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## The effects of child health nursing curriculum-integrated therapeutic activities on therapeutic communication skills of nursing students: Non-randomized study

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### ABSTRACT

**Background:** Effective therapeutic communication with hospitalized children is increasingly recognized as crucial for child-centered care in all healthcare settings. The quantity and quality of training nurses receive to promote and enhance nurse-child communication are vital. This study aims to evaluate the impact of planned therapeutic communication activities for the Child Health Nursing Course on the therapeutic communication skills of nursing students.

**Method:** A non-randomized study with a pre-test and post-test design was conducted with 28 junior nursing students in Turkey. Data were collected using an 'Information Form' and the 'Therapeutic Communication Skills Scale for Nursing Students'. The Child Health Nursing Course curriculum incorporated lectures with various activity designs to enhance students' therapeutic communication skills.

**Results:** The curriculum-integrated therapeutic activities significantly decreased non-therapeutic communication skills in students, with a large effect size [d: 0.827, 95% CI: (0.393)–(1.296)]. Furthermore, the activities led to a significant increase in Therapeutic Communication Skills-1 with a large effect size [d: -0.943, 95% CI: (-1.416) - (-0.513)], and improved Therapeutic Communication Skills-2 with a large effect size [d: -1.285, 95% CI: (-1.827) - (-0.804)].

**Conclusion:** The findings indicate that therapeutic activities effectively improved the therapeutic communication skills of nursing students.

**Practice implications:** Integrating therapeutic activities into the Child Health Nursing Course curriculum is recommended to enhance nursing students' therapeutic communication skills.

### Introduction

Therapeutic communication is an intentional engagement to enhance the patient's emotional and physical well-being (Laffan, 2011; UK Essays, 2015). This communication has a significant connection to the success of professions focused on supporting people (Çunkuş et al., 2021). Nursing is a profession that spends most of its professional life providing patient care (Birhanu et al., 2014; De la Fuente-Solana et al., 2020). Effective therapeutic communication is essential to optimal nursing practice regardless of the employment setting (Fite et al., 2019; Hartley et al., 2020). Therapeutic communication aims to create quality health care based on awareness, empathy, and trust between the nurse and the patient (Xue & Heffernan, 2021). Studies show that effective

communication between patients and nurses increases patient satisfaction (Lotfi et al., 2019) and quality of care (Kirca & Bademli, 2019) and reduces hospital stays (Howick et al., 2018). Inadequate or negative communication is reported to pose health risks for the patient (Fite et al., 2019).

During clinical practice, nursing students can communicate to assess patients' needs and environmental factors that affect their health (McCarthy & Wyatt, 2014). However, nursing students often find therapeutic communication one of the most stressful tasks (Cowen et al., 2016; Neilson & Reeves, 2019). In particular, studies report that nursing students face difficulties communicating to care for pediatric patients (Kostak et al., 2014; Liang et al., 2020; Shorey & Chua, 2022). Communication is situational and contextual, which can be affected by

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factors such as patient characteristics (Fite et al., 2019). It should be noted that healthcare professionals find communication with hospitalized children challenging (Younis et al., 2015). In this context, it is essential to teach students how to communicate effectively with children and family members in the Child Health Nursing Course, which teaches care and communication for children. The current literature emphasizes that the curriculum should be expanded with practices that improve the effective communication skills of nursing students (Çunkuş et al., 2021; Frost et al., 2015; Liang et al., 2020).

Although it has been stated that therapeutic communication is necessary for effective child-centered care in all healthcare settings, the training given to nurses in promoting and strengthening nurse-child communication is unfortunately insufficient (Cheraghi et al., 2021; Younis et al., 2015). Nursing education aims to train nurses with strong communication skills (Campbell & Aredes, 2019). Therefore, in nursing education, nursing students need to discover strategies that will enable them to understand therapeutic communication in depth and to gain skills that will allow them to communicate effectively with patients after graduation (Blake & Blake, 2019; Çunkuş et al., 2021; Figueiredo et al., 2013). In this direction, the study aimed to evaluate the effect of the planned therapeutic communication activities for the Child Health Nursing Course on the therapeutic communication skills of nursing students.

