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By Damaris Ongori

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DETERMINANTS OF NEONATAL PAIN MANAGEMENT PRACTICES AMONG NURSES WORKING IN NEONATAL CARE UNITS IN WESTERN KENYA HOSPITALS

Damaris Moraa Ongori[1*], Teresa Kerubo Okiri[2]

[1]Department of Midwifery and Child Health, School of Health Sciences Kaimosi Friends University, Kenya
[2]Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), Kenya

***Correspondence:**
Damaris Moraa Ongori
Kaimosi Friends University
P.O BOX 385 – 50309,
Kaimosi, Kenya
Email: dmoraa@kafu.ac.ke

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Abstract

Background: Newborn babies in the neonatal intensive care units (NICU) and newborn units (NBUs) undergo various tissue-damaging procedures as a result of both diagnostic and therapeutic care. Each neonate may experience an average of 300 painful procedures throughout their period hospitalization surgeries inclusive. However, little is known about factors that determine the neonatal pain management practices among nurses working in NICUs in Kenya.

Objective: To assess factors that determine neonatal pain management practices among nurses working in neonatal intensive care and newborn units.

Methods: A descriptive analytical cross-sectional study design with qualitative and quantitative approach was used. The statistical package for social science version 22.0 software was used for analysis. Spearman's was assessed for associations and correlations. Confidence level was 95%. A p-value equal or less than 0.05 was considered significant.

Results: Less than half of the respondents were aware of both the pharmacologic and non-pharmacologic methods used in management of pain in neonates. On beliefs and attitudes, less than half (42%) of the nurses believed that pharmacologic and non-pharmacologic interventions are vital in neonatal pain management. Only a third (33%) of the respondents felt that the pain assessment tool is accurate and effective. Use of pain assessment tools (5.6%), non-pharmacologic (34.8%) and pharmacologic (28.1%) pain intervention strategies was low. Majority used physiological and behavioral factors to assess pain in neonates. Knowledge of pharmacologic ($p<0.0001$) was significantly associated with the practice of pain management in neonates.

Conclusion: The study highlights that pain management in neonates is influenced by a variety of determinants including participants knowledge on various pain management practices and attitude towards pain management in neonates. Knowledge of pharmacological pain interventions emerged as the main determinant of neonatal pain management practices among nurses. There is therefore need to enhance nurses' knowledge on neonatal pain management aspects. This can be achieved through targeted trainings and CMEs on pain management in neonates.

Keywords: *Neonates, Neonatal Intensive Care Unit, Pain*

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INTRODUCTION

Newborn babies in the neonatal intensive care units (NICUs) and newborn units (NBUs) undergo various tissue-damaging procedures as a result of both diagnostic and therapeutic care (Balice-bourgois et al., 2020). Each neonate may experience an average of up to 300 painful procedures throughout their period hospitalization(Wari et al., 2021). Soon after birth neonates routinely receive a prophylactic intramuscular administration of vitamin K as well as skin pricks for checking blood glucose levels among other tests. In addition, those admitted in NICU are constantly exposed to painful procedures such as surgeries, venous punctures and resuscitations. The longer an infant remains in the NICU/NBU, the more procedures they will experience(Williams & Lascelles, 2020).

Nociceptive input during early neurodevelopment is not only deleterious but has also been associated with negative consequences on patients and their families. Evidence from studies including clinical trials(Gursul et al., 2019) and critical reviews (Williams & Lascelles, 2020;McPherson et al., 2020) have proved that repeated unrelieved procedural pain in early life can have negative repercussions. Such pain can impact on sensorimotor and cognitive development, behavior/mood, pain responses, and health status (Walker, 2019;Williams & Lascelles, 2020). As a consequence, neonates with unmanaged pain are more likely to develop maladaptive behaviors due to their diminished behavioral responses to pain and stress, including long-term heightened pain or hyperalgesia, increased stress sensitivity, altered neurobehavioral development, and life-threatening physiological reactivity (Lavanga et al., 2020). Such damage may have significant long-term effects that persist into childhood and even adulthood.

