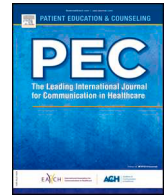




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Children's communication of emotional cues and concerns during a preoperative needle procedure

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ABSTRACT

Objective: This study explores children's expressions of emotional cues and concerns during needle procedures, nurses' responses and findings in relation to children's age and sex.

Methods: Twenty-six children aged 6–12 years were video recorded during a preoperative needle procedure. Emotional communication was analyzed using Verona Coding Definitions of Emotional Sequences.

Results: A total of 111 cues or concerns were identified in the observed needle procedures, with a distribution of 77 cues and 34 concerns. A majority of children (85%) expressed emotional cues through non-verbal communication. No differences between child age or sex related to expressed emotion were found. The child elicited the communicated emotion in 98% of sequences. Nurses' responses were coded as not providing space for communication in 75% of sequences.

Conclusion: Children are capable of expressing their emotional distress, primarily non-verbally, during needle procedures. A child showing less overt expressions during a needle procedure does not necessarily experience less fear or pain. The nurses' communication focused on practical information during the needle procedure, with less attention to the child's distress.

Practice implications: Nurses need to develop strategies to be aware of emotions the child communicates before, during and after a needle procedure.

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1. Introduction

Needle procedures in children with acute or long-term illness are often experienced as frightening and painful [1] and tend to be poorly managed in hospital care [2]. Children under 12 years of age tend to experience more fear and pain during needle procedures than older children [3]. Children's fear and pain levels also increase if they do not understand the situation [2, 4–6]. Furthermore, the child's age may influence their experience of fear and pain. In dealing with needle procedures health providers have to be able to recognize and then to acknowledge child's emotions [7]. However, knowledge about how children express and communicate fear and pain in connection with needle procedures is limited [8].

An emotion is an affective reaction to a personally significant event which can be verbally or non-verbally expressed and can result in changes in the body, facial expressions, posture and behaviors [9]. The purpose of children's expression of emotions, particularly when experiencing pain and fear, is to receive support from others

[10]. There are few studies on children's emotional communication with healthcare providers [10–12]. Communication during medical consultations with children receiving a cancer diagnosis and their families tends to be dominated by information giving. Korsvold et al. [11] showed that even though children's questions were emotionally oriented, physicians often responded without commenting on the emotional aspects.

How children handle situations that cause unpleasant emotions varies. Some children use coping strategies that help them when experiencing fear and pain [13]. Younger children generally use fewer coping strategies than older children [14] and generally express their emotions indirectly through verbal hints or non-verbal communication [7]. Observed communication between adult patients and healthcare providers has a positive impact on quality of care and health outcomes [15,16]. Furthermore, individualized communication can improve the patient's health and well-being [15–17]. The results of these studies on adult patients may apply to pediatric care. Communication between nurse and patient is necessary for information exchange, to manage nurse-patient relationships and to normalize unpleasant procedures, particularly when caring for children [15]. There is an awareness that nurses may underestimate procedural pain in children [18]. Healthcare providers

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response to expressed unpleasant emotions can depend on the child's verbal participation [10]. Communication between healthcare providers and adult patients is known to be more task orientated than emotional [19]. Children's subtle expressions have meant that their communication is often ignored by healthcare providers [10]. There is a dearth of knowledge on how children, particularly younger children, communicate their pain and fear. Knowledge on healthcare professionals understanding of and responses to children's expressions and communication during needle procedures is required.

Therefore, the purpose of this study was to explore children's expressions of emotional cues and concerns during needle procedures, nurses' response to these expressions and to analyze findings in relation to children's age and sex.

2. Method

2.1. Design

The study has a cross sectional, observational and descriptive design where data were gathered with video-recordings of nurse-child communication during needle procedures. Data were analyzed using the Verona coding definitions on emotional sequences (VR-CoDES).

2.2. Sample and setting

Data were collected in a pediatric day-clinic at a hospital in Sweden, between December 2019 and Mars 2020. Recorded needle procedures involved preoperative peripheral venous catheter (PVC) insertion, as per standard care, on children attending a day-surgery clinic for a planned operation.

Inclusion criteria were children aged 6–12 years undergoing a peripheral needle insertion prior to a planned surgical operation and who had the ability to express themselves verbally. Interpreters were used in five needle procedures when child or parents did not fully understand Swedish. Children with severely impaired cognitive ability were excluded from this study. All children who met the inclusion criteria were asked to participate. The inclusion criteria for nurses were that they were a registered nurse and employed by the clinic. All nurses at the pediatric day clinic ($n = 7$) agreed to participate. They were female and had the same pre-surgical plan of care that was to weigh the child, make sure that the child changed into a surgical gown, insert the PVC and administer premedication. For demographic data of children and nurses, see Table 1.

