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# Factors Influencing Post-Operative Pain Management Among Neonates at Moi Teaching and Referral Hospital, Kenya

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**Abstract:** Background: Neonatal post-operative pain management poses a unique challenge particularly with regard to assessing and treating the pain. In spite of the existence of empirical evidence on safety and effectiveness of neonatal postoperative pain management strategies, little is known about postoperative pain assessment and management practices in neonatal units in Kenya. In the Newborn Unit (NBU) at Moi Teaching and Referral Hospital (MTRH), neonatal assessment and treatment of neonatal postoperative pain is influenced by the knowledge base and personal decision of the health care provider. Objective: The objective of the study was to determine factors influencing postoperative pain management practices among neonates at MTRH, in Kenya in order to inform policy. Methods: This was a descriptive cross-sectional study design. The study was done at the newborn unit at MTRH, Eldoret. A semi –structured questionnaire and observation check-list was used to collect data. Data was analyzed using Statistical Package for the Social Sciences (SPSS) version 21.0 program and presented in tables, graphs, frequencies and content analysis. Statistical techniques including logistic regression and correlation statistical procedures were employed in analysis. Results: Data from 45 health care providers were collected. The mean years of practice were 9 years, while the mean score for the assessment was 3.7. There was a negative correlation ( $r = - 0.058$ ) between professional years of practice and assessment scores though it was not significant 0.703. There was a positive correlation between the intervention scores and professional years of practice ( $r = 0.028$ ,  $p > 0.05$ ) hence not significant. There was a positive correlation between the intervention scores and assessment scores ( $r = 0.546$ ) and it was statistically significant  $p < 0.001$ . The mean score between doctors and the nurses differed and was slightly higher on assessment as compared to intervention. All health care providers cited that there were no written guidelines and pain assessment scale for use at NBU. Majority of the doctors and nurses had adequate knowledge on assessment of postoperative pain in neonates and the subsequent intervention to alleviate pain although none of them had attended any course on the same. Conclusion and Recommendations: From the study, there was lack of provision of objective tools to assess neonatal pain. Postoperative pain management was influenced by the knowledge base and personal decision of the health care provider. The study recommends the need for evidence-based guidelines for postoperative pain management at the newborn unit of MTRH. In addition, there is need for Continuing Professional Development for professional staff working at the newborn unit on the systematic assessment and management of postoperative pain in neonates.

**Keywords:** Influencing Factors, Postoperative Pain, Neonate

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## 1. Background

Each year millions of neonates undergo surgery as part of corrective treatment worldwide. As a result, pain interventions need to be planned for the intra-operative and

postoperative periods. Neonatal postoperative pain management poses a unique challenge particularly with regard to assessing and treating the pain [1]. Neonates admitted in neonatal units worldwide experience moderate to severe postoperative pain [2]. Management practices of the

postoperative pain remains extremely variable, with wide inconsistencies in neonatal pain assessment, types of measurement tools and pain management interventions used [3]. Even though, there is substantial research evidence on postoperative pain treatment strategies, currently there exists no gold standard for measuring postoperative pain in neonates [4]. The significant limitations of pain research such as the inability of neonates to verbally vocalize whether or not they are in pain can often lead to contrasting ideas [5].

A study done in the United States of America (U.S.A) demonstrated that healthcare professionals may have insufficient knowledge regarding pain management; and may require guidelines on how to appropriately assess and document postoperative pain in the paediatric population. The study further revealed that improvement for individual healthcare professionals and clinical settings would overcome challenges to postoperative pain management in future [6]. In choosing an instrument for assessing postoperative pain in neonates, health care providers should take into consideration evidence based practice, including the aspects of validity and reliability of scales, clinical setting guidelines and characteristics of the individual neonate. Health care providers should also consider the type of pain experienced before choosing any method to alleviate pain [7].