To improve outcomes following exposure to acute procedural pain in neonates, multiple international organizations such as the World Health Organization, the Academy of Pediatrics (APP) and the Canadian Pediatric Society (CPS) recommend implementation of pain management interventions. Several interventions both non-pharmacological and pharmacological exist. According to evidence from evaluation of such interventions (Krowchuk, 2018;Hoarau et al., 2021) pain in neonates during medical or nursing procedures is significantly if the interventions are well implemented. Unfortunately, despite availability of a lot literature with evidence-based recommendations (American Academy of Pediatrics, 2017; Hall, 2014) and guidelines (Wade et al., 2020) studies done over years demonstrate that the issue of pain in patients admitted to neonatal intensive care units is still an important and neglected problem in many hospitals. According to the studies, Pain control in Neonatal Intensive Care Unit (NICU) remains suboptimal (Marchant, 2014; Maxwell et al., 2019; Popowicz et al, 2021). The under-treatment of pain should however not continue, as there are available tools, expertise, and evidence to provide better treatment for childhood pain.

Nurses have a role to alleviate pain and suffering through careful assessment and ensuring appropriate interventions are provided. To provide competent and effective neonatal nursing care, nurses should not only assess pain but should also acknowledge that neonates experience pain. According to existing literature (Samarkandi, 2018; Hanna Popowicz et al., 2021), nurses' knowledge, attitudes and beliefs can have a significant influence on the effectiveness of pain management.

Knowledge deficits may cause nurses to hold negative beliefs and attitudes towards neonatal pain management and vice versa

(Wari, 2021). To evaluate associations between nurse's knowledge, attitude and the practice of pain management in neonates, various aspects of knowledge on pain management have been investigated globally. While some studies show that adequate knowledge and positive attitudes towards management of pain in neonates are significantly associated with the practices of pain management (Mekonen et al., 2024; Ishak et al., 2019), others report that high knowledge on neonatal pain management does not necessarily translate to good pain management practices (Carlsen Misic et al., 2021). Despite the existence of rich literature on knowledge attitudes and practice of pain management in neonates, little is known about how nurse's knowledge and attitude determine the practice of pain management in neonates in Kenya at large. The study therefore assessed nurses' knowledge and attitude as determinants of neonatal pain management practices among nurses working in NICUs and NBUs in western Kenya counties.

Objective: The aim of the study was to assess the influence of knowledge, attitude and beliefs on the practices of pain management in neonates among nurses working in NICUs and NBUs in western Kenya.

METHODS

Study Design

A descriptive cross-sectional study design with qualitative and quantitative approach was used.

Setting

The study was conducted in January 2023 in major public hospitals in Western Kenya counties that had functional NBUs

Research Subject

The study subjects consisted of 89 nurses and 9 nurse in-charges working in NBUs and NICUs in the selected hospitals.

The study sites and research participants were both purposively selected. The sites were selected included in the study since they had functional NBUs and the subjects were selected on the basis of working in the NBUs. All the nurses working in NBU and were willing to participate in the study were recruited. There were nine study sites and 89 participants. The census method was used since the study sites and participants were few.

Instruments

The data collection tools were adapted from a previous study (Muteteli et al., 2019b) and modified. Quantitative data was collected through a structured self-administered questionnaire. Knowledge, attitudes and beliefs were assessed by use of a self -rating Likert's scale. In-depth interviews were conducted through a non-structured questionnaire on Key Informants (KI) who were nurse in-charges of the selected NBUs. Research assistants were trained on data collection procedures before the instruments were pre-tested to ascertain validity and reliability.

Data Analysis

Data obtained was entered and cleaned in the statistical package for social science (SPSS) version 22.0 software. Descriptive statistical analysis was done using frequencies and percentages. Tests of associations and correlations were done using spearman's tests for associations. The study assumed a confidence level of 95%. A (p) value equal or less than 0.05 was considered significant. Qualitative data was organized in themes and analyzed manually then it was reported verbatim.

Ethical Consideration

Clearance to conduct the study was obtained from one of the major hospitals IREC. Permission to collect data was sought from management in targeted hospitals. Participants signed an informed consent.

RESULTS

Most of the respondents (68.5%) were young in age bracket of 21 – 40 years. Majority

(84.3%) were females with most of them (60.7%) having attained basic diploma level of education. Only a few about a third (32%) had work experience of ten years or more (Table1).

