



Suggestions to Improve Peripheral Nerve Block Practices in Hospitals in Sri Lanka – Medical Administrators Perspectives.

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ABSTRACT :

Nerves can be blocked at several points along their paths. Locating nerves can be done using a nerve stimulator or ultrasound device. Single injections or catheters can be used, to block nerves. These blocks are one category of regional anaesthesia. In Sri Lanka, these blocks are given by anaesthetists in various settings. However, practice has been limited due to various factors, including lack of training and resources. This research focused to Study on nerve block practices among a selected sample of anaesthetists, in Sri Lanka. The study was performed among 37 anaesthetists working in 14 major hospitals across the country to assess their practices and barriers. The study was a mixed study. A self-administered questionnaire was distributed among doctors participating nerve block training programme. Results revealed there are gaps in training, infrastructure, drugs, and equipment availability. It is recommended to organize regular training programmes for medical officers, improve infrastructure and improve drugs and equipment availability.

1. Introduction

Background

Nerve Blocks provide an alternative as well as a supplement to general anaesthesia. It can postoperative analgesia. Nerve blocks are one category of regional anaesthesia. There are both advantages and disadvantages of regional anaesthesia over general anaesthesia. The practising physicians need to decide the mode of anaesthesia by applying existing evidence to individual patients. (Gulur, Nishimori and Ballantyne, 2006a) Numerous regional anaesthesia procedures, such as peripheral nerve blocks (PNBs) and neuraxial blocks, are widely utilised throughout the world. Numerous studies have found that patients who undergo peripheral nerve blocks as opposed to general anaesthesia (GA), experience better patient outcomes. These techniques carry less number of complications and better patient satisfaction(Gulur, Nishimori and Ballantyne, 2006)

Safety and accessibility in anaesthetic care are critically limited for countries with limited resources. Over half of the world's population is being affected and regional anaesthesia has potential benefits regarding access, safety, and cost-effectiveness. Encouraging the use of nerve block techniques will be a success story for these countries. It decreases the risk of COVID-19 spreading to healthcare providers. Neuraxial regional anaesthesia is considered as the anaesthetic of choice for surgeries below the umbilicus in resource-limited settings due to its safety, efficacy, and low cost. However, education and training of anaesthetic providers in low-and-middle-income countries (LMIC) are a significant barrier to practising these procedures. (Dohlman, Kwikiriza and Ehie, 2020)

Justification

Peripheral regional nerve blocks are an integral component of modern perioperative care. They are utilized for perioperative and procedural pain control by anesthesiologists as well as emergency physicians. Regional anaesthesia is an anaesthetic option that not only provides an alternative to general anaesthesia but can also be used to supplement general anaesthesia or to provide perioperative analgesia. These techniques produce benefits for both patients and hospitals. (Kessler et al., no date)

In Sri Lanka, the utilization of these techniques in clinical practice has been limited due to various factors, including lack of training and resources. Medical officers' knowledge and expertise are crucial for the effective application of ultrasound-guided nerve blocks. In our settings, the adoption of ultrasound-guided nerve blocks in clinical practice is limited due to various reasons. Medical officers may not receive comprehensive training in ultrasound-guided nerve blocks during their education and training. The lack of necessary equipment and resources for ultrasound-guided procedures also be a contributory factor to limited practices in nerve blocks. There may be misconceptions or a lack of awareness among medical officers regarding

the benefits and safety of ultrasound-guided nerve blocks. Patient safety issues can occur due to inadequate knowledge and skills in ultrasound-guided procedures.

No research data is available on said topic in our context and this research study will pave the path for relevant authorities to make decisions on the establishment of training programs for medical officers on nerve block practices. Findings will enable administrators to take necessary steps to provide institutions with the required equipment and drugs for those institutions.

This research aimed to identify barriers to practising peripheral nerve blocks in Sri Lankan hospitals. The findings of this study will help identify gaps in knowledge and training needs, and gaps in equipment availability and ultimately will help clinicians and administrators to plan for future improvements.

Objective

Study on nerve block practices among a selected sample of anaesthetists, Sri Lanka.

Specific objectives

1. Study on existing nerve block practices among a selected sample of anaesthetists, in Sri Lanka.
2. Assess the availability of equipment to perform nerve blocks in Sri Lanka.
3. Assess the support from administrators to perform nerve blocks in Sri Lanka.