Of 40 children approached to participate in the study, 26 children were included. Fourteen children declined to participate for various reasons; they were not comfortable seeing themselves on video ($n = 6$), or had protected identity ($n = 2$), the child and parent had agreed to participate but the surgery was canceled ($n = 3$). Three children felt uncomfortable when the camera was turned on and

declined continued participation ($n = 3$). This video-recording was stopped and deleted immediately.

2.3. Data collection

Data were collected of video-recorded communication between children and nurses during pre-operative needle procedures.

Prior to arrival at the clinic, all parents were asked to help their child to apply anesthetic patches for at least one hour. The PVC insertion took place in the child's assigned room in the clinic, after the child had been weighed and changed into a surgical gown. One, or in some cases two, nurses participated during the needle procedure, depending on the child's age or if it was already known that the child was afraid of needles.

The video-recording started when all participants involved in the needle procedure were in place and when the child gave the okay to start the recording. The needle procedure began with the nurse removing anesthetic patches and examining the child's blood vessels for accessibility for PVC insertion. All nurses asked the children to look away as the PVC was inserted. PVCs were then bandaged and the video-recording was stopped. All needle procedures included in the study followed the same procedure.

A video-camera was placed at the foot of the child's bed to best catch the child's facial and bodily expressions. IK was standing next to the camera. Some children lay on their parent's lap while on the bed with their arm over the child's chest as per instruction from the nurse. Other children lay on the bed by themselves.

2.4. The VR-CoDES instrument

VR-CoDES is an instrument used for coding sequences of emotional communication in order to explore patients expressions of emotional distress (cues and concerns) and provider responses to these [20,21]. VR-CoDES builds on the assumption that emotional concerns can be communicated in two ways, as explicit concerns or as less explicit cues about underlying concerns [20,21]. The coding consisted of three steps where the first step consisted of identifying sequences that contained communications of unpleasant emotions. These unpleasant emotions were coded as a concern or cue A-G [22]. A clear and unambiguous expression of an unpleasant emotion is coded as a concern [23]. Cues are when a verbal or non-verbal hint suggests an underlying unpleasant emotion [23]. Step two involved identifying who elicited the concern or cue. The concern or cue could be expressed independently or as a response to what the nurse just said or did. The final step consisted of coding the nurse's immediate response to the child's expressed concern or cue. The response is coded at different levels, first as whether the response are non-explicit or explicit, thereafter as whether the response provided or reduced space for further exploration of the child's cue or concern [22], and lastly divided in categories describing what the response consisted of. Examples of non-explicit nurse responses are *Ignore what the child communicated*, *Shutting down the child* or *give the child Information advice*. VR-CoDES is descriptive and does not validate if responses are good or bad as there is no given response to all expressions of emotions [24,25].

The coding followed the VR-CoDES [22,23]. Before the coding all video-recordings were transcribed. The transcribed text was used to support the coding. The coding of the data were initially co-coded by two of the researchers (IK and AJS) to establish inter-rater reliability. One of the authors (AJS) was formally training in coding adult data. The first three videos were co-coded together and all researchers watched these videos for discussions and to resolve disagreements in relation to the manual. Thereafter ten videos (37%) were co-coded. Inter-rater reliability was calculated with Cohen's kappa $k = 0.86$ ($p = < 0.01$), indicating strong inter-rater agreement between the

Table 1
Demographic data of children ($n = 26$) and nurses ($n = 7$).

	n	Mean (age)	Range (age)
Child ($n = 26$)			
Girls	8		
Boys	18		
Child (years)		8	6–12
Younger children < 8 year	15	6	
Older children ≥ 8 year	11	10	
Nurses ($n = 7$)			
Nurse (years)		48	28–63
Working experience (years)		23	7–40
Specialized in pediatric care	7		

Table 2
Frequency of children's emotional expressions during the needle procedure and type of response expressed by nurses.

