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Nurse's experience of caring infants in neonatal intensive care unit

A descriptive review

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Abstract

Background: The death rate of newborns is very high. At the same time, because of the special physiological characteristics of newborns, it brings a lot of pressure to the nurses in NICU. It is of great significance to pay attention to the work experience of nurses in neonatal intensive care unit (NICU) for relieving the psychological burden of nurses and improving the quality of nursing.

Aim: To describe nurses' experience of caring infants in neonatal intensive care unit.

Design: A descriptive review of qualitative studies.

Method: Articles were searched from PubMed and CINAHL. The appropriate articles were selected and read for several times, the results were extracted, the similarities and differences were compared, then the results were synthesized.

Results: There were 10 articles included in the review. The results were divided into four themes: (1). Nurses' emotional experience during the nursing process; (2). Nurses' difficulties during the nursing process; (3). What to do; (4). Adaption and coping during the nursing process. Nurses' emotional experiences in their work can be negative and positive. The difficulties they encountered in nursing work came from their parents, from the nursing environment, and lacked of nursing skills. Based on these difficulties, they took corresponding measures.

Conclusions: Nurses in NICU had both negative and positive emotions. While taking care of the newborns, nurses also provide psychological support to the infants' parents which increased the difficulty and pressure of the work. Better cooperation in nursing team was also required. Therefore, the nurses in NICU must have seasoned knowledge, working experience to alleviate the huge work tasks, and good coping strategies must be drawn up.

Key words: Neonatal Intensive Care Units, nurses, experience

摘要：

背景：因为新生儿的死亡率很高，同时由于新生儿特殊的生理特点，给新生儿重症监护病房的护士带来了很大的压力。关注新生儿重症监护病房护士的工作经历和体验对于缓解护士的心理负担以及提高护理质量有很重大的意义。

目的：描述护士在新生儿重症监护病房护理婴儿的经验。

设计：定性研究的描述性综述。

方法：从 PubMed 和 CINAHL 中搜索文章。并选择合适的文章，多次阅读，提取结果，总结相似点和不同点，然后进行分类。

结果：最后共有 10 篇文章被纳入综述，结果中大致分为四个主题：（1）. 护士在护理过程中的情感体验；（2）. 护士在护理过程中遇到的困难；（3）. 应该做什么；（4）. 在护理过程中护士应如何适应及应对。护士在日常工作中产生的情绪包涵消极的和积极的。他们在护理工作中遇到的困难来自病人和他们的父母，护理环境，以及缺乏护理技能。基于这些困难，他们采取了相应的措施。

结论：NICU 护士存在消极和积极情绪。不但要护理新生儿，也为父母提供心理支持。增加了工作难度和压力，要求护理团队加强配合。因此护士必须具备足够的知识、工作经验，以减轻繁重的工作任务，并制定良好的应对策略。

关键词：新生儿重症监护室, 护士, 经历

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1 Introduction

1.1 Background

There were 15.23 million newborns born in China in 2018, but not all newborns can survive (National Health and Family Planning Commission of China, 2018). The mortality rate of newborn infants is extremely high. Neonates have immature functions and weak resistance (Zhang, 2017). They are more likely to suffer from serious diseases in the course of infection than adults, and susceptible to infection, so they belong to special protection groups (Yang, 2017). Newborn infants are more delicate than adults, so special nursing care and strict management mode should be adopted in the process of nursing care (Han & Wang, 2016). In view of the particularity of neonatal care, neonatal intensive care unit (NICU) have been specially established as a special intensive care unit for neonates (Yang, 2017).

1.2 Definition

1.2.1 Neonatal intensive care unit (NICU) - definition

NICU is a special ward that provided care for sick or premature infants from birth to 28 days after birth (National Association of Neonatal Nurses, 2013). Nurses working in this department need to master a series of professional skills about perinatal, prenatal and neonatal development, be able to deal with premature babies, various diseases, congenital malformations, surgery, and effectively assist in providing their family both physical and emotional support (American Nurses Association, 2003). At the same time, the environment of NICU is greatly affected by the high stress of family members, nurses' practice is based on family-centered nursing concept (American Nurses Association, 2003).

1.2.2 Nursing - definition

Nursing is protection, promotion and optimization of health and ability, the prevention of diseases and injuries, the alleviation of pain through the diagnosis and treatment of human reaction symptoms, and the advocacy of nursing care for individuals, families, communities and populations (American Nurses Association, 2003).

1.3 Vulnerability of the infants

According to the special physiological characteristics of newborns, the newborns' resistance to disease are very weak, which leads to greater fluctuations in their condition, so NICU needs a relatively aseptic environment (Yang, 2017). At the same time, newborns can't express their experience or pain in words, and crying is all they can do (Yang, 2017). These infants in NICU are at high risk of developmental retardation and disability (Gonya et al., 2018). Extreme early childbirth (defined as gestational age less than 27 weeks) are often accompanied by a wide range of medical complications, such as cerebral hemorrhage, infection, bronchopulmonary dysplasia and feeding intolerance (Gonya et al., 2018). Premature infants in NICU usually have a variety of risk factors, including jaundice, feeding problems and crying behaviors (Pearson & Boyce, 2004). Feeding problems are manifested in the fact that infants may suffer from dysphagia and refuse to feed, leading to differences in body weight, length and head circumference between the healthy full-term infants (Hill et al., 2009). As a result, newborns hospitalization time were generally more than six times longer than that of adults (Gonya et al., 2018).

1.4 The experience of the parents

Most mothers have some knowledge of feeding full-term babies, but they have insufficient knowledge of taking care of the infants in NICU (Hill, 2015). They thought that the infants in NICU are very vulnerable and are very worried about their health and nutritional status (Hill, 2015). Facing the birth of a fragile newborn means that the family will face challenges and exhaustion (Merighi et al., 2011). they can't visit their babies, but want to know about their baby, which makes parents full of anxiety (Merighi et al., 2011). Therefore, nurses in NICU not only need to take care for neonates, but also need to give the social, emotional and psychological support for the family (Vasconcelos et al, 2006).

1.5 Nursing role

Nurses play multiple roles in clinical work. They are caregivers, communicators and managers.

As caregivers, nurses need to provide physical and psychological care comprehensively and continuously for the patients (Kozier, 2012). Neonatal nurses work with doctors to decide on treatment procedures, give direct care for newborns (Hendricks-Muñoz &

Prendergast, 2007), provide support to reduce the parents' anxiety and fear, to strive to cope with parents' concerns (Gaíva & Scochi, 2005).

As communicators, nurses need to be able to communicate effectively and accurately with patients and their families in order to meet the medical and health needs of patients (Kozier, 2012).