## Material and methods

### Study design

The present study used a nonrandomized study design. The ‘Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) Statement Checklist was followed in the implementation of the research (Des Jarlais et al., 2004). The study aimed to evaluate the effect of the planned therapeutic communication activities for the Child Health Nursing Course on the therapeutic communication skills of nursing students with two hypotheses;

**H1.** The planned therapeutic communication activities for the Child Health Nursing Course are effective in reducing students’ Non-therapeutic Communication Skills.

**H2.** The planned therapeutic communication activities for the Child Health Nursing Course are effective in increasing students’ Therapeutic Communication Skills.

### Participants

This study was conducted with junior nursing students at Koç University School of Nursing in Istanbul, Turkey, from September 2022 to February 2023. This university is a foundation university and has 28 junior students. Considering that a pre-test-post-test comparison will be made in a single group, it was calculated that 28 students should be included in the study based on the power ( $1 - \beta$  err probe) = 80%,  $\alpha$  err probe = 0.05, effect size 0.5 by using G\*power (Faul et al., 2009). In this context, it was aimed to reach all students who took the course. After the research was completed, a post hoc analysis was performed to determine the study’s strength. The Cohen  $d = 0.68$  effect size of the study, the power of 80% ( $1 - \beta$  error), and the confidence level of 95% ( $\alpha$  error) were found to be 97%.

**Inclusion criteria were:** students in the nursing department, completing the data collection tools, and volunteering to participate in the study.

**Exclusion criteria were:** not completing the data collection tools, and withdrawal from research.

## Procedures

### Data collection

The Child Health Nursing Course is held for three hours a week, every Tuesday, between 8:30 and 11:20. The Child Health Nursing Course is applied in the fall semester for 14 weeks. The curriculum was created based on the World Health Organization (WHO) Europe Children’s Nursing Curriculum design concept (World Health Organization, 2003). The Child Health Nursing Course’s curriculum prepared the lecture with several activity designs. This project was supported by the Koç University Office of Learning and Teaching. After receiving a teaching grant, the therapeutic toys were purchased.

Play therapy encompasses a range of interventions designed to improve the well-being of children during their hospitalization or through structured play activities tailored to their health, age, and developmental stage (Koukourikos et al., 2015). Utilizing play as a natural outlet, children can express their emotions, thoughts, and worries in a non-threatening and enjoyable manner. This approach fosters a sense of normalcy and ease within the clinical environment, enabling healthcare providers to engage with young patients on their level of understanding (Bray et al., 2023). Ultimately, integrating play into therapeutic interactions empowers children, alleviates their anxiety, and establishes a foundation of trust that bolsters the healing journey (Dodd, Nesbit, & FitzGibbon, 2022).

The Child Health Nursing Course curriculum incorporated lectures with various activity designs to enhance students’ therapeutic communication skills with sick children. Before this course, students were required to complete a therapeutic communication course during their sophomore year. At the outset of the Child Health Nursing Course, the initial topic covered by the course lecturer involved the growth and developmental characteristics of children across age groups. Additionally, the course included practical guidance on communicating with hospitalized children, tailored to their respective age groups. This guidance was delivered through case examples presented by a child psychologist, a child psychiatrist, and the course lecturer. Throughout the course, various aspects of therapeutic communication with children were elucidated using a combination of case presentations, video demonstrations, and interactive Kahoot quizzes to encourage students to embrace effective communication techniques. Furthermore, when discussing specific pediatric diseases, the lecturer provided students with essential considerations and communication strategies relevant to each illness (Bell & Condren, 2016). Each lesson was designed to enhance students’ therapeutic communication skills with children, incorporating video demonstrations, verbal explanations, and Kahoot quizzes as part of the learning process. Additionally, various toys suitable for different age groups were purchased that students could use to improve their therapeutic communication.

Seven groups were formed, with four students in each group. At the beginning of the semester, students determined case presentations by drawing lots. The lecturer sent each group their case two weeks in advance to prepare their presentation. These were the pediatric cases of the following week in different age periods related to the lesson’s subject. Students were responsible for presenting their case study each week at the end of the course. The students’ case presentations regarding disease titles, diagnosis, symptoms, treatment, nursing interventions, and discharge training. The students selected toys suitable for the disease and age of the child in their case and made their presentations with these toys (Fig. 1). For example, nursing students chose a bear from the box for a child to receive oxygen therapy, put the mask on the bear, and then tried to explain the procedure to the child. Another example is explaining what needs to be done to prevent infection using finger puppets.