2. Literature review

Plexus blocks, plane blocks, and Isolated nerve blocks are integral components of regional anaesthesia and pain management practices. This literature review explores the existing knowledge in the field. It is important to understand current practices, their effectiveness, and potential areas for improvement to enhance patient care and healthcare practices in the region. Many publications describe various aspects of peripheral regional anaesthesia techniques in daily clinical practice.

Innovative and more dependable needle positioning techniques, primarily based on ultrasonography, have increased the adoption of peripheral regional anaesthesia throughout the world over the past ten years. Regional anaesthetic blocks have more options because of the highly advanced technology that makes it possible to effectively blockade practically every peripheral nerve. Peripheral regional anaesthesia can be performed with minimal technological requirements using basic techniques. The improved capability of anaesthetists to achieve a high success rate with peripheral regional anaesthetic techniques has coincided with an increasing number of multimorbid surgical patients, who are generally perceived to benefit most from peripheral nerve blocks. On the one hand, such patients may benefit from avoiding general anaesthesia. (Gupta and Hopkins, 2012) A study on Ultrasound-Guided Nerve Blocks (USGNB) in Emergency Medicine in United States, revealed that USGNBs are performed at most academic institutions and there is significant variation in the practices and policies within these programs. (Choi and McCartney, 2016)

Studies aimed to review the recent evidence for the efficacy of peripheral regional anaesthesia revealed that the great majority of the blocks reviewed were associated with one or any combination of reduced postoperative pain, increased patient satisfaction or reduced opioid consumption. Use of blocks avoided general anaesthesia for selected surgical patients and was associated with increased efficiency of the surgical pathway. Studies further revealed that permanent complications are rare with peripheral regional anaesthetic blocks. but accurate estimates of their incidence are yet to be determined. (Kessler *et al.*, no date) (Huang and Gao, 2016) (Marhofer *et al.*, 2010)

In contrast a review article on Ultrasound guidance in peripheral regional anaesthesia revealed that regional anaesthesia, despite its well-known clinical benefits, has not gained the popularity of general anaesthesia. This is due to the failure rate, lack of simplicity, and the potential for patient discomfort or injury. Because of the great variation in human anatomy, clinicians can be challenged by techniques that demand anatomical assumptions. The recent use of ultrasound imaging for nerve localization is an innovative application of an old technology which addresses many of the shortcomings of current techniques. (Sites and Brull, 2006) (Agarwal and Kishore, 2009)

Ultrasound-guided nerve blocks are performed at most academic emergency departments. However, there is a substantial variation in the practices and policies within these institutions. (Amini *et al.*, 2015) A study performed to assess regional anaesthesia practice in China revealed. The survey was designed to ask questions about RA techniques, drug selections, fluid administration, complications, and postoperative pain management.

Plexus blocks involve the injection of local anaesthetic agents near a network of nerves, targeting a specific region of the body. These blocks can be highly effective in surgical anaesthesia and postoperative pain management. Studies on spinal anaesthesia and combined sciatic nerve/lumbar plexus block techniques in lower extremity orthopaedic surgery found that both standard anaesthesia and combined sciatic/lumbar plexus nerve block were effective in lower extremity orthopaedic surgeries. It revealed that although surgery preparation time was longer in the CSLPB group, patient-surgeon satisfaction was similar in both groups. (Adali *et al.*, 2011) However, barriers to the widespread adoption of plexus blocks include a lack of specialized training, limited access to equipment, and concerns related to complications such as nerve injury.

Plane blocks involve the injection of local anaesthetics into specific anatomical planes, providing effective analgesia for various surgeries. A Randomized Controlled Trial performed on the Analgesic Efficacy of Transversus Abdominis Plane Block (TAP Block) After Cesarean Delivery revealed it is effective in reducing pain after abdominal surgeries. (McDonnell *et al.*, 2008) Challenges in using plane blocks include variations in block techniques, equipment availability, and concerns about local anaesthetic systemic toxicity. Ultrasound-guided nerve blocks involve the use of real-time ultrasound imaging to

precisely locate nerves and administer anaesthesia or analgesia. However, the successful execution of ultrasound-guided nerve blocks requires a thorough understanding of ultrasound technology, anatomy, and procedural skills. Moving towards artificial technology, a study was performed to check the accuracy of real-time anatomy identification via a tool based on artificial intelligence for ultrasound-guided peripheral nerve block procedures: It revealed that AI technology can successfully interpret anatomical structures in real-time sonography while assisting young anesthesiologists during UGPNB practice.(Gungor *et al.*, 2021)

