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Determining the effectiveness of basic first aid training provided to secondary school student

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ABSTRACT

Aims: The aim of this study is to evaluate the effectiveness of first aid training provided to middle school students from diverse socio-demographic backgrounds, and to examine how these differences influence the outcomes of the training.

Methods: The study was conducted in three middle schools located in the eastern part of Turkiye between April and July 2016. The population of the study consisted of 7th-grade students (n=391) attending these schools during the spring semester of the 2015-2016 academic year. All students were included in the sample without any selection, as participation was obtained through parental and student consent. Data were collected using the "Descriptive Information Form" and the "First Aid Education Knowledge Evaluation Form". First aid knowledge levels were assessed before the training, after the training, and two weeks post-training.

Results: The study found that the average first aid knowledge scores of students based on socioeconomic status were 58.61±6.26 for high, 60.86±5.86 for middle, and 56.44±6.26 for low socioeconomic status. Post-training, the average scores increased across all groups. These findings indicate that socioeconomic status affects first aid knowledge, but the training programs benefit all students and improve their knowledge levels.

Conclusion: The findings of this study indicate that while socioeconomic status exerts a significant influence on first aid knowledge, the training programmes implemented have resulted in notable improvements in the knowledge levels of all students.

Keywords: First aid training, school health, school health nursing

INTRODUCTION

Accidents occurring at home, in traffic, or in the workplace have been shown to have profound impacts on individuals and communities.[1-5] Over the past decade, the increase in natural disasters and human-made accidents has resulted in many incidents that pose devastating threats to children and adolescents in primary and secondary schools.[6] This situation has led to numerous studies emphasizing the critical importance of first aid in accident scenarios.[7-9]

First aid plays a crucial role in providing immediate assistance to individuals who are suddenly injured or fall ill until professional help arrives or the person recovers.[10] Correctly administered first aid is essential to minimize disability, enhance the safety of victims, and potentially save lives.[11] Therefore, first aid skills are vital for individuals of all ages.[12] First aid training is particularly effective for children aged 11-20, as they have developed the highest levels of physical, sensory, and psychomotor functions in this age group.[13] Short-term training programs have been shown to significantly improve first aid knowledge and practices among students aged 13-15, highlighting the suitability of this age group for such education.[14] Schools provide excellent opportunities to offer first aid and basic life support training, preparing students for emergencies, reducing the severity of injuries, and promoting a culture of safety.[15-18] Additionally, short-term first aid training programs have been found to

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significantly enhance students' knowledge, attitudes, and confidence in performing first aid.[19,20]

This study aims to evaluate the effectiveness of first aid training provided to middle school students across three different schools with varying socio-demographic backgrounds. By examining the impact on students from diverse socio-economic backgrounds, this research seeks to reveal how these differences influence the outcomes of first aid education. Additionally, the study addresses a significant gap in the literature by focusing on the effectiveness of training provided by pediatric nurses. The originality and significance of this study lie in its comprehensive approach to understanding how socio-demographic factors influence the outcomes of first aid education. The hypothesis of this study is that first aid training will enhance the first aid knowledge levels of students from different socio-demographic backgrounds.

METHODS

Ethics

The study was carried out with the permission of Ataturk University Faculty of Medicine Clinical Researches Ethics Committee (Date: 18.04.2016, Decision No: 04/10). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Type of Study

The research was carried out using one of the Weak Experimental Designs, specifically a One-Group Pretest-Post-test Design, to determine the effectiveness of basic first aid training given to 7th-grade secondary school students.

Place and Time of the Study

The study was conducted in three secondary schools in a province in eastern Turkiye between April 2016 and July 2016.

Population and Sampling of the Research

The population of the study consisted of students studying at three secondary schools, which were determined according to the socioeconomic level classification in the city centre, in the spring semester of the 2015-2016 academic year. The study group included children aged 11 and over in the "Abstract Operations Period", in which rational solutions are produced against complex problems and ideas are developed in social events, according to Jean Piaget's theory of cognitive development.[21] In addition, considering previous studies, secondary school 7th-grade (12-14-year-old) students were included in the study to standardize the training program.[22,23] There are a total of 15 7th-grade classes in the three secondary schools where the study was conducted.

