

# **Home administration of needle injections for children with rheumatic diseases: A qualitative study on nurses' perception of their educational role**

## **Background**

Clinical outcomes of children with rheumatic diseases (RDs) have significantly improved due to treatments including biologics and methotrexate (Brunner et al., 2018). Such long-term treatments involve the administration of subcutaneous injections by the children and their parents at home. Thus, patient education for children and parents is called for, and healthcare professionals (HP) must possess pedagogical competence, disease-specific knowledge, along with an understanding of relevant coping strategies, communication skills, and user participation (Vågan et al., 2016). Pedagogy is the theory and practice of learning, as well as how this process influences and is influenced by the social, political, and psychological development of learners. *Health pedagogy* is a term commonly used for the approach to teaching patients; however, in patient education, nurses also have to assess the patient's ability to acquire, understand, and use health information (Batterham et al., 2016). A key area in patient education is patients' right to participation. This also applies to children; however, it must be adapted to age and stage of development (United Nations Human Rights, 1989). Actively involving children in decision-making processes can improve their understanding and utilization of healthcare professionals' advice (Quaye et al., 2019). For children with chronic conditions, educational interventions may improve their self-management capability (Saxby et al., 2019).

Injection training is an important part of patient education that is often provided in the hospital setting. Nurses teach children and parents injection techniques while at the same time delivering the first injection. However, this procedure encompasses much more than practical accomplishment, as needle injections may be frightening to children (Heden et al., 2020; McLenon & Rogers, 2018). Attention to emotional factors is therefore of great importance (Birnie et al., 2018). Children need detailed information to understand the procedure and information about relevant coping strategies (Bray, Appleton, et al., 2019b; Stinson et al., 2012). Parents are often overwhelmed by the responsibility of managing the injection therapy at home (Spiers & Beresford, 2017; Sørensen et al., 2021) and need a repertoire of measures

to help the child to adhere to the injection treatment. It is challenging for nurses to meet both children's and parents' needs while balancing the need to complete the procedure in a timely manner (Karlsson et al., 2014).

Hildegard Peplau's middle range theory of interpersonal relations in nursing provides a theoretical foundation that is still relevant for the current shift toward self-management (D'Antonio et al., 2014). Peplau's theory describes the principles of individual patient care, phases of the nurse-patient relationship, and how nurses' various roles, such as teacher and counselor, can help patients feel understood and respected (Hagerty et al., 2017; Peplau, 1997). Peplau emphasized that nurses should teach patients to handle their symptoms and challenges at home, described as a "freeing process" (Peplau, 1997). Peplau's theoretical perspective may still be relevant when reflecting on nurses' educational role (Hagerty et al., 2017). Though nurses may recognize a need for pedagogical competence, barriers such as skills, workload, motivation, a physician-oriented atmosphere, and insufficient teaching materials may impede competence in this field (Bergh, 2014). Thus, patient education may vary in different parts of the health service.

So far, there has been a lack of research on nurses' prerequisites for providing patient education to children with RDs during short-term hospital stays. Therefore, the aim of this study was to explore nurses' perceptions of their educational role, pedagogical competence, and practice in teaching children with RDs and their parents to manage treatment based on subcutaneous injections at home.

## **Methods and design**

This study has a qualitative, explorative design and is part of a larger project that examines the emotional aspects and handling of repeated needle injections among children with RDs, being initiated at the hospital and continuing at home. The present paper reports on nurses' perceptions of their educational role related to these patients, and we considered focus groups to be an appropriate method. By gathering nurses with similar experiences in small groups, we ensured that the participants could speak honestly (Krueger & Casey, 2015) and reflect together on the topics given to an expanded understanding.

