Nursing Undergraduate Work   College of Nursing Exemplary Student Work

5-2019

Nursing interventions that address barriers in the United States that impact neonatal mortality

Victoria D. Sullivan

Ashton J. White

Recommended Citation

NURSING INTERVENTIONS THAT ADDRESS BARRIERS IN THE UNITED

STATES THAT IMPACT NEONATAL MORTALITY

Victoria D. Sullivan & Ashton J. White

A senior research paper submitted in partial fulfillment

of the requirements for the degree of

Bachelor of Science in Nursing

Anna Vaughn College of Nursing

Oral Roberts University

May 2019

Abstract

In 2016, four out of every 1000 babies born in the US died within one month of age. This systematic research review explored nursing interventions that addressed barriers that impact neonatal mortality. The most significant barriers nurses faced in reducing and preventing NM were maternal access to healthcare and education during pregnancy, which can be influenced by maternal age, low socioeconomic status, lack of familial support, poor health literacy, and geographic location. The articles examined included nursing interventions that were evidence-based and addressed barriers relating to NM. Interventions promoting the reduction of NM included education of women's health and prenatal lifestyle, safe neonatal practices, and education of nursing staff. Subsequently, the majority of the educational interventions was prenatal, so nurses need to fill more public nursing roles to reach the community and assess maternal health education and disparities unique to varying locations and socioeconomic statuses. Nursing education in maternal-newborn care is also imperative to impacting the reduction NM. If nurses are more equipped to better educate patients, it can result in improved neonatal outcomes.

Keywords: neonatal mortality, low birth weight, low-income, maternal health, prenatal education, nursing interventions

Nursing Interventions that Address Barriers in the United States that Impact Neonatal

Mortality

The last several decades have shown a steady decline in neonatal mortality (NM) in the United States (US), but the US remains disadvantaged in NM for a developed country (Sawyer & Gonzales, 2017). In 2016, 3.95 million babies were born in the US, and four out of every 1000 of the babies born died before reaching one month of age (Martin, Hamilton, Osterman, Driscoll, & Drake, 2018; Sawyer & Gonzales, 2017). The first month of life is a crucial time that is termed the neonatal period, and the baby is considered a neonate during the first 28 days after it is delivered (World Health Organization [WHO], 2006). In this period, neonates can face many potential complications and challenges such as respiratory distress, hemorrhage, bacterial sepsis, genetic malformations, temperature regulation, and blood sugar stabilization problems (Sawyer & Gonzales, 2017). Research done by Sawyer and Gonzales showed that the U.S. neonatal mortality rate (NMR) has remained significantly higher than comparable developed countries such as Canada, Australia, Germany, Sweden, and Japan (2017). Their research also found that the U.S. NMR average is 71% higher than the comparable country average of 2.3 deaths per 1000 births.

There are many known contributing factors to the high NMR in the US, and most of these are highest among disadvantaged populations. Nurses play an essential role in propelling the health of women and neonates to where it should be and set the standard for practicing under the best evidenced-based care (Edmonson, McCarthy, Trent-Adams, McCain, & Marshall, 2017). Nurses must become aware of the causes and risk factors

associated with NM so that they can fulfill their roles as advocates and educators who promote the well-being of mother and baby.

Background

Over the past several years, NMRs in the US have gradually decreased from 4.6 deaths in 2000 to 4 deaths in 2014; however, the U.S. NMR has decreased at a slower rate than data found in Sawyer and Gonzales' research on comparable country averages, which decreased from 3.1 deaths in 2000 to 2.3 in 2014 (2017). Throughout history, nurses helped reduce NM in the 18th and 19th century by working directly with families and making sure mothers had the right nutrition and appropriate milk for their baby (Thompson & Keeling, 2012). Nurses functioned as public health nurses and were patient and consistent while working with families of different ethnic groups. These nurses were some of the first medical professionals who contributed to reducing NM (Thompson & Keeling, 2012).

Education has played a vital role in the development of nursing care for the neonate; however, many low-income patients never had the opportunity to see a nurse because they could not afford healthcare (Palmer, 1999). Palmer explained how health insurance emerged in the 1900s, during WWII, when companies could not raise wages due to the Stabilization Act of 1942. He goes on to explain that companies would include health care packages to add incentives for employees. Since then, it has become standard for the working class to have integrated health care coverages provided by their employer (Palmer, 1999).

Access to care has helped enable mothers to afford prenatal care, standard checkups and screenings, surgeries, in-hospital births, and neonatal care. Due to greater access to obstetrical and neonatal care, mother and baby were able to have direct care by skilled nurses. However, not everyone had employee health care benefits. Many people without these benefits were impoverished and could not afford private health insurance, which revealed the pressing need for a government assisted healthcare program (Palmer, 1999). Medicare, which was signed into U.S. legislation in 1965 for individuals over 65 by President Lyndon B. Johnson and then expanded to people with disabilities in 1972 but excluded basic healthcare assistance for low-income families until the 1990s (Anderson, 2016). Medicare became a part of the answer to one of the most significant barriers between low-income families and nurses' access to care. The addition of Medicare has helped nurses have access to low-income mothers and neonates across the US.