Table 1. Participants Socio -Demographics

Characteristic	Categories	n	%
Age group in years	20 and below	1	1.1
	21 – 40	61	68.5
	41 – 60	27	30.3
Gender	Male	14	15.7
	Female	75	84.3
Qualifications	Basic diploma	54	60.7
	Post-graduate diploma	38	39.3
Work experience in NBU	Below10 years	57	64
	≥ 10 years	32	36.0

Nurses' knowledge, attitude and beliefs towards neonatal pain and management of pain in neonates

Participant's knowledge, attitude and beliefs on selected aspects on neonatal pain was assessed using a Likert scale. Majority (75%) of the respondents knew that neonates experience pain. However less than half (45%) of the respondents agreed that preterm babies are likely to experience more pain due to high numbers of procedures. About the same proportion of respondents (42%) knew the pharmacological and non-pharmacological pain management interventions. Similar information was collected from respondents in the Key informant interview who reported that most nurses know that neonates experience pain. "***Nurses are very much aware that neonates feel pain but do little to address it since medication for neonates is limited" (***KII number 4). On beliefs and attitudes, less than half (42%) of the nurses believed that pharmacologic and non-pharmacologic interventions are vital in neonatal pain management (Table 2).

Participants practices in management of neonatal pain

The commonest neonatal pain management practice was use of physiologic and behavioral factors (39%) to assess pain and use of non-pharmacologic interventions (35%) to treat pain. Aspects of pain assessment using pain assessment tools were poorly scored. Majority (43%) of the respondents did not utilize pain assessment tools and only about 6% strongly agreed to the use of the assessment tools (Table 3).

Relationship between nurses' knowledge, attitudes and practices in management of neonatal pain

Spearman correlation was used to evaluate relationships between nurses' knowledge, perception and practices about neonatal pain management. Results show a strong positive correlation between knowledge and the pharmacological interventions for neonatal pain management and use of pharmacological interventions for neonatal pain management ($p < 0.0001$) (Table 4).

DISCUSSION

The current study assessed various aspects on knowledge beliefs and attitude as determinants of nurse's practices in neonatal pain management. The findings show that knowledge on most aspects of neonatal pain assessment and management among the participants was low. Most participants reported being uncomfortable with their knowledge and skills in neonatal pain management using pharmacological interventions. These findings correlate with those of studies done earlier (Costa *et al.,* 2017; Popowicz et al, 2021; Wari, 2021; Muteteli et al., 2019a) where nurses were found to have knowledge deficit on selected aspects of neonatal pain.

Table 2. Nurses' Knowledge and Attitude Towards Pain and Pain management in Neonates

Statement	Response			
	SA	A	D	SD
Knowledge and beliefs on pain in neonates				
Neonates experience pain	67 (75.3)	8 (9.0)	1 (1.1)	13 (14.6)
Preterm babies are likely to experience more pain	40 (44.9)	27 (30.3)	10 (11.2)	12 (13.5)
The pain assessment tool is accurate and effective in pain assessment	29 (32.6)	30 (33.7)	15 (16.8)	15 (16.8)
Pharmacologic interventions are vital regardless of the duration which the invasive procedures take	37 (41.6)	33 (37.1)	11 (12.4)	8 (9.0)
Non-pharmacologic interventions are vital	38 (42.7)	39 (43.8)	9 (10.1)	3 (3.4)
Attitudes on neonatal pain management interventions.				
I feel comfortable with my knowledge and skills in neonatal pain management using pharmacological interventions	28 (31.5)	28 (31.5)	18 (20.2)	15 (16.8)
I feel comfortable with my knowledge and skills in neonatal pain management using non-pharmacological interventions	28 (31.5)	34 (38.2)	21 (23.6)	6 (6.7)
I feel that neonatal pain management is undertaken well in my newborn unit	20(22.5)	21(23.6)	29(32.6)	19(21.3)

Table 3. Participants Practices in Management of Neonatal Pain

Statement (Practice)	Response			
	SA (%)	A (%)	D (%)	SD (%)
I use pharmacologic interventions for neonatal pain management	25 (28.1)	33 (37.1)	20 (22.5)	11 (12.4)
I use non-pharmacologic interventions for neonatal pain management	31 (34.8)	40 (44.9)	12 (13.5)	6 (6.7)
I use pain assessment tools regularly	5 (5.6)	17 (19.1)	29 (32.6)	38 (42.7)
I use physiological and behavioral factors to assess pain in neonates	35 (39.3)	26 (29.2)	20 (22.5)	8 (9.0)
I conduct pain assessment frequently among the neonates as per the protocols	10 (1.2)	22 (24.7)	32 (36.0)	25 (28.1)
I record all the scores and actions during pain assessment and management	10 (11.2)	18 (20.2)	29 (32.6)	32 (36.0)
I use massage in pain management	27 (30.3)	34 (38.2)	17 (19.1	11 (12.4)

Table 4. Spearman Correlation Between Nurses' Knowledge, Attitudes and Practices in Management of Neonatal Pain