According to September 2015 data, there are 112 secondary schools in the city centre. These schools were divided into three groups (good, moderate, and poor) according to their socioeconomic levels in line with the information of the provincial directorate of national education. Each group was accepted as a layer, and one school from each layer was selected by drawing lots. All students (n=391) for whom parental and student permissions to participate in the study were obtained were included in the study without selecting a sample group. Private schools were not included in the study because permission for the study could not be obtained.

A power analysis was performed to determine whether the number of students included in the study was adequate. According to the power analysis, it was determined that the power of the research was 0.97 at a significance level of 0.05, an effect size of 0.5, and a confidence interval of 0.95.

Inclusion Criteria

Students who were studying in the 7th grade of secondary school, who were willing to participate in the study, and for whom written permission was obtained from the parents were included in the study.

Exclusion Criteria

Students who were not willing to participate in the study and for whom written permission could not be taken from the parents were not included in the study.

Research Variables

Independent variables: Basic first aid training provided to students

Dependent variables: First aid knowledge scores of students

Control variables: Sociodemographic characteristics of students

Data Collection Tools

"Identifying Information Form" and "First Aid Training Knowledge Evaluation Form (FATKEF)" prepared by the researcher based on the literature [22-24] review were used to collect the data.

Identifying Information Form: The "Identifying Information Form" was prepared to determine the socio-demographic characteristics of the students included in the study. In the form, there are questions that inquire about the class, gender, age, and first aid training status of the students to be included in the research.

First Aid Training Knowledge Evaluation Form (FATKEF): This form was developed and validated by Yalcin[22] in 2010 in line with the cognitive goals expected to be achieved in first aid training. This form, designed to measure the level of first aid knowledge in accordance with the basic first aid training content and the determined objectives, measures the level of basic first aid knowledge. The form consists of 34 multiple-choice questions, including general first aid information (8 questions), first aid provider characteristics (1 question), human body (1 question), evaluation of the patient/ injured and the scene (9 questions), first aid in bleeding (5 questions), first aid in case of burns and frostbite (3 questions), first aid in fractures (2 questions), first aid in poisonings (3 questions), and first aid in respiratory obstruction (2 questions). Each question is evaluated as no knowledge, knowledge present, and incorrect knowledge. If the response of the student to a question is correct, it is scored as 3 points; if it is "I don't know", it is scored as 2 points; if the response is incorrect, it is scored as 1 point. The Cronbach's alpha coefficient of the FATKEF was determined to be 0.743 by Yalcin[22], in this study, this value was found to be 0.60.

Data Collection

The data were collected by the researcher by face-to-face interview method. First of all, the "informed consent form" prepared by the researcher to obtain written permission from the parents of the students was given to the students in a sealed envelope and delivered to their parents. The consent forms signed by the parents were returned by the students. In addition, after the students were informed about the research and their verbal consent was obtained, they were allowed to participate in the study. Following the collection of consent forms, the school administrations were contacted, and a schedule was formed to apply the data collection forms and implement the training program.

First aid knowledge levels of the students were evaluated in the classroom environment to determine their first aid knowledge levels, to evaluate the results of the first aid training, and to measure the changes over time. The first application (pre-test) evaluating the students' levels of first aid knowledge was carried out before the training, and training on first aid was given following the pre-test. The second test (post-test) was administered one day after the training, and the third test (control test) was given two weeks after the training; all tests were evaluated with the same form (FATKEF).

The training sessions were held separately for 15 classes in the classroom environment, the duration of the training consisted of two lesson hours (90 minutes) for each class, and the training was held in two sessions. During the training, training materials such as first aid materials, training videos, video projectors, and training slides were used. Moreover, a training booklet containing the subjects taught in class was given to the students. In the training, direct instruction, question-answer, and demonstration techniques were used. Training sessions were given by the researcher, who also holds a trainer certificate approved by the red crescent. The students were given 40 minutes to respond to the questions on the data collection forms in each measurement.

Basic first aid training: Educational materials were created by using the presentations prepared by the Turkish red crescent for children aged 6-14. These materials are the slides to be used during the training and the "First aid training booklet" to be given to the students. Necessary permission to use these materials was taken from the Turkish red crescent. In addition, the materials to be used in the training were supplied by the Provincial Directorate of the Turkish red crescent taking the required permissions.