During the last few years, NMRs have gained global attention. Research by WHO has shown that over the years, childhood deaths have decreased, and now NM holds a higher percentage of childhood deaths than ever before (2016). In 2017, NM accounted for 46% of deaths in children less than five years of age (United Nations International Children's Emergency Fund [UNICEF], 2016). The world is beginning to see that to decrease child mortality, NM must be addressed. In 2014, WHO and UNICEF worked together to create the *Reaching Every Newborn National 2020 Milestone* campaign (WHO, 2016). This campaign has helped NM gain global attention. Around this time, the U.S. NMR began to gain press attention as well. News articles published in the *Washington Post, Times*

magazine, and *Cable News Network* have featured articles addressing the issue since 2014.

While history has gradually shown better healthcare for neonates and an increase in attention to NMRs, there are still many barriers to modern day neonatal and perinatal care. The NMR in the US can be attributed to maternal age, socioeconomic status, geographic location, and access to healthcare (Liao et al., 2011; White, Horton, & Simpson, 2017; WHO, 2018;). These factors have become barriers nurses face when caring for neonates and pregnant women.

Although NM has decreased in the general U.S. population, it still poses a major public health issue in lower income minority populations (White et al., 2017). According to Larson's research, published in the *Pediatrics and Child Health Journal*, the correlation between poverty and pregnancy in a lower socioeconomic status with a lower level of education is that these women were more likely to smoke during pregnancy and not have prepared for the baby's arrival (2007). Larson's research continued to reveal that in locations where poverty is high, females are also at an increased risk for teen pregnancies. Larson adds that low birth weight (LBW) of neonates can be linked to low-income areas due to the mother having poorer nutrition and being at higher risk for preterm birth. Preterm delivery can also be attributed to an increased number of stressors experienced in lower-income communities such as unemployment, compromised and crowded living conditions, decreased social support, and financial burdens (Larson, 2007).

Research by WHO showed that lower-income communities are more at risk for teen pregnancies, which validates that previous research by Larson is still credible (2018). This research also showed that a young maternal age could negatively influence the risk of complications for both mother and neonate. According to the WHO, adolescent mothers encountered increased complications during and after birth as well as their unborn child having a larger risk of being born preterm with a LBW, unlike children born to women ages 20 to 24 years old (2018).

Minority populations in the US account for 50% of the total population (Liao et al., 2011); and, according to the Surveillance of Health Status in Minority Communities, there are disparities in the health status of minority races such as American Indians, African Americans, Hispanics, and Asians when compared to the national average (2011). For example, the NMR of non-Hispanic African Americans in the US is over twice as high as the rate of non-Hispanic Caucasians (Center for Disease Control [CDC], 2018). When 50% of the U.S. population experiences health care disparities, this contributes to the public health of entire communities (Liao et al., 2011). The Surveillance of Health Status in Minority Communities also revealed the contributing factors that account for higher percentages of minority populations not experiencing equal access to healthcare; these included lower education level and household income, which contributed to reduced health-coverage and decreased ability to visit a doctor due to the cost (Liao et al., 2011).

By understanding how social determinants such as socioeconomic status and access to care affect maternal health and NM, nurses are called to implement

interventions that are culturally and population-specific that reduce inequalities in access to knowledge and quality of care between middle-upper income families and lower income families. The article, "Emerging Global Health Issues: A Nurse's Role," emphasizes that because the nurse builds a relationship with a patient on the foundation of mutual trust, nurses are positioned perfectly to be the connecting link between what the patients need and what the legislators and other medical professionals are or are not implementing (2017). Nurses work directly taking care of neonates and their mothers, and are a necessity in helping identify, develop, implement, and evaluate the best approaches to improve maternal and neonatal health outcomes (Edmonson et al., 2017)

Significance

The percentage of neonatal deaths out of the total of under-five deaths has continued to increase over the past two decades; each day, on average, 7,300 neonates die globally (WHO, 2017). The issue of NM has a major impact on society, especially on the economy. Half of the NMR in the US stems from preterm birth complications (Oklahoma Policy, 2012), and efforts to save these preterm neonates are costly. The Secretary's Advisory Committee on Infant Mortality (SACIM) states that the average cost of care for a preterm infant in the US was $30,000 in 2005, increasing to $51,600 in 2013 (2013). This can take a heavy toll on families, particularly those who do not qualify for government assistance but still cannot afford proper health insurance coverage. The cost of NM not only affects the families but also burdens the U.S. economy. In 2005, the US spent upwards of 26 billion dollars on preterm neonates (SACIM, 2013). Additionally, each neonatal death represented the loss of a consumer, which in turn affects the

economy. According to Erdogan, Ener, and Arica's research, NMRs can be represented by a country's economic growth (2013). The CDC contributes to this statement by reporting that not only can NMRs reflect economic growth, but NMRs can also serve as an indicator of a population's overall health (2017).

