

Neonatal Resuscitation Preparedness Among Healthcare Provider: A Systematic Review

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Abstract

Neonatal asphyxia is a form of gravity that occurs in neonates. It is a condition when the baby cannot breathe spontaneously and regularly after birth. The management of neonatal resuscitation is carried out by the health team. It is provided by nurses, midwives, and physicians. To identify the evidence of health team readiness in administering neonatal emergencies is useful to succeed neonatal resuscitation. The selection was conducted by following PRISMA flow diagram. It was also criticized by JBI tool. The search keywords were "Readiness Factor" and "Neonatal Resuscitation". The steps consisted of making questions, identifying, eligibility, article inclusion selection, screening, and appraisal. After 11 relevant articles were collected, they were analyzed in a systematic review. The finding shows that readiness in carrying out neonatal resuscitation requires preparation from both the health team that administers these actions. It consists of six dimensions. These dimensions are knowledge, clinical skills, self-efficacy, handling algorithms, facilities, and medicine. They are interrelated with one another towards a successful neonatal resuscitation.

Keyword: Readiness Factor, Neonatal Resuscitation.



A. INTRODUCTION

Newborn infant (neonates) is a 0-28-day-old infant born at 37-40 weeks gestational age and is 2500-4000 gram weight (Budiwardhana, 2011). Neonates are individuals who adjust themselves from intrauterine life to extra uterine life. Therefore, there are some newborns can normally adapt. There are several conditions of neonates that may fall within emergency conditions. Infant Mortality Rate (IMR) is the number of infant deaths (0-12 months) per 1.000 live births in one year (Gilang et al., 2010). Neonatal asphyxia has contributed significantly to morbidity and mortality. Asphyxia is a condition that is defined as the inability of the newborn to start and maintain adequate respiration after birth (Alemu et al., 2019). The risky factors of neonatal asphyxia are maternal, placental, fetal, and labor factors (*Manuaba 2007.Pdf*, n.d.). Asphyxia condition is a condition that is correlated to circulatory problems caused by various factors that will lead to permanent damage to the central nervous system or other vital organs that may fall on gravity conditions.

Neonatal resuscitation is an event with high complexity for the concerning and responsible team to administer appropriate resuscitation for the newborns (Gamboa et al., 2018). Neonatal resuscitation administrations involve a nurse, midwife, and doctor. The nurses and health workers should ideally have the readiness to handle such cases (Abrha et al., 2019). Handling during neonatal

resuscitation requires speed and accuracy to take action. Thus, it requires necessary skills such as cognitive, psychomotor, and excellent communication to identify problems and analyze complex cases. Through this systematic review, the author expects to find out more about the contributive factors to the readiness of nurses in neonatal resuscitation treatment.

B. METHOD

This systematic review steps determined the research question in PICO method. The sample selection consists of nurses who handle neonatal resuscitation. The researchers collected by identifying, screening, selecting eligible articles, and determining the articles based on the inclusion criteria. They must follow PICO method and are written in English. The applied databases were *Proquest*, *Pubmed*, *Ebscohost*, and *Science Direct*.

The research question in this review section, "what factors influence readiness to administer neonatal resuscitation?". The process of literature search and selection are depicted in (figure 1). The searches were on four databases: *Proquest*, *Pubmed*, *Ebscohost*, and *Science Direct* by keyword "nursing readiness" and "neonatal resuscitation" from 2015-2019. They were taken through an integration which used the word "and".

C. RESULT AND DISCUSSION

There were 2,462 articles from Science Direct, 2,619 articles from Pubmed, 4,665 articles from Ebscohost, and 2,519 articles from Proquest. These results were combined by "and" and resulted in 242 items from Science Direct, 4 items from PubMed, 14 articles from Ebscohost, and 36 articles from Proquest. Based on the inclusion criteria, 11 final articles were obtained from all databases. The appraisal stage is to assess the existing 11 items. At this stage, the author summarized the article and evaluated it by using JBI tool on each item according to the method. The assessment results are shown in Figure 1.

