in the study on a voluntary basis, and that their written consent was obtained.

6. Evaluation of Research Data

The data obtained from the research were transferred to the computer environment, edited with the Microsoft Excel package program, and then analyzed with the SPSS (Statistical Package for Social Sciences) 27.0 Package Program. Before starting the analyses, the suitability of the numerical data to normal distribution was examined by Kolmogorov-Smirnov, Shapiro Wilk, Skewness and Kurtosis tests, Histogram, and Q-Q Plot graphs. As a result of the analyses, it was concluded that the data were normally distributed. Categorical data were shown with frequency and percentage values, while numerical data were shown with mean and standard deviation values since they met the normality assumption. While analyzing the data, the "Independent Sample t-test" was used for two independent group comparisons, and the "Paired Sample t-test" was used for intra-group comparisons. The statistical significance level was accepted as $p<0.05$ for all tests.

Results

The average age of the 72 students participating in the study was 19.9±3.1 years, aged 18 to 44 years. Among the participants, 97.2% were female, and 2.8% were male. Regarding their attitudes and knowledge about foreign body aspiration, 15.3% had previously encountered a situation requiring first aid due to solid object aspiration, while 84.7% had not. A significant majority (91.7%) expressed willingness to intervene in a case of foreign body aspiration in a child during their professional life, whereas 8.3% did not. Additionally, 43.1% of participants indicated they would hesitate to intervene due to a lack of confidence, while 56.9% reported they would not hesitate. Among the participants, 51.4% stated they were familiar with objects that could cause solid object aspiration in children, and 45.8% knew how to perform airway opening maneuvers. However, most students (54.2%) needed to learn how to perform these maneuvers. Only 48.6% of participants knew how to assess consciousness in children, and 27.8% knew how to do so in infants. Similarly, only 33.3% of students knew how to assess breathing in children and infants. Regarding the basic life support algorithm, 51.4% of students knew the algorithm for children, while only 37.5% knew the algorithm for infants (Table 1).

Table 2 presents the correct response rates to scale questions before and after training. Before the training, 51.4% of the participants correctly answered the statement, "Emergency assistance should be sought before intervening in a patient with airway obstruction" which increased to 61.1% after the training. Another question, "Try to communicate with a child with solid object aspiration; if the child can speak, encourage effective coughing" saw a statistically significant increase in correct responses from 30.6% before training to 76.4% afterward. The correct response rate for the statement "If the infant cries during the intervention in the 0-1 age group, it indicates that the object has been expelled, and the intervention should be stopped" increased from 27.8% before training to 63.9% after training. Generally, there was an increase in correct response rates for other questions related to essential life support following the training. For example, the correct response rate for the question "Basic life support in children starts with two rescue breaths" increased from 13.9% to 47.2%.

Table 3 evaluates the students' knowledge levels on foreign body aspiration before and after training. The average knowledge level score was 7.18±3.25 before the training and increased to 10.55±4.51 afterward. The mean difference was calculated as 3.37, which was statistically significant ($t=5.41$, $df=71$ $p<0.001$). The Cohen's d value was calculated as 0.86,

Table 1. Demographic characteristics of students and variables related to their attitudes and knowledge regarding foreign body aspiration (n=72)				
Demographic Variables				
	+	**Min.**	**Max.**	**Median**
Age (years)	19.9±3.1	18	44	19
				n (%)
Gender Female Male				70 (97.2) 2 (2.8)
Variables Related to Attitudes and Knowledge Regarding Foreign Body Aspiration				**n (%)**
Have you ever encountered a situation requiring first aid due to solid object aspiration? Yes No				 11 (15.3) 61 (84.7)
Would you want to intervene if a child develops foreign body aspiration in your professional life? Yes No				 66 (91.7) 6 (8.3)
If a child develops solid object aspiration, I would hesitate due to a lack of confidence. Yes No				 31 (43.1) 41 (56.9)
I am familiar with objects that can cause solid object aspiration in children. Yes No				 37 (51.4) 35 (48.6)
I know how to perform airway opening maneuvers. Yes No				 33 (45.8) 39 (54.2)
I know how to assess consciousness in children. Yes No				 35 (48.6) 37 (51.4)
I know how to assess consciousness in infants. Yes No				 20 (27.8) 52 (72.2)
I know how to assess breathing in children and infants. Yes No				 24 (33.3) 48 (66.7)
I know the basic life support algorithm for children. Yes No				 37 (51.4) 35 (48.6)
I know the basic life support algorithm for infants. Yes No				 27 (37.5) 45 (62.5)

indicating that the training significantly improved knowledge levels.

