









Educational intervention about airway obstructions for early childhood teachers: a quasi-experimental study

Intervenção educativa sobre obstrução das vias respiratórias para professores de educação infantil: estudo quase-experimental

Intervención educativa sobre la obstrucción de las vías respiratorias para profesores de educación de la primera infancia: estudio casi experimental

Adriano Langwinski^a 
 Ana Maria de Almeida^b 
 Adriana Zilly^a 
 Paulo César Morales Mayer^c 
 Anneliese Domingues Wysocki^d 
 Laiz Mangini Cicchero^e 
 Helder Ferreira^a 
 Reinaldo Antonio Silva-Sobrinho^a 

How to cite this article:

Langwinski A, Almeida AM, Zilly A, Mayer PCM, Wysocki AD, Cicchero LM, Ferreira H, Silva-Sobrinho RA. Educational intervention about airway obstructions for early childhood teachers: a quasi-experimental study. Rev Gaúcha Enferm. 2023;44:e20220335. doi: <https://doi.org/10.1590/1983-1447.2023.20220335.en>

ABSTRACT

Objective: To verify the effect of an educational intervention about airway obstructions and an airway clearing technique in teachers from Municipal Child Education Centers in a municipality in western Paraná.

Method: A quasi-experimental pre- and post-test study. Data was collected using a questionnaire with thirty questions to assess knowledge about the subject. For the analyses, the chi-square and McNemar tests were used, with $\alpha = 5\%$ of significance.

Results: After the training sessions, there was a 16.22% increase in the number of correct answers to the questions dealing with the recognition of the obstruction (<0.0001) and the airway clearance technique (<0.0001).

Conclusion: The intervention improved the knowledge of early childhood teachers in the municipality regarding the identification of airway obstruction and techniques airway clearing in school-age children.

Descriptors: Airway obstruction. Nursing. Knowledge. Firstaid. Childrearing.

RESUMO

Objetivo: Verificar o efeito de uma intervenção educativa sobre a obstrução de vias aéreas e a técnica de desobstrução, em professores de Centros Municipais de Educação Infantil de um município do Oeste do Paraná.

Método: Estudo quase-experimental do tipo pré e pós-teste. Os dados foram coletados por meio de um questionário com trinta questões para avaliar o conhecimento sobre a temática. Para as análises utilizou-se os testes de Qui-quadrado e McNemar, com $\alpha = 5\%$ de significância.

Resultados: Após o treinamento, houve o aumento de 16,22% no número de acertos das questões que tratavam do reconhecimento da obstrução ($<0,0001$) e da técnica de desobstrução das vias aéreas ($<0,0001$).

Conclusão: A intervenção melhorou o conhecimento dos professores dos Centros Municipais de Educação Infantil, quanto a identificação e a técnica de desobstrução das vias aéreas em crianças de idade escolar.

Descritores: Obstrução das vias respiratórias. Enfermagem. Conhecimento. Primeiros socorros. Educação infantil.

RESUMEN

Objetivo: Verificar el efecto de una intervención educativa sobre la obstrucción de las vías aéreas y una técnica de desobstrucción en docentes de Centros Municipales de Educación Infantil de un municipio del oeste de Paraná.

Método: Estudio cuasiexperimental del tipo pre y postest. Se recolectó a los datos a través de un cuestionario con treinta preguntas para evaluar el conocimiento sobre el tema. Para los análisis se utilizaron las pruebas chi-cuadrado y McNemar, con $\alpha = 5\%$ de significación.

Resultados: Después del entrenamiento, hubo un aumento del 16,22% en el número de respuestas correctas a las preguntas relacionadas con el reconocimiento de la obstrucción ($<0,0001$) y la técnica de desobstrucción de la vía aérea ($<0,0001$).

Conclusión: La intervención mejoró el conocimiento de los docentes de los centros municipales de educación infantil en cuanto a la identificación y técnica de desobstrucción de las vías respiratorias en niños en edad escolar.

Descriptor: Obstrucción de las vías aéreas. Enfermería. Conocimiento. Primeros auxilios. Crianza del niño.

^a Universidade Estadual do Oeste do Paraná (Unioeste). Foz do Iguaçu, Paraná, Brasil.

^b Universidade de São Paulo (USP). Ribeirão Preto, São Paulo, Brasil.

^c Universidade CEUMA (Uniceuma). Imperatriz, Maranhão, Brasil.

^d Universidade Federal de São Paulo (Unifesp). São Paulo, São Paulo, Brasil.

^e Secretaria Estadual do Estado do Paraná (SESA). Foz do Iguaçu, Paraná, Brasil.

INTRODUCTION

The Municipal Child Education Centers (CMEIs) receive four months old or older children and have an essential role in the development of the potential of these children. They are environments for early socialization, in addition to allowing parents to go to work while leaving their children under supervision. The CMEIs are accountable for the wellbeing of students in the school environment, attempting to prevent accidents and attend health complications⁽¹⁾.

It is important to note the magnitude and responsibility of educators directly involved in activities with children, which include not only meals and play, but also basic health care and safety⁽²⁾.