Nurse response					
Emotional expression	Non explicit reduce space N (%)	Non explicit provide space N (%)	Explicit reduce space N (%)	Explicit provide space N (%)	Total N (%)
Concern	22 (19.8%)	–	6 (5.4%)	6 (5.4%)	34 (30.6%)
Cue A	15 (13.5%)	–	2 (1.8%)	–	17 (15.3%)
Cue B	7 (6.3%)	–	1 (0.9%)	1 (0.9%)	9 (8.1%)
Cue C	1 (0.9%)	–	–	1 (0.9%)	2 (1.8%)
Cue D	5 (4.5%)	1 (0.9%)	1 (0.9%)	–	7 (6.3%)
Cue E	–	–	–	–	–
Cue F1	20 (18.0%)	1 (0.9%)	–	–	21 (18.9%)
Cue F2	10 (9.0%)	–	1 (0.9%)	2 (1.8%)	13 (11.7%)
Cue F3	4 (3.6%)	–	3 (2.7%)	1 (0.9%)	8 (7.2%)
Cue G	–	–	–	–	–
Total	84 (75.7%)	2 (1.8%)	14 (12.6%)	11 (9.9%)	111 (100%)

researchers [26]. Thereafter, remaining videos were coded individually and independently by one of the researchers (IK).

2.5. Statistical analysis

Descriptive statistics were used to report the frequency and types of cues and concerns and responses, according to VR-CoDES. To explore potential differences in emotional response and age an independent two-tailed Students *t*-test was used. The sample was divided into two age groups of < 8 and ≥ 8 years of age, in accordance to earlier suggestions that younger children experiences higher levels of fear and pain during needle procedures [1, 3, 6], developmental psychological reasons and the sample distribution. To explore differences of frequency and type of cues and concerns, nurses responses, child elicited responses in relation to age group (< 8 or ≥ 8 yr) and sex were analyzed with Student's *t*-test. The alpha level was set to 0.05. The choice of using the parametric *t*-test to analyze the secondary aim of potential differences in age and sex, is based on normal distribution (Levene test > 0.05) and the $N > 50$. Statistical analyses were performed using SPSS Statistics for Windows, version 25.0.

2.6. Ethics

The study was approved by The Swedish National Ethical Review Board (Dnr 2019-04927), which adheres to the Declaration of Helsinki [27]. The four principles of autonomy, beneficence, justice and non-maleficence guided the research process. On agreeing to participate, children and parents received written and oral information and were given the opportunity to ask questions. All participants were informed that they could withdraw participation at any time, without giving a reason or it affecting their care. Verbal assent was obtained from participating children. Parents and nurses gave verbal and written consent to participate [27].

3. Results

3.1. Sample description of the observed needle procedure

For analysis of emotional communication between children and nurses during needle procedures a total of 27 video-recordings were collected. In these recordings, 26 children and 7 nurses participated. One child appeared in two video-recordings, as the procedure needed to be repeated to insert the PVC in the correct position. The mean length of all videos was 4 min, with a range of 1–12 min.

Two nurses were present in 15 (58%) of the needle procedures. The same nurse appeared in 6 video-recordings during the needle procedures with a range of 2–12 times. All nurses were specialized in pediatric care. All children had one or more parent or other

relative as support during the needle procedure. For an overview of demographic data of children and registered nurses please see Table 1.

3.2. Children's emotional cues and concerns

A total of 111 cues or concerns were identified in 23 of the 27 needle procedures, with a distribution of 77 cues (mean = 2.96) and 34 concerns (mean = 1.31). No cues or concerns were identified in four needle procedures. There was no significant difference ($t = 0.099$, $p = 0.922$) between frequency of identified concerns and age group younger (mean = 1.33, SD = 1.496) or older (mean = 1.27, SD = 1.618). Nor were there any significant differences ($t = -0.127$, $p = 0.900$) between frequency of identified concerns in girls (mean = 1.25, SD = 1.389) or boys (mean = 1.33, SD = 1.609). For an overview of the frequency of children's emotional expressions during the needle procedure and type of response expressed by nurses, please see Table 2.