Variable indicators	R	P value
Knowledge that neonates experience pain **vs** uses pharmacologic interventions	0.29	0.006
Neonates experience pain **vs** use non-pharmacologic interventions	0.33	0.002
Knows pharmacological interventions **vs** use pharmacologic interventions	0.44	<0.0001
Feels comfortable with my knowledge and skills using pharmacological interventions **vs** use pharmacologic interventions	0.37	0.0004
Feels comfortable with my knowledge and skills using non-pharmacological interventions **vs** use pharmacologic interventions	0.38	0.0002
Feels that neonatal pain management is undertaken well in my newborn unit **vs** use pharmacologic interventions	0.37	0.0004
Preterm babies are likely to experience more pain due to high numbers of procedures **vs** use pain assessment tools regularly	-0.26	0.01
Feels comfortable with my knowledge and skills in neonatal pain management using pharmacological interventions **vs** I conduct pain assessment frequently among the neonates as per the protocols	0.314	0.003
Feels that neonatal pain management is undertaken well in my newborn unit **vs** conduct pain assessment frequently	0.28	0.007

According to the study by Costa et al, nurses had knowledge deficit on physiology of pain. Studies by Wari and Muteteli reported knowledge deficit on use of analgesia in neonates. Earlier literature findings from studies Cong et al (2013) USA and (Carlsen Misic et al., 2021) disagree with those of the current and other studies.

According to these studies, nurses are not only knowledgeable on most neonatal pain management aspects but they also assessed and managed pain in neonates. The participants were however highly learned and had vast experience working in NICUs.

The history of neonatal pain management consists of beliefs that neonates have blunted and immature responses to pain. This has since been disproved. Evidence shows that both premature (Walker et al., 2018) and mature infants (Walker, 2019) have the neuroanatomic pathways that communicate nociception.

Negative attitudes of caregivers are among the most important factors impeding effective pain management in neonates. Findings in the current study indicate that participants did not have the right attitude and beliefs towards pain management in neonates. According to this study, most nurses did not believe that the neonatal pain assessment tool is accurate in assessing pain while less than half (41.6%) believed that pharmacologic and non-pharmacologic interventions are vital in managing neonatal pain.

These findings are not unique. In agreement with the current study, are studies done in Rwanda (Muteteli et al., 2019b) and Saudi Arabia (Samarkandi, 2018). According to the Rwanda study even majority of the nurses believed that neonates should not receive anesthesia an indication of negative attitudes.

Contrary to the current study several studies done to assess nurse's attitude towards pain in neonates documented positive attitudes (Khoza & Tjale, 2014; Carlsen Misic et al., 2021; Mekonen et al., 2024). In a study assessing perception and use of neonatal pain assessment done among Swedish nurses (Carlsen Misic et al., 2021) revealed positive attitude among the nurses. This did not however translate to clinical practice since about only 53% reported to be using clinical guidelines on pain management in neonates.

Effective pain management is an evidence-based standard of care for preterm and term newborns and may potentially improve their clinical and neurodevelopmental outcomes. Despite existing evidence on the effectiveness of pain management and prevention in neonates, the practice of pain management in the current study was low. These findings confirm those of several other authors done to assess nurse's practices in managing pain in neonates (Muteteli et al., 2019;Wari et al., 2021). A recent study done in Ethiopia(Kebede et al., 2023) however disagree with the current study finding. In the study the practice of pain management in neonates was high majorly due to availability of protocols and in-service trainings.

The commonest neonatal pain management practice in the present study was use of physiologic and behavioral factors to assess pain and use of non-pharmacologic interventions to treat pain. This could be explained by the fact that very few nurses in the present study (32%) believed in the effectiveness of the neonatal pain assessment tools. These findings are in agreement with those of (Carlsen Misic et al., 2021; Blomqvist, Y. et al., 2019) where nurses felt that clinical judgement could be more effective in assessing neonates as opposed to use of specific tools. Differing results were found in a study done in Ethiopia (Wari, 2021) where majority of the respondents acknowledged that pain scales are crucial in assessing neonatal pain.