## **Setting and sampling**

The focus groups were carried out in one pediatric ward and two outpatient clinics at two university hospitals in Norway that treat children aged 0–18 years with different pediatric diseases. We used purposive sampling to recruit nurses with experience performing patient education for children and parents at the onset of home administration of an injection-based treatment. Small groups may afford better opportunities to share ideas; however, they must be large enough to provide a diversity of perceptions (Krueger & Casey, 2015). Most nurses in this study provided patient education for children recently diagnosed with RDs, but the outpatient clinics were small, and not all nurses worked explicitly with RDs. Therefore, three nurses were included who mainly educated children with type 1 diabetes and immune deficiency. This inclusion was justified by the argument that they could provide relevant information about the nurses' educational role in other similar patient groups even though the medical treatment of children with RDs includes a different side effect profile. A nurse coordinator who worked on the ward invited nurses with relevant experience to participate in the study, while a local contact person invited nurses at the outpatient clinics to participate.

## **Participants**

The final sample consisted of 14 nurses allocated into three focus groups, one for each unit. Practical considerations prevented one invited nurse from participating. The sample included most of the nurses who provided training in the home administration of injections at the three units at the time. Their experiences provided a broad understanding of nurses' perceptions of their educational role in different contexts. All nurses were females of European ethnicity, as no males or nurses with other ethnic backgrounds worked in these units during the participant recruitment period. Nurses' experience and level of education varied. Four nurses were specialists in pediatric nursing, and another four had undertaken additional education (e.g., in law, pedagogy, or music) after completing their bachelor's degree in nursing. Most nurses had injection training skills with children and their families, and only four nurses had completed less than 10 such training sessions. Table 1 presents more characteristics of the sample.

*Table 1 approximately here*

## **Data collection and context**

The focus groups were completed in February 2019. To establish a relaxed atmosphere, we offered the participants refreshments in locations without disturbances (Green & Thorogood, 2018; Krueger & Casey, 2015). To generate rich data, the first author (KS) facilitated group discussions in which participants were encouraged to interact (Green & Thorogood, 2018). KS is an experienced pain specialist nurse with a special interest in pain in childhood and has experience in qualitative research. The last author and PI of this project (HW) was the secretary in two of the focus groups. An external nurse fulfilled the role of secretary in the third focus group. Neither the moderator nor the secretaries were employees at the actual units. Topics for discussion in the focus groups covered the following areas: 1) descriptions of their own experiences with patient education, 2) the knowledge and competence nurses need to educate patients, 3) how they expand their competence, 4) their expectations of training sessions with children that need injections at home, 5) their experiences of managing children's pain and fear, 6) their reflections on how patient education may affect how children and parents manage the home administration of injections, and 7) their experiences of challenges during patient education sessions. The focus group discussions were audio recorded, and the secretaries took notes that were reviewed with the moderator immediately after each focus group. Written notes were included in the data material.

## **Analysis**

We analyzed data by following the six phases of Braun and Clarke's thematic analysis (Braun & Clarke, 2006; Terry et al., 2017). To become familiar with the data, KS listened to the audio recordings, transcribed the recordings verbatim, and read written transcriptions several times. The notes from the secretaries were reviewed together with the transcribed text, and initial ideas for coding were composed and discussed with HW. The transcribed text from each focus group was inductively coded and examined for nuances that provided information about the nurses' educational role. The research group discussed codes and ideas for potential themes and reviewed potential themes several times until agreeing upon whether they reflected the coded extracts and the entire data set. Table 2 shows an example of the analytical process for the topic, "How nurses expand their competence." We used fictional names for the nurses when labeling their speech. NVivo 11 software was used to organize the data, track the

coding process, compare codes, and review themes. In the analysis and interpretation, we aimed to understand the significance of the discussions in the focus groups, and we have illustrated our findings using verbatim quotations to emphasize certain topics (Green & Thorogood, 2018; Krueger & Casey, 2015). The Standards for Reporting Qualitative Research (SRQR) were used to guide the report of this study (O'Brien et al., 2014). To provide trustworthiness we generated data from three different contexts, provided rich contextual information and descriptions of the analytical steps, as well as the availability and organization of the data (Green & Thorogood, 2018). Member checking was used during the focus groups to ensure our correct perception of the participants' statements, and we included quotations from different participants in the three focus groups. The entire research team participated in the analytical process, reviewed topics, and discussed results in the context of relevant empirical research and theoretical perspectives. All the authors contributed to the composition of the article.