Children's cues were most frequently expressed as non-verbal cue F (30.6%). Among the cues identified as cue F, the authors observed a range of differences in relation to how the children communicated their non-verbal unpleasant emotions. Children's expressions varied and were more or less intense. Therefore, all cues coded as F cues were divided into three subgroups to illustrate the wide range of different non-verbal expressions used by the children to express an unpleasant emotion. The first group, cue F1, consisted of discreet non-verbal cues such as the child closing their eyes, frowning and grimacing ($n = 21$). The second group, cue F2, consisted of less obvious non-verbal expressions used by children such as crying or frozen facial expression and staying completely still ($n = 13$). Finally, we grouped overt expressions such as screaming, shaking, and kicking, into a third group, cue F3 ($n = 8$). The subcategories are not graded. This means that a child coded cue F1 can be just as scared and agitated as another child coded as cue F3. No significant differences ($t = 1.451$, $p = 0.160$) were found between non-verbal expressions in children in age group younger (mean = 1.27, SD = 1.580) or older (mean = 2.18, SD = 1.601). Nor were any significant differences ($t = 0.456$, $p = 0.653$) when comparing non-verbal expressions in girls (mean = 1.88, SD = 1.553) or boys (mean = 1.56, SD = 1.688). Analysis comparing the child's sex and age to the various cues could not be performed due to the low numbers of coded cues A-G. For examples of cues and concerns expressed during the needle procedure according to the Verona Coding Definitions of Emotional Sequences (VR-CoDES), please see Table 3.

No significant differences in cues and concerns were found ($t = 0.356$, $p = 0.725$) when comparing nurses working alone (mean = 4.60, SD = 4.835) with those working in pairs (mean = 4.06, SD = 2.909).

Table 3
Examples of cues and concerns expressed during the needle procedure according to The Verona Coding Definitions of Emotional Sequences (VR-CoDES).

Type of unpleasant emotion	Definition	Examples of cue and concerns
Concern	Clear expression of an unpleasant current or recent emotion where the emotion is explicitly verbalized	"Ouch, it hurts" (<i>Girl, 6 years</i>)
Cue	A verbal or non-verbal hint to a underlying unpleasant emotion	
Cue A	Vague or unspecified words to describe emotion	"I can't do it, I can't do this" (<i>Boy, 12 years</i>)
Cue B	Verbal hint about hidden concern	"I don't want to do that when you say those things" (<i>Boy, 6 years</i>)
Cue C	Physiological or cognitive correlation to emotion	"... I saw that my heart rate went up to 104 before, and even higher" (<i>Boy, 11 years</i>)
Cue D	Neutral expression that stands out	"What is it. Will I get one on my other arm too?" (<i>Boy, 6 years</i>)
Cue E	A patient elicited repetition of a previous neutral expression	_____ ^a
Cue F	Non-verbal cue	Frowning, closes eyes, tears flowing, screams, kicks the mattress
Cue F1	Discreet: Closing eyes, frowning or grimacing	Closes eyes and presses head backwards against the pillow (<i>Boy, 11 years</i>)
Cue F2	Less obvious: Sheds tears, freezes their facial expression or becomes completely still	Fixes gaze on the ceiling with tears running down cheeks (<i>Boy, 8 years</i>)
Cue F3	Overt: Screaming, shaking or kicking	Kicks the mattress and waves arms wildly about (<i>Girl, 9 years</i>)
Cue G	A clear and unambiguous expression of an unpleasant emotion which is in the past	_____ ^a

^a This type of code was not found during the analysis.

3.3. Nurses responses to emotional cues and concerns

The most frequent response given by nurses was a non-explicit response (77.5%) with the mean = 3.31 times per procedure. For an overview of the frequency of the response to children's emotional expressions please see Table 2. In 88.3% of the responses, nurses' expressions were coded as reducing space for further communication and 11.7% as providing space. The responses coded as non-explicit reduce space consisted of the subcategories Ignore (33%), Shutting down (14%) and Information advice (28%) responses. For instance, an expression coded as Ignore could be a response where the nurses were silent and did not respond to the child's expression of a cue or concern, or talked about something else without noticing the child's expression. For examples of the response type, non-explicit or explicit and reduce or provide space expressed by nurse during the needle procedure please see Table 4. There was no significant difference ($t = 1.009$, $p = 0.323$) between frequency of non-explicit response in age group younger (mean = 2.87, SD = 2.503) or older (mean = 3.19, SD = 2.737). Nor was there a significant difference ($t = 0.086$, $p = 0.932$) between frequency of non-explicit response in girls (mean = 3.38, SD = 2.615) or boys (mean = 3.28, SD = 2.675).

The most frequently observed explicit response from nurses was Information advice (10%). This consisted of the nurse responding to the child by explaining actions made during the procedure or facts about blood (Table 4).

3.4. Elicitation of cues and concerns

Children elicited 108 of the total 111 cues and concerns. The remaining two concerns and one cue F2, were nurse elicited. Two of these elicits consisted of the nurse telling the child that "sometimes you get scared and it is okay to be scared". The third elicitation consisted of the nurse asking the child if it hurt.