As managers, nurses manage personal and family care, support the activities of other staff members, and monitor and evaluate their performance (Kozier, 2012). they can effectively guide the team to carry out continuous improvement of nursing work (Gaíva & Scochi, 2005).

1.6 Nursing theory

The theory of adaptability was put forward by Roy. Roy's theory including person, environment, health and nursing (Roy, 2009). Person need constantly adapt to various stimuli of the internal and external environment (Roy, 2009). The environment includes both internal and external parts of the body (Roy, 2009). Health is a successful adaptation to the environment. Failure to adapt to the environment can lead to disease (Roy, 2009). Nursing is to help people to adapt the environment (Roy, 2009).

Nurses in NICU as persons, are open system, constantly disturbed by the environment. In NICU, the sudden deterioration of the patient's condition and the negative emotions of family members may make them sad and painful. Sometimes they cannot adapt to this high-pressure environment, causing psychological harm and prompting nurses unhealthy.

1.7 Early review

Merighi et al. (2011) described how nurses provided nursing care to newborns in the presence of their parents. Caring for the newborns can not only relied on the nurses, but the parents played a very important role also. Parents needed to join in the care for the newborn and nurses needed to pay attention to the psychological care for the parents. Gonya et al. (2010) explored how maternal stress in NICU was affected by nursing structure and the network that provided care to infants. The results showed that unfamiliarity with nurses and frequent replacement of nurses would increase the pressure of mothers. Hill (2015) mainly explored the mother's perception of the vulnerability of

premature infants. The study concluded that mothers believed that hospitalization time in NICU was negatively correlated with children's vulnerability, while babies were considered more vulnerable if they had more feeding problems.

1.8 Problem Statement

Exploring the nurses' experience in NICU can improve the management and training effect of nurses in the NICU, improve the nurses' professionalism and adaptability, and reduce staff turnover. Early reviews on nurses' experience working in NICU were limited in a single aspect, such as nurses' experience about providing care for the newborn in front of their parents, while our review was not limited to a single angle, the experience of nurses in NICU would be mentioned more comprehensively. Through summarizing and analyzing of the working experience of nurses in neonatal intensive care unit, authors can understand nurses' emotional feelings and sources of stress, thus formulate a series of measures to reduce stress, improve the work enthusiasm of nurses in neonatal intensive care unit and improve the quality of nursing care.

1.9 Aim and research questions

The aim of the literature review was to describe nurses' experience of caring infants in neonatal intensive care unit with the following question:

-What experience did nurses gain from caring for infants in neonatal intensive care unit?

2 Method

2.1 Design

The descriptive review was used (Polit & Beck, 2017).

2.2 Search strategy

Literature were searched through PubMed and Cinahl databases, but there were some limitations, as shown in Table 1. Search terms were neonatal intensive care units, nurses, experience OR view OR perspective OR feelings, which were combined to use (Polit & Beck, 2017). When combining search terms, were used the Boolean term AND, and index search terms were retrieved from the headings of MeSH and Cinahl. The search limit is

limited to ten years and must be an English article. In the initial screening, seen Table 1, left 32 possible articles that can be used and matched the aim.

Table 1. Results of database searches.

Database	Limits and search date	Search terms	Number of hits	Possible articles (excluding doubles)
Medline Via PubMed	English, 2009-2019 2019.07.02	“Intensive Care Units, Neonatal” [Mesh]	6629	
Medline Via PubMed	English, 2009-2019 2019.07.02	“Nurses” [Mesh]	23220	
Medline Via PubMed	English, 2009-2019 2019.07.02	“Intensive Care Units, Neonatal” [Mesh] AND (experience OR view OR perspective OR feelings)	39	4
Medline Via CLNAHL	English, 2009-2019 2019.07.02	“Neonatal Intensive Care Units” AND nurses AND (experience OR view OR perspective OR feelings)	378	28
				Total:32

2.3 Selection criteria

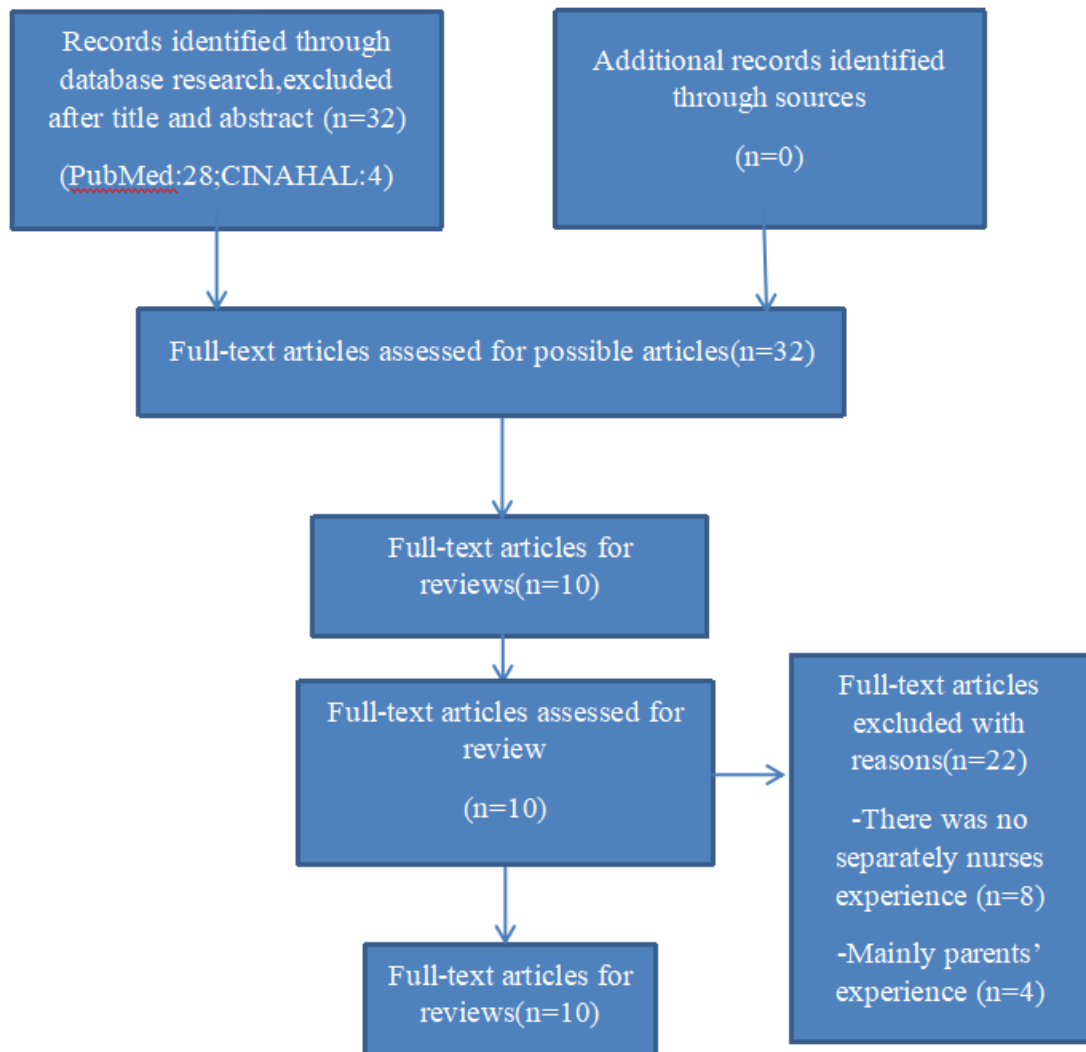
Inclusion criteria: Consistent with the aim of the study; nurses needed have experience of working in NICU or worked in NICU in the past; all articles used qualitative methods.