*Table 2 approximately here*

### **Ethical considerations**

The study was approved by the Regional Committee for Medical and Health Research Ethics in Norway (2017/2194) and performed according to the Code of Ethics (World Medical Association, 2013). All participants provided their written informed consent. Data were de-identified and stored in the Services for Sensitive Data Unit at the University of Oslo. Due to the relatively small sample and risk of recognizing participants, the quotations have been kept anonymous, along with some additional information (e.g., whether a quotation represents many or few nurses).

### **Results**

Overall, our findings showed that short-term stays in pediatric wards present challenges in delivering extensive patient education during hospitalization. The nurses perceived the educational role as squeezed between expectations of completing the training session within a short time span. Furthermore, the nurses supposed that most children need a stepwise approach to this procedure, which they initially find intimidating. The organizational conditions in the two outpatient clinics were different from the pediatric ward; however, all nurses described a lack of pedagogical competence, including managing children's fear of

needles. We identified three main themes that captured nurses' perceptions of their educational role: myriad expectations, awareness of own competence, and facilitation and prioritization of patient education.

### **Myriad expectations**

Nurses described a tacit but common expectation of completing the first injection and patient education within one session. The focus of the training session was to teach children and parents the injection technique and to handle equipment safely. The nurses agreed that the technical instructions were comprehensive and stated that they lacked the skills necessary to complete patient education for children and parents. Several nurses described expectations like the following, "If you can give injections, it's really just throwing yourself into it." Some nurses described a lack of necessary knowledge about the medications and that the equipment for training was different from what children would use at home. Nurses also described that expectations of accommodating children's emotional expressions were a bit overwhelming. Even the most experienced nurses discussed the challenges of performing patient education alone. They often wished they could work in a team of two nurses, as illustrated by this slightly ironic quotation:

*You are expected to find the most suitable distraction method for the child and, at the same time, perform a demanding technical injection, comfort anxious parents, and preferably sing along.*

Some nurses perceived that parents expected the nurses to take care of everyone, and instead of presenting themselves as confident in front of children, they felt nervous. Several nurses described this difficulty of accommodating parents' anxiety and children's needs simultaneously. Parents' anxiety could impede nurses' relationships and communication with children and disrupt the entire training session. A few nurses had experienced situations where they felt compelled to physically restrain a child in order to complete the first injection. The nurses were all aware that children's experience of their first needle procedure would shape later experiences and that physically restraining a child has the potential to worsen the fear of needles:

*Children who have experienced being held down during blood sampling will later on be terrified of everything. When two adults have to hold the child down.... After such a procedure, they don't even dare to measure their saturation or anything else.*

Some of the nurses at the outpatient clinics preferred to teach parents separately, as parents often needed detailed technical information that could frighten children. Nurses working in the ward did not have this option and were concerned about discharging patients after just one training session:

*I was thinking: oh my god, this is a lot of information—and now they are going to do this on their own—how would that turn out?*

These nurses did not expect to see children for follow-up, and they expressed a lack of time for follow-up consultations.

### **Awareness of own competence**

Nurses struggled to elaborate on what they included in concepts of pedagogical competence and knowledge. Most nurses related competence to experience and defined lack of knowledge as absence of experience rather than inadequate education. They referred to experienced nurses as role models and stated that the experienced nurses had taught them “everything.” However, a few observations of patient education by an expert were seen as insufficient preparation to be responsible for the training sessions:

*I have never had any education in training sessions for needle injections. I did not really know what kind of medicine it was; I could only give subcutaneous injections.*

Nurses agreed that their basic nursing education was inadequate. For example, most nurses said they lacked skills and experience in using specific methods to manage children’s pain and fear. They had different views on the use of non-pharmacological measures, and some nurses were in doubt as to whether such measures were effective. Other nurses explained that they believed distraction could help; however, lacking available tools beyond entertainment on mobile phones. More experienced nurses used several distraction techniques, often randomly chosen rather than selected for their effectiveness and individual suitability. Many nurses believed that completing the first injection would help children overcome their fear:

*Many children are surprised by how little pain there is, but the whole process and imagining the stick and having a needle inside—it’s scary.*

Nurses related that this belief could sometimes justify completing an injection even if the child complained. However, several nurses agreed on the importance of creating good memories, encouraging the child to think of what they achieved, instead of reminding them of

the times a procedure did not succeed. Some experienced nurses described how they sometimes had to provide a break during the procedure:

*If the child has rejected for an hour, we will not succeed in persuading the child. By taking a break, the child often regains some control so that we can complete the procedure.*

There were also different views on how nurses' pediatric competence had developed and improved the educational session. A few nurses stated that such skills would probably develop just by working on a pediatric ward, while pediatric nurses' opinions deviated:

*I know we have another focus during our education: about children's development physically and psychologically—and so—you are more aware of that, I would say.*

Many nurses called for opportunities for discussion and reflection within their daily work and requested access to guidelines on patient education. They also felt a lack of knowledge about research literature on children's pain and fear due to needle procedures but expressed a positive attitude toward local projects aiming to improve clinical practice.

### **Facilitation and prioritization of patient education**

All nurses reported that they usually completed the first injection and patient education either the same day children were discharged or during a follow-up at the outpatient clinic. This spared families unnecessary travel, as they often lived far away from the hospital; however, this did not facilitate the learning process:

*Some of the children return for follow-ups and report that they do not always succeed with needle injections at home; however, we really want them to manage well.*

The ward nurses pointed out that children with RDs had previously been hospitalized for a long time. Now, most children with RDs were discharged after only a few days, while other children suffering from, e.g., neurological diseases were sicker and needed more extensive nursing care. The nurses often felt squeezed between the many tasks, as exemplified by the following quote:

*The planning at the ward doesn't provide us sufficient time. The children here are more critically ill, so we have to prioritize their needs before those with rheumatic diseases in need of patient education—right? Previously, these patients were*



*hospitalized for a week, not just two days, especially the newly diagnosed ones; they should have been given repeated information and training in needle injections.*

Attempts to deliver patient education in the afternoon, when wards were less busy, often failed, as nurses felt pressured to discharge patients as soon as possible. The ward nurses also lacked adequate facilities, such as a separate room adapted for educational sessions, meaning that they had to use children's bedrooms or other random, vacant places. However, nurses working in outpatient clinics expressed greater confidence in the implementation of patient education. They could arrange several consultations either by telephone or in person:

*We have the freedom to set up our own appointments with the family. We try to put together a good plan. If the child needs to receive the injection here a couple of times, then we have to make it happen.*

Most nurses expressed skepticism about leaving injection training to general practitioners (GPs), and several referred to bad cases, such as in the following statement:

*I remember a boy who was about to change medication and didn't want to have the injection right away. We agreed that he could have the injection at the GP's office, but there everything happened—swish, swish—very fast! Thus, he mentally locked down. However, when he returned and could practice in a slow tempo—that changed the situation.*

All nurses emphasized the personal responsibility they felt to facilitate education for each child and parent and stated that they lacked the necessary support and guidance from their leaders. Although some nurses were able to offer additional training sessions for their patients, the majority described a lack of a systematic approach to patient education.

## **Discussion**

Nurses perceived patient education as their personal responsibility and an important and expected duty of their daily work, albeit lacking sufficient organizational priority. Their ideals of preventing needle fear and providing children with confidence were difficult to achieve because of limited pedagogical competence and insecurity related to managing children's and parents' fears and worries. Patient education for children with RDs and their parents involves the delivery of complex technical instructions and essential emotional support (Sørensen et

al., 2020). If nurses lack not only the necessary knowledge and pedagogical competence but also the ability to convey information to children and parents, then there is a risk that patients will not benefit from education (Spiers & Beresford, 2017; Vågan et al., 2016). However, nurses are able to deliver patient education by developing their patient-centered communication skills and improving their preparedness for the procedure (Saxby et al., 2019). Nurses in the present study were not fully aware that communication skills and relationships with children and parents were part of their pedagogical competence, while pediatric nurses concluded that they had acquired the necessary competence from their specialist education. One important part of communication and information is the assessment of children and parents' needs. Studies have shown that newly educated nurses frequently lack confidence and preparedness for clinical assessment in general when providing patient education (Sørensen et al., 2020; Taylor et al., 2021).