In this stage of the life of a child, they are interested in exploring new situations, discoveries and curiosities. Thus, they run the risk of accidents when the school environment is not appropriate. Even when the conditions are adequate, children stay long periods at school, meaning that education workers are more likely to witness accidents. Therefore, they must be trained to prevent, identify, and intervene in risk situations, since often insecurities and awareness of one's own lack of preparation to provide first aid can affect educators⁽¹⁾, and it is widely known that incorrect first aid application can have negative consequences, with irreparable and even fatal repercussions^(3,4).

In Brazil, the most common external cause of death in children under 6 was foreign body aspiration (FBA), with 3,106 deaths, 334 (10.75%) of which took place in Paraná, from 2012 to 2020, representing an important public health problem^(5,6).

Foreign body airway obstruction (FBAO), also known as choking, is frequent among children below 4 and responsible for 84% of accidents in Brazil. According with records from the Fire Brigade of the state of Paraná, there was an increase in the number of accidents from 2010 to 2021. In this period, 4,791 victims of FBAO were attended, and 3,404 (71.04%) of them were children from 0 to 4, meaning that this is the third most common cause of accidents in childhood. The Heimlich Maneuver is the most common intervention in these cases, and its use must be taught^(4,7).

Concerns about the high number of FBAO in children led to the creation of the Federal Law No. 13.722/2018, which makes mandatory the training in basic first aid notions for teachers and others who work with basic education and children recreational activities⁽⁸⁾.

This study is based on the strategical axes of the National Policy for the Integral Attention to Children's Health (PNAISC), and on the concept of Health at School adopted by National Curricular Parameters, which aim to provide integral education and health, valuing the dimensions of health promotion,

disease and health issue prevention, and health care to children and adolescents⁽⁹⁾.

Considering this context, it is extremely relevant to create training programs with practical first aid classes for child education teachers, in order to capacitate them to recognize and act in situations that may put the lives of children at risk. These activities, preferably, should take place during their work journeys⁽⁷⁾. The goal of this study was assessing the effects of an educational intervention about airway obstruction and clearing techniques, for teachers of Municipal Centers of Child Education from a municipality in western Paraná.

METHOD

Ethical aspects

This study was approved by the Ethics Committee for Research with Human Beings and followed the ethical and legal precepts from Resolution 466/12, under CAAE and opinion No. 2.373.673.

Design, period, and place of study

Quasi-experimental pre-test post-test study, evaluating a single group.

This research was carried in a city in the west of Paraná, which, according with data from the Brazilian Institute of Geography and Statistics (IBGE) is classified as small-sized municipality 2⁽¹⁰⁾. In 2018, the municipality had six CMEIs, located in the urban area, which attended nearly 550 children every day.

Population or sample; criteria of inclusion and exclusion

The population of this study was formed by 168 teachers who worked in 2018 in the CMEIs in the city. They included teachers who had worked in the CMEIs for more than 6 months. Exclusion criteria were: being on vacation, on leave, being fired from work during the period of the test, and not answering the first attempt to collect data into the questionnaire. 135 professors had the prerequisites to be included, but only 131 answered the first questionnaire (pre-test), and 111 participated in the intervention by answering the second questionnaire (post-test) afterwards (Figure 1).

Study protocol

The data collection instrument was a questionnaire with two-option and three-option questions, as well as Likert type questions. Researchers elaborated 30 questions,

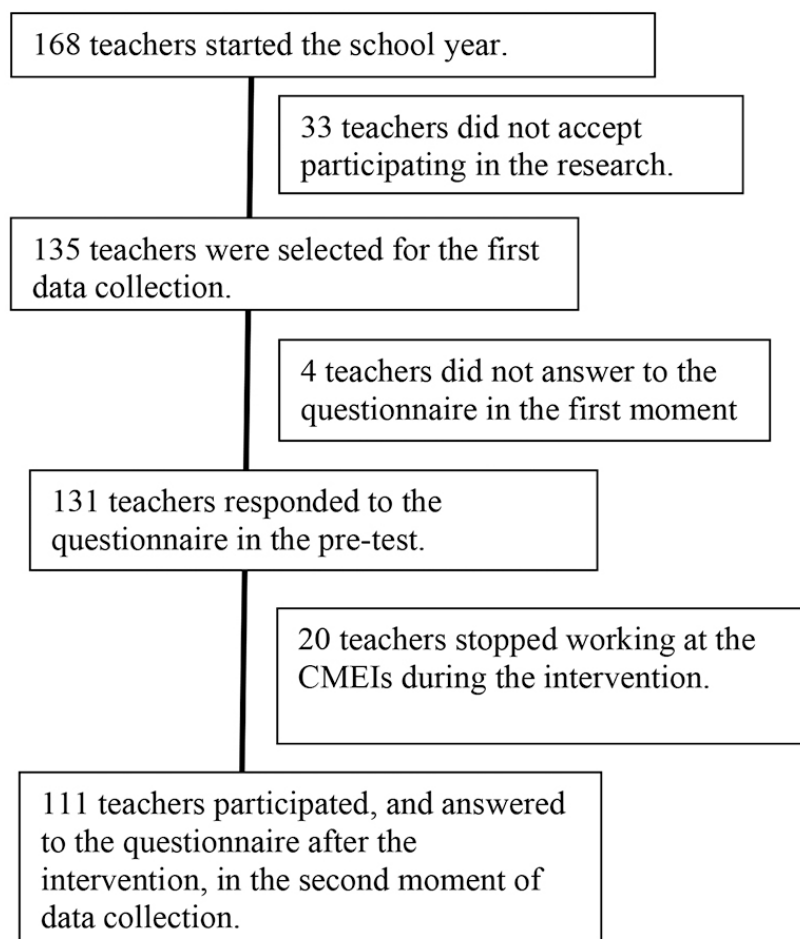


Figure 1 – Flowchart of the population of the study in a city in the west of Paraná. Paraná, Brazil, 2018
Source: The authors, 2018.

which covered the topics of airway obstructions and the Heimlich Maneuver.

