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Picture analysis of nursing perception of children on coagulation factor therapy

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ABSTRACT

Aims: Children with clotting factor deficiency need to receive clotting factors intravenously throughout their lives; this necessity leads to intense interaction between the child and the nurse.

Methods: The study was conducted using projective picture analysis method to examine the perceptions of children with clotting factor deficiency disease towards nurses. The study was conducted between March 5 and April 12, 2022 in the Pediatric Clinic of Aksaray Training and Research Hospital with 20 children aged 7-11 years with clotting factor deficiency disease. The data were collected through the "Introductory Information Form" and the pictures drawn by the children with the instruction "draw me a nurse". Data analysis was done by projective picture analysis method.

Results: It was observed that 75% of the nurse drawings in the study contained positive perceptions of nurses. It was found that 40% of the children's perception of nursing was emotional, 35% was professional, 10% was both physical and professional, 10% was both physical, emotional and professional, and 5% was physical.

Conclusion: It was observed that hemophilic children perceived nurses positively, but they felt anger towards them for opening the vein and thought that they hurt them; however, especially the gifts given, the smiling face and the completion of the procedure made the children feel good. It is recommended that pediatric nurses use this method in children with different diseases.

Keywords: Children's pictures, nursing, hemophilia, picture analysis

INTRODUCTION

Childhood chronic diseases are diseases that can negatively affect the development of the child in terms of physical, mental and environmental adaptation and can cause different psychological reactions (Kavaklı, 2016). Coagulation factor deficiency diseases, which are among the diseases that start in childhood and deeply affect life, occur due to hemophilia A and hemophilia B, factor VIII and factor IX deficiency. The child is often diagnosed with the experience of a bleeding that does not stop, bleeding symptoms occur after the baby becomes mobile, starts walking in the later period, accidents, bumps or surgical operations such as circumcision, and after the diagnosis, a childhood full of limitations and years of receiving the missing factor in the hospital begin for children (Zhang, Zhang & Chen, 2024). Since there is no definitive treatment for the disease, the missing clotting factor is regularly administered externally (Srivastava et al., 2013). Due to the short half-life of these factors, which are not produced by the body due to the disease, factor replacement is performed with intravenous administrations, which can be one to three times a week (Kavaklı, 2016). Therefore, a challenging life begins for the hemophilic child and his/her family and turns into a process that affects all family members emotionally, socially and financially due to the need for lifelong hospitalization and prolonged hospitalization (Berntorp, et al., 2023).

For the hemophilic child, bleeding periods and the resulting prolonged hospitalizations can be a frightening, disturbing and limiting experience for children. On the one hand, the child has to struggle with treatments including invasive interventions to combat the disease, on the other hand, he/she has to struggle with the negative feelings of being separated from his/her family, playmates, school environment and being different from his/her peers (Zhang, Zhang & Chen, 2024). The experience of being sick and hospitalized in childhood can interfere with children's independence, relationships with friends, school and play activities, which are very valuable for children (Boyce, et al., 2023). While hemophilic children already have a life outside the hospital

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that makes them feel different from other children, where running, playing soccer and even participating in physical education classes are prohibited in addition to the soft room arrangement to prevent bleeding, this situation is further restricted with hospitalization (Negrier et al., 2013). Anderst et al. (2017) showed that hospitalization and mobility restriction of children with bleeding disorders due to illness negatively affect school attendance and reduce the happiness, well-being and interaction with others (Negrier et al., 2018).

For the hemophilic child, bleeding periods and the resulting prolonged hospitalizations can be a frightening, disturbing and limiting experience for children. On the one hand, the child has to struggle with treatments including invasive interventions to combat the disease, on the other hand, he/she has to struggle with the negative feelings of being separated from his/her family, playmates, school environment and being different from his/her peers (Zhang, Zhang & Chen, 2024). The experience of being sick and hospitalized in childhood can interfere with children's independence, relationships with friends, school and play activities, which are very valuable for children (Boyce, et al., 2023). While hemophilic children already have a life outside the hospital that makes them feel different from other children, where running, playing soccer and even participating in physical education classes are prohibited in addition to the soft room arrangement to prevent bleeding, this situation is further restricted with hospitalization (Negrier et al., 2013). Anderst et al. (2017) showed that hospitalization and mobility restriction of children with bleeding disorders due to illness negatively affect school attendance and reduce the happiness, well-being and interaction with others (Negrier et al., 2018).