Table 4 analyzes the findings related to students' willingness to intervene in a child's foreign body aspiration during their professional life and their hesitation due to a lack of confidence in the case of solid object aspiration, based on pre-test and post-test results, both within and between groups. The average pre-test score for participants who expressed willingness to intervene in such cases (n=66) was 7.31±3.32,

Table 2. Correct response rates to scale questions before and after training (n=72)		
Scale Questions	**Before Training** (%)	**After Training** (%)
1. Emergency assistance should be sought before intervening in a patient with airway obstruction.	51.4	61.1
2. Try to communicate with a child with solid object aspiration; if the child can speak, encourage effective coughing.	30.6	76.4
3. Basic life support should be initiated if consciousness is lost while intervening in a child with airway obstruction.	91.7	87.5
4. The intervention to be performed in airway obstruction differs depending on whether the child is conscious.	73.6	87.5
5. Basic life support should be initiated if consciousness is lost while intervening in a child with airway obstruction.	75.0	81.9
6. In the 0-1 age group, five back blows and five chest compressions should be applied.	22.2	56.9
7. The intervention for airway obstruction in the 0-1 age group differs from that in other age groups.	81.9	87.5
8. Abdominal thrusts are not applied in the 0-1 age group.	37.5	48.6
9. If the infant cries during the intervention in the 0-1 age group, it indicates that the object has been expelled, and the intervention should be stopped.	27.8	63.9
10. For a child (over 1-year-old) with airway obstruction, five back blows, and 5 abdominal thrusts should be continued until the object is expelled or consciousness is lost.	25.0	50.0
11. If no foreign object is visible in an infant's mouth with airway obstruction, a blind finger sweep should not be performed.	72.2	70.8
12. Basic life support in children starts with 2 rescue breaths.	13.9	47.2
13. The chest compression/ventilation ratio during basic life support in children is 30:2.	47.2	58.3
14. Chest compressions in children (over 1 year old) are applied with one hand.	52.8	63.9
15. Chest compressions in infants (0-1 year) are performed with two fingers (middle and ring fingers).	68.1	77.8
16. The point for chest compressions in infants is the middle of the line below the nipples.	41.7	69.5
17. The point for chest compressions in children is the mid-point of the lower half of the sternum.	48.6	68.1
18. Chest compressions should be performed at 100-120 per minute.	45.8	50.0
19. In infants, compressions should depress the chest by 4 cm (approximately one-third of the chest depth when viewed laterally).	25.0	40.3
20. If the child appears adult-like, chest compressions should be performed with both hands.	29.2	36.1

Table 3. Comparison of students' knowledge levels on foreign body aspiration before and after training

	n		Mean Difference	t[a]	Degrees of Freedom (df)	p-value	Effect Size
Pre-Test	72	7.18±3.25	3.37	5.41	71	<0.001*	Cohen's d: 0.86**
Post-Test	72	10.55±4.51					

*[a]Paired-Samples t test $p<0.05$ is considered statistically significant. †d≈0.8 values indicate a large effect size.