### **Nurses' lack of pedagogical competence**

The focus of training sessions was to provide the first injection and to teach the families technical instructions within a limited period. A common notion that applied to most nurses in this study was that children will get used to needle sticks and that the challenge is getting the first one completed. This may be partly true; however, it implies a stepwise approach including shared decision-making and age-appropriate preparation. Such an approach can reduce children's fear of needles and improve acceptance of injections (Birnie et al., 2018; Quaye et al., 2019). The use of non-pharmacological measures can help to establish a relationship between nurses and children, which increases the quality of their cooperation during a procedure (Svendsen & Bjørk, 2014). When nurses lack sufficient time for educational sessions, it may be difficult to achieve a collaborative atmosphere with children and parents (Karlsson et al., 2014). Some nurses in this study had been involved in procedures where the child's distress and reluctance escalated out of control and led to physical restraint in order to achieve completion. Such actions may be justified by a notion that "applying restraint to a child is in the best interest of the child," (i.e., receiving the prescribed treatment), while ignoring the children's own experiences of being forced to complete a procedure (Nilsson et al., 2015). Current studies have revealed that children desire detailed pre-procedural information about what is to happen, how it will feel, and what will help them cope and self-regulate the situation (Bray, Appleton, et al., 2019b; Smeland et al., 2019).

Although nurses may feel moral distress and guilt when ignoring children's statutory right to be heard (United Nations Human Rights, 1989), they lack alternative solutions and therefore often continue with persuasion and restraint in order to get the procedure done "as quickly as possible" (Bray, Appleton, et al., 2019a; Svendsen & Bjørk, 2021). However, nurses are aware that they may disrupt the possibilities of developing a trusting and protective relationship with the child by not respecting children's right to be heard (Quaye et al., 2019). Some of the pediatric specialist nurses at the outpatient clinics related how they managed the escalating distress by taking a break, leaving the room, and providing the child with a fresh start after a short while. This strategy has similarities with facilitating a "clinical pause," which provides HPs time to listen to the child's wishes and explore alternative coping strategies (Bray, Ford, et al., 2019). Providing clinical pauses or space provides freedom to disclose personal thoughts and feelings and may serve as a coping strategy (Piccolo et al., 2017; Sørensen et al., 2020).

We found extensive but random use of comfort measures in nurses' practice, most often provided by entertainment on mobile phones. However, nurses lacked a selection of age-appropriate aids, and they based their choices mainly on experience rather than relevant research. Many research papers, educational videos, and campaigns have elaborated on procedural pain and fear in children; in particular, the use of distraction has been widely studied (Birnie et al., 2018; McLennon & Rogers, 2018). One such campaign is the YouTube video, "It Doesn't Have to Hurt," which provides simple advice to parents and healthcare providers during needle procedures. The video has been widely viewed and strongly accepted by both healthcare providers and parents (Chambers et al., 2020); however, for the nurses in the present study, such knowledge had not been included in their basic training. International and national organizations, such as the Paediatric Rheumatology International Trials Organization (PRINTO) and the Norwegian National Advisory Unit of Rheumatic Diseases in Children and Adolescents (NAKBUR), provide relevant information on their websites aimed at developing competence in the treatment of RDs in children and adolescents. However, our results showed that the nurses were not familiar with these resources, and some of the newly educated nurses lacked disease-specific knowledge. The nurses in our study did not have access to resources like play specialists, music therapists, or clowns, which are sometimes offered to children during medical hospitalization procedures. Our findings supported the recurring problem that evidence-based knowledge does not guide nurses' clinical practice (Renolen et al., 2018). As means of empowering patients to improve self-management, nurse

collaboration with user organizations or patient support groups may be untapped resources (Keil, 2019). The advantage of web-based solutions, employed in mobile health applications assisted by nurse-led teams, might also be successful in pediatric chronic disease management (Karataş et al. 2022; Stinson et al., 2016).