The technique of having children draw pictures can be a more effective way than verbal expression in conveying the events that affect them emotionally. Children reflect a part of themselves through their drawings and express their feelings, thoughts and perspectives about events (Yavuzer, 2005). Due to these advantages, it is recommended to use drawing, which is a projective method, in children who express themselves verbally in a more limited way than adults (Efe, et al., 2023). The fact that the majority of children like drawing pictures facilitates the use of this technique (Yavuzer, 2005). The hemophilic child may feel "angry" at the nurse who constantly opens the intravenous line and sometimes hurts him/her due to the disease process, being "obliged" to the same nurse for the continuity of the treatment and receiving the treatment thanks to the "nurse" may create a process involving ambivalent feelings in the child. Again, the difficulties that these children may experience in communicating themselves make it difficult to express this ambivalence in words. The ability of the child to express himself/herself to the nurse, to convey his/her feelings, to communicate his/her expectations and existing problems will increase the strength of the relationship with the nurse, while nurses will be able to understand the needs of hemophilic children and provide optimal care in this direction. Therefore, it is important to examine the perceptions of hemophilic children towards nurses.

METHODS

Ethical Dimension

The approval of the ethics committee of the research was first obtained from Aksaray Provincial Health Directorate to which Aksaray Training and Research Hospital, where the application will be carried out, with the decision dated 15/09/2021 and numbered 3612. After the institutional permission was obtained, approval was obtained from Kırşehir Ahi Evran University Faculty of Medicine Non-interventional Clinical Researches Ethics Committee for the implementation of the research (Date: 19.10.2021, Decision No: 2021-17/178). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Research Model

This research was shaped according to the phenomenology model, one of the qualitative research methods. In this research, the perceptions of children with clotting factor deficiency disease towards nurses were determined as phenomena and the drawing technique was used.

Population and Sample of the Study

The population of this study consisted of 30 children between the ages of 7 and 11 who had coagulation factor deficiency disease and received factor replacement therapy at Aksaray Training and Research Hospital in Aksaray province. The 7-11 age group was chosen because it is the age group that continues primary education and knows how to read and write. The information of the children who underwent coagulation factor deficiency treatment was obtained from the hospital where the application was performed, and it was seen that a total of 30 children were registered. The times of the replacement therapy were learned from the hospital records, and the children and their parents were informed about the study during the application and invited to the study. Inclusion criteria were as follows: administration of coagulation factor deficiency treatment, age between 7-11 years, the child's willingness to participate in the study, the parent's willingness to participate in the study, no factor treatment in the last 24 hours and no active bleeding. The exclusion criteria were as follows: having any physical disability to draw, not consenting to participate in the study by themselves or their parents, having received factor treatment in the last 24 hours (negative perception may occur due to pain and pain sensation), having active bleeding due to an increase in the amount of factor applied and the number of invasive procedures.

After the children and parents were informed about the study, 23 children met the inclusion criteria and 5 children were excluded because they did not want to participate and 2 children were excluded because they were bleeding. For the implementation of the study, children were invited again to draw pictures on a day without factor replacement therapy. In this process, 3 children did not participate in the application and were excluded from the study. Accordingly, the study was conducted with 20 children with coagulation factor deficiency disease.

Data Collection Tool

Personal Information Form and 'Draw Me a Nurse' themed picture were used as data collection tools.

Personal Information Form: The personal information form used in our study was prepared by the researcher considering the personal and family characteristics of children with coagulation factor deficiency. The form includes questions about age, gender, grade, height, weight, family income,

number of siblings, presence of bleeding disorders in parents, and frequency of anti-bleeding treatment (Appendix 1).

Draw me a nurse: Drawing a picture for a nurse with the theme. This data collection form consists of a blank, white A4 paper. After the "draw me a nurse" command is given to the participant, he/she can draw whatever he/she wants with the coloring pencils given to him/her.