We validated the appearance of the questionnaire in February 2019 with the aid of a panel of specialists, formed by five professors experienced in teaching in CMEIs, who were in managerial roles in the Education Secretariat of the municipality. After they answered and analyzed the questionnaire, we reached a consensus that part of the questions should have three options of response, while others should be Likert-type questions.

Data collection took place in two different moments, known as pre-test and post-test. The first data collection took place from 13 to 20 March 2018, and 131 teachers answered the questionnaire.

To ensure the confidentiality of information, the teachers answered the questionnaires at the CMEIs where they worked, in a private room. The specific place was chosen considering suggestions from the school management, number of teachers, and routine of the institution. The

days and times to apply the questionnaires were previously scheduled with the direction of each CMEI, to respect particularities and avoid disturbances to the routine of professionals and institution.

The second data collection took place from 19 to 25 June 2018, after the educational intervention. 111 teachers answered the questionnaire at this time. The intervention took place from May 14 to June 14, 2018, including theoretical and practical training. There were 11 one-hour sessions; 10 of them had 10 teachers, while one had 11.

The teachers were reunited at the working room at each CMEI. Each received a booklet elaborated by researchers from the Nursing School of Ribeirão Preto, at the Universidade de São Paulo⁽¹¹⁾, and a common toy doll, which belonged to the CMEI itself, where it was used for playful activities with the children, and had no specific training related characteristics. The booklet and the toy doll were the instruments used by the researcher in the theoretical-practical intervention.

The researcher started the work using the booklet, addressing the theoretical aspects of airway clearance in children up to one year old. The professors received information on how to recognize choking and its signs, about the airway clearance maneuvers in children under one year old and in children above that age (since these are different techniques). They also received orientations about cardiopulmonary resuscitation in case of airway obstructions with cardiopulmonary arrest. For situations involving children above one year old, the theoretical training was provided according with recommendations from Parolin and Teixeira⁽¹²⁾. The teachers followed the explanation in their booklets while the researcher simulated the content being addressed using the toy doll, using it to show the adequate positions and the proper movement of hands to perform the technique in children below one year old.

The practical part was carried out with dolls that simulated babies up to one year of age. For each theoretical explanation in the booklet, a practical simulation was performed on the doll. The teachers were encouraged to start the movements simultaneously, and to count the number of slaps on the back and thoracic compressions out loud. The use of toy dolls which were already present at the CMEIs made it financially possible to execute the training, since it would be too costly to acquire specific dolls. Thus, it was possible to provide each teacher with one.

Analysis of results and statistics

We used descriptive statistics to analyze data related to the information of participants in the research and their knowledge about first aid. An analysis of the statistical differences between the frequency of the categories in each question was carried out using the chi-squared test for K proportions, with $\alpha = 5\%$ of statistical significance.

To compare the answers found before and after training, we used the McNemar test, with $\alpha = 5\%$ of statistical significance. We crossed the answers considered to be correct or incorrect in both moments (before and after training), finding a p-value which indicates whether there was a significant difference between responses.

RESULTS

Table 1 shows the profile of teachers. We found that most were female (99.10%, $p < 0.0001$) and 54.95% did not have children. Regarding their academic education, 30.63% were specialists, 26.13% were licensed teachers, 22.52% had

incomplete higher education, and 17.12% had complete higher education ($p < 0.0001$). The most common type of employment was via selection process (63.06%), followed by internships (30.63%) ($p < 0.0001$). The time as a teacher in the CMEI was evaluated in years. Most participants had worked there for 1 year or less (34.23%), followed by those who had been working in CMEIs for more than 10 years (27.03%) ($p < 0.0001$).

Among the 111 teachers who answered the questionnaire in the pre-test, 57.66% stated to have participated in some educational course about first aid ($p = 0.031$). Most of those who participated in some formation course had had previous contact with the topic of the Heimlich Maneuver (90.63%) ($p < 0.0001$). Regarding first aid courses specific for children in the CMEI, most participants stated to have been through one (65.50%; $p < 0.008$). Furthermore, most teachers (76.56%; $p < 0.0001$) stated to know in part how to act in cases of airway obstructions in children (Table 2).

Table 3 shows the capacity of teachers to identify airway obstructions before and after training. Considering the answers of CMEI teachers before and after training, the only one that did not show a statistically significant difference was the absence of breathing and coughs ($p > 0.05$).

Before training, 70.27% of teachers correctly answered about the importance of knowing what the activity is the child was doing when the signs of airway obstruction were perceived. After training, 86.49% ($p = 0.004$) answered the same question correctly (Table 3).