4. Discussion and conclusion

4.1. Discussion

4.1.1. Children's emotional distress expressed as cues and concerns

Children expressed multiple cues and concerns, indicating emotional distress when undergoing a needle procedure. Emotional expressions made by children were to a large extent non-verbal,

with some individual differences. Even when silent, the children were able to communicate their unpleasant emotions, in accordance with earlier suggestions in the literature [7, 10, 11]. These non-verbal expressions were found to vary, from discreet (F1) and less obvious (F2) to overt (F3) expressions. Children with discreet expressions might be at risk of nurses missing their expressions. In conclusion children are excellent at expressing negative emotions, even if such expressions might be discreet and difficult to detect and the onus should be on nurses to be attentive to and confirm what the child is communicating. The challenge may lie in non-verbal communication that is more discreet than overt. This study reinforces the fact that active listening requires more than just hearing what is said [28]. Active listening demands that nurses are present and open to accepting what the child is communicating either verbally or non-verbally. When active listening is achieved, the dialog between nurse and child can incorporate more than words [28]. The results show no significance difference related to age and frequency of verbal or non-verbal unpleasant emotion. Vatne et al. [7], described how children under the age of 11 lack the vocabulary to express unpleasant emotions and suggest that expressions occur by verbal or non-verbal hints instead. Children up to the age of 15 years express negative emotions explicitly or in a non-verbal way [12]. This indicates that non-verbal communication is not age-dependent. Children undergoing care and treatment can be distressed [29] which may affect their way of communicating. Children who experience emotionally stressful situations find it more difficult to express themselves with words [7].

Most cues and concerns were elicited by the child themselves. Previous studies in using the VR-CoDES in the pediatric field collected data during consultations where healthcare professionals asked the child questions [7, 11, 30]. This makes comparisons of the numbers of child elicited cues or concerns to previous studies difficult. Initiatives from the nurse to communicate with the child could involve the child in their own care [12,31], which can lead to reduced fear and pain. Children experience stress and fear during PVC insertions when there is a lack of communication and information [32]. If guiding principles for best supportive practice are what's best for the child and a child perspective, then nurses should actively elicit the child's emotional cues and concerns. Not encouraging the child to talk about how they feel can create further stress, which in turn can increase the experience of fear and pain.

Table 4

Examples of the response type non-explicit or explicit and reduce or provide space expressed by nurses during the needle procedure.

Response type	Definition	Examples of nurses (N) response to the childs (C) expressed cue or concern
Non-explicit reduce space	Any response which does <i>not explicitly</i> mention either the content/topic or the emotion and closes down further disclosure about the child expressed cue or concern	C: "Ow! Ow! Ow!" (Boy, 6 years) N: "I have to look at the other arm too. I could not find a suitable blood vessel" (Nurse 3) ----- C is hiding her arms (Girl, 7 years) N: "Do you have a favorite on Youtube?" (Nurse 4) ----- C: Ow! Owwww! Ow! (Girl, 9 years) N: "It's just water, nothing else, just a little water" (Nurse 2) C: "Ow! Owwww!" (Boy, 12 years) N: "What is it?" (Nurse 1) ----- C: "But I want to be able to see mom" (Boy, 6 years) N: "Sure, I'll move so you can see Mom" (Nurse 5) C: "It hurts" (Girl, 6 years) N: "Yes, it hurts a little but it's just because I have to push hard so that the blood flows" (Nurse 3) ----- C is crying and screaming (Boy, 10 years) N: "Look! I'm injecting water. It doesn't hurt. Watch now!" (Nurse 3) C jerks with the whole arm (Boy, 6 years) N: "Did it hurt there?" (Nurse 6) ----- C: "It hurts" (Boy, 11 years) N: "does it hurt when I flush? You have to say if it does" (Nurse 3) ----- C is crying (Girl, 6 years) N: "It's done now. What a good girl you are, who was so scared" (Nurse 7)
Non-explicit provide space	Any response which does <i>not explicitly</i> mention either the content/topic or the emotion and <i>gives space</i> for further disclosure about the child expressed cue or concern	
Explicit reduce space	<i>Any response</i> which mentions either the content/topic or the emotion and <i>closes down</i> further disclosure about the child expressed cue or concern	
Explicit provide space	<i>Any response</i> which mentions either the content/topic or the emotion and <i>gives space</i> for further disclosure about the child expressed cue or concern	