Tools for neonatal postoperative pain assessment and management provide guidance to some of the best practices in current clinical practice. Brief information of the intended age ranges for which the tool has been developed and information on the ages for which the tool has been validated are presented [8]. Any pain scale is scored after observations of various behaviors and physiological changes which are interpreted to be communicating neonatal pain. The higher the scoring the severe the pain is rated. Pain assessment and management practices should be documented in a manner that facilitates regular reassessment and follow-up interventions [9]. It has been proposed that systematic pain assessment increases the awareness of the need to treat and prevent pain, so most international and national neonatal pain guidelines state that pain assessment should be performed in a systematic way. National surveys show a wide variation in compliance to these guidelines [10]. A neonate's pain should be assessed upon admission and at regularly defined intervals throughout the hospitalization [9]. Pain scores, interventions, and responses should be documented in a way that facilitates high visibility and regular review by members of the healthcare team. Pain scores should be recorded on the nursing progress record, using a valid and reliable pain instrument at time intervals defined in hospital policy.

Further research shows that, effects of Knowledge, education, and clinical experience on neonatal postoperative pain management by the health care providers are vital. In a study conducted to determine how nurses' education and clinical experience influence nurses' interpretation of neonatal postoperative pain, findings revealed that the specialist nurses perceived lower levels of physical pain than the generalist nurses [11]. It is possible that nurses who deal with postoperative pain management on a regular basis may become desensitized to the

neonate's perception of pain. Nurses' desensitization of the neonates' pain inhibits better postoperative pain management. Since a large majority of neonates in the Neonatal Intensive Care Unit (NICU) settings are experiencing pain, NICUs need to be mindful of the impact of nurses' desensitization of pain when assessing their NICU postoperative pain management strategy because pain relief is a basic human right [11].

In a study to examine nursing factors which influence evidenced based postoperative pain care delivery during tissue damaging procedures in neonates, findings showed that nurses were able to accurately identify evidenced based postoperative pain care [12]. The same study further revealed that nurses' knowledge on postoperative pain management and varied nurses' educational level had no effect on pain management. The authors concluded that nursing knowledge is an important variable in the final equation despite the lack of statistical evidence [12].

In a study done on factors that influence nurses' postoperative pain management in neonates, the researchers identified the management of postoperative pain as a basic human right although despite research on neonatal postoperative pain management; neonates continue to experience more pain [13]. Further, the authors, found that co-operation of health care providers with parents influence postoperative pain management as well as knowledge, attitudes, and experience of health care providers [13]. The same study implied that there are multiple influences that affect postoperative pain management in the hospital setting and that neonates benefited more when adequate structures are present to assist nurses in managing neonates' postoperative pain.

Findings from a study conducted among neonates in Kenya showed that, neonates were regularly subjected to a multitude of diagnostic and therapeutic procedures that are painful but medically necessary for their care [14]. It is only over the last two decades that clinicians have started to acknowledge that neonates experience pain and require treatment to alleviate unnecessary suffering. Currently, treatment of pain in neonates is a priority in many healthcare institutions [15 & 16]. In the Newborn Unit (NBU) at Moi Teaching and Referral Hospital (MTRH), neonatal assessment and treatment of neonatal postoperative pain is influenced by the knowledge base and personal decision of the health care provider, yet little is known about factors influencing post-operative pain management among neonates at Moi Teaching and Referral hospital in Kenya. It is in light of this knowledge gap that the study was conducted in order to inform policy.

## 2. Objective

The objective of the study was to determine factors influencing postoperative pain management in neonates at Moi Teaching and Referral hospital in Kenya.

## 3. Methods

A descriptive cross-sectional study was conducted in the

newborn unit (NBU) of the Moi Teaching & Referral Hospital (MTRH), Eldoret in Kenya. The study population comprised of 45 health care providers (32 nurses, one (1) neonatologist and 12 pediatric doctors which includes anesthesiologists, surgeons and physicians. Data collection tools: Interview guide to interview the health care providers in the NBU which included nurses and doctors taking care of the postoperative neonates. Nurses and doctors filled a questionnaire enquiring factors contributing to individual assessment and management of postoperative pain in neonates. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0 and presented in tables, graphs, frequencies and content analysis Ethical approval was obtained from institutional research and ethical committee (IREC) based at Moi Teaching and Referral Hospital. Permission was sought from hospital management and the nurse in charge at New born unit to collect data from the health care providers working at NBU during the period of study. Informed consent was obtained from each

healthcare provider before being interviewed by use of semi-structured questionnaire. Participation was voluntary and the information provided was treated with utmost regard for confidentiality and anonymity.