Regarding their knowledge on how to identify signs of airway obstruction, all teachers responded they would not know how to identify it before the training. After it, 90.09% of them responded they would not know how to identify the signs (Table 3; $p = 0.003$).

Regarding the signs of airway obstruction, 72.97% of teachers marked the option blueish-purplish lips before training. This percentage was 16.22% higher after training (Table 3; $p = 0.004$). Regarding fast, gasping breathing, a high percentage of teachers did not mark this option before training as a sign of obstruction (54.95%). After training, this percentage fell to 39.64%, which is still high (Table 3; $p = 0.017$). Regarding coughing, 56.76% of teachers did not mark it before training, and 54.05% still did not mark it after the training (Table 3; $p = 0.749$). The percentage of correct responses regarding unconsciousness, agitation, and body sluggishness increased, respectively, in 34.23%, 14.41%, and 21.62% (Table 3; $p = 0.024$). The percentage of teachers who marked not breathing as a sign of airway obstruction decreased in 2% after the training. However, it continued to be high, nearly 90% (Table 3; $p = 0.803$).

Table 1 – Profile of teachers from the Municipal Child Education Centers in a city in the west of Paraná. Paraná, Brazil, 2018

Variables	Categories	n	%	P
Sex	Male	1	0.90	<0.0001
	Female	110	99.10	
Has children	Yes	61	54.95	0.14
	No	50	45.05	
Number of children	None	50	45.05	<0.0001
	1	27	24.32	
	2	25	22.52	
	3	7	6.31	
	4	1	0.90	
	6	1	0.90	
Schooling	Licensed to teach	29	26.13	<0.0001
	Incomplete higher education	25	22.52	
	Complete higher education	19	17.12	
	Specialization	34	30.63	
	Others	4	3.60	
Nature of employment in the municipality	Internship	34	30.63	<0.0001
	Selection process	70	63.06	
	Temporary contract	6	5.41	
	Volunteer	1	0.90	
Time teaching at the CMEI (years)	1 or less	38	34.23	<0.0001
	1 to 2	16	14.41	
	2 to 5	13	11.71	
	5 to 10	14	12.61	
	more than 10	30	27.03	

Source: Research data. 2018.

Table 2 – Distribution of the responses of professors from Municipal Child Education Centers regarding first aid in a municipality in the west of Paraná. Paraná, Brazil, 2018

Variables	Categories	n	%	P
Participated in some educational course about first aid	No	47	42.34	0.031
	Yes	64	57.66	
Workload (hours)	Up to 3	9	14.06	< 0.0001
	4 to 10	50	78.13	
	11 to 20	3	4.69	
	more than 20	2	3.13	
The Heimlich Maneuver was addressed	No	6	9.38	< 0.0001
	Yes	58	0.63	
Institution that provided the course	City Hall	61	95.31	< 0.0001
	Cebrap	1	1.56	
	Eco cataratas	1	1.56	
	Does not remember	1	1.56	
Institution that taught the course	Fire brigade	61	95.31	< 0.0001
	Cebrap*	1	1.56	
	Eco cataratas	1	1.56	
	Does not remember	1	1.56	
Participation in a first aid course specific to attend children in CMEIs	No	24	37.50	0.008
	Yes	40	65.50	
Workload (hours)	Up to 3 hours	11	17.19	< 0.0001
	4 to 10	27	42.19	
	11 to 20	1	1.56	
	more than 20	1	1.56	
Would know how to act in cases of airway obstruction in a child.	No	10	15.63	< 0.0001
	Partially	49	76.56	
	Yes	5	7.81	

Source: Research data. 2018.

*Brazilian Center of Analysis and Planning

Table 3 – Distribution of the answers of teachers from the Municipal Child Education Centers regarding the identification of airway obstruction in a city from the west of Paraná. Paraná, Brazil, 2018

Question	Before training				After training				P
	Incorrect		Correct		Incorrect		Correct		
	n	%	n	%	n	%	n	%	
Do you think it is important to know which activity the child was doing when you noticed that they are presenting signs of airway obstruction?	33	29.73	78	70.27	15	13.51	96	86.49	0.004
Would you know how to identify signs of airway obstruction?	111	100.0	0	0.00	100	90.09	11	9.91	0.003
Blueish-purplish lips	30	27.03	81	72.97	12	10.81	99	89.19	0.004
Fast, gasping breathing	61	54.95	50	45.05	44	39.64	67	60.36	0.017
Unconsciousness	59	53.15	52	46.85	21	18.92	90	81.08	<0.0001
Agitation	56	50.45	55	49.55	40	36.04	71	63.96	0.024
No breathing	11	9.91	100	90.09	13	11.71	98	88.29	0.803
Body sluggishness	31	27.93	80	72.07	7	6.31	104	93.69	<0.0001
Coughing	63	56.76	48	43.24	60	54.05	51	45.95	0.749

Source: Research data, 2018.

Table 4 discusses the knowledge of teachers about the technique of airway clearance in children. For all questions, there was an increase in the percentage of correct responses after the intervention. The only question that showed no statistical difference in the responses given before and after the training was "Do you think it is important to refer the child to a hospital after clearing their airways?" (Table 4, $p > 0.05$).

Although a large number of teachers answered correctly the question about the position of the torso of the child in regard to their head during the maneuver, showing a statistical significant difference, the percentage of incorrect responses continued to be high (65.77%).