4.1.2. Nurses responses to children's emotional expressions

Nurse's responses to children's emotions were mainly as non-explicit. This may be due to the evidence based use of distraction during needle insertions that aims to alleviate unpleasantness like pain and fear [32]. Further discussion of the use of distraction is warranted. Which child expressions prompt nurses to respond with the use of distraction are still unclear. A suggestion is therefore to distinguish between the concepts of distraction and confirmation. Confirmation of the child's negative expressions is important, even when the nurse uses distraction during a needle procedure. A well-planned distraction can be appropriate to decrease children's fear and pain. However, fear and pain may occur anyway and need to be acknowledged. Using distraction in response to an expressed concern or cue may be a weak intervention for children needing support and understanding to manage the negative emotion they are communicating.

VR-CoDES does not assess nurse responses in terms of good or bad [25] although one could hope that the nurse would be open and provide space for the child to communicate, particularly when working from a child's perspective. However, VR-CoDES category "Provide space" is not always the best response for the child, either. Rather, different combinations of "explicit/non-explicit" and "provide space/reduce space" are the key to communication with the child [25]. Shutting down a child who is experiencing unpleasant emotions may be considered negative from an outside perspective. However, from a child perspective, distraction and shutting down responses may, in some situations, allow for individual care and treatment for children. Consequently, there is no one given response to children's emotional expressions. That said, individual experiences and the child's perspective must be acknowledged. Another reason for shutting down the child could be that nurses tend to become more task-oriented and focus on efficiency [33]. The consequence of performing a needle procedure from a task-oriented approach can be missing or ignoring children's verbal and non-verbal communication.

Adapting communication to the child's level of maturity is an important aspect in involving the child. Using familiar and

understandable language and adapting it to the individual child will encourage both child involvement and nurse responsibility [34]. Nurses with good communication skills pay more attention to the child and thereby practice a more individualized care [34].

4.1.3. Strengths and limitations

VR-CoDES is a known and reliable method for analyzing communication of emotions in healthcare contexts for patients older than 12 years of age [11,21,35]. This study contributes with knowledge of analyses of communication in children as young as 6 years of age. Children commonly used a wide range of non verbal expressions, and we identified a need to further explore and develop cue F subcategories to mirror the richness of different expressions in the data, not previously described. The subsequent division of cue F into subcategories provides knowledge about how the children expresses themselves non-verbally, which can contribute to clinical practices and developing more individualized care.

The child's previous experiences may play a certain role in communication. Most of the children in this study received a PVC for the first time, while children living with a long-term illness generally have numerous needle procedures and probably experience communication in a different way compared to healthy children [1,36]. Further, the child's personality can play a decisive role on how active the child is in communicating under stress [31].

Data collection was limited to a single pediatric setting. The limited number of nurses could mean a smaller spread around how nurses communicate with the children. Several settings with more nurses would have allowed the researchers to observe other nursing cultures. Nurses in the present study may have influenced each other to perform needle procedures and to communicate in a particular way.

A strength of the present study is that data were collected with video-recordings. As VR-CoDES is based on both verbal and non-verbal communication, it is important to be able to analyze the child's expression of emotions. To achieve acceptable inter-rater reliability, the first ten video-recordings were co-coded within the

research group. This resulted in a good level of agreement ($k = 0.86$), which strengthened the study's credibility [26].

4.2. Conclusion

Children are capable of expressing emotional distress, during needle procedures, regardless of age and sex. The emotional expressions are primarily non-verbal. Therefore, a child showing less overt expressions during a needle procedure does not necessarily experience less fear or pain. The nurses' communication was focused on to prepare and inform the child of the practical stages during the needle procedure, with less attention to the child's emotion. To support the child during needle procedures nurses need to be aware of the broad spectra of non-verbal expressions of unpleasant emotions. Nurses response to children's emotional expressions is vital to support the child.

4.3. Practice implications

Acknowledging emotional communication may decrease distress in children during needle procedures. Nurses should allow children to express earlier experiences and encourage their views and needs, even when using distraction techniques during a needle procedure. This study adds knowledge on how nurses and other healthcare professionals can pay attention and respond to each child's discreet emotional signals. Nurses need to develop strategies to invite the child to communicate experiences of emotions before, during and after a needle procedure to increase the child's sense of control and of being listened to.

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CRedit authorship contribution statement

Study Design: IK, KK, LD, AJS, LH, Data collection & analysis: IK, AJS, Manuscript preparation: IK, KK, LD, AJS, LH.

Declarations of interest

None.

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