### **Organizational and theoretical perspectives of patient education**

Previous research has recommended that the facilitation of patient education should be included in organizational priorities (Vågan et al., 2016). The nurses in our study lacked both guidelines and specific expectations from management on how to practice patient education. However, nurses who worked at outpatient clinics felt freer to individualize patient education than those who worked on wards. A Swedish study confirmed that the conditions for patient education vary between healthcare settings and that teaching is usually intertwined in daily nursing activities as tacit knowledge (Bergh et al., 2014). Similar to the results of this study, they concluded that patient education needs to be clarified to a greater degree and more organized at each workplace (Bergh et al., 2014). Our findings indicate that healthcare institutions should take more responsibility in facilitating a systematic approach to patient education. This should not depend on each nurse's sense of responsibility. Organizational structures built on theoretical foundations that stimulate critical thinking, evidence-based care, and clinical introduction programs are potentially vital for nurses' development and ability to fulfill their educational role (Widarsson et al., 2020). Peplau's theory of interpersonal relations in nursing describes different nursing roles and the transformative power of the nurse-patient relationship (D'Antonio et al., 2014; Hagerty et al., 2017; Peplau, 1997). Her theoretical perspective of self-awareness, personal identity, and individuality has gained renewed recognition in the field of patient-centered care and is standard in modern health services (D'Antonio et al., 2014). However, these professional ideals and the nurses' desire to offer a high standard of care to these children and parents are threatened if their ability to deliver patient education is not present. Nurses who provide patient education need sufficient time and comprehensive competence in nursing, didactic, and interpersonal skills (Bergh et al., 2014; Saxby et al., 2019). Our results indicate that pediatric specialist nurses at outpatient clinics had more competence and a better ability to provide patient education and follow-up than did nurses who worked in a busy hospital ward. However, nurses would benefit from an organizational structure based on a theoretical foundation like Peplau's theory (D'Antonio et al., 2014). The relationships between organizational structure, nurses' use of research, and

pain management outcomes are complex and currently not fully understood (Yamada et al., 2017). Organizational structures affecting nurses' adherence to evidence-based practice (EBP) in hospitals are investigated less often than interpersonal factors; however, a central concern for leaders is how to create room for EBP given their tight resources (Renolen et al., 2020).

### **Strengthening nurses' pedagogical competence**

Different scientific cultures at universities and clinical wards may partly explain the persistent lack of knowledge among recently qualified nurses (Widarsson et al., 2020). Nurses participating in this study developed their competence by accompanying an experienced nurse a few times without support from any guidelines or explicit expectations from their leaders. Role modeling has a long tradition in nursing and despite the development of evidence-based nursing, a belief in "learning by doing" and support from experienced colleagues is reported as important for newly educated nurses (Pascale Blakey & Jackson, 2016). However, in this tradition, there is a risk of nurses acquiring competence in patient education without reflecting on the pedagogical approach or assessment of the patient's individual needs (Bergh et al., 2014). Peplau believed that reflection should be mandatory for nurses and that the nurse-patient relationship is important to achieving effective patient education (D'Antonio et al., 2014). The findings of the present study indicate that nurses would appreciate opportunities for discussion and reflection in their daily work to help them become more aware of their educational role. Opportunities for reflection seem essential for learning processes and may bridge the gap between theoretical and practical knowledge for newly educated nurses (Widarsson et al., 2020).

### **Implications for practice**

Short hospital stays make it challenging to provide comprehensive patient education to children with RDs and their parents while they are hospitalized. Nurses working on pediatric wards need increased training in communication and management of children's pain and fear during needle injections. Competence development should include the opportunity for reflection and guidance in clinical practice, as well as skill training using simulation. Pediatric specialist nurses at outpatient clinics seem to have better competence in providing individual patient education for patients' families. Their skills also represent important resources for

less-experienced and less-educated nurses. A promising avenue of future research might be the potential advantage of web-based solutions for nurses' handling of patient education.