There is very minimal literature related to practices in peripheral nerve block practices anaesthesia in Sri Lankan settings. A study performed to detect Benefits and Barriers to Increasing Regional Anesthesia in Resource-Limited Settings suggested that more research is needed to strengthen the evidence for improved access and safety specifically with regional anaesthesia in resource-limited settings. The cost of ultrasound equipment is identified as a barrier to the increased use of ultrasound techniques for peripheral nerve blocks. Low-cost handheld devices that can be connected to cell phones or laptops were suggested as alternatives to overcome barriers. Lack of well-trained anaesthetists lack of support for the profession and the resulting low morale are also identified as a barrier. The study recommends developing a core of anesthesiologists who are skilled in regional anaesthesia and motivated to train others to achieve sustainable growth in the field.(Dohlman, Kwikiriza and Ehie, 2020b)

3. Methodology

3.1 Study Design

A descriptive cross-sectional study will be performed. This research will be a mixed study with a quantitative component and a qualitative component.

3.2 Study setting :

Government Hospitals in Sri Lanka.

3.3 Study period

September 2023- to December 2023

3.4 Study population

All participants participated in training in USS-guided nerve block practices.

Exclusion criteria- Doctors working in the private sector.

Doctors who are not working in anaesthesia departments

3.5 Study sample:

All participants will be taken into the study.

3.6 Data Collection

Study instrument

A Google sheet was developed using the questionnaire adopted from India, (Ali, Athar and Ahmed, 2019) by the principal investigator and it was validated by a panel of consultants in the faculty of pain medicine. Pretesting of the study instrument will be performed at the National Institute of Kidney Diseases Maligawatta, and relevant alterations will be made. The link with the Google sheet was emailed to randomly selected medical officers along with the information sheet and consent form.

4. Results:

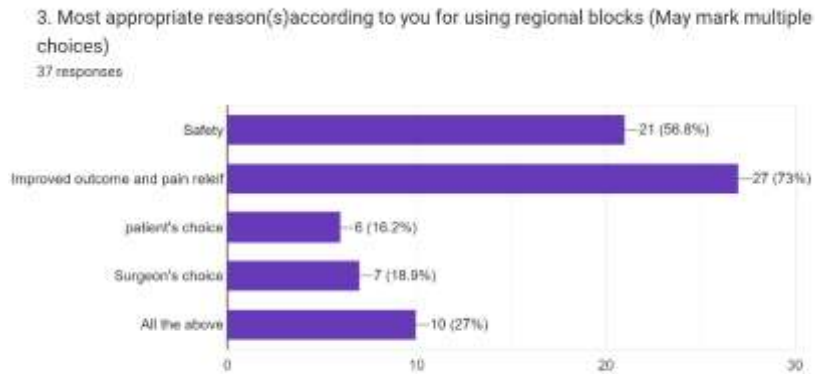
4.1 Basic demographic data

62.2% of participants (n=37) were females. Fifty-one-point-four percent of participants are postgraduate registrars in anaesthesiology. Whereas 29.7% of them are medical officers and 18.9% are consultants.

37 Participants were from 14 major hospitals of Sri Lanka namely, the National Hospital of Sri Lanka, Colombo South Teaching Hospital, Colombo North Teaching Hospital, National Hospital Kandy, Teaching hospital Peradeniya, Teaching Hospital Karapitiya, Apeksha Cancer Institute Maharagama, de Soysa Maternity Home, Base Hospital Homagama, Base Hospital Avissawella, Infectious disease hospital, Colombo east base hospital and National Hospital for Kidney disease and Transplant.

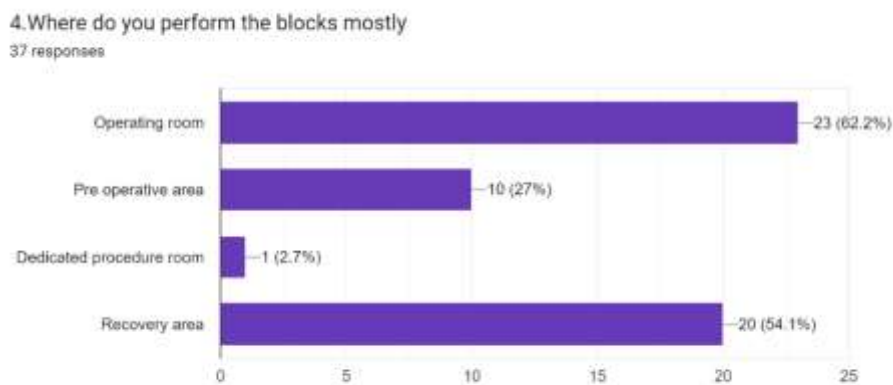
Analysis of the frequency of using blocks for perioperative care revealed 35.1% always use nerve blocks in perioperative care whereas 54.1% occasionally used and 10.8% are rarely used.