Exclusion criteria: Participants were only parents or doctors; the article did not mention the experience of nurses in NICU; the article was a review or a quantitative study.

2.4 Selection process and results of potential articles

After reading the title and abstract, the remaining 32 articles were included in the review which met the selection criteria. In 32 articles, the author deleted 8 articles which did not describe the experience of nurses separately, 4 articles described the experience of parents and 10 articles were quantitative study. Finally, the author identified 10 articles for this review. (see Figure1).

Figure 1. Selection process



2.5 Data analysis

The selected articles were numbered from A-J to facilitate induction (Lommi et al., 2015). The author, title, design (possibly approach), participants, data collection method, data analysis method, and codes were summarized in Appendix 1. Results section of each article were read in detail, then the result parts were summarized, and each article's refined result part were classified, similarity and difference of the results were compared and sorted into a list, finally themes and sub-themes were draw up in appendix 2.

2.6 Ethical considerations

When reading the relevant literature, we kept objective and impartial, and were not influenced by the position of other articles. The results were completely objective. At the same time, plagiarism was avoided.

3 Results

The results were drawn based on 10 articles, which were qualitative studies. The articles presented nurse's experience of caring infants in neonatal intensive care unit. The themes and sub-themes of the results were presented in table 1. Four themes were summarized as nurses' experiences of caring infants in neonatal intensive care unit: (1) Nurses' emotional experience during the nursing process; (2) Nurses' difficulties during the nursing process; (3) What to do; (4) Adaption and coping during the nursing process.

Table 1

Themes	Sub-themes
Nurses' emotional experience during the nursing process	Positive emotions
	Negative emotions
Nurses' difficulties during the nursing process	Difficulties in caring for parents
	Difficulties for nurse and care requirement
	Difficulties in caring for infant
	Adverse effects of nursing environment
What to do	Giving support to parents
Adaption and coping during the nursing process	Nurse's adaptation process and coping strategies

3.1 Nurses' emotional experience during the nursing process

3.1.1 Positive emotions

Two articles mentioned the positive emotions of nurses in caring for newborns (Gallagher et al., 2017 & Turner et al., 2014). Most of nurses described that recover of the child under their caring was a positive experience (Turner et al., 2014). Because, for nurse, it was a pleasure to be able to take care of them, and they would feel happy when they made babies back to health by their expertise (Gallagher et al., 2017). Some nurses said it was the duty to make patients happy, to help them in their fight back to health and strength, which made them feel proud (Green et al., 2014). In addition, the work was an enjoyable thing for some nurses (Gallagher et al., 2017). Some nurses said the patients were helpful to establish them, so that they can fully exerted their potential to achieve success (Green et al., 2015). Despite these challenges, nurses hold different perceptions of reality, they can cope their work by finding their work meaningful (Strandas & Fredriksen, 2014). While challenged by the children's conditions, their helplessness, and struggle for survival, nurses found strength in helping them, in making them different and in seeing infants recover and discharged (Green et al., 2015 & Green et al., 2014).

3.1.2 Negative emotions

At the same time, caring for children may have some negative emotions, which was described in five articles (Green et al., 2015 & Feeley et al., 2018 & Ford & Austin 2017 & Fernanda et al., 2018 & Green et al., 2014). The nurses reported that they felt a high level of mental tension because the work load in the NICU was heavy, requiring both treatment and nursing care (Green et al., 2014). Many nurses worked in a stressful environment where the newborns in were premature who lack of some human-recognizable physical characteristics and were not stable (Green et al., 2015 & Feeley et al., 2018). In addition, most of the nurses worried about medical errors because newborns had no verbal competence and were looked very similar (Green et al., 2015).

And the negative emotions also stemmed from the uncertainty of prognosis (Ford & Austin, 2017), they felt powerless and unexpected when treatment did not meet a good expectation. If the babies may not be able to survive, nurses would be in great sorrow (Fernanda et al., 2018 & Green et al., 2014).

3.2 Nurses' difficulties during the nursing process

3.2.1 Difficulties in caring for parents

Nurses believed that their role in the neonatal intensive care unit was challenging, and part of the challenge came from parents, which were shown in three articles (Turner et al., 2014 & Stranda & Sven-Tore., 2015 & Trajkovski et al., 2014).

The nurses reported that the parents would feel anxious because they lacked the necessary skills to care for the newborn, and the anxiety and tension would be conveyed to the nursing staff through the family members, hindered the smooth implementation of the nursing work (Turner et al., 2014).

Moreover, most family members failed to understand the work of caregivers because they lacked knowledge of the disease which was caused by ineffective communication (Trajkovski et al., 2014). Therefore many nurses described that they found it difficult to communicate with the patient's family and was scarcely able to interact with their parents (Stranda & Sven-Tore, 2015 & Turner et al., 2014).

3.2.2 Difficulties for nurse and care requirement

The difficulties nurses encountered in caring for children were reflected in these six papers (Green et al., 2015 & Turner et al., 2014 & Feeley et al., 2016 & Ford & Austin, 2017 & Stranda & Sven-Tore, 2015 & Fernanda et al., 2018).

When nurses provided care for children and their families, they also needed to provide personalized care to each family based on each family's different situation (Turner et al., 2014 & Stranda & Sven-Tore, 2015). Nurses thought it was difficult to continue to provide high-quality nursing care under high-intensity and high standard work in NICU, where was easy to cause high psychological tension and fatigue (Green et al., 2015 & Turner et al., 2014). They described that providing patients with high quality nursing and also to take into account the psychological nursing of their parents was challenging (Green et al., 2015 & Turner et al., 2014).

Furthermore, nurses reported that their work was often disturbed by the negative emotions of patients and their families (Feeley et al., 2016 & Ford & Austin, 2017).