Table 4. Intra-group and inter-group comparisons of pre-test and post-test results according to certain variables

Variables	Groups	Measurements		Test/Significance (Within-group)[a]		
		Pre-test	Post-test	t	p-value	Cohen's d
Willingness to intervene in a child's foreign body aspiration during professional life	Willing (n=66) Unwilling (n=6)	7.31±3.32 5.66±1.96	10.78±4.47 8.00±4.56	5.29 1.09	**<0.001*** 0.322	**0.65**** **0.67****
	Test/Significance (Between Groups)	t: 1.19 df: 70 p: 0.237	t: 1.45 df: 70 p: 0.149			
Hesitation due to lack of confidence in case of solid object aspiration	Hesitant (n=31) Not Hesitant (n=41)	6.77±2.98 7.48±3.45	10.45±4.17 10.63±4.81	4.06 3.65	**<0.001*** **<0.001***	**1.02***** **0.75****
	Test/Significance (Between Groups)	t: 0.920 df: 70 p: 0.361	t: 0.169 df: 70 p: 0.867			

*[a]Paired-Samples t-test, [b]Independent-Samples t-test, $p<0.05$ is considered statistically significant. †d≈0.5-0.8 values indicate a medium effect size. §d≈0.8 values indicate a large effect size.

which increased to 10.78±4.47 in the post-test. The results of the paired t-test show that this increase is statistically significant (t=5.29, p<0.001). For participants unwilling to intervene (n=6), the average pre-test score increased from 5.66±1.96 to 8.00±4.56 in the post-test, but this increase was not statistically significant (t=1.09, p=0.322). When comparing the pre-test and post-test results between those willing and unwilling to intervene, no statistically significant difference was found between the groups in either measurement (pre-test t=1.19, p=0.237; post-test t=1.45, p=0.149).

For participants who indicated they would hesitate due to a lack of confidence in the case of solid object aspiration (n=31), the average pre-test score was 6.77±2.98, which increased to 10.45±4.17 in the post-test. This increase was statistically significant (t=4.06, p<0.001). Similarly, participants who indicated they would not hesitate (n=41) also showed a significant increase in their scores; the average pre-test score increased from 7.48±3.45 to 10.63±4.81 in the post-test (t=3.65, p<0.001). When comparing the differences between those who would hesitate and those who would not, no statistically significant difference was found between the groups in either measurement (pre-test t=0.920, p=0.361; post-test t=0.169, p=0.867).

Discussion

Foreign body aspiration is a severe pediatric emergency which is frequently encountered

especially in children in the first three years of age and may result in death if not intervened correctly in the early period (15,16). In our study, 15.3% of the participants stated that they had previously encountered a situation requiring first aid due to solid body aspiration. In a study by Maalim Issack et al., 43.3% of the participants stated that they had encountered drowning cases at school, but they were able to administer first aid to the victim in only 42.2% of these cases (17). The fact that the mean age of the participants in our study was low (19.9±3.1) may be a reason why they encountered such cases less frequently.

91.7% of the participants stated that they would like to intervene in case of foreign body aspiration in a child in their professional life. Similarly, in the study by Ojifinni et al., the participants showed a willingness to intervene to a great extent, and the main concerns of those who did not want to intervene included fear of being sued, fear of harming the victim, and risk of infectious disease (18). However, as in our study, it was observed that the participants' willingness to intervene was generally positive.

Correctly recognizing and assessing the state of consciousness of a victim with airway obstruction is critical for the success of the emergency intervention. Correct assessment may be vital since the interventions to be performed differ depending on whether the consciousness is open or closed. Our study found that 51.4% of the participants did not know how to check consciousness in children, while this rate was 72.2% in infants. These high rates are a severe indicator of a lack of education and awareness.

In order to prevent the risk of disability and death due to oxygen deficiency after airway obstruction, it is vital that the person closest to the victim immediately starts essential life support. In a study conducted by Kinoshita et al., it was found that the rapid initiation of chest compressions by the observer was significantly effective in terms of survival in victims who experienced airway obstruction due to a foreign body during a meal and, therefore, lost consciousness (19). These findings reveal that timely correct intervention in emergencies plays a critical role in increasing the chance of survival.

According to the pre-test results of our study, the lowest score was 13.9, which belonged to the question, "If it is necessary to apply basic life support, basic life support is started by giving two rescue breaths." After the training, the score of this question increased to 47.2. The highest score was 91.7, which belongs to the question, "If a child with airway obstruction loses consciousness during the intervention, basic life support should be started." However, the score of this question decreased to 87.5 after the training. This suggests that the transition to essential life support may not have been emphasized sufficiently or that the training methods used may not have sufficiently reinforced the understanding of this issue. Our study was conducted using a training model.