### **Limitations and strengths**

A limitation in this study is the relatively small sample size, including nurses from only one pediatric ward and two outpatient clinics. The results cannot be generalized to every context, but may be applicable, meaningful and relevant for nurses who provide similar patient education before home-treatment. We did not intend to achieve data saturation, however, the sample held content-rich information relevant for the study, and may be justified by the concept of information power (Malterud et al., 2016). The sample included three nurses from outpatient clinics who educated mainly children with type 1 diabetes and immune deficiency, which broadens the scope of the collected data. Their perceptions of patient education were quite similar to those educating children with rheumatic diseases, and their data merely strengthened the results. Nurses working on wards were younger and had less experience and education compared with nurses working at outpatient clinics. This might explain some of the variation in our findings.

### **Conclusion**

This study revealed that nurses perceive as significant their educational role in enabling children and parents to manage home administration of subcutaneous injections. However, there is a need to increase nurses' child-specific pedagogical competence and to facilitate and integrate this competence through discussions and reflections in daily practice. Short-term stays in pediatric wards represent challenges with respect to delivering extensive patient education and may necessitate better organizational structures for competence building in specialist health services.

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## Appendix:

Table 2: Example of the analytical process of the topic: “How nurses expand their competence”

### Author statement

Kari Sørensen: Conceptualization, Methodology, Data collection, Software, Writing- Original draft preparation. Helge Skirbekk: Conceptualization, Methodology, Supervision, Validation, Reviewing and Editing. Gunnvald Kvarstein: Supervision, Validation, Reviewing and Editing. Hilde Wøien: Conceptualization, Methodology, Data collection, Supervision, Validation, Reviewing and Editing, Project administration.

### Conflict of Interest Statement

All authors have no conflicts of interest to declare.


**Table1:** Characteristics of the participants and duration of focus groups

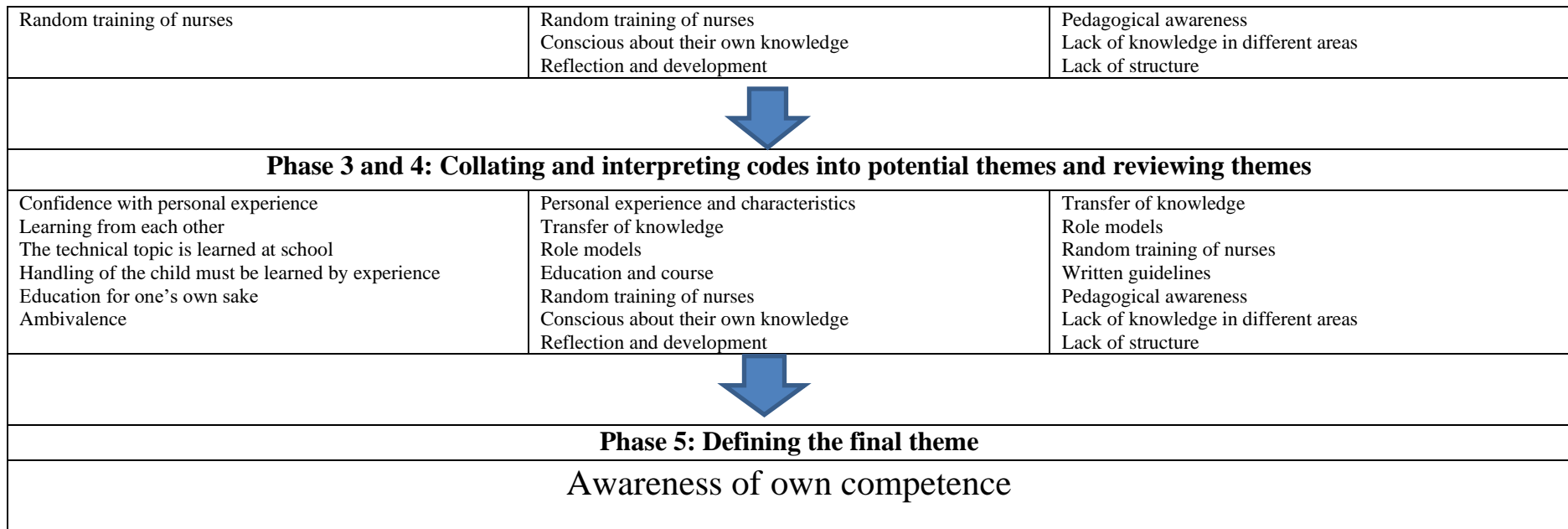
Focus groups	FG1	FG2	FG3	The complete sample
Participants: number	6	4	4	14
Age: median (range)	29 (24 - 35)	40,5 (35 -64)	59,5 (31- 63)	40,5 (24 - 64)
Years of nursing experience: median (range)	3,5 (1-8)	9,5 (3- 37)	31,5 (7 – 41)	9,5 (1 - 41)
Education: RN/ pediatric nurse /other¶ (number)	4/0/2	1/1/2	1/3/0	6/4/4
Duration of each focus group: minutes	90	80	70	

