

# Experiences of Healthcare Staff Regarding Angiography in Infants

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## ABSTRACT

**Background:** Nowadays, the promotion of cardiac care programs for infants in need of specialized heart care has improved the survival of these patients. This study aimed to explain the experiences of healthcare staff regarding angiography in pediatric patients.

**Methods:** This study was conducted based on qualitative content analysis. The data were collected through in-depth, semi-structured, face-to-face, and individual interviews. In total, 20 participants (9 nurses, 4 radiologists, and 7 pediatric cardiologists) were included in this study.

**Results:** According to the results, three main categories were found in this study, including the need for specialized skills (along with three subcategories of the need for knowledge skills, communication skills, and experience), lack of pediatric angiography facilities (along with three subcategories of a shortage of specialist and pediatric nurses, as well as lack of space), and lack of providing care to caregivers (along with three subcategories of intensive shifts, suffering from aggressive pediatric procedures, and environmental vulnerability).

**Conclusion:** Health care staff working in the field of angiography in infants are experiencing numerous mental and psychological problems; however, the health system has not taken supportive measures for such personnel. The result of this study can help future interventions develop supportive programs for healthcare staff working in this unit.

**Keywords:** Angiography, Professional staff, Qualitative research

## Introduction

The effect of nursing care quality is evident in the patient's health outcome (1). The provision of high-quality nursing care to infants is of significant importance since the etiology and epidemiology of diseases are very different in infants from adults, and these differences can lead to long-term complications (2). Nowadays, the promotion of cardiac care programs for children in need of specialized heart care has improved the survival of these patients (3). However, due to the complicated treatments, the provision of care for severely ill infants causes mental and psychological problems and burnout among nurses (4). In this regard, the provision of safe and high-quality care is not possible without experiencing workload by health care staff (5). In most countries, nurses are the largest professional group working in intensive care units (ICU).

Therefore, the presence of skilled nurses is the basis of high-quality care provision. Recent evidence suggested a direct relationship between nursing care and the reduction of mortality among patients (6). Teamwork and coordination among care team members is the most important determinant of patient health outcome (7).

Correct team response means intra-team professional performance in order to examine and manage patients; therefore, communication between staff is essential for providing safe and effective care (8). The nurses working in the ICU have more interactions with medical professionals. Moreover, the provision of specialized complex care through intravenous therapies and life stabilization devices as well as psychosocial support of the family are the other responsibilities of these nurses, which expose

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them to stress and job pressure (9). On the other hand, an increased level of stress among health care staff causes depression, anxiety, and reduced job satisfaction, thereby encouraging them to leave the profession (10). In one study, it was found that patients expected to be cared for by competent, compassionate, and trustworthy nurses (11).

The results of another study showed that it was necessary to consider the experiences and views of nurses working in the ICU to improve the ICU environment. Therefore, it is critical to prioritize environmental health and apply a multi-dimensional approach toward environmental health (12). Since the provision of heart care to infants with heart disease is of great importance, and the provision of high-quality care requires a holistic health care system, this study aimed to explain the experiences of healthcare staff regarding angiography in pediatric population.

**Methods**

This study was conducted based on an inductive content analysis approach. This process involved open coding, classification, and abstraction (13). Before the initiation of the research procedure, the required Ethics code (IR.SKUMS.REC.1396.84) was acquired from Shahrekord University of Medical Sciences, Shahrekord, Iran; moreover, informed written consent was obtained from each of the physicians and nurses interested in participating in the study. In total, 20 participants (9 nurses, 4 radiologists, and 7 pediatric cardiologists) were recruited through purposeful sampling. In order to maximize the variability of the participants, nurses, physicians, and radiologists were selected from the angiography unit. The inclusion criteria were nurses and physicians with one-year working experience in angiography or cardiac unit who were willing to participate in this study. On the other hand, those who were unwilling to cooperate at each stage of the research were excluded from the study.

Interviews were conducted by the first author

in the restroom of the Angiography Unit in Hajar Hospital affiliated to Shahrekord University of Medical Sciences, Shahrekord, Iran. Data collection and sampling were continued until data saturation and lack of any new issues or facts.

Furthermore, interviews and data analyses were performed simultaneously. All interviews were transcribed; moreover, the key words/ concepts were highlighted and coded.