Similar to studies done earlier in other set-ups (Wari et al., 2021; Carlsen Misic et al., 2021) knowledge was significantly associated with the practice of pain management in neonates in the current study. According to the study by Wari, there was a twofold likelihood OR-2.67 of nurses with good knowledge to manage pain in neonates an indication that adequate knowledge can lead to improved management of neonatal pain. Further findings from the current study show that respondents who were comfortable with their knowledge and skills in neonatal pain management ($p=0.0004$ and $p = 0.0002$) were more likely to implement pharmacologic interventions as neonatal pain management strategies. These findings are in conformity with those of international and regional researchers (Popowicz et al, 2021) and (Muteteli et al., 2019) who reported increased likelihood of implementing pain management strategies in neonates among nurses who perceived to be knowledgeable on the subject matter. Contrary findings were however reported by (Costa et al., 2017). According to Costa, technical knowledge on neonatal pain management exists. However, an existing gap in the translation of knowledge to practice was found hence the conclusion that knowledge does not necessarily translate to practice.

CONCLUSION

The study highlights that pain management in neonates is influenced by a variety of determinants including Participants knowledge on various pain management practices and attitudes towards pain management in neonates. Based on the findings of the current study, it was concluded that nurse's knowledge of pharmacological pain interventions is the main determinant of neonatal pain management practices among nurses. In conclusion, optimizing the determinants of pain management in neonates will not improve the immediate comfort of newborns but will also contribute to their long health and development.

SUGGESTIONS

A continuous training and educational program should be planned and offered on regular basis for nurses regarding non-pharmacologic techniques to relieve pain in neonates. There is also a need for clearer and more accessible guidelines, since the existing guidelines mentioned by the study respondents were not consistent with recommendations on pain management in neonates.

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DECLARATION OF CONFLICTING INTEREST

There is no conflict of interest.

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AUTHOR CONTRIBUTION

Damaris Moraa Ongori: Conceptualization, proposal and thesis writing.

Teresa Kerubo Okiri: Data entry and analysis.

ORCID

Damaris Moraa Ongori: https://orcid.org/0000-0002-0743-3816

Teresa Kerubo Okiri: https://orcid.org/0009-0003-7369-9756

REFERENCES

American Academy of Pediatrics. (2017). Prevention and Management of Pain in the Neonate : An Update. *Pediatrics*, *118*(5). https://doi.org/10.1542/peds.2006-2277

Balice-bourgois, C., Zumstein-shaha, M., Newman, C. J., & Simonetti, G. D. (2020). A complex interprofessional intervention to improve the management of painful procedures in neonates. *Pediatric Neonatal Pain*, *2*(September 2019), 63–73. https://doi.org/10.1002/pne2.12012

Carlsen Misic, M., Andersen, R. D., Strand, S., Eriksson, M., & Olsson, E. (2021). Nurses' perception, knowledge, and use of neonatal pain assessment. *Paediatric and Neonatal Pain*, *3*(2), 59–65. https://doi.org/10.1002/pne2.12050

Costa, T., Rossato, L. M., Bueno, M., Secco, I. L., Sposito, N. P. B., Harrison, D., & de Freitas, J. S. (2017). Nurses' knowledge and practices regarding pain management in newborns. *Revista Da Escola de Enfermagem*, *51*, 1–7. https://doi.org/10.1590/S1980-220X2016034403210

Gursul, D., Hartley, C., & Slater, R. (2019). Nociception and the neonatal brain. *Seminars in Fetal and Neonatal Medicine*, *24*(4), 101016. https://doi.org/10.1016/j.siny.2019.05.008

Hall, R. W. (2014). Pain Management in Newborns Analgesia Sedation Pain Stress NICU Infant-newborn. *Clinics in Perinatology*, *41*(4), 895–924. https://doi.org/10.1016/j.clp.2014.08.010

Hanna Popowicz, Wioletta Medrzycka-Dabrowska, Kwiecie, Katarzyna, A. K. (2021). Knowledge and Practices in Neonatal Pain Management of Nurses Employed in Hospitals with Different Levels of. *Healthcare*, *9*(48).

Hoarau, K., Payet, M. L., Zamidio, L., Buissante, F., & Iacobelli, S. (2021). "Holding–Cuddling" and Sucrose for Pain Relief During Venepuncture in Newborn Infants: A Randomized, Controlled Trial (CÂSA). *Frontiers in Pediatrics*, *8*(02803723). https://doi.org/10.3389/fped.2020.607900

Ishak, S., Nfe, F., Zakaria SZ, S., Adli, A., & Jaafar, R. (2019). Neonatal pain: Knowledge and perception among pediatric doctors in Malaysia. *Pediatrics International*, *61*(1). https://doi.org/10.1111/ped.13724