Neonatal mortality affects not only the public health in the US but also has major effects on family well-being. Due to the emotional and psychologic stress both parents experience after the death of their newborn, there is an increased risk for marital instability that could result in separation or divorce (Rogers, Floyd, Seltzer, Greenberg, & Hong, 2008). Neonatal mortality also significantly increases the risk of parental mental illnesses such as depression, anxiety, and substance abuse, even ten years after the loss of a newborn (Gold, Sen, & Hayward, 2010). Therefore, NM contributes to additional pressure on nurses to implement family-centered care and be sensitive to families who have lost a child. Wallbank and Robertson state that this can be especially difficult when nurses may be grieving themselves (2008). They continue to report that nurses often experience significant adverse effects when caring for grieving families. An essential part of nursing includes incorporation of family care and support; however, nurses also need to learn to protect their emotions, even when neonatal losses can feel personal. This emotional distress the nurse feels is often overlooked (Jonas-Simpson, Pilkington, MacDonald, & McMahon, 2013; Wallbank & Robertson, 2008).

Neonatal mortality not only takes a toll on nurses mentally and emotionally but also increases the demands of neonatal nurses. Since about half of NM results from complications of premature birth, labor and delivery nurses as well as neonatal intensive

care unit (NICU) nurses must be aware of potential complications of premature births due to high NMRs in the US (Oklahoma Policy, 2012). For every ten births in the US, one child is born premature (WHO, 2017). Subsequently, 40,000 neonates are born each year at a LBW, so there is a great need for educated and experienced neonatal nurses (Sines, 2015). According to research by Lake, Rogowska, and Weiners, LBW and very LBW neonates are leading causes of NM (2016). Their research also shows LBW neonates are at increased risk for infection and other medical complications, which means their stay in the hospital could be longer (Lake et al., 2016). Many hospitals have not been able to keep up with the demand for neonatal nurses, and many NICUs remain understaffed (Lake et al., 2016). Understaffed NICUs increase the workload on nurses, which raises the nurse to patient ratio. The urgency for NICU nurses continues to rise; and the Bureau of Labor Statistics estimates that between 2012 and 2022 there will be a 19% increase in the demand for nurses in this specialty (Sines, 2015). Lack of NICU nurses not only puts additional stress on the current nurses but also affects the quality of care given (Lake et al., 2016). With the rising urgency of NICU nursing, nurses are beginning to see the sustained prevalence and issue of NM, pointing to a larger problem that requires nurses to invest in maternal and newborn health. By investing in the publics' health, nurses are discovering the root of the issue, which tends to be maternal health; therefore, nurses must understand that NM is mostly a preventative issue (Edmonson et al., 2017).

Neonatal mortality can be prevented in some instances, but there are many barriers that nurses face when beginning to address the problem (Edmonson et al., 2017). Nurses have important relationships with patients that are established on trust and are

directly involved in the care of the patient; therefore, nurses in the US play a vital role in impacting the reduction of NM (Edmonson et al., 2017).

Problem and Purpose Statement

Given the prevalence and rate of NM in the US, it is necessary for nurses to address barriers that impact NM such as maternal age, low socioeconomic status, financial constraints, and geographic location of mothers (Liao et al., 2011; White et al., 2017; WHO, 2018;). The purpose of this systematic research review was to synthesize current research on NM and answer the question, "What are nursing interventions that address barriers that impact NM in the US?".

Definitions of Variables

This study seeks to understand how nursing interventions can positively impact NM in the US. The variables identified in this study are nursing interventions, barriers, and NM. The independent variables are nursing interventions and barriers. The dependent variable is NM. Nursing interventions are nursing actions geared toward improving patient outcomes that are rooted in clinical research (Butcher, Bulechek, Docterman, & Wagner, 2013). Nursing interventions are grounded in evidence-based research that seeks to promote the well-being of patients directly and indirectly (University of Iowa, 2018). A barrier, concerning NM, is defined by any community, maternal, or newborn indicator or obstacle that puts a neonate at higher risk for NM (White et al., 2017). The dependent variable is NM; the WHO defines NM as the death of a newborn within the first 28 days of life (2006).

Methodology

The searches for this systematic review were conducted intermittently between February 2018 through August 2018. Databases utilized were Academic Search Complete, MEDLINE, and CINAHL through the Oral Roberts University online library. Keywords included nursing interventions, neonatal mortality, low birth weight, low-income, maternal health, and prenatal education in varying combinations. The various databases used, and the keywords selected singly and in conjunction provided the most comprehensive number of hits. Inclusion criteria required articles published within the last five years, available in full text, from a peer-reviewed journal, and available in English. This combination of criteria allowed for the most credible information on the topic. The total number of hits from all searches was over 10,000. The results were narrowed by scanning the titles. Those that did not appear to relate to answering the research question were excluded. If articles could not be excluded based on the title, abstracts were read. The abstracts that coincided with the research question were collected, and the full-text articles were reviewed. Out of all the searches, 30 studies were saved for inclusion in the sample. The saved studies were critiqued for quality and the ability to answer the research question. Once critiqued the sample size was 15.