After extracting the key concepts and codes, the codes were grouped considering the similarities and differences between the extracted concepts. Finally, the subcategories with similar concepts were merged, and the number of categories reduced (Table 1). The interviews lasted about 35-65 minutes, and they were conducted in the staff restroom.

Some of the raised questions are as follows:

*Please talk about your experience with angiography in infants.*

*What problems do you have considering angiography in infants?*

The interview was followed by asking questions below:

*Do you want to bring up another issue?*

*Would you please explain more?*

To increase the rigorous of qualitative research, four criteria of credibility, dependability, transferability, and conformability were used which were developed by Streubert and Carpenter (2011) (14). Furthermore, in-depth interviews were conducted several times to increase credibility. The researcher tried to increase the transferability of the results by describing the process of the research and characteristics of the participants explicitly and precisely. Additionally, the results of the research were presented to several people having similar characteristics to the participants to judge the similarity between the research results and their experiences. In order to achieve conformability, some of the interview transcriptions, codes, and extracted classes were provided to some researchers and faculty members who were familiar with the analysis of qualitative research and did not

**Table 1.** Sample of data analysis

Meaning unit	Code	Subcategories	Categories
-I underwent training in a pediatric cardiology hospital, and I have five years of work experience at the neonatal intensive care unit (NICU).	Importance of experience	Need for experience	Need for specialized skills
-Working with children has a high risk, and it is quite different. You are dealing with infants. Their vessels are thin, and blood drawing in children is difficult.	Importance of Practical skills		
-Controlling children is hard and requires more expertise and patience.			

participate in this study. Subsequently, they were asked to check the rigorous of the data coding process, and the researcher also performed many qualitative research and projects.

## Results

In total, 20 participants (9 nurses, 4 radiologists, and 7 cardiologists) were included in this study. The mean ages of the nurses, radiologists, and pediatric cardiologists who participated in this study were 34, 31.5, and 45 years, respectively. Moreover, the mean work experiences of the nurses, radiologists, and pediatric cardiologists were 5, 3, and 5 years in the angiography unit, respectively.

### Data analysis

According to the results, three main categories found in this study were the need for specialized skills, lack of pediatric angiography facilities, and lack of providing care to caregivers. These categories are presented in detail in the following section.

#### The need for specialized skills

This main category is divided into three subcategories of the need for knowledge skills, communication skills, and experience. The majority of the participants state that angiography in infants requires higher specialized knowledge and skills although all of them working in the angioplasty unit.

*"...In addition to the specialized knowledge, the health care team needs to have strong communication skills to communicate effectively with children. The angiography in infants is much more difficult, compared to that in adults. Working with babies or newborns is very difficult. Infants are more sensitive and need patience."*[n2]

*"...I underwent training in a pediatric cardiology hospital and I have five years of work experience in the neonatal intensive care unit. Working with children has a high risk, and it is quite different. You are dealing with infants. Their vessels are thin, and blood drawing in children is difficult. Controlling children is hard and requires more expertise and patience."*[n5]

*"... Both nurses and physicians should have the necessary pediatric angiography knowledge. The physician needs to have enough skill in performing the angioplasty. However, the duration of angioplasty is longer than that in adults, and the staff needs to communicate effectively with the child. We must patiently deal with those children who do not cooperate."*[d2]

Data analysis showed that nurses in the pediatric angiography unit should have working experience in the pediatric unit or NICU.

*"...I have four years of working experience in the neonatal unit. I can do blood sampling more easily. I know how to communicate with infants and parents. Sometimes, they are restless or have less cooperation than adults ..."*[n2]

*"... For us who did not have working experience in the neonatal unit, working with infants is harder. Mostly, we need a couple of nurses to control infants during angiography. I was in the radiology unit. Nurses with working experience at the pediatric unit accompany us for performing angiography. Furthermore, angiography in the pediatric population is a specialized measure. Communicating with the infant and his/her family is also very important and needs strong communication skills and experience ..."*[R3]

One of the skills nurses need regarding angiography in the pediatric population is communicating with the infant and his/her family. The worried families look for news about their infant. One of the important skills a nurse needs in this unit is making an efficient communication with the families of these children.