The study was conducted in three stages. Firstly, the ‘Therapeutic Communication Skills Scale for Nursing Students’ was applied to students as the pre-test. Secondly, the therapeutic play toys box was created by the lecture. This box was in the classroom throughout the entire term.

Age group	Type of the toys	
0-1 ages	Musical activity toy, Storytelling Caterpillar, Educational Puppy Walker, Lighted and Fun Toy Piano	
1-3 ages	Wooden Giraffe Shaped Maze Game, Play Dough Set, musical activity toy, Storytelling Caterpillar, Educational Puppy Walker, Lighted and Fun Toy Piano, Little Dancer BeatBo	
3-6 ages	Coloring book, LCD 10" Digital Drawing Tablet, Play Dough Set, Memory game, Jewelry Design Set, Doctor Child Costume, Luminous Ball, Painting Set, Who Am I Matching Game	
6-12 ages	Stone Painting Hobby Set, LCD 10" Digital Drawing Tablet, Play Dough Set, Jewelry Design Set, Luminous Ball, Painting Set, Create Your Story Education Cards, Who Am I Matching Game	
12-18 ages	Stone Painting Hobby Set, Painting Set, human model, Mini Microscope Set, Science Laboratory - Physics, Chemistry, Mechanics	

Fig. 1. Toys that are used for therapeutic communication.

Students were asked to do activities on how to approach sick children by using the toys in this box in classroom activities. Thirdly, the students' therapeutic communication skills were evaluated at the end of the course with the 'Therapeutic Communication Skills Scale for Nursing Students'.

**Data collection tools**

Data were collected using the 'Information Form' and 'Therapeutic Communication Skills Scale for Nursing Students'.

**Information Form:** The form was prepared by the researchers and consists of six questions including descriptive characteristics of the students, which assess their age, gender, status of taking therapeutic communication course, status of taking communication course, their experience with communication difficulties, and their liking for taking care of pediatric patients.

**Therapeutic Communication Skills Scale for Nursing Students (TCSSNS):** The Therapeutic Communication Skills Scale was developed by Karaca et al., 2019 to assess nursing students' therapeutic communication skills (Karaca et al., 2019). The Therapeutic Communication Skills Scale for Nursing Students was previously used for pediatric nursing students and the Cronbach Alpha values of the scale were found to be within the reliable value >0.70 (Geçkil et al., 2021; Kudubes et al., 2023). The scale consists of a total of 16 items, with the first subscale composed of 7 items, the second subscale comprising 6 items, and the third subscale composed of 3 items. Karaca et al. determined the Cronbach Alpha value of the scale as 0.775, the Cronbach Alpha value of the Non-Therapeutic Communication Skills subscale as 0.826, the Cronbach Alpha value of the Therapeutic Communication Skills-1 as

0.791, and the Cronbach Alpha value of the Therapeutic Communication Skills-2 subscale as 0.601. There are no reverse-coded questions in the Therapeutic Communication Skills Scale, which has a 7-point Likert scale. The maximum score that can be obtained from the scale is 112 (16 × 7), and the minimum score is 16 (16 × 1). The maximum score that can be obtained from the Non-Therapeutic Communication Skills subscale (items 2, 6, 7, 9, 14, 15, 16) is 49 (7 × 7), and the minimum score is 7 (7 × 1). The maximum score that can be obtained from the first subscale of Therapeutic Communication Skills (items 5, 8, 10, 11, 12, 13) is 42 (6 × 7), and the minimum score is 6 (6 × 1). The maximum score that can be obtained from the second subscale of Therapeutic Communication Skills (items 1, 3, 4) is 21 (3 × 7), and the minimum score is 6 (3 × 1). In this study, before education the Cronbach Alpha value of the TCSSNS was 0.785, the Cronbach Alpha value of the Non-Therapeutic Communication Skills subscale was 0.817, the Cronbach Alpha value of the Therapeutic Communication Skills-1 was 0.790, and the Cronbach Alpha value of the Therapeutic Communication Skills-2 subscale was 0.700. In this study, after education the Cronbach Alpha value of the TCSSNS was 0.890, the Cronbach Alpha value of the Non-Therapeutic Communication Skills subscale was 0.854, the Cronbach Alpha value of the Therapeutic Communication Skills-1 was 0.786, and the Cronbach Alpha value of the Therapeutic Communication Skills-2 subscale was 0.798.