Statistical Analysis

The data were analysed in the computer environment using the SPSS (Statistical Package for Social Sciences) 21.0 package software. In the analysis of the data, percentage distributions, mean, and standard deviation, analysis of variance in repetitive measurements, independent groups t-test, analysis of variance, Kruskal-Wallis test, and Cronbach's alpha coefficient calculation were employed. The study findings were evaluated at a 95% confidence interval and $p<0.05$ significance level.

Methods

Written permission for the study was taken from the provincial directorate of national education. In addition, permission to use the first aid training knowledge form was taken from the corresponding author.

Families and their children who volunteered and were willing to participate in the study were included in the study, and it was explained that they were free to participate or not in the study. In addition, before collecting the data, an informed consent form containing information about the study was sent to the families, and their written consent was obtained. In addition, verbal permission was obtained from the children.

RESULTS

In the study, the effectiveness of basic first aid education provided to secondary school 7th-grade students was evaluated, and the findings obtained are presented in this section. Table 1 presents the distribution of the students included in the study by descriptive characteristics. It was determined that the mean age of the students included in the study was 13.18±0.54, 51.2% were male, and 48.8% were

Table 1. Distribution of students by descriptive characteristics

Characteristics	Number	%
Mean age of students*	13.18±0.54	
Age		
12 years old	27	6.9
13 years old	266	68.0
14 years old	98	25.1
Gender		
Female	191	48.8
Male	200	51.2
Socioeconomic status		
Good	129	33.0
Moderate	133	34.0
Poor	129	33.0
Total	391	100.0

*Mean ± Standard deviation

Table 2. Students' opinions regarding receiving training on first aid (n=391)

Characteristics	Number	%
Considering receiving training necessary		
Necessary	388	99.2
Unnecessary	3	0.8

Table 3. The distribution of the sources from which the students wanted to receive training on first aid (n=391)

Trainer	Number	%
Health professional	227	58.1
Teacher	85	21.7
Family	38	9.7
Internet	28	7.2
Coursebook	9	2.2
Television-radio	3	0.8
Newspaper-magazine	1	0.3

Table 4. Evaluation of the students' first aid knowledge levels through pretest, posttest, and control test (n=391)