Findings

The sample that included NM interventions was gathered from 14 scholarly sources with dates ranging from 2013 to 2018. Of these studies, 11 studies were quantitative (Grundt, Eide, Brantsæter Anne-Lise, Margaretha, & Trond, 2016; Harvey et al., 2017; Himes, Stroud, Scheidweiler, Niaura, & Huestis, 2013; Lindberg, Maddow-

Zimet, & Boonstra, 2016; Matias de Oliveira, Ribeiro Bispo dos Santos, Linhares Coelho

Alvarez, Pinheiro Enokibara, & Ferreira Medeiros, 2016; Moon et al., 2017; Park, Chang,

Ahn, Sung, & Park, 2018; Prakash, Das, Habeebullah, Bhat, & Shamanna, 2017;

Sonchak, 2016; Watson et al., 2016; White, Horton, & Simpson, 2017), one study was

mixed methods (Lopez-Bushnell, Torrez, Robertson, Torrez, & Strickler, 2017), and two

were qualitative research studies (Ashghali-Farahani et al., 2018; Reyes, Klotz, &

Herring, 2013). Table 1 summarizes the information from each article, listing authors,

date published, sample size, interventions, and findings.

Table 1

Summarized Findings

Author/ Year	Type of Study/ Level of Evidence	Sample Size	Interventions	Findings
Ashghali-Farahani, Ghaffari, Esfidarjani, Hadian, Qomi, & Dargahi, 2018	Qualitative, Individual interviews (III)	20	Interview NICU staff	Staff reported inappropriate infrastructure, incomprehensive NICU curriculum, inappropriate training of NICU staff
Grundt, Eide, Brantsæter Anne-Lise, Margaretha, & Trond, 2016	Quantitative, Randomized control study (I)	62,494	Survey mothers throughout pregnancy	High sugar drink intake during pregnancy increases risk of LBW
Harvey, Strobino, Sherrod, Webb, Anderson, White, & Atlas, 2017	Quantitative (III)	2886	Prenatal risk assessment Home visits by nurses to high-risk women	Maternal HTN increases the risk of LBW; need for educational sessions with mothers by healthcare providers
Himes, Stroud, Scheidweiler, Niaura, & Huestis, 2013	Quantitative, Longitudinal study (IV)	119	Prenatal smoking survey	37.8% smoked during pregnancy; smoking increases risk of LBW
Lindberg, Maddow-Zimet, & Boonstra, 2016	Quantitative (III)	4662	National Survey of Family Growth Clustered, multistage sampling to collect interviews	21% of female and 35% of male adolescents did not receive formal or informal education on birth control

Author/ Year	Type of Study/ Level of Evidence	Sample Size	Interventions	Findings
Lopez-Bushnell, Torrez, Robertson, Torrez, & Strickler, 2017	Mixed Method (IV)	802	Educational leaflets, video, interactive demonstration doll, & follow up telephone interview	99% said SBS education was helpful, 17% had not previously known of SBS, 78% remembered the nurse/social worker, 99% remembered the video, 65% shared education to friends
Matias de Oliveira, Ribeiro Bispo dos Santos, Linhares Coelho Alvarez, Pinheiro Enokibara, & Ferreira Medeiros, 2016	Quantitative, Exploratory study (II)	99	Interviews, questionnaires, informational hand-outs	60% of respondents showed limited knowledge on effects of alcohol during pregnancy 81% could not identify symptoms or effects related to FAS
Moon, Hauck, Colson, Kellams, Geller, Heeren, & Corwin, 2017	Quantitative, Randomized Clinical Trial (II)	1263	Nursing quality improvement (NQI), ensuring nurses are educating moms and role modeling Mobile text alerts	Mobile alerts alongside NQI for new parents resulted in 88.3% for supine sleep position, 79.9% for room sharing without bed sharing, 77.8% for no soft bedding use
Park, Chang, Ahn, Sung, & Park, 2018	Quantitative, Retrospective observational (III)	564	Review Samsung Medical Center Medical Records	5 min Apgar scores and serum albumin levels indicate NM, 1 to 1 ratio for critical care neonates reduced NM
Prakash, Das, Habeebullah, Bhat, & Shamanna, 2017	Observational Study (II)	139	Anthropometric measurements, HbA1c, fasting lipid profile	Controlled maternal glucose led to better neonatal outcomes, 44% GDM pregnancies resulted in C/S
Reyes, Klotz, & Herring, 2013	Qualitative, Semi-structured individual interviews (IV)	21	Interviews Questionnaires	Mothers felt they could not afford healthy food, did not have access, lacked knowledge about proper prenatal calorie intake, too tired to find health foods Mothers in multigenerational households do not feel like they have control over food choices
Sonchak, 2016	Quantitative, Observational (II)	102,079	Review Vital Statistics Natality Data	Maternal WIC participation showed decreased LBW (2.5%), prematurity (3.8), and NICU admission (1.7%)
Watson, Arulampalam, Petrou, Marlow, Morgan, Draper, & Modi, 2016	Quantitative, Population-based analysis (II)	43 units	Proportion of days in intensive care that had one-to-one nursing care was given	One-to-one ratio in the NICU prevents nursing errors With every 10% decrease in days with one-to-one ratio