*"... Here, in the angiography unit, the most important responsibility is to communicate with the family of the infant, which is made by the nurses. Physicians usually do not communicate with infants' families. Of course, sometimes it is forgotten because of the crowd in the unit..."*[n1]

*"... Providing care to children is our main goal, and interaction with their families is less important. We usually do not have enough time to communicate with the families and provide them the information they needed. We are sad but our job is demanding, and we should do all the responsibilities."*

#### Lack of pediatric angiography facilities

This main category was identified with three subcategories, including a shortage of specialists and neonatal nurses, as well as a lack of space. The majority of the participants stated that they faced with shortages of physicians and neonatal nurses. Due to the specialized and aggressive practices, angiography in pediatric population requires a higher number of nurses.

*"...We only have two pediatricians, and other physicians do not have pediatric working experience. We have to do angiography. There are a few numbers of pediatric nurses. Most nurses do not have pediatric working experience."*[d2]

*"... I, with five years of working experience in the*

*NICU, can work better here than a nurse who did not have this experience. Here, a few of us are pediatric and neonatal nurses. Infants require arterial blood sampling, and a nurse should do it. The pediatric nurses can do children's procedures better... "[n5]*

The analysis of the interviews showed that the availability of infant cardiac surgery unit and infant cardiac surgery room is very important for successful infant angiography. Unfortunately, these specialized units do not exist in the hospital, which brings up many problems for physicians and patients.

*"... We do not have the necessary facilities for infants. For example, we do not have a pediatric cardiac surgery room. Since the children's treatment is very risky, physicians tend to do pediatric cardiac angiography at centers equipped with pediatric cardiac surgery room." [n 3]*

*"...Unfortunately, here, if a patient needs surgery, we should go to the hospital that is in front of this center, which is accompanied by transmission risks. It is necessary to change here ... "[d1]*

*"... The absence of a pediatric cardiac surgery room will cause physicians to send their pediatric patients to other centers that they are working at and pose pediatric cardiac surgery room, confronting families with many problems, such as commuting problems and extra expenses ... "[n7]*

### **Lack of providing care to the caregivers**

This main category was characterized by three subcategories of intensive shifts, suffering from aggressive infant procedures, as well as neonatal and environmental vulnerability. The majority of the participants stated that multiple shifts made it hard for them to provide care to infants.

*"... Due to shortages of nurses, we have multiple shifts which lead to increased levels of fatigue and decreased quality of provided care, especially to infants whom dealing with is harder and needs more energy ..."*

Most participants stated that the grief and suffering of parents are painful for nurses. Moreover, therapeutic interventions in the angioplasty unit can be an unpleasant experience for caregivers, especially for female nurses who experience motherhood. Nevertheless, all the staff in the angiographic unit are female.

*"...We often experience distressing conditions. The suffering of the patient's companions, especially if the patient is an infant, the mother's grief, and the suffering of the parents are very painful for the staff/nurses. For female nurses, who have a*

*motherhood experience, it is much more difficult to do aggressive procedures on infant (the nurse starts crying) ... "[n2]*

*"... Very often, four nurses perform pediatric angioplasty. The nurses' experience of a child's pain is very difficult. Seeing the procedures and child's pain hurts nurses. It is so hard ... "[n9]*

Data analysis showed that nurses working in the pediatric angiography unit are susceptible to serious stress due to the importance of this unit; moreover, they are afraid of diseases caused by radiation exposure.

*"... There are job pressure and stress. Nursing is very difficult and demanding. We are more stressed when dealing with certain patients such as children. The working conditions in this unit are very hard. "[n4]*

*"... We are working side by side with the physicians. We are exposed to radiation. We are adults but environmental ionizing radiation is extremely carcinogenic." [R4]*

*"...Well, many of the retired staff in other cities get cancer (breast), it is because of radiation and ionizing environment. There is a risk for the body to get cancer. All or none. Physicians and personnel can be harmed. "[n6]*

*"... The left part of our body and that of the physicians is mostly involved. The probability of getting a disease on the left side is higher. Well, hair whitening is higher on our left side. The risks induced by radiation exposure are one of our problems." [d1]*