	Pretest			Posttest			Control test		
Knowledge area	**Incorrect %**	**No knowledge %**	**Correct %**	**Incorrect %**	**No knowledge %**	**Correct %**	**Incorrect %**	**No knowledge %**	**Correct %**
1. The definition of first aid	16.4	5.1	78.5	1.5	1.0	97.4	2.8	1.0	96.2
2. Who will apply first aid	16.6	1.3	82.1	1.5	1.8	96.7	3.1	1.8	95.1
3. Priorities in first aid	63.4	4.9	31.7	2.3	0.5	97.2	1.8	0.3	98.0
4. What should be done first on the scene of injury	86.2	4.1	9.7	9.5	2.0	88.5	11.0	2.3	86.7
5. Basic practices in first aid	65.5	9.5	25.1	9.7	4.6	85.7	10.2	5.6	84.1
6. Emergency service telephone number	4.3	0.5	95.1	0.0	0.0	100.0	0.0	0.0	100.0
7. Information to be provided when the emergency service is called	88.2	3.3	8.4	11.5	10.5	78.0	12.5	11.3	76.2
8. Injured persons to whom priority intervention should be made on the scene of an accident	34.5	9.0	56.5	4.1	5.9	90.0	5.1	6.9	88.0
9. Chatacteristics of a first aid provider	69.8	11.5	18.7	4.1	6.6	89.3	4.6	7.7	87.7
10. What should be evaluated in terms of vital signs	37.9	7.2	55.0	15.6	2.3	82.1	16.4	3.3	80.3
11. Correct sequencing of the primary evaluations steps	60.6	15.1	24.3	17.1	0.8	82.1	18.9	0.8	80.3
12. What should be checked for CAB evaluation	42.7	16.9	40.4	6.9	10.0	83.1	9.0	9.7	81.3
13. How to ensure airway patency (A)	75.4	15.3	9.2	3.1	0.3	96.7	4.1	0.5	85.4
14. In what situation coma (recovery) position should be given	61.1	21.2	17.6	1.8	1.8	96.4	3.8	1.5	94.6
15. How to evaluate the presence of breathing in the primary evaluation	60.9	24.0	15.1	10.5	2.6	87.0	13.0	2.6	84.4
16. The purposes of evaluating the injured person	48.3	13.3	38.4	6.1	0.0	93.9	7.9	0.0	92.1
17. How to monitor the circulation (C) of the injured person	59.6	16.9	23.5	5.6	1.0	93.4	7.2	1.3	91.6
18. In what situation head-chin position should not be applied	69.1	16.6	14.3	16.1	0.8	83.1	17.1	0.8	82.1
19. What sequence should be followed while examining the injured person in the secondary evaluation	45.8	7.9	46.3	4.1	0.0	95.9	5.9	0.0	94.1
20. What should be done to an injured person with severe bleeding	55.8	2.0	42.2	5.1	0.5	94.4	7.4	0.5	92.1
21. What to do in case of nasal bleeding	62.1	6.1	31.7	1.3	0.3	98.5	2.3	0.3	97.4
22. What to do for internal bleeding while providing first aid	56.0	23.0	21.0	11.5	5.4	83.1	13.8	5.1	81.1
23. Shock symptoms	74.4	10.7	14.8	9.7	2.3	88.0	11.3	2.3	86.4
24. Internal bleeding symptoms	72.6	16.4	11.0	11.5	1.8	86.7	13.6	2.3	84.1
25. What to do to a person who froze due to exposure to cold in first aid	87.2	6.9	5.9	10.7	2.8	86.4	13.3	2.3	84.4
26. First aid to be provided to the injured person in case of an electric shock	37.3	4.9	57.8	1.0	0.0	99.0	1.8	0.0	98.2
27. What to do in case of burns while providing first aid	67.8	11.0	21.2	12.0	2.6	85.4	13.6	2.6	83.9
28. First aid practices when there is movement loss, swelling, and pain in the arm	50.4	13.3	36.3	6.1	2.3	91.6	8.4	2.3	89.3
29. The purpose of identifying fractures	56.3	12.0	31.7	9.2	3.1	87.7	11.3	2.8	85.9
30. What to do in case of poisoning through digestive system	72.9	11.5	15.6	10.2	4.1	85.7	13.3	3.6	83.1
31. What to do in case of respiratory tract poisoning while providing first aid	63.2	17.1	19.7	9.2	5.1	85.7	11.3	5.1	83.6
32. What to do in case of poisoning through the skin while providing first aid	64.7	14.3	21.0	9.2	5.6	85.2	11.5	5.1	83.4
33. What to do in case of partial blockage in the airway as a result of foreign material presence	77.0	11.5	11.5	1.0	0.8	98.2	1.5	0.8	97.7
34. What to do in case of total blockage in the airway as a result of foreign material presence	76.5	8.7	14.8	1.0	0.8	98.2	1.8	0.5	97.7

Table 5. Comparison of the students' first aid knowledge mean scores on the pretest, posttest, and control test (n=391)

Measurements	Mean±SD**	f	p
Pretest	58.66±6.57*		
Posttest	96.29±4.12	0.24	0.001
Control test	95.26±5.05		

f=Fisher, *The group causing signifciance as a result of advanced analysis **Mean ± SD, SD: Standard deviation

Table 6. Comparison of the students' first aid knowledge mean scores on the pretest, posttest, and control test according to their descriptive characteristics

Characteristics	Pretest Mean±SD**	Posttest Mean±SD	Control test Mean±SD
Age			
12 years old	59.22±4.96	96.96±3.56	95.67±5.06
13 years old	58.64±6.46	96.32±4.18	95.28±5.03
14 years old	58.55±6.53	96.06±4.14	95.10±5.15
Test and p	KW=0.631 p=0.729	KW=0.967 p=0.617	KW=0.440 p=0.803
Gender			
Female	58.92±6.25	96.24±4.47	95.30±5.19
Male	58.41±6.49	96.36±3.78	95.23±4.93
Test and p	t=0.801 p=0.424	t=0.298 p=0.766	t=0.144 p=0.886
Socioeconomic status			
Good	58.61±6.26*	97.21±3.55	96.12±4.68
Moderate	60.86±5.86*	96.46±4.32	95.41±5.35
Poor	56.44±6.26*	95.22±4.24*	94.24±4.99*
Test and p	f=17.079 p=0.000	f=7.889 p=0.000	f=4.663 p=0.010