Implementation of the Research

The treatment times of the children who were treated for coagulation factor deficiency in the Pediatrics Clinic of Aksaray Training and Research Hospital were learned. Firstly, the researcher working in the same hospital informed the parents and children about the study during the treatment of the children and invited them to the study. After the consent of the child and the parent was obtained, they were invited to the hospital again between March 5 and April 12 for the implementation of the study. Before the application, the verbal and written consent of the parent and the child was obtained. Then the child was asked to fill in the introductory information form, and finally, the children were given blank A4 file paper, 12 color crayons, one pencil and told to "draw me a nurse". During drawing, the child was not intervened, conditions were provided so that he/she could draw comfortably and waited until he/she completed his/her drawing. Finally, when the drawing was completed, the child was asked to interpret the drawing. Two children asked for an eraser during the drawing process, but they were not given erasers in order not to change the results of the study. On average, all the procedure lasted 20 minutes for each child. After reaching 20 children who received clotting factor deficiency treatment, the data collection process was terminated.

Statistical Analysis

Document analysis technique was used in the research. Document analysis is used to support the information obtained when written and visual materials, observations and interviews are not sufficient or when such methods are used (Baş, 2017). Since the main body of the study consisted of nurse drawings made by children aged 7-11 years with clotting factor deficiency, document analysis was used. The pictures drawn by children with clotting factor deficiency disease were used as data collection tools in the study. In order to determine the nurse perception of children with coagulation factor deficiency through pictures, each child was asked to draw a picture by saying "draw me a nurse". The drawn pictures were interpreted in line with the information obtained after attending the "child pictures analysis and psychological tests" course taken by the researcher, and the interpretation was based on Haluk Yavuzer's approaches to the picture analysis method in his 2005 book "children with pictures." During the interpretation, the parts of the body in the human figure in the picture drawn by the child, the colors used by the child ant the child's interpretation were taken into consideration. In the pictures where the human figure was not drawn or where there were missing limbs in the human figure, the child's interpretation, the colors used by the child in the picture and other figures were taken into consideration.

Validity and Reliability

The following methods were followed in internal reliability measures. The research was conducted with a descriptive approach and the data obtained through drawing were presented with direct visual quotations and then interpreted. The findings of the picture analysis were matched with the information obtained from the children and the information obtained from the parents about the child, and it was determined that there was 90% agreement between the picture interpretations and the data. In addition, a comparison was made with similar research findings and the analysis interpretations were approved by two experts in the field. In external reliability measures, the information of the children included in the study was confirmed by comparing the hospital records.

In the validity measures of the research, the data were associated with the evidence obtained. It was clearly stated how the interpretations were arrived at. With regard to external validity, due to the low generalizability of qualitative studies, it is stated that elaboration and good description of the research stages in ensuring external validity will facilitate similar studies by other researchers in other settings. In this respect, in this study, the research stages and the interpretations of the picture analysis were detailed.

RESULTS

The research findings were analyzed in two sections. In the first part, the personal information of the children and in the second part, the interpretations of the pictures drawn by the children were given (Table).

Table. Distribution of children with hemophilia according to their personal information

Personal Characteristics		n	%
Age (year)	7	2	10
	8	6	30
	9	6	30
	10	6	30
Gender	Girl	1	5
	Boy	19	95
Class of education	Grade 1	2	10
	Grade 2	6	30
	Grade 3	6	30
	Grade 4	6	30
Height (cm)	120-125	2	10
	126-130	7	35
	130-135	6	30
	136-140	5	25
Weight (kg)	20-25	12	60
	25-30	6	30
	30-35	2	10
Income status	Income is equal to expenditure	16	80
	Income less than expenditure	1	5
	Income more than expenditure	3	15
Number of siblings	0	1	5
	1	1	5
	2	16	80
	3	2	10
Presence of bleeding disorders in mother/father	Mother is a carrier	18	75
	The mother has a disease	1	5
	The father has the disease	5	25
	Both have the disease	1	5
	No disease in both of them	0	0
Frequency of anti-bleeding treatment	1 time a week	5	25
	2 times a week	14	70
	3 times a week	1	5

Of the children who participated in the study, 10% were 7 years old, 30% were 8 years old, 30% were 9 years old and 30% were 10 years old. 95% of the children were boys and 5% were girls. When their educational status is analyzed, it is seen that all of them went to primary school and 30% were in 2nd grade, 30% in 3rd grade, 30% in 4th grade and 2% in 1st grade. 35% of the children were 126-130 cm tall and 60% weighed 20-25 kg. The majority of the children had an income equal to their expenses and had 2 siblings.