We think that advanced simulation applications can provide a better understanding of the subjects that students have difficulty understanding. In training given by Martínez-Isasi et al. to school-age children on prevention and intervention of airway obstruction using advanced simulation technique, 77.1% of the children recognized the situation and immediately called the emergency medical service when the simulated victim became unconscious; in addition, 81.1% started chest compressions (20). These findings suggest that simulations enriched with real scenarios, rather than simple training mock-ups, may contribute to more effective learning in solid body obstruction intervention.

In a study conducted by Higuchi et al., the highest correct response rate among the participants was related to the information that small objects may cause foreign body aspiration in children. On the other hand, the lowest correct response rate was observed in the question about not giving foods such as nuts and peanuts to children younger than three years of age (21). Similarly, in our study, 48.6% of the students stated that they did not recognize objects that could cause solid body aspiration. In the study by Higuchi et al., although the participants knew the risk of small objects, they did not know that a food such as peanuts could cause solid body aspiration, indicating that the risks related to the subject were not sufficiently recognized. Our study also supports this finding, as almost half of the students stated that they did not recognize such objects.

This demonstrates that lack of awareness about the risks of foreign body aspiration in children is a serious problem. Therefore, it is important to strengthen the training and awareness-raising activities in this field and provide more comprehensive training, especially on the recognition of risky objects.

While the pre-test score of the participants indicating their willingness to intervene in foreign body aspiration in children was 7.31±3.32, this score increased to 10.78±4.47 after the training. Similarly, while the pre-test score of the participants who stated they would be timid in intervention due to lack of self-confidence before the training was 6.77±2.98, this score increased to 10.45±4.17 in the post-test. This increase was found to be statistically significant.

Since there is a risk of disability and death due to oxygen deficiency in airway obstructions, emergency intervention is vital. Therefore, in environments where staff are responsible for the education and care of children, such as schools and nurseries, the ability of staff to respond effectively and quickly is critical. In addition to hands-on training for staff, additional measures such as regular refresher courses, scenario-based simulations, accessible first aid manuals, provision of necessary equipment, and information seminars for parents can strengthen emergency preparedness by increasing initiative and courage in first aid. Such holistic approaches can be critical in increasing survival rates in emergencies such as foreign body aspiration in children.

The total knowledge level of the students about foreign body aspiration was evaluated with the tests performed before and after the education. While the mean knowledge level score of the students was 7.18±3.25 before the training, this score increased to 10.55±4.51 after the training. This difference was found to be statistically significant. In the study of Behbudi et al., it was observed that mobile-based foreign body aspiration training given to mothers improved prevention, intervention, and decision-making processes (22). Similarly, in the study of Camilo et al., a significant increase in the knowledge level of mothers was reported after foreign body aspiration training given to mothers using telesimulation (23).

These findings show that using different techniques can increase the level of education and awareness of parents, teachers, and personnel working in places where children are present. Dursun et al. found that teachers who had not received first aid training had low self-confidence in performing cardiopulmonary resuscitation (CPR). However, 92% of the teachers thought that having a first aid certificate was necessary to become a teacher (24). Based on these findings, it can be said that teachers are willing to improve themselves in this field. Making the training widespread and accessible will be an essential step to support this desire.

Conclusion and Recommendations

Our study observed that the students' first aid knowledge level about airway obstruction due to foreign body aspiration increased significantly after the training. In addition, a significant increase was found in the willingness of students to intervene in victims of foreign body aspiration after the training. To prevent deaths due to foreign body aspiration in children, it is necessary to increase the awareness of carers, teachers, and other personnel responsible for the care of children to take protective measures to reduce possible risks.

Improving the first aid skills of these personnel through training methods such as simulation, practical training, and case reenactment scenarios can significantly prevent injuries and deaths due to foreign body aspiration. Therefore, it is of great importance that such training is made widespread and continuous. In addition, regular updates to training and the integration of innovative teaching methods can increase the effectiveness of training. Expanding the scope of training programs and evaluating them periodically will contribute to improving the quality of teaching.

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Declaration of interest statement

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