Regarding the position of the torso, most teachers correctly indicated that it should stay a bit below the head. Before training, 85.59% of teachers answered incorrectly; after training, this number decreased to 65.77% (Table 4; $p < 0.001$).

The best results were related with the number of slaps recommended during the maneuver in children below one year old, as the percentage of correct answers increased in 57;66% (Table 4; $p < 0.001$). The percentage of teachers aware that the technique for children above one year old is similar to the technique used in adults increased in 46.85% (Table 4; $p < 0.001$). Furthermore, the percentage of teachers who responded correctly about the number of abdominal compressions that should be done to children above one year old increased in 52.25% (Table 4; $p < 0.001$).

Although there was an increase of 46.85% in the percentage of correct responses, the number of teachers who did not answer correctly what was the adequate number of abdominal pressures that should be applied to children below one year old was still high after the training, 42.34% (Table 4; $p < 0.001$).

Table 4 – Distribution of the responses by teachers from the Municipal Child Education Centers about the airway clearing technique for children, in a municipality in the west of Paraná. Brazil, 2018.

Question	Before training				After training				P
	Incorrect		Correct		Incorrect		Correct		
	n	%	n	%	n	%	n	%	
Should the victim's face be turned downwards?	41	36.94	70	63.06	5	4.50	106	95.50	<0.0001
Should their torso be positioned a little below their head?	95	85.59	16	14.41	73	65.77	38	34.23	<0.0001
Should you apply slaps on the back of the child, between the scapulae?	28	25.23	83	74.77	9	8.11	102	91.89	<0.0001
Should you compress the torso of the child, below the line of the nipples?	36	32.43	75	67.57	7	6.31	104	93.69	<0.0001
How many slaps are recommended for children below one year old?	97	87.39	14	12.61	33	29.73	78	70.27	<0.0001
What is the number of thoracic compressions recommended for children under one year old?	99	89.19	12	10.81	47	42.34	64	57.66	<0.0001
Is the technique used to clear the airways of children above one year old similar to that used in adults?	86	77.48	25	22.52	34	30.63	77	69.37	<0.0001
Does the technique of airway clearing consist in abdominal pressure, above the navel?	70	63.06	41	36.94	34	30.63	77	69.37	<0.0001
How many times should you compress the abdomen of a child above one year old?	89	80.18	22	19.82	31	27.93	80	72.07	<0.0001
If the child is unconscious, should you start cardiopulmonary resuscitation maneuvers?	42	37.84	69	62.16	15	13.51	96	86.49	<0.0001
In your evaluation, is it important to refer the child to a hospital after clearing their airways?	10	9.01	101	90.99	5	4.50	106	95.50	0.2670

Source: Research data, 2018.

■ DISCUSSION

Considering the framework of PNAISC and the directives of the Health at School Program, which aims to promote the health of the child, providing integral and integrated care, especially in early childhood⁽⁹⁾, it becomes clear how complex and challenging this issue is. Thus, there is still room for improving the operationalization of practices of health and education workers. The pact between the Ministries of Health and Education is an example, as it seeks to qualify those involved in child care^(13,14).

Evidence on the knowledge of teachers suggest they receive no first-aid training targeted at children in child education in the university, as they are trained to become teachers. Furthermore, the Brazilian National Common Core (BNCC) does not mention that the topic should be taught in courses for the licensing of teachers, and the Ministry of Education only requires it from certain technical course modalities⁽¹⁴⁾.

Different studies around the world have shown that choking is the main type of accident that takes place in the school environment between children below 5 years old, and that schools and teachers have implemented preventive action in this regard. However, when it comes to providing first aid care for these cases, they are mostly insecure and lack knowledge⁽¹⁵⁻¹⁸⁾.

As a result, literature often mentions the need to implement a process of continued first aid education, especially for teachers in basic education, so they can act if there is an emergency at school^(16,18). This is also one of the steps to implement the PNAISC and the structuring axes of the Health at School Program.

Regarding identifying airway obstructions, the percentage of right answers increased regarding the importance of knowing what activity the child was doing before the signs of choking appeared, since the analysis of the scene of the accident could indicate the agent that caused it⁽¹³⁾. This observation is worrisome due to considerations about the safety of the school space, its physical and structural distribution, the presence of small toy pieces, the training of the teachers, and the organization to provide meals, since these dynamics can contribute to accidents^(7,17).

Studies have suggested that the ingestion or inhalation of food is the main cause of choking^(19,20), thus, there must be an adequate number of caregivers per children to supervise them at times of meals at school. Another strategy is not offering high-risk foods, such as seeds/nuts, candies, M&Ms, and large pieces of meat for children under 5 years old⁽²¹⁾.

When asked whether they would know how to identify signs of airway obstruction, in the pre-test, no teacher answer "yes". After the intervention, only about 10% stated they would know how to do so, which is still a very low percentage. This is very worrisome, since, to apply the Heimlich Maneuver, one must be sure that the victim is actually choking. On the other hand, it is well known that, even for health workers, it is difficult to ascertain the level of obstruction, except when it is in the region of the mouth or the nose^(21,22).