Many nurses felt that they lacked the necessary skills to provide emotional support to their families, and that they were emotionally unprepared (Green et al., 2015 & Turner et al., 2014). This directly led to the nurses neglecting to provide emotional support to the children's families in their daily nursing work (Fernanda et al., 2018 & Green et al., 2014).

3.2.3 Difficulties in caring for infant

The particularity and importance of newborns added difficulty to nursing work was mentioned in three articles (Green et al., 2015 & Green et al., 2014 & Ford & Austin, 2017).

Nurses reported the vulnerability and particularity of newborns, the physiological function of the children were poor, it was easy to be infected with diseases which brought a lot of trouble to the nursing work (Green et al., 2015 & Green et al., 2014). And the difference in appearance and particularity made newborns were considered by the nurses to be very fragile, so it was difficult to provide body care (Green et al., 2014 & Green et al., 2015). As the infant was a special group of children, there were some problems in the process of communication due to the children's language incompetence (Green et al., 2015).

At the same time, due to the uncertain prognosis of infants, it was difficult for nurses to provide care for them. (Green et al., 2015 & Ford & Austin, 2017). Many nurses described some infants having a sense of strangeness and fear to the medical workers, and they were easy to cry. This situation made it difficult for them to concentrate while taking care of infants (Green et al., 2015).

3.2.4 Adverse effects of nursing environment

Adverse effect of environment in NICU on the growth and development of premature infants was stated in four articles (Turner et al., 2014 & Hall et al., 2010 & Feeley et al., 2016 & Ford & Austin, 2017).

Many nurses reported that due to the congenital defects of newborns, they were not adapted to the surrounding environment, and even a little stimulation may cause a strong reaction (Turner et al., 2014). The noise of treatment equipment can cause premature babies failing to recover normally (Hall et al., 2010 & Feeley et al., 2016). Too much light in the NICU can affect the growth and development of premature babies (Turner et al., 2014 & Hall et al., 2010 & Feeley et al., 2016 & Ford & Austin, 2017).

The narrow space of the neonatal intensive care unit, and the scarcity of employees was also mentioned in these two articles (Green et al., 2014 & Turner et al., 2014). The narrowness of the environment can bring a strong sense of discomfort to the newborn, delaying the premature infant's future growth and development (Hall et al., 2010). The scarce of employees made the interruption of continuity of care and the quality of nursing declined. (Green et al., 2014 & Turner et al., 2014 & Hall et al., 2010).

3.3 What to do

3.3.1 Giving support to parents

As the main support of infants' treatment, parents needed the attention and support from nurses. This view reflected in these 6 articles (Feeley et al., 2016 & Turner et al., 2014 & Trajkovskr et al., 2012 & Gallagher et al., 2017 & Strand a& Sven-Tore., 2015 & Green et al., 2014).

As parents' psychological pressure was too big, the nurse found it necessary to provide emotional support to their parents (Feeley et al., 2016 & Gallagher et al., 2017 & Trajkovskr et al., 2012).

Lacking effective communication unable the family members to cooperate with the treatment and interfere with nursing support (Stranda & Sven-Tore., 2015 & Turner et al., 2014). Many nurses thought that it was paramount to build trust with their parents (Trajkovskr et al., 2012), and communication must be based on trust and honesty (Stranda & Sven-Tore., 2015 & Trajkovskr et al., 2012). Most nurses would have more communication, participate in the discussion and activities of parents, to strengthen mutual understanding and trust (Stranda & Sven-Tore., 2015 & Turner et al., 2014).

Through the effective communication, the nurses stated that they can give disease-related knowledge to parents (Turner et al., 2014 & Green et al., 2014).

In addition, the nurses also suggested that they need to encourage parents to participate in the daily care of patients as much as possible, and to guide parents to take care of the patients and fill the gaps in the care-giving skills of new parents (Feeley et al., 2016 & Green et al., 2014).

3.4 Adaption and coping during the nursing process

Nurses had strategies for dealing with these difficulties. Three studies reported that adjustment was very important for achieving the best working efficacy (Hall et al., 2010 & Ford & Austin, 2017 & Green et al., 2014). Many nurses found that they need to identify the pressure through their own steady state of mind, and handled the pressure correctly to achieve the best working state (Green et al., 2014). So emotional status was an important index in measuring the quality of nursing care. Some nurses with long-term working experience insisted that they needed to develop their own skills and framework to deal with the negative emotions that came from these very early babies (Ford & Austin, 2017 & Green et al., 2014).

Strengthen the training of nurses' professional ability and nurses in emotional support skills were mentioned in three articles (Ford & Austin, 2017 & Gallagher et al., 2017 & Trajkovski et al., 2012). Some nurses reduced the pressure on new technology through constant learning and training, understand cutting-edge nursing knowledge, so that their nursing skills can continue to develop (Gallagher et al., 2017). Nurses who had learned emotional support were better able to talk to their parents (Ford & Austin, 2017 & Gallagher et al., 2017 & Trajkovski et al., 2012).

In addition, nurses advanced some advice to progress the humanized management (Hall et al., 2010). They mentioned the particularity of premature infants and need special sensitivity and concentration (Feeley et al., 2016 & Green et al., 2014 & Hall et al., 2010 & Stranda & Sven-Tore, 2015). So that nursing workers should keep quiet and operate, reduced the stimulation to premature infants (Hall et al., 2010).

3.5 The chosen articles information

These ten articles were from seven countries: Australia (Trajkovski et al., 2010; Green et al., 2015; Green et al., 2014), Brazil (Fernanda et al., 2018), Canada (Feeley et al., 2016), Denmark (Hall et al., 2010), Norway (Stranda & Sven-Tore et al., 2015), Sydney (Turner et al., 2014), Vietnam (Ford & Austin et al., 2017; Gallagher et al., 2017).

In nine of the articles, the participants were only nurses (Trajkovski et al., 2010; Green et al., 2015; Green et al., 2014; Fernanda et al., 2018; Feeley et al., 2016; Hall et al., 2010;

Stranda & Sven-Tore et al., 2015; Turner et al., 2014; Ford & Austin et al., 2017). In one of the articles, the participants were nurses and parents (Gallagher et al., 2017).

All of articles, used descriptive design (Trajkovski et al., 2010; Green et al., 2015; Green et al., 2014; Fernanda et al., 2018; Feeley et al., 2016; Hall et al., 2010; Stranda & Sven-Tore et al., 2015; Turner et al., 2014; Ford & Austin et al., 2017; Gallagher et al., 2017).

In nine of the articles, the semi-structured interviews guide with questions were used (Trajkovski et al., 2010; Green et al., 2015; Green et al., 2014; Fernanda et al., 2018; Feeley et al., 2016; Stranda & Sven-Tore et al., 2015; Turner et al., 2014; Ford & Austin, et al., 2017; Gallagher et al., 2017). And the one remaining article didn't mention which type of interview they used (Hall et al., 2010).