f=Fisher, t=t-testi, KW= Kruskal-Wallis, * The group causing significance, **<mean ± SD, SD: Standard deviation

female. It was also found that 34.& of the students had a moderate level of socioeconomic status, 33.% had a good level, and 33. % had a poor level (Table 1). The students' opinions regarding the necessity of receiving training on first aid are presented in Table 2. 99.2% of the students stated that receiving training on first aid was necessary, while 0.8% saw it as unnecessary (Table 2). The distribution of the sources from which the students wanted to receive training is presented in Table 3. Accordingly, it was determined that the top three sources from which the students wanted to receive training on first aid were health professionals (58.1%), teachers (21.7%), and families (9.7%) (Table 3). After the training, a significant increase in students' first aid knowledge was observed. 100% of students correctly identified the emergency service number, and 99% knew the correct first aid for electric shock. However, knowledge levels were lower for more detailed practices like airway patency (96.7%) and CAB evaluation (83.1%). Table 5 shows statistically significant differences between the pre-test (58.66±6.57) and post-test (96.29±4.12) scores. These results indicate a substantial improvement in students' knowledge levels after the training. Socioeconomic status significantly impacted students' scores. The average scores for students from lower socioeconomic backgrounds increased from 56.44±6.26 in the pre-test to 95.22±4.24 in the post-test. The middle socioeconomic group had the highest scores (pre-test: 60.86±5.86, post-test: 96.46±4.32). No significant differences were observed across age and gender groups.

DISCUSSION

First aid training programs include making the first intervention in an emergency before professional medical help arrives, providing basic first aid while waiting for the ambulance, and taking measures supporting the injury or injured site.[7,19]

The present study was conducted to evaluate the effectiveness of the first aid training program provided to the 7th-grade students studying at three secondary schools in the east of Turkiye. Particularly, the effect of factors such as age, gender, and socioeconomic status on the students' first-aid knowledge levels as a result of the training program was examined.

The study revealed that the average age of the students was 13.18±0.54. Additionally, 99.2% of the students acknowledged the necessity of first aid training, indicating their readiness for such education. When studies conducted in this regard were reviewed, it was reported that first aid training for school-age children could be started at age 12 or earlier.[25-28] Health professionals were the most preferred source for receiving first aid training (58.1%). In various studies, it was stated that nurses and other health professionals were able to teach first aid to children with success at schools.[25,28-30] In the study they conducted with students, Banfai et al.[31] determined that students advocated that training on first aid should be received from a health professional rather than a teacher. In our study, consistent with the literature,[22] it was found that students are not only ready for education but also prefer to receive it from health professionals. This preference could enhance the quality of the training.

In this study, the students' first aid knowledge levels were assessed using a pretest, posttest, and control test. The pretest results indicated that most students knew the "telephone number of the emergency service." Similarly, Yalçın[22] (2010) found that the majority of students correctly identified the emergency service number.In the study by İbrahimoğlu et al.[7] (2024), nearly all students correctly answered the emergency service number following basic first aid training. Banfai et al.[31] (2017) also reported a high rate of correct responses in the pretest regarding the emergency service number The findings across these studies demonstrate similarities in students' knowledge of the emergency service number.

In the pretest, it was determined that the majority of students knew "who should perform first aid," "the definition of first aid," "the first aid provided to a person injured by electric shock," and "the injured person who should be prioritized in case of an accident." Similarly, in Yalçın's[22] study, it was found that the majority of students correctly identified "who should perform first aid," "the definition of first aid," "what to do first when seeing someone suffering from electric shock," and "the vital signs." Comparing the results of the two studies, it is evident that students in both studies have a high level of knowledge regarding first aid and yielded similar results. These findings suggest that students may have acquired first aid knowledge from their daily lives or previous experiences.