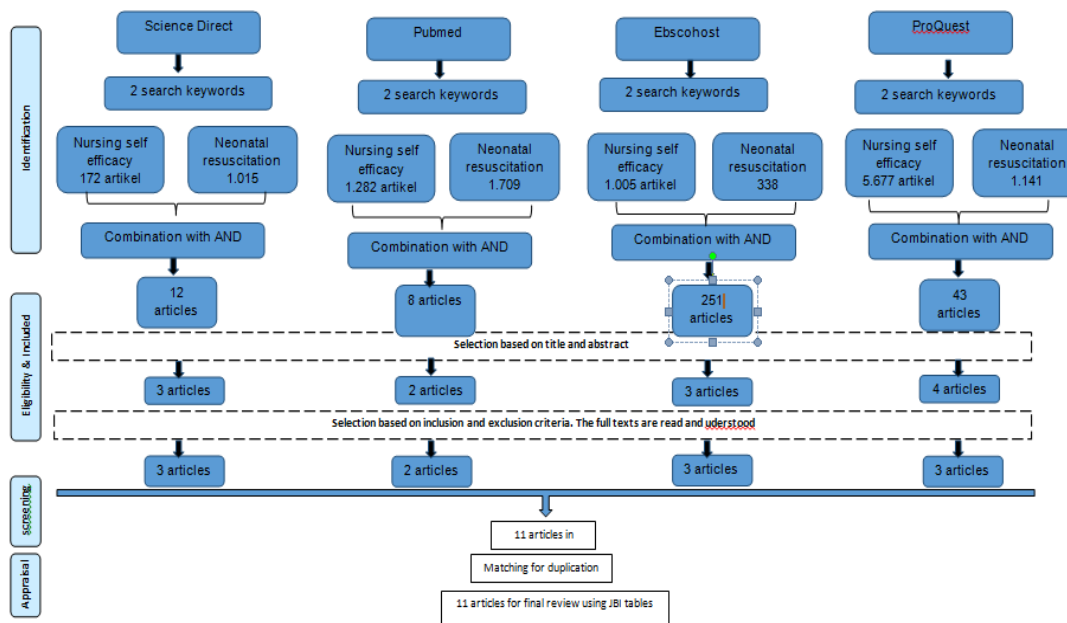


Figure 1. Framework Search Process of the Article Selection based on the Modified PRISMA

Table 1. Eligible Articles to be Reviewed

No	Author& year	Objectives	Methods	Sample	Data Analysis	Major Findings
1	(Trevisan uto et al., 2015)	To examine the effectiveness of the adaptation program in neonatal resuscitation program of Nursing Resuscitation Program (NRP) on the performance of health care providers through simulation video recording.	Analytical observational	100 neonates require neonatal resuscitation, 77 and 32 using the BVM	fisheries and Mann-Whitney test.	The results showed that an increase in clinical performance after simulation with video recording was useful for an objective assessment of the performance of the staff during resuscitation.
2	(Khalid et al., 2015)	To assess the knowledge of health workers that midwives are working in primary health care facilities for the handling of the early neonatal	Cross-sectional study	103 health workers and 54 is 49 is a midwife.	SPSS 16 to analyze the statistical analysis.	They are needed for training in regular service of health workers and midwives on women's health Basic

		resuscitation.				neonatal resuscitation.
3	(Shikuku et al., 2017)	This study aims to examine the quality of service during <i>neonatal Resuscitation</i>	Analytical observational	8 newborns with neonatal resuscitation. and 28 health workers	SPSS was used to analyze the statistical analysis	The critical steps in the treatment of neonatal resuscitation require a period that needs to be taken into account to improve the quality of work and ensure that safe to do.
4	(Bintabara et al., 2019)	To assess the availability and readiness of health facilities in essential services and emergency obstetric and newborn care and related factors.	Cross-sectional study	Used a nationally representative sample of Tanzania as an example of low-resource settings with a high burden of maternal and newborn.	Using seven sizes based on the provision of antibiotics.	Readiness is a variable that is measured by the availability of supporting items that are categorized into three domains: staff training, diagnostic equipment, and essential drugs.
5	(Cordero, 2013)	To evaluate the procedural skills and team performance of occupants uses pediatrics during neonatal resuscitation.	Analytical observational	Twenty-six respondents	Wilcoxon Test and McNemar x2 Test	Twenty-six residents (11 teams) completed two sessions in pairs. detected by simulation training; can increase respondents report increased confidence after the simulation with a mannequin.
6	(Healthstream et al.,	To determine whether	Cross-sectional	3,804 health care	SPSS version 21.	Training based neonatal