When the characteristics related to the disease were evaluated, it was observed that 75% of the children's mothers were carriers and 70% of the children received anti-bleeding treatment 2 times a week. The results of the analysis of children's perception of nurses are as follows;

- **C1:** Looking at the overall picture, the use of colors and the child's interpretation, the child's perception of nurses is positive and the emotional aspect comes to the fore.
- **C2:** It can be said that the child felt very painful during the nursing interventions and complained a lot about this situation, and wanted to talk to the nurse, indicating an emotional deficiency due to these interventions. The child's perception of nurses is negative. It is seen that the profession of nursing comes to the forefront in the picture.
- **C3:** When the child's perception of nurses is combined with his/her comments and the picture he/she drew, the child's perception of nurses is positive. It is seen that the nursing profession comes to the forefront in the picture.
- **C4:** The child likes nurses and has a positive perception of nurses. Emotional aspect came to the fore.
- **C5:** It can be said that the child has a negative view of nurses due to nursing interventions, but still loves them. Considering the child's interpretation and drawing, the child's perception of nurses is not completely positive or negative. There are positive and negative expressions. The nursing profession came to the forefront.
- **C6:** It was revealed from the child's expressions and the picture drawn by the child that the child had a distrust towards nurses and thought of illness when he/she thought of nurses. The child's perception of nurses is negative. The emotional aspect came to the fore.
- **C7:** The child's view of nurses is generally positive, but the appearance of the mouth, which is the most striking part of the drawn face, expresses negativity. The child's perception of nursing is not completely positive or negative, it is predominantly negative. Emotional aspect came to the fore.
- **C8:** The child's perception of nursing is positive. Emotional aspect came to the fore.
- **C9:** The child's perception of nursing is positive. It came to the fore physically.
- **C10:** The child's perception of nursing is negative. In the picture, it is seen that the nursing profession and physical characteristics come to the forefront.
- **C11:** The child's perception of nurses is positive. He drew a big head, he expresses that he sees them as academically successful. The nursing profession came to the forefront.
- **C12:** The child's perception of nursing is negative. The emotional aspect came to the fore.
- **C13:** The child did not draw the face and therefore expresses that he/she experiences uncertainty about the lack of emotion. Considering the child's comments and drawings, the child's perception of nursing is positive. The physical characteristics of nurses came to the fore.
- **C14:** The child's perception of nursing is negative. It is seen that the nursing profession comes to the forefront in the picture.
- **C15:** The child's perception of nursing is positive. There is an eyelash drawing expressing that he finds nurses physically beautiful. He associated the nurse with himself. Physical, emotional and professional aspects were emphasized in the perception of nurses.
- **C16:** It is seen that nursing interventions negatively affect the child's perception of nursing, but otherwise the picture is positive and the child's perception of nursing is positive. It is seen that the nursing profession comes to the forefront in the picture.
- **C17:** It is a positive picture towards the nursing profession, but it is a picture in which the child has a communication problem with the nurse applying treatment. The child's perception of nursing is negative. Physical, emotional and professional aspects were emphasized in the perception of the nurse.
- **C18:** The child's perception of nursing is positive. He drew a nurse emotionally.
- **C19:** The child's perception of nursing is positive. It is seen that the nursing profession comes to the forefront in the picture.
- **C20:** The child's perception of nursing is positive. It is seen that the nursing profession and physical characteristics come to the fore in the picture.

DISCUSSION

It is seen that 75% of the nurse drawings in the study contain positive perceptions of nurses. The comments of some of the children with positive perceptions of nurses are as follows: "Nurses are always in my life, I love them very much." (C4). "They always hurt me, but after a short time the pain goes away and I can love them then." (C5). "I love nurses very much, my nurse too." (C6). "I love them very much, whenever I start to feel bad, they always heal me." (C11). Çakırer Çalbayram et al. (2018) asked children with chronic diseases to draw a picture. 83.3% of the children drew a nurse figure. In this study, in which the facial expressions of the nurses were asked to be drawn, it was found that 95.5% of the nurses drawn by the children were smiling and 4.5% were angry. Similarly, Corsano et al. (2012) examined the relationships of hospitalized children aged 6-15 years with doctors and nurses and analyzed their drawings for this purpose. The study revealed that children's relationships with the healthcare team, especially with nurses, were positive. It can be said that the findings obtained in the study are consistent with the literature, hemophilic children who undergo frequent invasive procedures feel relieved after these interventions, which offer the opportunity to access treatment and recovery, and their perceptions of nurses are generally positive.