In the study, the pretest showed that the question "information to provide when calling emergency services" had the highest rate of incorrect answers. This can be attributed to students not having previously called an emergency number and lacking sufficient knowledge in first aid. During the training, students were shown practical examples of the necessary conversations when requesting emergency assistance. Consequently, the correct response rate for this question significantly increased in the post-test and was largely retained in the control test. Similarly, Çil Eyi et al.'s,[32] study reported a significant increase in correct responses to what should be communicated to 112 teams in the post-test.

First aid training given to children in schools is of great importance for them to respond effectively to emergencies and potentially save lives.[33] Training individuals, including children, in first aid can enhance their skills to provide immediate assistance in emergencies.[34] In our study, a significant increase was observed in the knowledge levels of students after basic first aid training. Students' knowledge in essential first aid topics such as "CAB assessment," "airway clearance," "breathing assessment," and "circulation monitoring" increased significantly. In the control tests, it was found that this knowledge was largely retained. Similarly, the literature indicates that children aged 11-15 can learn CAB applications and cardiopulmonary resuscitation.[25,26,35,36]

Although our short course was effective, the literature suggests that repeating first aid knowledge and extending the curriculum throughout the year enhances emergency performance and motivation.[25,26,28] This finding underscores the importance of the continuity and variety of training programs.

In our study, the percentage of students who correctly knew how to provide first aid to a patient with severe bleeding increased significantly from the pre-test to the post-test. Similarly, the percentage of those who knew the correct first aid for nosebleeds, common in school accidents, showed a marked increase. This aligns with the literature, where studies have shown that success rates in managing bleeding during first aid significantly increased between the pre-test and post-test, with substantial retention of knowledge several months later.[22,31,32] These findings demonstrate that first aid training effectively enhances students' knowledge and skills, particularly managing bleeding.

In our study, the percentage of correct responses for first aid topics such as shock position, first aid for burns, first aid for a person who is about to freeze, first aid for fractures, first aid for poisoning through ingestion, and first aid for partial or complete airway obstruction increased significantly from the pre-test to the post-test. In the control test, this knowledge was retained. These findings are consistent with previous studies.[19,22,32,35]

Yalçın[22] found that the first aid knowledge scores of 7th-grade students were significantly higher after training compared to before. Another study also reported that children's first aid knowledge and skills, which were initially low, improved significantly after training and remained high even four months later.[31] Comparing the pre-test, post-test, and control test scores, it is evident that there was a significant increase in first aid knowledge levels.

In the study, the average pre-test first aid knowledge scores based on students' socioeconomic status were found to be 58.61±6.26 for high socioeconomic status, 60.86±5.86 for middle socioeconomic status, and 56.44±6.26 for low socioeconomic status. Post-training, the average scores increased across all groups, supporting the hypothesis of the study.

The post-test and control test revealed some differences among students based on their socioeconomic status. Students from lower socioeconomic backgrounds had slightly lower average scores compared to other groups. However, the fact that students from the middle socioeconomic group had the highest average scores suggests that the impact of socioeconomic status on first aid knowledge is complex and cannot be explained by a single factor. Other factors, such as differences in educational environments, student participation, and motivation, may have also contributed to these findings. Therefore, it is important to consider the relationship between socioeconomic status and first aid knowledge from a broader perspective.

Limitations

One limitation of the study was that it was conducted only on 7th-grade students of three secondary schools located in the provincial center in the 2015-2016 academic year. Therefore, the study results can only be generalized to this group. Additionally, the data regarding the socioeconomic characteristics of the students were obtained from the provincial directorate of national education. The age group may also limit the generalizability of the study results to the broader population.

CONCLUSION

This study found statistically significant differences in first aid knowledge scores between pre-training, post-training, and control tests, with the differences attributed to pre-training scores. It was determined that age and gender had no effect, but socioeconomic status did.

These findings suggest that first aid education should be included in the curriculum at all educational levels, with an emphasis on increasing practical training in middle schools. Teachers should regularly receive first aid training, and these trainings should be conducted by nurses certified to teach first aid. Additionally, activating school health nursing and conducting similar studies with students at different grade levels is recommended.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Ataturk University Faculty of Medicine Clinical Researches Ethics Committee (Date: 18.04.2016, Decision No: 04/10).

Informed Consent

All patients signed and free and informed consent form.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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