### **Discussion**

The results of this study revealed that the personnel of the angiography unit should have sufficient knowledge and expertise, as well as communication skills to provide high-quality health services to infants and their families hospitalized in this unit. Similarly, previous studies confirmed that personnel of the angiography unit should have specialized skills. White et al. provided care standards for patients suffering from cardiovascular diseases. They suggested that specialty-trained nurses who took specialized educational and clinical courses should merely participate in this procedure, and these nurses should not be involved in the nursing workload (15). Participants' experiences demonstrated that angiography in infants requires specialized skills, such as knowledge and experience in the field of infant, as well as health care communication skills. Other researchers, such as Ruiz, (2010) also indicated that pediatricians mainly carry out surgery or

angiography on infants who are candidates for angiography; however, when the child needs more specialized surgeries, pediatricians are unfamiliar with all the cardiac procedures. Therefore, the cardiologists need to be familiar with pediatric heart diseases and take necessary educational courses (16). In addition, Rejeh stated that experienced personnel of the angiography unit should have adequate training and expertise in applying non-pharmacological pain management methods for patients who are candidates for angiography (17). Hamester et al. also showed that nurses' communicative interventions, such as family guidance in the first family visit, had an important role in reducing family anxiety (18). According to some studies, the provision of appropriate care programs based on patient expectations would increase the quality of care and patients' satisfaction (19, 20). Based on data analysis, multiple work shifts have made child care a rigorous experience for staff. The results of the current study indicated that the angiography unit needs specialized equipment, especially for performing angiography on pediatric patients.

Similarly, Bellenger stated that the provision of health care standards in a health care setting would reduce the disparity in care provision, which can be performed by reorganizing the care and referral system in order to properly manage patients undergoing angiography (21). In the same vein, Sacco (2015) stated that the nursing shortage had a direct relationship with burnout of nurses. In addition, the care culture, interaction with the personnel, personnel recognition, and professional development of the personnel should be promoted in order to improve the working conditions for the authorities and managers (22).

Data analysis showed that experienced personnel should be recruited for the angiography unit due to the workload of this unit, and the specialized skills are required for conducting angiography. Additionally, it was found in this study that the working conditions of this unit required teamwork, which is in line with the findings of other studies. Stewart et al. demonstrated the necessity for planning and organizing care before the admission and during the hospitalization of patients with coronary artery diseases in order to manage resources and equipment (23). Hayman also indicated that the provision of care to patients with coronary artery disease required teamwork, and he stressed the importance of patient-centered care and the role of nurses in providing care to these patients (24).

Data analysis showed that the number of personnel in the angiography unit is very low forcing them to work overtime, and the angiography personnel needs to leave and rest after their shifts due to the presence of environmental radiation in this unit.

In addition, angiography personnel are not satisfied with their salaries. However, Gouzou et al. showed that an increase in the nurses' workload led to dissatisfaction with/degradation of care and suggested employing a sufficient number of nurses, pay nurses adequately and timely, and reduce their working shifts to increase their satisfaction (25). Similarly, Wilson-Stewart et al. suggested that all angiography unit personnel should have adequate access to appropriate radiation protection devices and receive adequate training in this regard (26).

The results of the current study indicated that the grief and suffering of parents are painful for nurses. In addition, therapeutic interventions performed in the angiography unit can be an unpleasant experience for caregivers, especially for female nurses who experience motherhood. Although all of the staff working in the angiography unit were female, no support was provided for them by the care system. The stressful environment of this unit was another factor that predisposed our participants to psychological problems. Meanwhile, the results of a study showed that managers should provide nurses with a professional environment and empower them mentally and psychologically to increase their motivation and interest (27, 28). Although health caregivers play an important role in providing care to infants, data analysis unraveled that caregivers were not supported. Therefore, future studies are suggested to focus on the development of a supportive program for personnel working in the infant angiography unit.

## Conclusion

Although the professional staff working in the pediatric angiography unit is experiencing numerous mental and psychological problems, the health system has not taken supportive measures for such personnel. System health problems, such as the shortage of male nurses and forced overtime, have worsened the situation while angiography personnel needs to leave and rest after their shifts due to environmental radiation that exists in this unit. Therefore, health authorities are recommended to take the necessary care and intervention plans to deal with such problems. Attention should also be paid to

the recruitment of sufficient numbers of staff for this unit. In addition, given the importance of this unit, it is suggested to take into account the radiation rights and the staff number of leaves. The most important limitation of this study was the low number of participants; however, generalizability is not the goal of a qualitative study. It was aimed to unravel the challenges and problems of the pediatric angiography care team.

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## Conflicts of interest

The authors have no conflict of interest.

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