It was found that 40% of the children's perception of nursing was emotional, 35% was professional, 10% was both physical and professional, 10% was both physical, emotional and professional, and 5% was physical. When the children's drawings and their own comments are analyzed, it is seen that nurses are considered by children in emotional, professional and physical dimensions. Some of the comments of the children for the professional dimension are as follows: "Nurses are constantly doing something like robots. In fact, they are constantly giving injections and hurting people." (C2). For the emotional dimension, a child said: "Nurses are always in my life, I love them very much" (C4), while the comments on the physical dimension were as follows. "Nurses are very ugly, I don't like them because they give me injections." (C10), 'Nurses are very beautiful.' (C13). A similar study was conducted by Sönmez et al. (2014) to examine the perception of nurses among children aged 6-18 years. In the study, when children were asked about the responsibilities of nurses, 74.8% stated that they gave injections and 1.9% stated that they played with them. In a similar study, the views of hospitalized children on "good nurses" were examined and for this purpose, a study was conducted with 22 children between the ages of 7 and 12 using the draw and write technique. As a result of the research, the characteristics of a good nurse defined by children were identified as five themes: communication, professional competence, trust, professional appearance and virtues (Brady, 2009). It can be said that these themes, especially professional competence and professional appearance, are similar to the professional characteristics emphasized in our study.

It was determined that 85% of the children participating in the study used human figures in their drawings of nurses and all of these figures were drawn as women. In a study conducted by Canbulat et al. (2012), it was found that 57.8% of the children drew nurses as female figures. The reason why nurses are mostly drawn in the female figure may be due to the fact that the number of female nurses working in our country is considerably higher than the number of male nurses and therefore the rate of encounters with female nurses will be higher (Yayan & Kan, 2019), and it can be said that especially based on the positive perception of the nurse, it can be said that the nurse with a positive experience is drawn more. In this direction, it can be thought that female nurses may be more caring, patient or understanding in their approach to children compared to male nurses due to gender differences and motherhood roles, and therefore children may prefer to draw female nurses more.

In the study, it was found that half of the children drew a needle figure in the hands of a nurse. In the study by Uysal et al. (2018), it was determined that children with negative perceptions of nurses defined nurses as people who give injections, hurt, give medicine, make them cry, scare them, make them angry, frustrated and silence them. Durualp et al. (2012) found that 75% of children reported that nurses gave injections, and Ünal et al. (2002) found that 22% of children reported that nurses gave injections. In the upbringing of children, it is known that families show the nurse as "the person who gives injections" and as a threat for children to be more docile, calm, not to misbehave or to finish their meals before they ever come to the hospital or encounter a nurse (Uysal et al., 2018). It is clear that this misguidance creates a sense of prejudice and fear against nurses in children. In addition, the child is also introduced to injection as a painful and painful procedure in hospital experiences, and this experience increases the child's negative feelings like a self-fulfilling prophecy. For these reasons, it can be said that children identify needles and nurses, and this is reflected in their drawings.

It is thought that there is a strong link between the colors used in children's drawings and diseases. It was determined that 55% of the children participating in the study used blue, 35% black, 30% red, 30% purple, 30% yellow, 20% pink, 20% green, 15% brown and 5% orange colors. In a study, it was found that children with aggressive behavior preferred red the most in school-themed drawings of children (Şener, 2018). In another study, it was determined that the color in which the feeling of anger was expressed was red. When the colors in the violence-themed study of Aytar and colleagues (2019) were examined, it was found that brown was used more intensely. In a study conducted by Yayan and Kan (2019) with children with leukemia, it was found that children mostly used red in their drawings (Yayan & Kan, 2019). In the study, it was observed that blue was used the most, followed by black and then warm colors. Blue color expresses trust. The color black is seen as a reflection of the negativity in the child's feelings and thoughts. Children sometimes associate the color black with the thought of death. Children also used the color red and it is thought that this is because some children associate red with blood. The color red can also be associated with a burning sensation, pain or a tumor. It can be said that the colors chosen in the drawings are often related to the treatment process of the children, that the disease and infusion practices have a decisive place in their lives, and that they need to feel trust. It is possible that nurses, who are frequently encountered in the treatment process, can be reassuring and healing as well as hurting and disliked people in their illnesses. For this reason, children experience ambivalent feelings towards nurses and it can be said that this ambivalence is reflected in the colors they use.