¶Other education was in law, pedagogy or music

Abbreviations: FG = focus group, RN = registered nurse

TABLE 2: Example of the analytical process of the topic: “How nurses expand their competence”

<b>Phase 1: Excerpt of transcribed text from each of the focus groups ¶</b>		
<p><b>Cathrine:</b> I do not know if I had performed this differently if I not was a pediatric nurse.  <b>Judy:</b> But there is a reason for one to choose an education in pediatric nursing...  <b>Claire:</b> Well, it’s probably because you want to become better and so..., yes  <b>Jessie:</b> The technical part and principles of hygiene, syringes and such stuff are from the education, but the handling of the child is not that easy to learn by reading; colleges and role models are important resources. I would also argue; having three kids myself, is a huge advantage! I feel confident.</p>	<p><b>Meghan:</b> So all that was in a way new to me, for as I said the first times; I can administrate injections, but then it is to teach and, in addition, to teach a child who may not be willing to learn, so I could have wished more training..., but I went along with Peggy a lot, and she’s GOLD! Having so much experience and .., so I have followed her a lot.  <b>Moderator:</b> Yes?  <b>Louise:</b> But the rest of us have worked with children for many years and are pediatric nurses, so we are used to work and relate to children, both in education and the like, yes, learned a little about coping and children of different ages and... like that  <b>Moderator:</b> So you think that is important... education?  <b>Louise:</b> Yes, I think so! At least it helps.  <b>Moderator:</b> Is there something you miss?  <b>Meghan:</b> Yes, I feel that I maybe should have had a little more experience with...children.  <b>Louise:</b> ...and over the years I have participated in courses and such, it is often about the topic coping and .., I have also taken part in courses about pain in children and such. You receive a few drops over the years, even if you do not specifically immerse into this... I feel that both education, courses and experience help - in daily life  <b>Sophie:</b> Yes, it is possible that a nurse without further education in children, can certainly... if she follows an experienced..., yes then it works safely and (speaks hesitantly), but as you say Louise, it helps...  <b>Louise:</b> Yes, I think you become more conscious!</p>	<p><b>Anne:</b> No, I have never experienced that they (our leaders) say how they want us to provide training for the patient - you perform the task like everything else, try to be pedagogical, to show and explain and so on.  <b>Simone:</b> I participated in an (patient) education immediately after I finished my own training, but I never had any education in training sessions for needle injections. I did not really know what kind of medicine it was; I could only give subcutaneous injection.  <b>Cathy:</b> But I remember I followed you (Anne: Oh yes?) but I have never registered discussions about a written procedure? Does it exist? (laughs) That one should have a certain time and somehow spread it over the stay and ...  <b>Anne:</b> Yes, that was a good question. I remember it was part of the employee training. When you started, you got a written..., at least earlier; I do not know exactly how it is now (laughs). I have not seen anything...</p>
		
<b>Phase 2: Initial codes</b>		
<p>Personal experience and characteristics            Transfer of knowledge            Role models            Education and course</p>	<p>Personal experience and characteristics            Transfer of knowledge            Role models            Education and course</p>	<p>Transfer of knowledge            Role models            Random training of nurses            Written guidelines</p>



¶ The names of the nurses are fictional.