**Data analysis**

The data were analyzed using the IBM SPSS version 28.0 software package. Sociodemographic characteristics of the participants were

presented as numbers (%) and means  $\pm$  standard deviations. The choice to use the Wilcoxon rank test was made based on the nature of study data. It was used this nonparametric test when study data did not meet the assumptions required for parametric tests, such as normality of distribution or homogeneity of variances. This was the case for many variables in the study, and it was aimed to ensure the robustness and validity of our statistical analysis. Therefore, the mean scores of the participants on the scale before and after the training were assessed using the Wilcoxon Signed Rank Test. A  $p$ -value of  $<0.05$  was considered statistically significant. Effect sizes were interpreted using Cohen's  $d$ , with benchmarks suggested by Cohen (1988), categorizing effect sizes as small ( $d = 0.2$ ), medium ( $d = 0.5$ ), and large ( $d = 0.8$ ) (Lakens, 2013).

#### Ethical considerations

The study was approved by the ethical committee of Koç University in Turkey (IRB No = 2022.324.IRB3.140). The professional lecturers were informed about the study's purpose and the methods for filling out the questionnaires, and their consent was obtained. Participants informed permission, confidentiality, and the freedom to withdraw at any time were all provided. When required, permission from the original authors was obtained to utilize the instruments in the study.

#### Result

This study included 28 junior nursing students, consisting of 24 female students and four male students, with an average age of 21.8 years and a standard deviation of 0.65 (Table 1).

#### Effects of the intervention

Table 2 shows the students' mean scores of the sub-dimensions of the TCSSNS. A comparison of the pre-test and post-test scores revealed by the Wilcoxon Signed Rank Test and statistically significant differences in the sub-dimensions of Non-Therapeutic Communication Skills, Therapeutic Communication Skills-1, and Therapeutic Communication Skills-2.

The mean score for Non-Therapeutic Communication Skills exhibited a significant difference between the pre-test and post-test scores ( $n = 28$ , Wilcoxon Signed Rank Test:  $-4.250$ ,  $p < 0.001$ ) (Table 2). Curriculum-integrated therapeutic activities resulted in a substantial decrease in the Non-Therapeutic Communication Skills of the students, with a large effect size [ $d: 0.827$ , 95% CI: (0.393)–(1.296)]. Furthermore, the mean score for Therapeutic Communication Skills-1 significantly increased from the pre-test to the post-test ( $n = 28$ , Wilcoxon Signed Rank Test:  $-4.042$ ,  $p < 0.001$ ). Curriculum-integrated therapeutic activities led to a significant improvement in the Therapeutic Communication Skills-1 of the students, with a large effect size [ $d: -0.943$ , 95% CI: ( $-1.416$ ) - ( $-0.513$ )]. Similarly, the total score for the Therapeutic Communication Skills-2 sub-dimension also significantly increased between the pre-test and post-test ( $n = 28$ , Wilcoxon Signed Rank Test:  $-4.584$ ,  $p < 0.001$ ). Therapeutic activities resulted in notable enhancement of the Therapeutic Communication Skills-2 of the students, with a large effect size [ $d:$

$-1.285$ , 95% CI: ( $-1.827$ ) - ( $-0.804$ )].

#### Discussion

The purpose of this study was to determine the effect of planned therapeutic communication activities in the Child Health Nursing Course on nursing students' therapeutic communication skills. The study showed that including therapeutic communication activities in the Child Health Nursing Course curriculum improved nursing students' therapeutic communication skills while decreasing non-therapeutic communication skills. Therapeutic communication skills encompass various communication behaviors that facilitate effective interactions and contribute to positive patient outcomes. These skills include active listening, empathy, respect, and trust (Vinitha, 2022). It is critical to recognize that effective therapeutic communication is important in developing positive relationships between healthcare professionals and patients. This, in turn, can improve patient satisfaction, trust, and treatment adherence (Howick et al., 2018; Vaghee et al., 2018). Given the importance of therapeutic communication skills, it is critical to develop and maintain these skills in undergraduate nursing students. Students can practice and enhance these important skills through integrating therapeutic communication activities into the Child Health Nursing Course curriculum. This strategy ensures that future nurses have the communication skills to develop connections, deliver sympathetic care, and support positive patient outcomes. Finally, the outcomes of this study support the concept that including therapeutic communication activities in the Child Health Nursing Course curriculum can successfully improve nursing students' therapeutic communication skills. These skills are critical for developing effective patient relationships, increasing patient satisfaction, and promoting treatment adherence. Therefore, including therapeutic communication activities in the Child Health Nursing Course curriculum is critical for teaching and developing these skills among nursing students.