In the pictures drawn by the children participating in the study, it was determined that 30% of the nurse figure's hands or fingers were missing, some children drew feet or legs, and some childre n drew the face missing. The pictures for the missing limbs were interpreted as follows: "... but he drew the hands missing, which, when considered together with his tall height and his interpretation, indicates that the child wanted to punish the nurse for giving the needle by not drawing her hands." (C2). "..., the fingers were drawn missing on the hand that was expressed to be a needle, which, when considered together with the child's tall stature, indicates that the child considered nursing interventions as violence." (C5). "...legs and feet were drawn missing; this expresses a sense of insecurity." (C6). "...fingers were drawn missing on the hand that was expressed to be a needle, and when this is considered with the open mouth and the prominent drawing of the teeth, it is obtained that the child thinks of nursing interventions as violence." (C10). "...the fingers on the hands are drawn missing and the needle figure can be expressed that the nursing intervention is perceived as violence by the child, this situation, together with the absence of a neck, indicates that the child is angry with the nursing interventions." (C14). "... he did not draw the face, so he expresses a lack of emotion and uncertainty." (C13). In one study, it was observed that although children had the ability to draw the limbs of human

figures completely, they drew the limbs of human figures incompletely (Aktın, 2018). When the drawings are examined, it is seen that the fingers, hand, face, legs and feet are drawn incompletely. It is seen that this situation is mostly related to the fact that the child perceives the process of opening an intravenous line for infusion as violence, feels anger at the nurse who does this from time to time and wants to punish her. In addition, there is also a lack of communication and trust problems with the nurse. These findings are consistent with the colors used and the comments of the children.

Another finding obtained in the study is that some gifts given to children by nurses were pictured. The comments of the children who received gifts from their nurses were as follows. "She bought me a hairpin once, one with a butterfly, and I wanted to draw it. I love her very much." (C9). Another child said: "first they give me an injection, but then they make me happy, once she gave me a chocolate bar, I drew it in her hand." (C1). The fact that the children reflected a gift given to them by the nurses in their drawings shows that this action had a significant effect on them and created a positive perception about nurses in a professional sense. It is also thought that this situation helps hemophilic children to cope with the anger they feel towards nurses and the perception of violence they feel due to infusion applications, which is a painful, painful and repetitive procedure. Working with children and reaching out to children requires very different competencies than adults, and the use of techniques such as therapeutic play and therapeutic communication facilitates communication. It can be said that the nurses' being caring, smiling and talking to the children relaxed the children before the infusion, therapeutic games such as balloons made by inflating gloves prepared the children for the procedure, and small gifts given after the infusion made it easier to cope with the negative effects of the procedure and reflected this situation in the children's drawings.

CONCLUSION

In this study, which aimed to examine the perceptions of children who received factor therapy due to hemophilia disease towards nurses by using picture analysis method, it was determined that children's perceptions towards nurses were mostly positive and the emotional aspect was more prominent. It was observed that half of the children defined nurses as 'needle-makers' and perceived the invasive procedure as violence. It was found that hemophilic children were angry with the nurse for opening the vascular access and thought that she hurt them, but especially the gifts given, the kind face and the completion of the procedure made the children feel good. In line with these results, it can be said that nurses' being friendly in their communication with the child and using therapeutic play can make it easier for the child to cope with invasive procedures. It is recommended to conduct studies with different designs to clarify the situations that cause this perception in children with negative perception of nursing.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was initiated with the approval of the Kırşehir Ahi Evran University Faculty of Medicine Non-interventional Clinical Researches Ethics Committee (Date: 19.10.2021, Decision No: 2021-17/178).

Informed Consent

All childrens' parents 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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