Author/ Year	Type of Study/ Level of Evidence	Sample Size	Interventions	Findings
White, Horton, & Simpson, 2017	Quantitative (III)	77 communities	Examine association between variables such as community-level natality, mortality, demographic, economic, and social characteristics	led to an increase of 0.6 in 100 neonatal deaths Foreigners and Hispanics have higher levels of NM NM is higher among lower-income families

The articles in the sample included nursing interventions that were evidence-based and addressed barriers relating to NM. Interventions to promote the reduction of NM included education on women's health and prenatal lifestyle (Grundt et al., 2016; Harvey et al., 2017; Himes et al., 2013; Lindberg et al., 2016; Matias de Oliveira et al., 2016; Moon et al., 2017; Park et al., 2018; Prakash et al., 2017; Reyes et al., 2013; Sonchak, 2016; White et al., 2017), safe neonatal practices (Lopez-Bushnell et al., 2017), and education of nursing staff (Ashghali-Farahani et al., 2018; Watson et al., 2016). These interventions are explained in greater detail in the next section.

Discussion

Neonatal mortality poses an issue in the US; therefore, interventions in women's health and maternal care, safe neonatal practices, and nursing education are warranted. The health of a neonate begins with the mother before she is pregnant. Prenatal education about nutrition throughout pregnancy is imperative to the growth and wellbeing of the fetus in utero, and, consequently, neonatal outcomes. The research found in this study has shown that the mother's diet also directly affects neonatal outcomes (Grundt et al., 2016; Harvey et al., 2017; Prakash et al. 2017; Reyes et al., 2017; Sonchak, 2016).

Furthermore, many of the pregnancy complications that put the neonate at risk, such as diabetes and hypertension (HTN), could be prevented with better maternal diets (Harvey et al., 2017; Prakash et al. 2017). Many women do not realize the potential consequences their diet has on the unborn child. Reyes, Klotz, and Herring recognized that there was a significant knowledge deficit about a healthy prenatal diet (2017). Women need to have an adequate intake of vitamins, specifically vitamin D, folic acid, and iron. These nutrients can be increased by women consuming a higher intake of vegetables, meats, and healthy dairy options, along with taking a prenatal vitamin. Some women do not fully understand what a healthy diet consists of and are not aware of their access to healthy nutrition options. One option low-income women have is the Women, Infants, and Children program (WIC); the core goal of WIC is to allow low-income women access to healthy food, which has been proven to result in better neonatal outcomes (Sonchak, 2016). Women can use WIC as a resource for both nutritional education and resources. Nurses should refer patients who are at risk for prenatal knowledge deficits to WIC as an educational tool and low-income patients as a resource to prenatal care and healthy foods. Nurses can also participate by implementing similar educational practices in community clinics.

Apart from maintaining a healthy diet during pregnancy, women need to be educated on the impact of unsafe behaviors such as smoking and drinking alcohol during pregnancy (Himes et al., 2013; Matías de Oliveira et al., 2016). Research by Himes et al. showed that many women still smoke during pregnancy (2013). Smoking during pregnancy contributes to LBW neonates as well as alcohol consumption, which can lead

to fetal alcohol syndrome, thus leading to several additional complications such as brain damage or death (Matías de Oliveira et al., 2016). If women are educated prenatally on the consequences of their choices and substance use, complications could be minimized. Not only do pregnant women need to be educated, but adolescents as well need to be informed about safe sex practices, which could potentially affect the neonate. According to Lindberg, adolescents showed a significant lack of knowledge about safe sex practices, which resulted in undesired pregnancies, as well as acquired sexually transmitted infections (STIs) that can result in neonatal complications such as infection, vesicular lesions, sepsis, microcephaly, hydrocephaly, and death (2016).

Not only do women need to be educated about healthy prenatal practices, but research has shown that women need to be informed about the care of the newborn after birth (Lopez-Bushnell et al., 2017; Moon et al., 2017). Even after the birth of a healthy infant the neonate is still at risk. Mothers must be educated about safe sleep practices and how to handle the constant demand of a neonate to reduce the risk of both shaken baby syndrome (SBS) and sudden infant death syndrome (SIDS) (Lopez-Bushnell et al., 2017; Moon et al., 2017). Safe sleep practices to avoid SIDS include the Back to Sleep protocol and ensuring the neonate is not bed-sharing with the mother as well as promoting firm bedding (Moon et al., 2017). Nurses need to educate parents to not place pillows, stuffed animals, or more than a few small blankets in the crib with the neonate (Moon et al., 2017). Research by Lopez-Bushnell et al. showed that many parents had never heard of SBS. Parents were educated by using a demonstration doll that showed the damage in the

newborn's brain when shaken. The majority of parents reported remembering the

education and sharing it with others (2017).