Research in nursing education supports the idea that incorporating therapeutic communication activities into the Child Health Nursing Course curriculum improves students' therapeutic communication skills (Donovan & Mullen, 2019; Kesgin & Tok, 2023; Yoo & Park, 2015). Several studies have examined the effectiveness of incorporating communication training into nursing curricula, and the results have consistently shown that it has a positive impact on nursing students' communication skills and confidence in engaging with patients and their families (Baghchehi et al., 2011; Kesgin & Tok, 2023; Taghizadeh et al., 2018). Despite the existence of studies on educational interventions aiming at increasing nursing students' communication skills, Gutiérrez-Puertas et al. (2020) comprehensive review reveals that the most effective technique has not yet been found. Although educational interventions have been found to be beneficial, further study is needed to determine the best methods. The introduction of simulation-based learning activities into nursing education has shown potential (Blake & Blake, 2019; Gutiérrez-Puertas et al., 2020; Ok et al., 2020). Nursing students can practice communication skills in a safe and controlled environment using these activities. Furthermore, they provide students with significant opportunities to obtain feedback and direction from qualified instructors, supporting their learning and skill development. Finally, including therapeutic communication activities in the Child Health Nursing Course curriculum improves therapeutic communication skills among nursing students and is consistent with the current literature on nursing education and communication training. However, further research is required to determine the most effective methods for improving communication skills in nursing education.

The finding that therapeutic practices integrated into the Child Health Nursing Course curriculum reduced students' nontherapeutic communication abilities is significant. A previous study has shown that introducing therapeutic activities into nursing education, particularly for adult populations, has a beneficial impact (Kesgin & Tok, 2023; Yoo & Park, 2015). However, research on the influence of therapeutic

**Table 1**  
Demographic characteristics of students ( $n = 28$ ).

Characteristics	Frequency	%
Gender		
Female	24	85.7
Male	4	14.3
Status of taking therapeutic communication course <sup>a</sup>	28	100
Course taking related to communication skills <sup>a</sup>	8	28.6
Age <sup>b</sup>	21.8 $\pm$ 0.65	21–23

<sup>a</sup> Reflects the number and percentage of participants answering "yes" to this question.

<sup>b</sup> Mean (standard deviation), range.

**Table 2**

Statistics for the students pre-and post- test scores of ‘Therapeutic Communication Skills Scale for Nursing Students’.

Sub-Dimensions	Pre-test			Post-test			Z	p-value	Cohen's d	% 95 CI	
	Mean	Median	Sd	Mean	Median	Sd				Lower	Upper
Non-therapeutic Communication Skills	20.5	20	9.17	14.1	12	5.58	-4.250	<0.001	0.827	0.393	1.296
Therapeutic Communication Skills-1	29.4	30	4.09	33.5	33	4.35	-4.042	<0.001	-0.943	-1.416	-0.513
Therapeutic Communication Skills-2	16.8	17	1.85	19.1	19.5	1.62	-4.584	<0.001	-1.285	-1.827	-0.804

Sd: Standard deviation, Z: Wilcoxon signed-ranked test, CI: Confidence Interval.

activities on communication skills in pediatric nursing students needs to be more extensive (Lee et al., 2021; Sherko et al., 2013). The introduction of therapeutic activities in the Child Health Nursing Course curriculum pushed students to change their attention from nontherapeutic to more therapeutic forms of communication, according to one possible explanation for the current study's findings. This change may have reduced nontherapeutic communication skills, as students may have been less likely to use inefficient communication strategies that limit the development of significant relationships with patients and their families. It should be noted that more study is required to verify these findings and dive into how therapeutic activities improve communication skills in pediatric nursing students. Future research ought to investigate at the possible benefits of adding therapeutic activities into other areas of nursing education and the long-term impact on nursing practice and patient outcomes.