### 4. Results

Data from 68 neonates and 45 health care providers were collected for this study on the basis of inclusion and exclusion criteria. Each neonate was observed after every three hours in conjunction with the normal time of taking neonatal vital signs up to 48 hours postoperatively. The nurses and doctors filled a questionnaire enquiring factors contributing to individual assessment and management of postoperative pain. The researcher used CRIES scale to rate the observation of pain assessment. The immediate intervention undertaken in case a neonate was in pain was also observed and recorded by the researcher.

#### 4.1. Association Between Professional Experience and Intervention Scores



Figure 1. Association between professional experience and intervention scores.

As indicated in figure 1, the mean years of practice cited by the health care providers interviewed were 9 years, while the mean score for the assessment was 3.7. There was a negative correlation ( $r = - 0.058$ ) between professional years of practice and assessment scores though it was not significant (0.703).

#### 4.2. Association Between Professional Experience and Intervention Scores

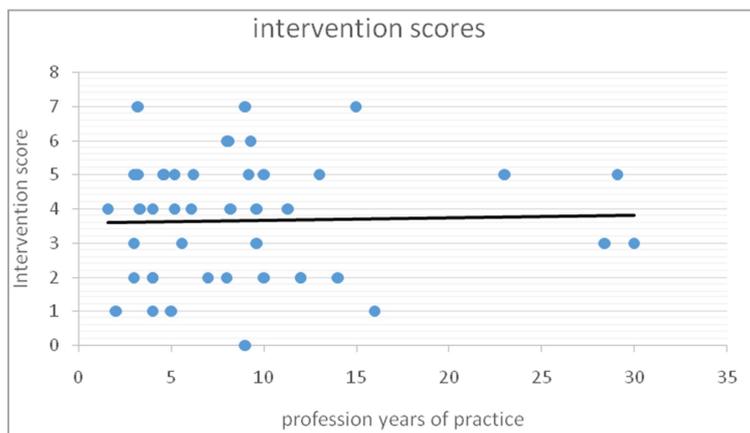


Figure 2. Association between professional experience and intervention scores.

Figure 2 shows that, there was a positive correlation between the intervention scores and professional years of practice ( $r = 0.028, p > 0.05$ ) hence not significant.

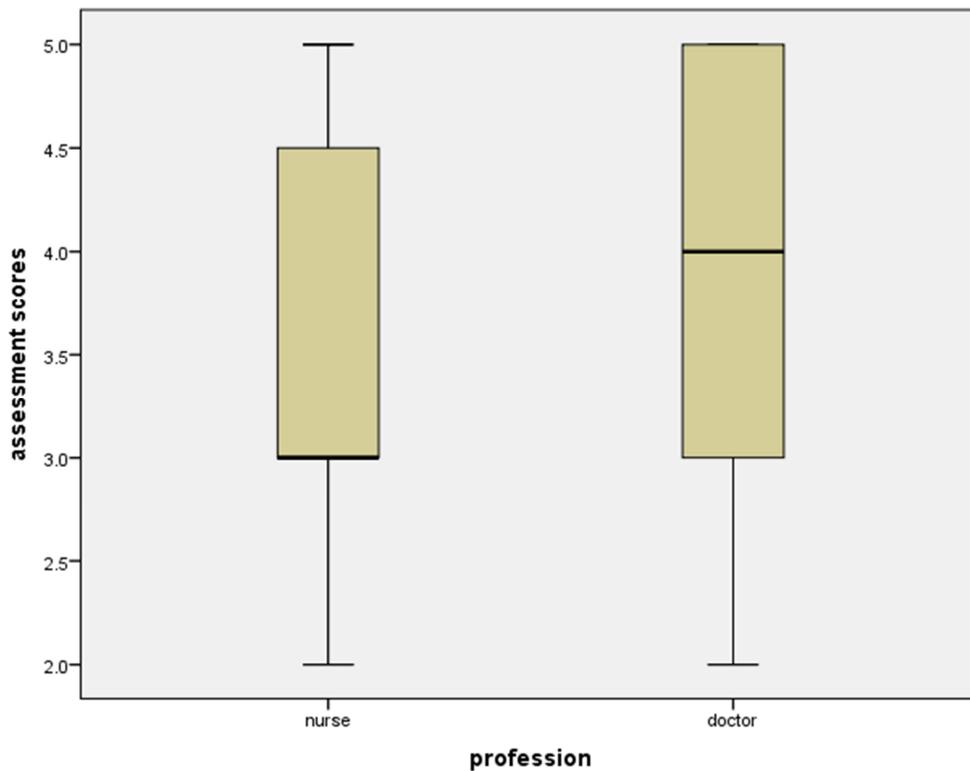
**4.3. Association Between Assessment Scores and Intervention Scores**