Maternal education is key to decreasing NM, but nurses are the primary

educators; therefore, they must be adequately informed, equipped, and trained to become

educators and caretakers (Ashghali-Farahani et al., 2018; Park et al., 2018; Watson et al.,

2016). Nurses working in the NICU report poor nurse-to-patient ratios and training,

resulting in detrimental neonatal outcomes (Ashghali-Farahani et al., 2018; Park et al.,

2018; Watson et al., 2016). Additionally, the nurse must be willing to advocate for both

mother and neonate to promote healthy outcomes.

Implications

Nursing Education

Nursing education in maternal-newborn care is imperative to impacting NM. If

nurses are more equipped to educate their patients, the result will be better patient

outcomes for both mother and baby. Nurses should be more informed about health

disparities and healthcare access in low-income areas so that problem-solving can occur,

and women in those areas can have equal access and knowledge about pregnancy, birth,

and postnatal care. This would create nursing leaders who are engaging the community

by addressing the need for new interventions in maternal and neonatal education and

healthcare (Edmonson et al., 2017).

Nursing Practice

By implementing additional nursing education in maternal-newborn care, nurses

would become more effective in providing patient-centered care as well as patient

outcomes improving. Nurses would become more adept at better patient education, which could improve both maternal and neonatal health and survival. On the floor, nurses should embrace new educational programs to promote safe sleep practices and SBS prevention after birth. This is a very cost-efficient intervention; however, it requires additional work for the nurse.

Nursing Research

There is a significant need for mixed-methods research to test various nursing interventions to prevent NM. There is a significant amount of research showing the need for interventions, particularly education. However, there needs to be additional studies testing the effectiveness of nurses providing education to patients. There is a lack of generalized prenatal educational programs; such programs need to be standardized and tested for effectiveness. Additionally, there should be more research comparing the neonatal practices in comparable developed countries with lower NMRs such as Canada, Australia, Germany, Sweden, and Japan (Sawyer & Gonzales, 2017).

<div align="center">

Strengths and Limitations

</div>

The strengths and limitations of this research study need to be identified. The strengths of this study were that both authors were passionate about the topic addressed, an experienced research mentor was collaborated with, and a year was given to perform research and accomplish the project. Another strength is that all the research articles were published within the last five years. The limitations of this study included inexperience of researchers and time constraints relating to other educational commitments. Though there were many statistics on this topic, actual interventions were sparse.

Recommendations

This study could be improved with limited external time commitments and without large breaks during the research process. A collaborative group and more extensive databases could be used to improve the study. There could be a more in-depth search for the effect of prenatal education programs and research. Since the topic has various contributing factors, the sample size should be increased to accommodate a broader range of research. No clinical guidelines on NM were found during the research. Because this topic is education based, it would be more beneficial to create an educational manual to inform nurses how to implement teachings and research findings.

Conclusion

Neonatal mortality remains a preventable issue in the US. This systematic research review analyzed barriers to neonatal survival such as maternal health education, socioeconomic status, geographic location, and age. The findings showed that there is a significant lack of maternal education concerning NM prevention and risk factors. Research revealed that maternal lifestyle factors such as smoking, alcohol consumption, and diet affects neonatal outcomes.

Additionally, research showed that there is inadequate knowledge in safe neonatal practices concerning SBS and SIDS prevention. Knowledge acquired through this study may inspire nurses to deepen their understanding of this topic so that they can implement more effective educational strategies for mothers. Lastly, there is a need for further research on the effectiveness of different educational programs to decrease the prevalence of NM in the US. Through the implementation of education about healthy maternal

practices, safe sex practices, and safe neonatal practices, nurses have the power to decrease the NMR in the US.

References

Anderson, S. (2016). A brief history of Medicare in America. Retrieved

    from https://www.medicareresources.org/basic-medicare-information/brief-history-

    of-medicare/

Ashghali-Farahani, M., Ghaffari, F., Esfidarjani, S. H., Hadian, Z., Qomi, R., & Dargahi,

    H. (2018). Neonatal intensive care nursing curriculum challenges based on context,

    input, process, and product evaluation model: A qualitative study. *Iranian Journal of*

    Nursing & Midwifery Research, *23*(2), 111-118. doi:10.4103/ijnmr.IJNMR_3_17

Center for Disease Control. Infant mortality: What is the CDC doing? (2017). Retrieved

    from https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality-

    cdcdoing.htm

Center for Disease Control. Infant mortality. (2018). Retrieved from

    https://www.cdc.gov/reproductivehealth/maternalinfanthealth/infantmortality.htm

Cooper, A. (2015). High-fidelity simulation for neonatal nursing education: An

    integrative review of the literature. *Neonatal Network: NN*, *34*(6), 345-354.

    doi:10.1891/0730-0832.34.6.345

Edmonson, C., McCarthy, C., Trent-Adams, S., McCain, C., & Marshall, J. (2017).

    Emerging global health issues: A nurse's role. *OJIN: The Online Journal of Issues in*

    Nursing, *22*(1).