#### Limitations

This study has some limitations. Firstly, this study evaluates the effect of incorporating therapeutic activities into the Child Health Nursing Course curriculum on nursing students' therapeutic communication skills at the end of the course. There are no findings related to the long-term effects of this intervention. It is important to note that further research is needed to confirm the findings of this study and to explore the long-term effects of incorporating therapeutic activities into nursing education. Future studies could also investigate the specific types of therapeutic activities that are most effective in improving communication skills in nursing students, as well as the potential benefits of incorporating these activities into other areas of nursing education. Secondly, a randomized controlled trial (RCT) design could not be implemented in this study. Future studies should be conducted with an RCT design to reveal more evidence. Thirdly, the Therapeutic Communication Skills Scale, originally designed to assess the therapeutic communication abilities of nursing students, lacks communication examples tailored to the pediatric patient population, which is a noteworthy shortcoming in this study. To enhance its utility, future iterations of this tool could be improved by incorporating specific instances of effective pediatric communication skills, thereby aiding students enrolled in the Child Health Nursing Course. Consequently, the absence of pediatric communication examples within this instrument represents a notable limitation. Lastly, This study was conducted with a small sample size. At the end of the study, post-doc analysis was performed and the power of the study was found to be high, but it would be beneficial to conduct the study in a large sample size.

#### Strengths of the study

This study places significant emphasis on long-term learning and a pedagogical approach. It was a pioneering study integrating therapeutic activities into the Child Health Nursing Course curriculum and investigating their effects on nursing students' therapeutic communication skills. This approach adds new insights to the field of nursing education by pushing the boundaries of traditional teaching methodologies. Additionally, the study focuses on nursing students' therapeutic communication skills, which are a key element in providing effective patient care. By shedding light on the effectiveness of these pedagogical

methods, the study provides valuable information that can inform the development of nursing curricula and potentially improve the overall quality of nursing education. Moreover, the study's findings are promising beyond its current scope by providing a model that can be applied to other nursing programs, considering the integration of therapeutic activities into their educational frameworks. Essentially, this research forms the basis for evidence-based decisions favoring similar interventions in various healthcare settings.

#### Implication to practice

The implications of this study are substantial for nursing education. We recommend integrating therapeutic activities into the Child Health Nursing Course curriculum, offering a spectrum of therapeutic techniques such as play therapy, art therapy, and music therapy. These methods have shown their effectiveness in enhancing communication skills among nursing students. Furthermore, this study highlights the importance of embedding therapeutic communication skills in nursing education. These skills are the cornerstone for fostering positive relationships with patients and their families, championing patient-centered care, and ultimately elevating patient outcomes. The study findings support including therapeutic activities within the Child Health Nursing Course curriculum to enhance nursing students' therapeutic communication competencies. By considering these insights, international nursing education programs can contribute significantly to the development of their students. This approach will empower future nurses to refine their communication skills, better preparing them to provide compassionate, patient-centered care across diverse healthcare settings.

#### Conclusion

Although there is literature on nursing students' gaining therapeutic communication skills in undergraduate education, there is a limitation as to which method is effective in improving students' therapeutic communication skills. This study aims to address this gap in the literature by examining the impact of incorporating therapeutic activities into the Child Health Nursing Course curriculum on nursing students' therapeutic communication skills. The study's results demonstrate the positive effects of integrating therapeutic activities into nursing education. Specifically, therapeutic activities led to significant improvements in the therapeutic communication skills of nursing students. This finding showed the potential benefits of infusing therapeutic activities into nursing curricula, as it enhances communication skills among future healthcare professionals.

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## Statement of authorship

Both authors confirm that they meet authorship criteria and that all authors agree with the article's content.

## Ethical considerations

The study was approved by the ethical committee of Koç University in Turkey (IRB No = 2022.324.IRB3.140). The professional lecturers were informed about the study's purpose and the methods for filling out the questionnaires, and their consent was obtained. Participants' informed permission, confidentiality, and the freedom to withdraw at any time were all provided. When required, permission from the original authors was obtained to utilize the instruments in the study.

## CRedit authorship contribution statement

**Remziye Semerci:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Investigation, Supervision. **Eyşan Hanzade Savaş:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Investigation, Supervision.

## Declaration of Competing Interest

The authors have declared no conflict of interest.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pedn.2023.10.026>.

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