In all of the chosen articles, the interviews were recorded and transcribed verbatim (Trajkovski et al., 2010; Green et al., 2015; Green et al., 2014; Fernanda et al., 2018; Feeley et al., 2016; Hall et al., 2010; Stranda & Sven-Tore et al., 2015; Turner et al., 2014; Ford & Austin et al., 2017; Gallagher et al., 2017).

In two of the chosen articles, the articles didn't mention the age or gender of the interviewees (Green et al., 2014; Gallagher et al., 2017). The remaining eight papers included the age, gender, number and work years of the interviewees (Trajkovski et al., 2010; Green et al., 2015; Fernanda et al., 2018; Feeley et al., 2016; Hall et al., 2010; Stranda & Sven-Tore et al., 2015; Turner et al., 2014; Ford & Austin et al., 2017).

4 Discussion

4.1 Main results

The aim of this article was to describe the experience of nurses in the neonatal intensive care unit. The results were emerged into four themes: (1). Nurses' emotional experience during the nursing process; (2). Nurses' difficulties during the nursing process; (3). What to do; (4). Adaption and coping during the nursing process. Emotions by nurses in their work can be negative and positive. The difficulties they encountered in nursing work came from patients and their parents, the nursing environment, and lack of nursing skills. Based on these difficulties, they took corresponding measures.

4.2 Results discussion

4.2.1 The importance of regulating emotions

Nursing a baby could have some psychological effects on nurses. They felt unexpected, powerless, fear, worried, sad and other negative feelings (Green et al., 2015 & Feeley et al., 2018 & Ford & Austin, 2017 & Fernanda et al., 2018 & Green et al., 2014). This was in line with the result in Vaismoradi (2011), as it mentioned that the negative emotions stemmed from the uncertainty of prognosis could prompt feelings of frustration, anger, agitation and fear in nurses. This review reported that neonatal nurses felt hard to manage their own mood (Green et al., 2016). Similar result can be found in Hale & Levy (1982) study. They acknowledged that dealing with the negative emotions associated with caring for a baby and their parents could be stressful for them.

Most nurses stressed that they had to develop their own emotional coping framework and special way to help them endure the negative emotions brought by work (Green et al., 2016). Similar result can be found in Jansen et al., (2011), they advocated nurses to face their emotions and replace negative thoughts with humor such as "joking".

The goal of emotional stability could be achieved through optimism therapy which elucidated by Jansen (2011), while remaining optimistic, the nurses showed an understanding of the patient's prognosis. Nurses should maintain an optimistic attitude in their nursing work, because sometimes they may often face situations that made them pessimistic rather than optimistic (Jansen et al., 2011).

Hence, in Roy's adaptation theory, people needed to accept the stimulation brought by the environment, and the pressure from the newborn's poor prognosis was generated in NICU (Roy, 2009). If nurses can't adapt to this kind high pressure environment, it would have a great impact on the psychological and physiological status of nursing staff, and at the same time, it would affect the quality of nursing care. Therefore, it was more necessary to pay attention to the psychological and emotional changes of nurses in NICU, so as to facilitate the better regulation of nurses' emotions, to better fulfill the nursing work.

4.2.2 The need for effective communication

Working in NICU was a challenging with the demands of taking care of the infant and providing family-centred care, this included need of communication with parents (Stranda & Sven-Tore., 2015 & Trajkovskr et al., 2012 & Turner et al., 2014 & Green et al.,2014). Similar result can be founded in Cone et al., (2007) study, parents want to know as much as they can about their babies. But communicating with a nurse in a busy NICU was neither easy nor intuitive (Hall et al., 2010). This was in line with the result in Lupton (2001). Direct and clear communication with nurses enabled parents to know their child.

The nurses said they must made parents feel included and recognized when nurses' and parents' collide in some way (Strandas & Fredriksen, 2015). In situations where parents did not understand or agree with a certain measure of care, the nurses also found it difficult to carry out nursing work normally (Hall et al., 2010). Similar result can be found in Fegran et al., (2006). Effectively communicated with parents by listening to parents was an important duty of nurses.

In order to better communicate with parents, nurses should include informal chats as well as more formal discussions and emphasis the impact of emotions on parental communication (Jones et al., 2007). Communication needed to be directly and clearly with parents to avoid confusion (Cegala et al., 1995). At the same time, a nurse's politeness and respect and together with treating them as equals can also increase parent satisfaction (Fenwick et al., 2001).

In Roy's adaptation theory, the stimulation received by parents was the newborn was in NICU, and they were fear and anxious (Roy, 2009). Therefore, nurses must provide emotional support, effective communication can make parents trust nursing staff more and relieve tension.

4.2.3 The importance of nursing skills

Working in NICU was demanding and burdensome, it required nursing staff to have the high level of the nursing skills (Green et al., 2015 & Turner et al., 2014). It was in line with the result in the study of Morelius & Anderson (2015). They believed that to become neonatal intensive care nurses, even if they had fully grasped the general expertise, it would also need a lot of time to train. Therefore, nurses should increase their skills in training by

increasing their knowledge, impacting on practice and improving infant care (Gallagher et al., 2017). Similar result can be founded in Benner et al. (1982), to become an expert intensive care unit nurse, nurses need to spend more time to update knowledge.

Nurses viewed their role in requiring seniority, training and experience (Ford & Austin, 2017& Gallagher et al., 2017 & Trajkovskr et al., 2012). Nursing skills' education and training were also considered to be factors that affected the ability of nurses to provide support (Turner et al.,2014). Similar result can be found in Green et al., (2006), they reported that knowledge and skills training can enhance the capabilities of medical personnel.

In order to change the practice effect, teaching and learning were needed to be maintained over a sustained period of time to ensure clinical quality (Thukral et al., 2015). Evaluation of the nurse 's personal knowledge reserve was essential to ensure that an appropriate teaching plan was developed for the individual (Shrestha et al., 2013).

In Roy's adaptation theory, the nurses in NICU needed to adapt to the external environment (Roy, 2009). The work in NICU required nurses to have solid theoretical knowledge and superb clinical operation technology.In order to adapt to the working environment in NICU, the nurses must constantly improve their theoretical knowledge and operating skills to adapt to their high-pressure working environment.

4.2.4 The uncertainly of children's prognosis

The uncertainty was related to caring for premature babies. Nurses reported that the vulnerability and particularity of the newborns, the poor physiological function which made them easy to be infected with diseases, brought a lot of uncertainly to the nursing work (Green et al., 2015 & Green et al., 2014), it was consistent with the study of McHaffie & Fowlie (1996), which found that tolerance of the grayness of uncertainty was hard for some neonatal staff members. Uncertainty about prognosis and results may confuse nurses' treatment and bring frustration to nurses (Green et al.,2015). This was in line with the result in Hale and Levy (1982), as it mentioned that care for children with uncertainty may put pressure on nurses.