Erdoğan, E., Ener, M., & Arıca, F. (2013). The strategic role of infant mortality in the

    process of economic growth: An application for high income OECD countries.

    Retrieved from doi:///doi.org/10.1016/j.sbspro.2013.10.467

Gold, K. J., Sen, A., & Hayward, R. A. (2010). Marriage and cohabitation outcomes after pregnancy loss. *Pediatrics*, *125*(5), e1202–e1207.

Grundt, J. H., Eide, G. E., Brantsæter Anne-Lise, Margaretha, H., & Trond, M. (2016). Is consumption of sugar-sweetened soft drinks during pregnancy associated with birth weight? *Maternal & Child Nutrition, 13*(4), e12405. Retrieved from https://doi.org/10.1111/mcn.12405

Harvey, E. M., Strobino, D., Sherrod, L., Webb, M. C., Anderson, C., White, J. A., & Atlas, R. (2017). Community-academic partnership to investigate low birth weight deliveries and improve maternal and infant outcomes at a Baltimore city hospital. *Maternal and Child Health Journal*, *21*(2), 260-266.

Himes, S. K., Stroud, L. R., Scheidweiler, K. B., Niaura, R. S., & Huestis, M. A. (2013). Prenatal tobacco exposure, biomarkers for tobacco in meconium, and neonatal growth outcomes. *Journal of Pediatrics*, *162*(5), 970-975.

Jonas-Simpson, C., Pilkington, F., MacDonald, C., & McMahon, E. (2013). Nurses' experiences of grieving when there is a perinatal death. *SAGE Open, 3*(2).

Lake, E., Rogowska, J. & Weiner, J. (2016). Improving the lives of fragile newborns: What does nursing have to offer? Retrieved from https://ldi.upenn.edu/brief/improving-lives-fragile-newborns-what-does-nursing-have-offer

Larson, C. (2007). Poverty during pregnancy: Its effects on child health outcomes. *Pediatrics and Child Health*, (8). 673.

Liao, Y., Bang, D., Cosgrove, S., Dulin, R., Harris, Z., Taylor, A., & ... Giles, W. (2011).
Surveillance of health status in minority communities - Racial and ethnic approaches
to community health across the U.S. (REACH U.S.) risk factor survey, United
States, 2009. *Surveillance Summaries: Morbidity and Mortality Weekly Report, 60*
(6).

Lindberg, L. D., Maddow-Zimet, I., & Boonstra, H. (2016). Changes in adolescents'
receipt of sex education, 2006–2013. *Journal of Adolescent Health*, *58*(6), 621-627.

Lopez-Bushnell, K., Torrez, D., Robertson, J. V., Torrez, C., & Strickler, L. (2017).
Shaken baby syndrome: A hospital-based education and prevention program in the
intermediate care and the newborn intensive care nurseries. *Journal of Neonatal
Nursing*, *23*(3), 142-150.

Martin, J.A., Hamilton, B. E., Osterman, M.J.K., Driscoll, A. K., & Drake, P. (2018).
Births: Final data for 2016. *National Vital Statistics Reports*, *67*(1), 1.

Matias de Oliveira, Á., Ribeiro Bispo dos Santos, A. J., Linhares Coelho Alvarez, F. T.,
Pinheiro Enokibara, M., & Ferreira Medeiros, M. (2016). Study of the perceptions of
women of childbearing age about the effects of alcohol intake during pregnancy as a
proposal for systematization of teaching practices by nursing for the prevention of
fetal alcohol spectrum disorders. *Revista De Pesquisa: Cuidado E Fundamental*,
8(1), 3860-3872. doi:10.9789/2175-5361.2016.v8i1.3860-3872

Moon, R. Y., Hauck, F. R., Colson, E. R., Kellams, A. L., Geller, N. L., Heeren, T., & ...
Corwin, M. J. (2017). The effect of nursing quality improvement and mobile health
interventions on infant sleep practices: A randomized clinical trial. *JAMA: Journal*

of The American Medical Association, 318(4), 351-359.

doi:10.1001/jama.2017.8982

National WIC Association. (2009). WIC program overview and history. Retrieved

from https://www.nwica.org/overview-and-history

Oklahoma Policy. (2012). Economic impact of neonatal mortality. Retrieved from

https://www.okpolicy.org/wp-content/uploads/2013/01/Economic-Impact-of-Infant-

Mortality.pdf

Palmer, K.S. (1999). A brief history: Universal health care efforts in the US. Retrieved

from http://www.pnhp.org/facts/a-brief-history-universal-health-care-efforts-in-the-

us.

Park, J. H., Chang, Y. S., Ahn, S. Y., Sung, S. I., & Park, W. S. (2018). Predicting

mortality in extremely low birth weight infants: Comparison between gestational

age, birth weight, Apgar score, CRIB II score, initial and lowest serum albumin

levels. *Plos ONE, 13*(2), 1-10. doi:10.1371/journal.pone.0192232

Peters, L., Cant, R., Payne, S., O'Connor, M., McDermott, F., Hood, K., & …

Shimoinaba, K. (2013). How death anxiety impacts nurses' caring for patients at the

end of life: A review of literature. *The Open Nursing Journal, 7*, 14–21.

http://doi.org/10.2174/1874434601307010014

Prakash, G. T., Das, A. K., Habeebullah, S., Bhat, V., & Shamanna, S. B. (2017).