The fact that most teachers did not know how to identify choking showed how vulnerable children are to this event. Changes to this modality can be implemented through assertive pedagogical strategies, producing integral health and education to prevent, in this particular case, childhood accidents⁽⁹⁾.

Still in regard to identifying choking, teachers were tested about the seven characteristic signs of airway obstruction (Table 2), according to the booklet used in the intervention stage⁽¹²⁾. In these items, the knowledge acquired after the intervention increased, but was still below par because, when the obstruction by foreign body manifests itself, the identification/diagnosis must lead to an assertive and rapid intervention⁽²³⁾.

Regarding the correct way to clear the airways, post-test results showed that the educational activity increased the number of right answers (with statistical significance), showing that the training session provided to the teachers had a positive effect, as did that from a previous research (pre- and post-test)⁽²³⁾.

It stands out that a large percentage of interviewees, in the pre-test, correctly answered that, if the victim was or became unconscious, resuscitation maneuvers should be started. The number of correct answers increased further in the post-test. However, we expected all teachers to be aware of this need, since the lack of breathing and pulse indicate that resuscitation maneuvers are necessary, according to the American Heart Association⁽²⁴⁾.

The lack of preparation from teachers and other members of the school community, when it comes to evaluating and execution cardiopulmonary resuscitation maneuvers was also found by studies in different continents⁽²⁵⁻²⁶⁾. There is a gap between knowing and acting, and often teachers do not feel prepared to help their students when an emergency situation arises, going through feelings of concern, fear, and anguish⁽¹⁸⁾.

Studies that sought to identify strategies to improve the knowledge and ability of teachers about first aid in school had inconclusive results, but all proposals had some effect, increasing the knowledge on the topic^(23,27).

Regarding the profile of teachers from the Municipal Child Education Centers who participated in this research, it is similar to that of child education teachers around the country⁽²⁸⁾.

As we consider the evidence provided by this study in light of the PNAISC and the directives of the Health at School Program⁽⁹⁾, it became clear how complex and necessary an intersectoral work is, involving society and family to articulate the prevention of avoidable deaths in children, providing healthy meals and preventing accidents at school. In this regard, the intervention carried out by this research led to an increase in the number of correct answers in the post-test, when compared to the pre-test, showing itself to be efficient, despite the fact that some items showed less correct answers than expected in the post-test.

The design of this study was coherent, since it involved the observation of effects of a specific intervention, and it is recommended to evaluate actions/programs that deal with large populations. Results from other national and international studies on the topic corroborate those found in this research^(4,28-30).

In order to analyze the opinions and knowledge of future teachers in the last year of graduation of a Spanish public university, regarding the training for first aid and its need at school, it was found that teachers recognize how important first aid is for their professional development, but do not know how to act in emergencies in the classroom and received no training of the sort during graduation⁽²⁷⁾.

Another research, aimed at evaluating the knowledge, attitude, and practices regarding first aid in kindergarten and elementary school teachers in Africa, found that most teachers had good knowledge and a positive attitude regarding first aid. The study also indicated how important first aid training is for teachers, especially those who work in kindergarten⁽¹⁶⁾.

The study model boosted the educational effect in the group, since randomizing the population would exclude certain individuals from participation, depriving them from the possibility of acquiring this knowledge.

Integral health care to children involves different spaces and experiences, and the time in school is a relevant period in the life of these children, showing the interface between school education and health. Therefore, this study brings contributions to the implementation of PNAISC, showing the need for continued education in order to educate and empower teachers to deal with first aid situations. It also, transversally, has a positive effect for nursing, as these workers have a central role regarding the integral attention to the health of the child, as they provide education, organize

assistance protocols, and are part of teams who formulate public health policies.

Even with a significant increase in the percentage of results, the short period of time between intervention and the second data collection can be considered a limitation of this study, since it is not possible to measure how much knowledge the teachers will retain regarding the topic at hand as the time period increases. Furthermore, our results are limited to the setting of the research and cannot be generalized.

CONCLUSION

A small part of teachers reported knowing how to identify cases of airway obstruction in children, and how to act in such cases. Data analysis suggests that the intervention proposal improved the knowledge of teachers from the Municipal Child Education Centers regarding the identification of airway obstruction and the techniques of airway clearing in school children.

The results show the importance of the topic of first aid in the courses that provide licenses to teach, so these educators can be prepared to take action in emergency cases that may happen in the school environment. We suggest further research about the topic to discover for how long the teachers can maintain the knowledge acquired.

It stands out that this knowledge is essential at school. It is necessary to look at its educational value and see that the professionals involved can go beyond education, also providing integral health care.

Considering that BNCC guides the common core of teaching education courses in the country, we can assume that the gaps found in this study may represent the reality around the country, showing a need not only to provide pedagogical care, but also to provide safety in the case of accidents at school. This continued education process with the teachers can be implemented through the Health at School Program, a partner strategy to implement the strategic PNAISC axes.