**Figure 3.** Association between assessment scores and intervention scores.

Figure 3 shows that, there was a positive correlation between the intervention scores and assessment scores ( $r = 0.546$ ) and it was statistically significant  $p < 0.001$ . Most doctors and nurses had adequate knowledge on assessment of postoperative pain in neonates and the subsequent intervention to alleviate pain though none had attended any course.

**4.4. Association Between Profession and Assessment Scores Between Doctors and Nurses**



**Figure 4.** Association between profession and assessment scores.

Figure 4 shows that 50% of the nurses scored 3 and below in assessment while only 25% of the doctors scored 3 and below.

#### 4.5. Association Between Profession and Intervention Scores Between Nurses and Doctors

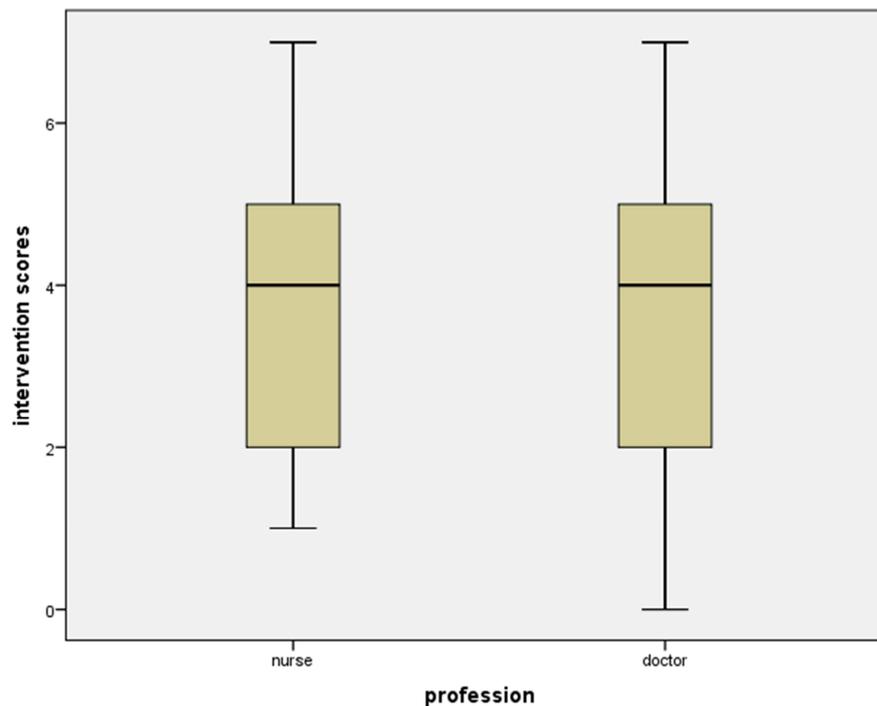


Figure 5. Association between profession and intervention scores.