Maternal and neonatal outcome in mothers with gestational diabetes mellitus. *Indian

Journal of Endocrinology & Metabolism, 21*(6), 854-858.

doi:10.4103/ijem.IJEM_66_17

Reyes, N. R., Klotz, A. A., & Herring, S. J. (2013). A qualitative study of motivators and barriers to healthy eating in pregnancy for low-income, overweight, African-American mothers. *Journal of The Academy of Nutrition & Dietetics*, *113*(9), 1175-1181. doi:10.1016/j.jand.2013.05.014

Rogers, C. H., Floyd, F. J., Seltzer, M. M., Greenberg, J., & Hong, J. (2008). Long-term effects of the death of a child on parents' adjustment in midlife. *Journal of Family Psychology: Journal of the Division of Family Psychology of the American Psychological Association (Division 43)*, *22*(2), 203–211. http://doi.org/10.1037/0893-3200.22.2.203

Sawyer, B., & Gonzales, S. (2017). How does infant mortality in the U.S. compare to other countries? Retrieved from https://www.healthsystemtracker.org/chart-collection/infant-mortality-u-s-compare-countries/#item-infant-mortality-higher-u-s-comparable-countries

Secretary's Advisory Committee on Infant Mortality (SACIM). (2013). Report of SACIM: Recommendations for Department of Health and Human Services (HHS) action and framework for a national strategy. Retrieved from https://www.hrsa.gov/advisorycommittees/mchbadvisory/InfantMortality/Correspondence/recommendationsjan2013.pdf

Sines, V. (2015). Neonatal nurse salary and careers. Retrieved from https://nurse.org/articles/neonatal-nurse-salary-and-career-opportunities/

Sonchak, L. (2016). The impact of WIC on birth outcomes: New evidence from South

   Carolina. *Maternal & Child Health Journal*, *20*(7), 1518-1525. doi:10.1007/s10995-

   016-1951-y

Thompson, M. E., & Keeling, A. A. (2012). Nurses' role in prevention of infant mortality

   in 1884 – 1925: Health disparities then and now. *Journal of Pediatric Nursing*,

   27(5), 471–478. . http://doi.org/10.1016/j.pedn.2011.05.011

United Nations Children's Fund. (2016). Newborn care. Retrieved

   from https://data.unicef.org/topic/maternal-health/newborn-care/

Wallbank, S., & Robertson, N. (2008). Midwife and nurse responses to miscarriage,

   stillbirth and neonatal death: A critical review of qualitative research. *Evidence-

   Based Midwifery (Royal College of Midwives), 6*(3)

Watson, S. I., Arulampalam, W., Petrou, S., Marlow, N., Morgan, A. S., Draper, E. S., &

   Modi, N. (2016). The effects of a one-to-one nurse-to-patient ratio on the mortality

   rate in neonatal intensive care: A retrospective, longitudinal, population-based study.

   Archives of Disease in Childhood -- Fetal & Neonatal Edition, *101*(3).

   doi:10.1136/archdischild-2015-309435

White, B. M., Horton, L. S., & Simpson, K. N. (2017). Community-level characteristics

   of high infant mortality: A tool to identify at-risk communities. *Journal of Health

   Disparities Research & Practice*, *10*(2), 21-29.

Women, infants and children (WIC). (2017). Retrieved

   from https://www.fns.usda.gov/wic/wic-eligibility-requirements

World Health Organization. (2006). Neonatal and perinatal mortality. *Geneva: World Health Organization*. Retrieved from http://ebookcentral.proquest.com/lib/oru-ebooks/detail.action?docID=284688

World Health Organization. (2013). Senegal: A leap forward on infant survival. Retrieved from http://www.who.int/features/2013/senegal-infant-survival/en/

World Health Organization. (2017). Preterm birth. Retrieved from http://www.who.int/mediacentre/factsheets/fs363/en/

World Health Organization. (2017). Reaching every newborn national 2020 milestone. Retrieved from http://apps.who.int/iris/bitstream/handle/10665/255719/9789241512619-eng.pdf;jsessionid=4551147B3510B1BF51F7375D64025D2B?sequence=1

World Health Organization. (2018). Adolescent pregnancy. Retrieved from http://www.who.int/mediacentre/factsheets/fs364/en/

World Health Organization. (2018). Individualized, supportive care key to positive childbirth experience. Retrieved from http://www.who.int/mediacentre/news/releases/2018/positive-childbirth-experience/en/

Xiaojia, H., Luma, A., Winfred G., A., Huey-Min, H., & Hafiz A., A. (2015). Trends in infant mortality in United States: A brief study of the Southeastern states from 2005–2009. *International Journal of Environmental Research and Public Health, 12*(5), 4908-4920. doi:10.3390/ijerph120504908