	2015)	professional knowledge about resuscitation fatal health and the factors that influence it.	study	providers		resuscitation should be conducted with simulation methods to provide knowledge and preparation during the learning process
7	(Jukkala & Henly, 2007)	To describe the development of instruments among knowledge of neonatal resuscitation, frequency performance with neonatal resuscitation skills, and self-reported comfort level to perform neonatal resuscitation.	Descriptive, correlational	37 to 860 hospitals with 1,257 births, while the other has 3,693 births.	Pearson correlation and T-test.	Knowledge on neonatal resuscitation, performance skills that often, and comfort level with the performance skills are the dimensions of quality implementation of neonatal resuscitation.
8	(Maya-Enero et al., 2018)	To evaluate the adherence to guidelines of the neonatal resuscitation team after birth in preterm infants.	Analytical observational	162 infants <32 weeks as the respondents at designated hospitals.	Chi-square test and Fisher's exact test	Resuscitation led by pediatricians and neonatologists with a guided algorithm and intubation training may improve the outcomes of neonatal resuscitation.
9	(Article et al., 2019)	To analyze the knowledge of the doctors who deal with child patients of neonatal resuscitation.	Cross-sectional study	A total of 137 doctors	Data were analyzed using SPSS version 20.	Needed training neonatal resuscitation is often done to improve neonatal outcomes.

10	(Olson et al., 2015)	To understand the extent of knowledge and self-efficacy in their contributions to resuscitation efforts	Retrospective cohort	348 midwives who have to handle 3116 birth	Path analysis	Training has an impact on resuscitation efforts indirectly through relationships with self-efficacy and knowledge.
11	(Heathcote et al., 2018)	To describe neonatal survival time of the events observed resuscitation of newborns who require handling of resuscitation.	Retrospective.	6000 births per year	By using the documentation of events and the results of neonatal resuscitation.	Time-critical resuscitation events and often overlooked in the documentation that could provide a basis for quality improvement in neonatal resuscitation.

According to the analysis of several articles, several components should have been owned by nurses in neonatal resuscitation readiness. They played essential roles in success. Those components include the knowledge, training simulations, documentation of activities, duration, algorithms, resuscitation equipment, drugs, and self-efficacy. Knowledge in performing neonatal resuscitation becomes an integral part of the health care system that may impact on successful handling (Khalid et al., 2015). Another study conducted by Jukkala & Henly (2007) describes the relationship test among knowledge of neonatal resuscitation, frequency of performance with neonatal resuscitation skills, and comfort level self-reported by conducting tasks that associated with neonatal resuscitation. The study was conducted at 37 to 860 hospitals with 1,257 births while the other had 3,693 births. The study found that knowledge of neonatal resuscitations, performance skills, and comfort levels with the performance of skills was included in the dimension of the quality of neonatal resuscitation. Knowledge of the newborn resuscitation could prevent the consequences of asphyxia resuscitation procedures in newborns. It played important roles in early diagnosis, proper management, and reduce the number of complications in newborns with life-threatening conditions (Abrha et al., 2019).

Clinical skills have significant contributions to the treatment of neonatal resuscitation. Based on the strategy, to decrease mortality rates in neonates could be conducted by providing training for people who were still studying or were already working. According to several articles, to improve education about neonatal

resuscitation could be done by consistently teaching the skills that could be applied for clinical practice (Trevisanuto et al., 2015). Research conducted Shikuku et al (2017). Examined the quality of service during *neonatal resuscitation* at 8 newborns and 28 health workers. They found that the critical steps in the treatment of neonatal resuscitation required a period that should be taken into account to improve the quality of work and ensure its safety.