The mean score between doctors and the nurses differed and was slightly higher on assessment as compared to intervention as indicated in figure 5. The researcher found that doctors were more knowledgeable on how to do assessment than nurses but almost equal to the nurses in terms of knowing how to intervene.

All health care providers cited that there were no written guidelines and pain assessment scale for use at NBU. None of them had attended a course on pain management in neonates.

#### 4.6. Association Between Assessment Scores, Intervention and the Nurses' Cadre

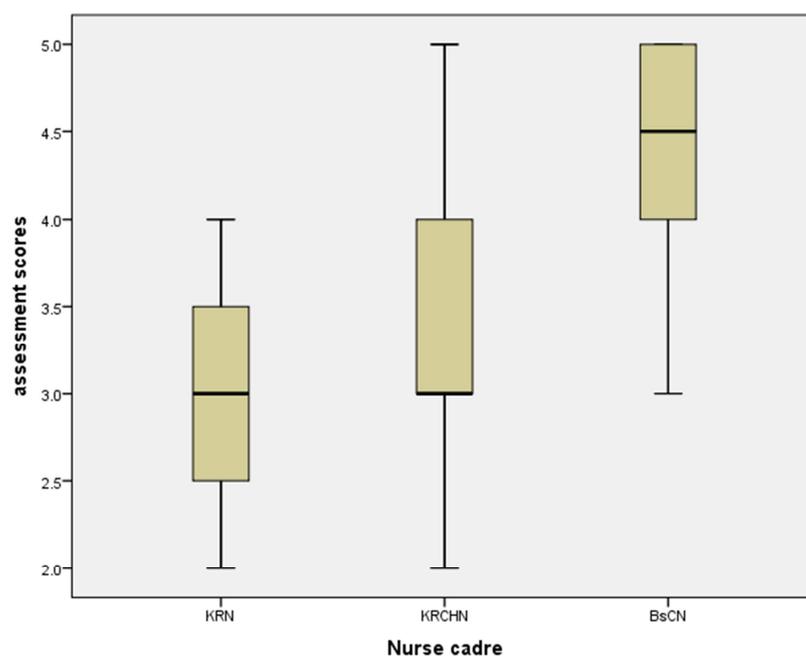


Figure 6. Association between nurses' cadre and assessment scores.

Findings from figure 6 indicate that, BScN nurses had a higher assessment median score as compared to both the KRCHN and KRN. This means that they have better skills in pain assessment. The scores for KRCHN were more dispersed than any other cadre. Consequently, the mean assessment score for BScN nurses was high at 4.3 compared to the mean score for KRN (3.0) and KRCHN (3.5).

**4.7. Association Between Nurses' Cadre and Intervention Scores**

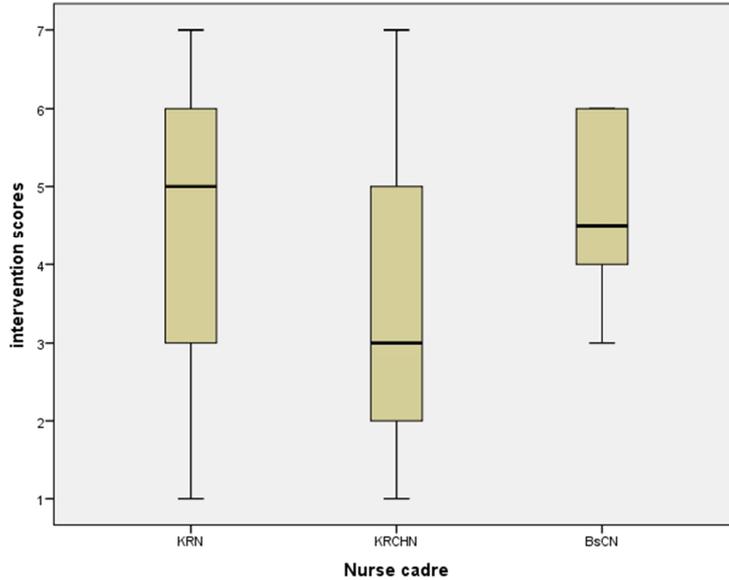


Figure 7. Association between nurses' cadre and intervention scores.