Nurses were the primary caregivers for the baby and the parents. They were not only need to deal with their own uncertainty, but also required them to help the parents of the child

to manage the uncertainty about their baby (Green et al.,2015). Similar result can be found in Vaismoradi (2011), they reported that uncertainty was ubiquitous in clinical nursing practice.

Hoping promoting strategies was considered to be a dynamic inner-power, enabled transcendence of the current situation and fosters positive new ways of awareness and being (Turner& Stokes 2006). Nurses recognized that parental hope was made possible through the development of a trusting relationship between the nurses and parents (Turner & Stokes 2006).

In Roy's adaptation theory, parents needed to adapt to all kinds of stimuli (Roy, 2009). The poor prognosis of infants may lead the change of parents' psychology, and excessive sadness would affect parents' health. Therefore, the nurse must inform the parents of the uncertainty of prognosis during the treatment, so gave the parents a period of time to adapt to prevent sudden changes in the condition.

4.2.5 The influence of NICU environment

There were many aspects of this critical care environment that pose challenges to closeness, this included noise, ward design, lack of privacy and other aspects (Turner et al., 2014 & Hall et al., 2010 & Feeley et al., 2016 & Ford & Austin, 2017). This was in line with the result in Heinemann (2013) & Wigert (2008), noise and lack of privacy were environmental factors that affect parents' and infants' experience in NICU. What's more, nurse believed that even the smallest babies have personalities and that normalizing the environment in NICU was important to them (Green et al., 2015). Similar results can be founded in study by Browne et al. (2006). The physical structure of the NICU can greatly impact on the function of the NICU and the emotions of the staff and parents who used it.

Nurses had a vital role to play in controlling noise and provided privacy to support closeness (Feeley et al., 2016). Nurses pointed to care practices that could control aspects of the environment and in turn the closeness of parents and their babies in the NICU (Turner et al., 2014). Similar results can be founded in wigert et al. (2008), nursing intervention that supports closeness was imperative.

To achieve the goal of nurses in NICU, nurses should help parents to feel relaxed and welcome into the unit as a participant in their baby's care (Feeley et al., 2012 & White et

al., 2013 & Flacking et al., 2014 & Browne et al., 2006). Meanwhile, the needed for privacy of infants and families should be addressed not only in the overall unit design, but also in the design of each bed space, for example, by minimizing traffic flow past each bed (White et al., 2013 & Flacking et al., 2014).

In Roy's adaptation theory, patients and newborns needed to receive stimulation from environment in NICU (Roy, 2009). That was to say, nurses need to improve the environment of NICU and provide parents' care for the newborn to provide a familiar and reassuring environment for patients and newborns, which was conducive to the recovery of newborns and the comfort of parents.

4.2.6 Giving support to parents

Nursing staffs described many problematic staffing issues, this included the range of skills of caregivers (Turner et al., 2014). This was in line with the result in Wigert (2006). The training and experience of the staff and the nurse's personal ability to establish emotional relationships with parents were factors that affect the nurse's ability to provide emotional care to babies and their families. Hence, more and more nurses realized that providing emotional care for parents was important that requires a lot of experience (Turner et al., 2014). Similar result can be found in Pannacciulli (2012), they reported that providing this emotional support to parents was a challenge for many nurses.

However, the reason why nurses thought provide emotional support as a challenge was lack of supportive education and training (Turner et al., 2014). Parents' desired for more support from nurses also reflected the importance of providing support (Gallagher et al., 2017). This finding was similar with the study by Pannacciulli (2012), they thought providing emotional support was viewed as enhancing closeness.

For nurses who may not be able to provide emotional support directly, we can provide a booklet about their babies that recorded information, so parents can recall the information, and it also useful for some nurses who were inexperienced and need to convey complex information (Koh et al., 2007).

In Roy's adaptation theory, the stimulation received to parents was the newborn in NICU, and they would fear (Roy, 2009). Therefore, nurses must to provide emotional support,

reduce the adverse stimulation of the external environment, and reduce the pressure of parents.

4.2.7 Adaption and coping

For nurses, difficulties were persisted. In long-term clinical work, nurses had different coping strategies based on different difficulties.

For the problem of negative emotions in NICU, some nurses with long-term experienced insisted that nurses needed to develop their own skills and frameworks to deal with (Ford & Austin, 2017 & Green et al., 2014). This finding was similar with the study by Jasen et al (2011). They showed that in order to have optimally work, neonatal nurses needed to develop their own techniques and methods to endure the environment in NICU. Nurses used humor to help them to provide care for some very precocious babies (Green et al., 2014).

Lack of personal expertise, some nurses reduced the pressure through studying new technology and constantly receiving training, so that their nursing skills can continue to grow and develop (Gallagher et al., 2017 & Ford & Austin, 2017 & Trajkovskr et al., 2012). Consistent with the study of Martinez et al (2012), this study founded that nurses with training can better provide neonatal care. Nurses had increased their pride in training by increasing their knowledge, impacting on practice and improving infant care (Gallagher et al., 2017).

In addition, nursing staffs made recommendations for humanized care. Based on the particularity of infants, nurses needed special sensitivity and attention to keep quiet in the nursing work and reduced the stimulation to the newborns (Feley et al., 2016 & Green et al., 2014 & Hall et al., 2010 & Stranda & Sven-Tore, 2015). It was in line with the results in the study of Fegran (2006). Nurses committed to ensure infants adequate rest and minimized sensory impressions such as pain, noise and light. Therefore, nursing workers should keep quiet and operative, reduced the stimulation to premature infants (Hall et al., 2010)

In Roy's adaptation theory, nurses needed to adapt all kinds of stimulation and adapt working environment (Roy, 2009). Nursing newborns may feel sad and incompetent, so it

was necessary for the nurses to adjust their mentality and improve their nursing level, so as to maintain their mental health and enough nursing ability to work.

4.3 Method discussion

First of all, the review had some advantages. First, the articles cited were published within 10 years, which was more closely to the current work status of nurses (Polit & Beck, 2017). Secondly, the inclusion criteria were strict, and the articles were all related to the aim (Polit & Beck, 2017). Third, the selected articles from different perspectives of nurses' work, covering nurses' emotional experience, working experience, what nurses to do, and how to deal, so as to enrich the results (Polit & Beck, 2017).