REFERENCES

1. Ilha AG, Cogo SB, Ramos TK, Andolhe R, Badke MR, Colussi G. Educational actions on first aid for early childhood education teachers: a quasi-experimental study. *Rev Esc Enferm USP*. 2021;55:e20210025. doi: <http://doi.org/10.1590/1980-220X-REEUSP-2021-0025>
2. Alshehri KA, Alharbi AA, Yaghmoor BE, Salman AK, Alaydarous AS, Abdalwassie LK, et al. Awareness of the first aid management of foreign body aspiration among students: a cross-sectional study. *J Edu Health Promot*. 2019;8(1):220. doi: https://doi.org/10.4103/jehp.jehp_306_19

3. Verçosa RCM, Silva MDBP, Santos MM, Silva JR, Santos RFEP. Conhecimento dos professores que atuam no âmbito escolar acerca dos primeiros socorros. *Rev Ensino EducCiênc Humanas*. 2021;22(1):78-84. doi: <https://doi.org/10.17921/2447-8733.2021v22n1p78-84>
4. Pereira JP, Mesquita DD, Garbuio DC. Educação em saúde: efetividade de uma capacitação para equipe do ensino infantil sobre a obstrução de vias aéreas por corpo estranho. *Rev Bras Multidiscipl*. 2020;23(2). doi: <https://doi.org/10.25061/2527-2675/ReBraM/2020.v23i2Supl..828>
5. Justino DCP, Andrade FB. Análise espacial das causas de mortalidade infantil no Brasil de 2000 a 2015. *Rev Ciênc Plural*. 2020;6(3):174-93. doi: <https://doi.org/10.21680/2446-7286.2020v6n3ID21978>
6. Ministério da Saúde (BR). DataSUS. Mortalidade por causas externas no Brasil [Internet]. Brasília, DF: Ministério da Saúde; 2022 [cited 2022 Apr 5]. Available from: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?sim/cnv/ext10uf.def>
7. Ferreira C, Martins DA, Gomes GM, Santos JC, Oliveira JCB, Eloy LA, et al. Prevenção e primeiros socorros de obstrução de vias aéreas por corpos estranhos para crianças. *InterAção*. 2022;04(2):44-53. doi: <https://doi.org/10.47296/interao.v4i2-2022.315>
8. Presidência da República (BR). Secretaria-Geral. Subchefia para Assuntos Jurídicos. Lei n. 13.722, de 4 de outubro de 2018. Torna obrigatória a capacitação em noções básicas de primeiros socorros de professores e funcionários de estabelecimentos de ensino públicos e privados de educação básica e de estabelecimentos de recreação infantil. *Diário Oficial União*. 2018 out 5 [cited 2019 Jan 6];155(193 Seção 1):2. Available from: <https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=05/10/2018&jornal=515&pagina=2&totalArquivos=171>
9. Ministério da Saúde (BR). Secretaria de Atenção à Saúde. Departamento de Ações Programáticas e Estratégicas. Política nacional de atenção integral à saúde da criança: orientações para implementação [Internet]. Brasília, DF: Ministério da Saúde; 2018 [cited 2019 Jan 6]. Available from: <https://portaldeboaspraticas.iff.fiocruz.br/wp-content/uploads/2018/07/Pol%C3%ADtica-Nacional-de-Aten%C3%A7%C3%A3o-Integral-%C3%A0-Sa%C3%BAde-da-Crian%C3%A7a-PNAISC-Vers%C3%A3o-Eletr%C3%B4nica.pdf>
10. Instituto Brasileiro de Geografia e Estatística [Internet]. Brasília, DF: IBGE; 2017 [cited 2018 Nov 19]. Cidades. Available from: <https://cidades.ibge.gov.br/brasil/>
11. Habeeb KA, Alarfaj G. Saudi parents awareness regarding burn, choking, and drowning first aid in children. *J Family Med Prim Care*. 2020;9(3):1370-5. doi: https://doi.org/10.4103/jfmpc.jfmpc_1064_19
12. Oliveira BFM, Parolin MKF, Teixeira JREV. Trauma: atendimento pré-hospitalar. 2 ed. São Paulo: Atheneu; 2007.
13. Silva-Sobrinho RA, Pereira BSA, Trevisan CL, Martins FJ, Almeida ML, Mansour NR, et al. Percepção dos profissionais da educação e saúde sobre o programa saúde na escola. *RevPesq Qual*. 2017 [cited 2022 Apr 1];5(7):93-108. Available from: <https://editora.sepq.org.br/rpq/article/view/77/66>
14. Senado Federal (BR). LDB: Lei de diretrizes e bases da educação nacional [Internet]. Brasília, DF: Senado Federal; 2017 [cited 2018 Nov 23]. Available from: https://www2.senado.leg.br/bdsf/bitstream/handle/id/529732/lei_de_diretrizes_e_bases_1ed.pdf
15. Joseph N, Narayanan T, Zakaria SB, Nair AV, Belayutham L, Subramanian AM, et al. Awareness, attitudes and practices of first aid among school teachers in Mangalore, South India. *J Prim Health Care*. 2015;7(4):274-81. doi: <https://doi.org/10.1071/HC15274>
16. Workneh BS, Mekonen EG, Ali MS. Determinants of knowledge, attitude, and practice towards first aid among kindergarten and elementary school teachers in Gondar city, Northwest Ethiopia. *BMC Emerg Med*. 2021;21(1):73. doi: <https://doi.org/10.1186/s12873-021-00468-6>