Figure 7 indicates that, the median intervention score was higher in KRN than KRCHN and BScN though with wider percentiles range. That is, they were better in intervention skills than other cadres. The mean intervention score for BScN nurses was high at 4.67 compared to the mean score for KRN (4.50) and KRCHN (3.38). However, the difference in the mean scores was not statistically different ( $p > 0.05$ ).

**4.8. Association Between Assessment Scores, Intervention and the Doctors' Cadre**

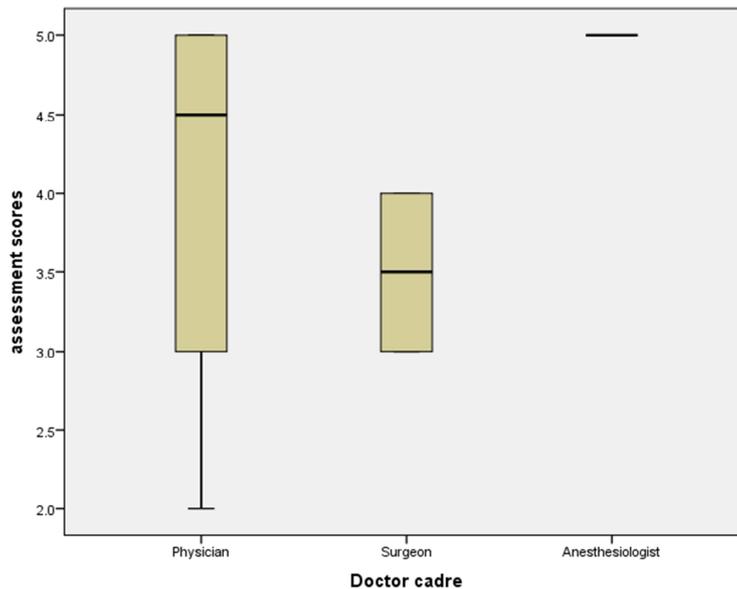


Figure 8. Association of doctors' cadre and assessment scores.

Findings on the association of doctors' cadre and assessment scores indicated that; all the anesthesiologists knew how to assess pain in postoperative neonates, followed by physicians while surgeons had the lowest median score as shown in figure 8. However, some physicians had the lowest scores in all the doctors' cadres.

#### 4.9. Association Between Doctors' Cadre and Intervention Scores

Findings from this study indicated that, anesthesiologists had better skills in interventions compared to surgeons and physicians. Also, in assessment scores, physician scores were more diverse than the others, although the differences in the mean score were not statistically significant. The anesthesiologists scored highly, followed by the physicians in both assessment and intervention scores as shown in figure 9 below.

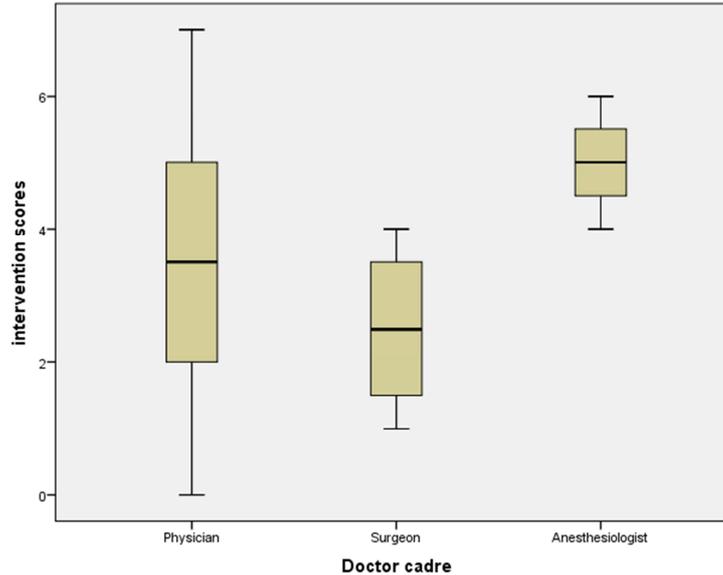


Figure 9. Association between doctors' cadre and intervention scores.