Then, the review also had its disadvantages. First, the cited articles that were searched through PubMed and CINAHL databases, may not fully represent the nurses' experience in NICU (Polit & Beck, 2017). Second, the search restricts were must the English articles, may ignore some articles in different languages that fit the aim (Polit & Beck, 2017). Third, this article was mainly from the perspective of nurses and did not focus on the experiences of parents and doctors in the NICU, so it may not be comprehensive (Polit & Beck, 2017).

4.4 Clinical implication for nursing

The results of this literature review summarized the experiences of nurses worked in the intensive care unit (NICU). These four topics were roughly divided into four parts: nurses' emotional experience during the nursing process; Nurses' difficulties during the nursing process; What to do; Adaption and coping during the nursing process. By summing up the experience of these four parts, authors can provide coping methods for nurses who lacked experience or cannot adapt to the working environment in the NICU, which would help nurses better adapt to the working environment and improve the quality of work. This affected not only the patients, but also the family of the child. Understanding the adverse effects that lack of experience can have on children and their families can help nurses better understand their parents' experiences and how to support them, which may ultimately affect children's mortality and morbidity.

4.5 Suggestions for further research

Most of the interviewees were women. However, there were some male nurses in NICU. Future research can have more male nurses, which may enrich the results. At the same time, the interviewees were only nurses, in the future research, doctors' and patients' family's views in NICU should be further explored, so that the results may be more objective and have substantial content. Finally, the interviews of existing article were only once, and the number of interviews can be increased in the future, and different result may be drawn by interviewing them in different periods of working years.

5 Conclusions

Nurses in NICU had both negative and positive emotions. While taking care of the newborns, nurses also provide psychological support to the infants' parents which increased the difficulty and pressure of the work. Better cooperation in nursing team was also required. Therefore, the nurses in NICU must have seasoned knowledge, working experience to alleviate the huge work tasks, and good coping strategies must be drawn up.

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APPENDIX 1

Themes	Sub-themes	Study findings
Nurses' experiences of the emotions during the nursing process	Negative emotions	E1. Anxiety E3. Disappointing B1. Grief A6. Feel guilt B2. Imagined themselves in the same situation F1. Feeling shocked C1. Feeling powerless, hopeless and guilty C5. Feeling sad and uneasy
	Positive emotions	J1. Enjoyable and rewarding D2. Stastify D1. Sense of pride G5. Joy
Nurses' experiences of difficulties during the nursing process	Difficulties in caring for parents	J7. Lack of parent engagement J8. Have language and cultural barriers with parents G2. The nurse can interpret the body language between the parents and the child. H1. Lack of understandings

	<p>Difficulties for nurse and care requirement</p>	<p>J5. Lack of time .(G3) J6. Limitation with physical space B4. Lack of necessary skills E2. Can't certain the patients prognosis C4. Nurses are more vulnerable H6. Patient situations have impact on nurses</p>
	<p>Difficulties in caring for infant</p>	<p>D7. Incapable of infants suffering from illness D8. Inform parents that their babies died F2. Baby's vulnerable and fragile F3. The practical care difficulties and challenges</p>
	<p>Difficulties in nursing environment</p>	<p>J4. Need positive environment . G4. The environment was important. A5. Need quiet environment G5. Teamwork was very helpful B3. Providing humane care</p>
<p>What to do</p>	<p>For parents</p>	<p>J2. Give individualized support for each parent J3. Encouraged and guidance for parents in caring for their baby (h2, i3) A2. Promoting and respecting parent's role A3. Encouraged parents have physical contact with their infant(d6,i3) A4. Providing emotional support(d3,h4)</p>

		<p>G1. Attentive to the infant and the mother—infant dyad</p> <p>A1. Facilitate parent-infant closeness(h5)</p> <p>I2. Develop and build trusting</p>
Adaption and coping	For nurses	<p>F4. Do not face emotions directly</p> <p>D4. More intimate and interactive after training</p> <p>D5. The knowledge of nurses make them more confident</p> <p>C2. Experience and time acted as a source of guidance</p> <p>C3. Follow nurse conscience</p> <p>H5. Developed good coping strategies</p> <p>H7. Requires particular sensitivity and attentiveness</p>

APPENDIX 2

Authors	Title	Design and approach	Sample	Data collection method	Method of data analysis
Feeley N. Genest C. Niela-Vilén H. Charbonne L. Axelin A. Year of publication: 2016 Country: Canada	Parents and nurses balancing parent-infant closeness and separation: a qualitative study of NICU nurses' perceptions	A descriptive design with a qualitative approach	Number:37 Age: in Canada were 28.4 years on average, in Finland were 38.7 (SD = 11.4) years old Gender: All female Worked years in NICU: majority more than one year	Individual semi-structured in-depth interviews with open-ended questions. Length of interview: 60 to 90 minutes. The interviews were recorded and transcribed.	thematic analysis (Vaismoradi M, Turunen H, Bondas T.,2013)
Fernanda D.C. D. O. Cleveland L.M. Darilek U. Borges Silva A.R. & Carmona, E.V. 2018+Brazil Year of publication: 2018 Country: Brazil	Brazilian Neonatal Nurses' Palliative Care Experiences	A descriptive study with a qualitative approach	Number:9 Age:34 to 57 years old Gender: Two were male and 7 were female Worked years on average: No information Worked years in NICU: 18 months to 20 years	Semi-structured inter views Length of interview: 60 to 90 minutes interview was audio- recorded	Thematic analysis (Boyatzis' 1998)
Ford N.J. Austin W. Year of publication: 2017 Country: Vietnam	Conflicts of conscience in the neonatal intensive care unit: Perspectives of Alberta	A descriptive design with a qualitative approach	Number:5. Age:27~53. Gender: female. average years of work on neonatal intensive care unit:2.5~32 years of neonatal nursing experience and 7~32 years	Length of interview: 30– 60 min semi-structured interview interviews were audio- recorded and transcribed verbatim.	Constant comparative; grounded-theory.

			of registered nurse experience.		
Gallagher K. Partridge C. Hoang T. Macrae D. lubran S. Year of publication: 2017 Country: Vietnam	Nursing & parental perceptions of neonatal care in Central Vietnam: a longitudinal qualitative study	A study with a qualitative approach.	Number:26 average years of work on neonatal intensive care unit:2 to 30 years	Length of interview: 20 min Semi-structured interview	manifest content (Kondraki NL 2002)
Green J. Darbyshire D. Adams A. Jackson D. Year of publication: 2014 Country:sydney	Looking like a proper baby: nurses' experiences of caring for extremely premature infants	Qualitative approach	Number : 24 average years of work on neonatal intensive care unit :5 years had undergone treatment for PPD.	semi-structured interviews Length of interview: 60-120 mins. The interviews were recorded and transcribed.	Content analysis (Elo et al., 2014).
Green J. Darbyshire P. Adams A. Jackson D. Year of publication: 2015 Country: Australia	Balancing hope with reality: how neonatal nurses management the uncertainty of caring for extremely premature babies	Qualitative approach	Number:12 Age:34 to 52 years old Gender:no information Worked years in NICU: 10–28 years Worked years with caring for extremely premature babies:at least eight years	semi-structured interviews interviews Length of interview: 60–90 minutes Recorded using audio tape	phenomenological approach (Van Manen's 1990)