The training method with the simulation of video recording has been used to evaluate the performance of neonatal resuscitation of health care providers in high-resource settings (Trevisanuto et al., 2015). A training method using the simulation could be useful to facilitate learning by providing knowledge in a controlled and secure environment that could make the nurses exposed to specific events and could increase self-confidence (self-efficacy). After completion of this program, it is expected to show readiness for neonatal resuscitation that has become a gap over the years related to the availability of citizens to perform neonatal resuscitation (Cordero, 2013). Research conducted by Olson et al (2015) aimed to understand the extent of knowledge and self-efficacy that contributed to resuscitation efforts of 348 midwives who had to handle 3,116 births. It was conducted by a retrospective cohort design. The results showed indirect influences on resuscitation efforts through its relationship with self-efficacy and knowledge.

Algorithm guidance on neonatal resuscitation is frequently conducted in a hospital that has interventions during the transition after birth and viability. Their prognoses are highly dependent on the care they receive in the delivery room. Most premature babies start breathing after birth but they often have weak and poor respiratory boosts. Guidelines/algorithms recommend tactile stimulation (warm, dry, and rub his back or legs) to stimulate breathing. They are the standard guidelines and could optimize resuscitation. Research conducted by (Maya-Enero et al., 2018). about the resuscitation team, evaluated the adherence of the guidelines for neonatal resuscitation after birth in preterm infants. It was done by analytical observational study design. The results showed that resuscitation led by a pediatrician and neonatologist with intubation training guides accompanied the algorithm could improve the outcomes of neonatal resuscitation.

The Standard of time is an integral part of the implementation of neonatal resuscitation. It is the determination of time duration during the action. The timing should be considered and examined thoroughly to achieve success and improve survivability. To improve the standards concerning newborn resuscitation, it is important to ensure the time is right for action. The time should be described in real life when certain essential events resuscitation achieved in newborn resuscitation (Heathcote et al., 2018). Adequate facilities are needed in the handling of neonatal resuscitation. Evidence from around the world also showed that the risk of death increased by 16% for every 30 seconds of delay. Therefore, it is clear that the first minute after birth is crucial to decrease neonatal mortality (Shikuku et al., 2017). Evidence shows that successful neonatal resuscitation by trained health care providers, in providing proper and adequate resuscitation, has the potential to

prevent mortality. The need for urgent referral to specialist facilities asphyxia cases is higher. It can also help to prevent some of these complications if early anticipations are carried out (Shikuku et al., 2018).

The findings from this study will provide essential guidelines concerning essential factors that need to be addressed to strengthen services for policymakers, administrators, and researchers in each relevant agency (Bintabara et al., 2019). Neonatal asphyxia has been identified as a significant cause of worldwide neonatal mortality. Globally, about 25% of all infant mortalities are caused by neonatal asphyxia. Neonatal asphyxia is defined by the World Health Organization as a failure to initiate and sustain breathing at birth (Alhassan et al., 2019). Neonatal resuscitation is an action taken by the complexity and high stress for the team that is responsible for neonatal care. Success in conducting neonatal resuscitation skills is correlated to the survival of newborns who cannot breathe spontaneously

American Heart Association (AHA) has a program that adopts simulation techniques. It designs the educational program for the acquisition and maintenance of skills necessary for adequate neonatal resuscitation (Wyckoff et al., 2015). Management guidelines for neonatal resuscitation or algorithm are also outlined in the guidelines covering the handling of the airway, oxygenation, or medication. Other studies have shown that there is value in use that may affect the development of competence in provisioning, such as the type and quality of video recordings; the selection of video segments which allows highlighting the learning objectives; the number of times a video is reviewed; time, space, and the duration of the briefing; and the expertise and knowledge of instructors who conduct a training (Gamboa et al., 2018).

D. CONCLUSION

According to the five components that affect the readiness of neonatal resuscitation, it includes the dimensions of knowledge, clinical skills, self-efficacy, treatment algorithms, facilities, and medicines. These dimensions are interrelated one to another so that successful neonatal resuscitation could be the basis for the institution of policy-making related to neonatal resuscitation in the hospital.

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