17. Santos ACA, Silveira BSL, Tavares LRS, Santos MC, Santos MAM, Lopes IMD. Injury prevention in childhood: analysis of a public health problem. *Res SocDev*. 2022; [cited 2023 jun 6];11(10):e124111032171. doi: <https://doi.org/10.33448/rsd-v11i10.32171>
18. Jonge AL, Martins AS, Santos HM, Santos AST, Goes FGB, Silva LJ. Conhecimentos de profissionais de educação infantil sobre obstrução de vias aéreas por corpo estranho. *Enferm Foco*. 2020 [cited 2022 Apr 1];11(6):192-8. Available from: <http://revista.cofen.gov.br/index.php/enfermagem/article/view/3425/1074>
19. Amaral JB, Felix MM, Ferreira MBG, Ribeiro S, Barbosa MH. Characterization of children accidental death cases by aspiration of foreign bodies in Minas Gerais. *Rev Min Enferm*. 2019;23:e-1218. doi: <https://doi.org/10.5935/1415-2762.20190066>
20. Na'ara S, Vainer I, Amit M, Gordin A. Foreign body aspiration in infants and older children: a comparative study. *Ear Nose Throat J*. 2020;99(1):47-51. doi: <https://doi.org/10.1177/0145561319839900>
21. Montana A, Salerno M, Feola A, Asmundo A, Di Nunno N, Casella F, et al. Risk management and recommendations for the prevention of fatal foreign body aspiration: four cases aged 1.5 to 3 years and mini-review of the literature. *Int J Environ Res Public Health*. 2020;17(13):4700. doi: <https://doi.org/10.3390/ijerph17134700>
22. Luczak A. Effect of body position on relieve of foreign body from the airway. *AIMS Public Health*. 2019;6(2):154-9. doi: <https://doi.org/10.3934/publichealth.2019.2.154>
23. Silva FL, Galindo Neto NM, Sá GGM, França MS, Oliveira PMP, Grimaldi MRM. Technologies for health education about foreign-body airway obstruction: an integrative review. *Rev Esc Enferm USP*. 2021;55:e03778. doi: <https://doi.org/10.1590/S1980-220X2020035103778>
24. American Heart Association. Destaques da American Heart Association 2015: atualização das diretrizes de RCP e ACE [Internet]. Dallas: AHA, versão Português; 2015 [cited 2018 Nov 23]. Available from: <http://www.perc.ufc.br/wp-content/uploads/2016/02/2015-AHA-Guidelines-Highlights-Portuguese.pdf>
25. Silva DP, Nunes JBB, Moreira RTF, Costa LC. First aid as an object of health education for municipal school professionals. *Rev Enferm UFPE on line*. 2018;12(5):1444-53. doi: <https://doi.org/10.5205/1981-8963-v12i5a234592p1444-1453-2018>
26. Onyeaso AO, Onyeaso OO. Comparison of practising and student teachers' knowledge of cardiopulmonary resuscitation in Nigeria. *Public Health Res*. 2017;7(6):143-7. doi: <https://doi.org/10.5923/j.phr.20170706.03>
27. Anto-Ocrah M, Maxwell N, Cushman J, Acheampong E, Kodam RS, Homan C, et al. Public knowledge and attitudes towards bystander cardiopulmonary resuscitation (CPR) in Ghana, West Africa. *Int J Emerg Med*. 2020;13:29. doi: <https://doi.org/10.1186/s12245-020-00286-w>
28. Ministério da Educação (BR). Perfil do professor de educação básica. Brasília, DF: Instituto Nacional de Estudos e Pesquisas Anísio Teixeira; 2018.
29. Zonta JB, Eduardo AHA, Ferreira MVF, Chaves GH, Okido ACC. Self-confidence in the management of health complications at school: contributions of the in situ simulation. *Rev Latino Am Enferm*. 2019;27:e3174. doi: <https://doi.org/10.1590/1518-8345.2909.3174>
30. Olmos-Gómez MDC, Ruiz-Garzón F, Pais-Roldán P, López-Cordero R. Teaching first aid to prospective teachers as a way to promote child healthcare. *Healthcare (Basel)*. 2021;9(4):367. doi: <https://doi.org/10.3390/healthcare9040367>

■ **Authorship contribution:**

Project administration: Reinaldo Antonio Silva-Sobrinho.

Formal analysis: Reinaldo Antonio Silva-Sobrinho, Adriano Langwinski, Helder Ferreira.

Concept: Reinaldo Antonio Silva-Sobrinho, Adriano Langwinski.

Writing – original draft: Adriano Langwinski, Ana Maria de Almeida, Adriana Zilly, Paulo César Morales Mayer, Anneliese Domingues Wysocki, LaizManginiCicchelerio, LaizManginiCicchelerio, Helder Ferreria, Reinaldo Antonio Silva-Sobrinho.

Writing – revision and editing: Helder Ferreira.

Methodology: Reinaldo Antonio Silva-Sobrinho, Ana Maria de Almeida, Adriana Zilly, Paulo César Morales Mayer.

Validation: Reinaldo Antonio Silva-Sobrinho, Adriano Langwinski, Ana Maria de Almeida.

The authors declare that there is no conflict of interest.

■ **Corresponding author:**

Helder Ferreira

E-mail: heelfer@gmail.com

Received: 12.30.2022

Approved: 06.12.2023

Associate editor:

Gabriella de Andrade Boska

Editor-in-chief:

João Lucas Campos de Oliveira