Hall E.O.C. Kronborg H. Aagaard H. Ammentorp J. Year of publication: 2010 Country: Denmark	Walking the line between the possible and the ideal: Lived experiences of neonatal nurses	A descriptive study with qualitative approach.	Number:7 Age:from 27 to 52 (median 38) years old, Gender:all women Worked years on average:1 to 25 (median 12) years. Worked years in NICU: No information	interview Length of interview: 60 minutes Recorded with tape-recorded	Phenomenologic - hermeneutic approach (Van Manen, 1990)
Stranda M. Sven-Tore D. Year of publication: 2015 Country: Norway	Ethical challenges in neonatal intensive care nursing	Qualitative approach.	Number:6. Age:42 ~ 54. Gender:female. average years of work on neonatal intensive care unit: 6 to 23 years.	Length of interview:lasting 35–60 min. semi-structured interview taped transcribed verbatim.	Phenomenological-hermeneutic analysis (kvale &Brinkmann 2009)
Trajkovski S, Schmied V, Vickers M Jackson D. Year of publication: 2012 Country:Australia	Neonatal nurses' perspectives of family-centred care: a qualitative study	A descriptive design A qualitative approach	Number:33 Age:25~64years Gender:women average years of work on neonatal intensive care unit :ranged from first year postgraduate nurses to senior experienced nurses with more than 15 years of service in this particular neonatal unit	Length of interview:lasting 35–60 min. semi-structured interview taped transcribed verbatim.	Narrative analysis and constant comparison approach.
Turner M. Chur-Hansen A.	The neonatal nurses' view of their role in emotional support of	A descriptive exploratory design	Number:9 Age:between 32–58 years old	Semi-structured interviews Length of interview:	NVIVO version 10 (QSR, Bur

Winefield H.	parents and its		Gender:all women	45–70 minutes	lington, MA, USA)
Year of publication: 2014	complexities		Worked years on		
		A qualitative approach	average:No information	Interviewed were	
Country:Australia			Worked years in NICU:	transcribed verbatim	
			No information		

APPENDIX 3

<p>Author(s) +year/country of publication</p>	<p>Aim</p>	<p>Results</p>	<p>Codes</p>
<p>Feeley N. Genest C. Niela-Vilén H. Charbonne L Axelin A. 2016+Canada</p>	<p>explore from nurses' perspective, what do parents and nurses do to promote parent-infant closeness or provoke separation.</p>	<p>A1. Facilitate parent-infant closeness A2. Promoting and respecting parent's role A3. Encouraged parents have physical contact with their infant A4. Providing emotional support A5. Need quiet environment A6. Feel guilt</p>	<p>A</p>
<p>Fernanda D.C.D.O. Cleveland L.M. Darilek U. Borges Silva A.R. & Carmona, E.V.</p>	<p>explore the palliative care (PC) experiences of Brazilian NICU nurses.</p>	<p>B1. Grief B2. Imagined themselves in the same situation B3. Providing humane care B4. Feeling unprepared</p>	<p>B</p>

2018+Brazil			
Ford N.J. Austin W. 2017+Vietnam	To explore the individual experiences of a conflict of conscience for neonatal nurses in Alberta.	C1. Feeling powerless, hopeless, and guilty C2. Experience and time acted as a source of guidance C3. Follow nurse conscience C4. Nurses are more vulnerable C5. Feeling sad and uneasy	C
Gallagher K. Partridge C. Hoang T. Macrae D. lubran S. 2017+Vietnam.	The aim of this study was to explore changes in the perceptions and attitudes of nurses and parents towards their experiences in the neonatal unit following a neonatal nursing education intervention in a single neonatal unit in central Vietnam.	D1. More intimate and interactive after training D2. The knowledge of nurses let them more confident D3. Instruct parents how to support us D4. Sympathize with the patient parents D5. Encourage parents D6. Upset and awkward when nurse could not save babies' lives D7. Inform parents that their babies died is the biggest challenge	D
Green J. Darbyshire P. Adams A. Jackson D.	Explore the ways in which neonatal nurses manage the uncertainty associated with the treatment and outcomes of	E1. Anxious E2. Infant prognosis was unpredictable E3. Disappointing	E

2015+Australia	extremely premature babies.		
Green J. Darbyshire D. Adams A. Jackson D. 2014+Sydney	To explore the ways in which neonatal nurses draw meaning and deal with the challenges associated with caring for extremely premature babies.	F1. Feel shocked F2. Vulnerable and fragile F3. The practical care difficulties and challenges F4. Don't face emotions directly	F
Hall E.O.C. Kronborg H. Aagaard H. Ammentorp J. 2010+ Denmark	To investigate the lived experiences of neonatal nurses.	G1. Attention to the infant and the mother—infant dyad. G2. The nurse can interpret the body language between the parents and the child G3. Lack of time. G4. The environment was important. G5. Teamwork was very helpful G6. Joy G7. Grief	G
Stranda M. Sven-Tore D. 2015+Norway	The purpose of this study is to investigate which types of ethical challenges neonatal nurses experience in their day-to-day care for critically ill newborns.	H1. Interact with parents is as rewarding as well as challenging. H2. Understand the parents' situation H3. Communicating clearly and honestly H4. Evaluate the parents' emotional condition H5. Developed good coping strategies H6. Patient situations have impact on nurses. H7. Requires particular sensitivity and attentiveness	H

Trajkovski S, Schmied V, Vickers M and Jackson D. 2012+ Australia	The aim of this study is to explore neonatal nurses' perspectives of their role in facilitating family centred care in the neonatal intensive care unit.	I1. Deliver care that is individual I2. Develop and build trusting I3. Provide encouragement and support I4. Not adequately trained I5. Share information and guide families I6. More experienced and confident are better to talk	I
Turner M. Chur-Hansen A. Winefield H. 2014+Australia	To explore the nurses' views of their role both in the neonatal intensive care unit and in the provision of interacting with, and emotionally supporting of the families.	J1. Enjoyable and rewarding J2. Challenging J3. Give individual support for each parent J4. Encouraged and guidance for parents in caring for their baby J5. Need positive environment. J6. Lack of time. J7. Limitation with physical space. J8. Lack of parent engagement J9. Have language and cultural barriers with parents J10. Requiring training, experience and seniority.	J