## 5. Discussion

This study found numerous inconsistencies in the assessment and management of postoperative pain in the NBU such as lack of hospital standardized guidelines for neonatal assessment and management of postoperative pain as previously observed by [17] which is a prerequisite for adequate pain management, is the routine assessment of pain in neonates. The data showed that NBU nurses did not use objective pain-assessment tools, whereas those with prescriptive authority (doctors) did not prescribe analgesics. There were no available tools to assess postoperative neonatal pain at the NBU hence pain assessment was poorly done.

Findings from available literature shows that, many numeric pain assessment tools that are used for neonates have limited applicability for postoperative pain, whereas others are cumbersome for clinical use. The Premature Infant Pain Profile [18] and CRIES scale [19] are validated for postsurgical pain in neonates [7] but none of these tools were in use at the Moi Teaching and Referral Hospital newborn unit.

The most significant finding of this study was that doctors rarely practiced pain assessments in neonates postoperatively yet they were more knowledgeable than nurses. The findings were similar to the findings from a study on social barriers to optimal pain management in infants and children where the authors found that most doctors may be unfamiliar with the metric properties of numeric scales and/or were unable to commit their time to use these tools in a busy NBU setting [20]. However this could be attributed to the fact that, nurses

often assess neonates for postoperative pain and then obtain therapeutic orders from doctors, thereby reducing the need for a doctor to use pain scales.

The health care providers stated that there were no set guidelines and pain assessment tools in place at the MTRH, NBU. In choosing an instrument for assessing postoperative pain in neonates, health care providers should take into consideration evidence based practice, including the aspects of validity and reliability of scales, clinical setting guidelines and characteristics of the individual neonate. Health care providers should also consider the type of pain experienced before choosing any method to alleviate pain [7]. Any pain scale is scored after observations of various behaviors and physiological changes which are interpreted to be communicating neonatal pain. The higher the scoring, the severe the pain is rated. Evidence on pain management indicate that, brief information of the intended age ranges for which the tool has been developed and information on the ages for which the tool has been validated are required to be presented before choosing the best tool to assess neonatal pain [8].

In comparing knowledge and experience in managing of neonatal postoperative pain, it was found that doctors were more knowledgeable on pain assessment than nurses but in the intervention there was no difference. Findings from a study conducted to determine how nurses' education and clinical experience influence nurses' interpretation of neonatal postoperative pain revealed that the specialist nurses tended to perceive lower levels of physical pain than the generalist nurses [11]. It is possible that nurses who deal with postoperative pain management on a regular basis may become desensitized to the

neonate's perception of pain. Similar findings indicate that the major goal in the management of postoperative pain is to minimize the dose of medications in order to reduce the side effects while still providing adequate analgesia hence the health care providers ought to be keen in alleviating postoperative pain in neonates as cited by [21].

A logistic-regression model, designed to examine factors that led to the management of neonatal postoperative pain showed that the odds of the health care providers managing neonatal postoperative pain were slightly higher when doctors had performed a pain assessment than the nurses. It is intriguing that nursing pain assessments alone did not play a role in the decision to use analgesia, despite the voluminous literature on nursing pain assessments and increasing awareness of neonatal pain among nurses [4]. In contrast, not much information has been published in the pediatric surgical literature to promote the use of pain assessments in postsurgical neonates.

## 6. Conclusion and Recommendations

This study demonstrated that postoperative pain management was influenced by the knowledge base and personal decision of the health care provider. There was no provision of objective tools to assess neonatal pain. In addition, there was lack of management guidelines which resulted to irregular neonatal postoperative pain management at the NBU. The results of this study highlight the need for evidence-based guidelines for postoperative care for all providers at the newborn unit. In addition, there is need for doctors and nurses to have Continuing Professional Development (CPD) on the recognition, assessment and control of postoperative pain in neonates.

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