Kebede, S. M., Degefa, M., Getachew, T., Lami, M., Tadesse, B., & Bekele, H. (2023). Neonatal pain management practice in the neonatal intensive care unit of public hospitals: a survey of

healthcare providers in eastern Ethiopia. *International Health*, *0*, 1–11. https://doi.org/10.1093/inthealth/ihad095

Khoza, S. L. T., & Tjale, A. A. (2014). Knowledge, attitudes and practices of neonatal staff concerning neonatal pain management. *Curationis*, *37*(2), E1–E9. https://doi.org/10.4102/curationis.v37i2.1246

Krowchuk, H. V. (2018). The Minimally Effective Dose of Sucrose for Procedural Pain Relief in Neonates: A Randomized Controlled Trial. *MCN The American Journal of Maternal/Child Nursing*, *43*(5), 297. https://doi.org/10.1097/NMC.0000000000000457

Marchant, A. (2014). "Neonates do not feel pain": A critical review of the evidence. *Bioscience Horizons*, *7*, 1–9. https://doi.org/10.1093/biohorizons/hzu006

Maxwell, L. G., Fraga, M. V, & Malavolta, C. P. (2019). Assessment of Pain in the Newborn. In *CLINICS IN PERINATOLOGY*. Elsevier Inc. https://doi.org/10.1016/j.clp.2019.08.005

McPherson, C., Miller, S. P., El-Dib, M., Massaro, A. N., & Inder, T. E. (2020). The influence of pain, agitation, and their management on the immature brain. *Pediatric Research*, *88*(2), 168–175. https://doi.org/10.1038/s41390-019-0744-6

Mekonen, W. M., Mu[illegible], A. B., & Gobeza, M. B. (2024). Nurses' knowledge and practice about neonatal pain management in public hospitals in West Oromia, Ethiopia, 2022: multi-centered cross-sectional study. *BMC Nursing*, *23*(1), 1–11. https://doi.org/10.1186/s12912-024-01972-3

Muteteli, C., Tengera, O., & Gowan, M. (2019a). *Neonatal Pain Management among Nurses and Midwives at Two Kigali Hospitals*. *2*(2), 138–146.

Muteteli, C., Tengera, O., & Gowan, M. (2019b). *Neonatal pain management among nurses and midwives at two Kigali hospitals Neonatal Pain Management among Nurses and Midwives at Two Kigali Hospitals*. *June 2021*. https://doi.org/10.4314/rjmhs.v2i2.9

Samarkandi, O. A. (2018). Knowledge and attitudes of nurses toward pain management. *Saudi Journal of Anaesthesia*, *12*(2), 220–226. https://doi.org/10.4103/sja.SJA_587_17

Wade, C., Frazer, J. S., Qian, E., Davidson, L. M., Dash, S., te Water Naudé, A., Ramakrishan, R., Aluvaala, J., Lakhoo, K., & English, M. (2020). Development of locally relevant clinical guidelines for procedure-related neonatal analgesic practice in Kenya: a systematic review and meta-analysis. *The Lancet Child and Adolescent Health*, *4*(10), 750–760. https://doi.org/10.1016/S2352-4642(20)30182-4

Walker, S. M. (2019). Seminars in Fetal and Neonatal Medicine Long-term effects of neonatal pain. *Seminars in Fetal and Neonatal Medicine*, *24*(4), 101005. https://doi.org/10.1016/j.siny.2019.04.005

Walker, S. M., Melbourne, A., Reilly, H. O., Beckmann, J., Ourselin, S., & Marlow, N. (2018). Somatosensory function and pain in extremely preterm young adults from the UK EPICure cohort : sex-dependent differences and impact of neonatal surgery. *British Journal of Anaesthesia*, *121*(3), 623–635. https://doi.org/10.1016/j.bja.2018.03.035

Wari, G. (2021). *Knowledge and Practice of*

Nurses and Associated Factors in Managing Neonatal Pain at Selected Public Hospitals in Addis Ababa , Ethiopia , 2020. 2275–2286.

Wari, G., Wordofa, B., Alemu, W., & Habte, T. (2021). Knowledge and practice of nurses and associated factors in managing neonatal pain at selected public hospitals in Addis Ababa, Ethiopia, 2020. *Journal of Multidisciplinary Healthcare*, *14*, 2275–2286. https://doi.org/10.2147/JMDH.S322903

Williams, M. D., & Lascelles, B. D. X. (2020). *Early Neonatal Pain — A Review of Clinical and Experimental Implications on Painful Conditions Later in Life*. *8* (February). https://doi.org/10.3389/fped.2020.00030

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