All participants agreed that regional nerve blocks improved outcomes and pain relief. Twenty-one participants agreed that it is safe to perform blocks, and only 6 participants have used blocks on patients' request. Seven participants perform blocks at the surgeon's request.

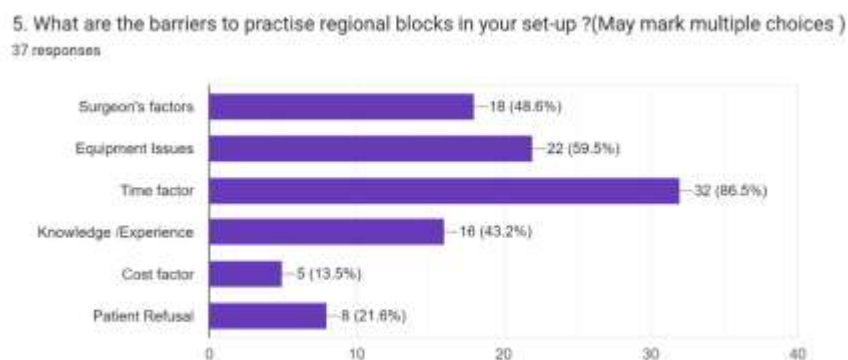


Analysis of barriers

The study revealed that 62.2% of participants performed nerve block Operating room and 54.% performed at the recovery area. Ten out of 37, perform blocks at the preoperative area and only one participant has a dedicated procedure room. (Apeksha -Cancer Institute Maharagama)

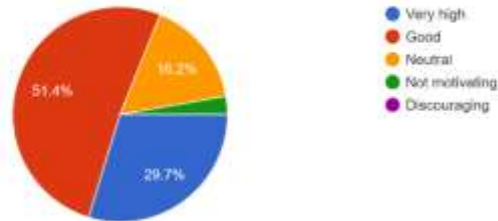


The study revealed that time factors are a barrier for regional blocks in 86.5% of participants, whereas only 13.5% stated that the cost factor is a barrier. Equipment issues were identified by 22 participants out of 37, and 8 mentioned that patient refusal is a reason for non-practising regional blocks. 43.2% stated that inadequate knowledge and experience of medical officers were also a factor. Surgeons-related factors were identified as a reason by 18 participants out of 37.



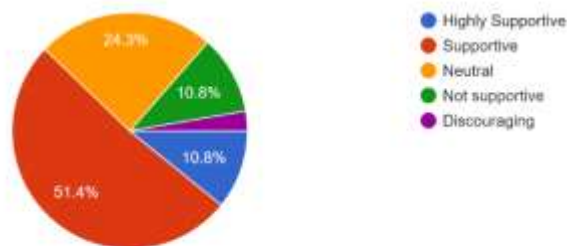
The availability of an separate USS machine for nerve blocks has been analysed and 62.2% are having a separate USS machine. Continuous supply of needles is experienced by 48.6% of participants, whereas 51.4% of participants stated that they do not have continuous supply of needles.

4. Motivation of consultants to perform Plexus blocks ,plane blocks and Nerve blocks.
37 responses



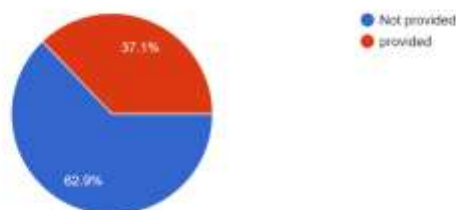
Support from other staff categories towards nerve block is illustrated in the following figure. It revealed that 51.4% of participants stated that other categories are supportive.

3. Support from other staff categories to perform Blocks
37 responses



Motivation from other consultants to perform nerve blocks was analysed as follows. It revealed that 51.4% are having good motivation from consultants. Sixty-two point nine per cent of participants stated that training programmes not provided by the Ministry of Health .

5. Training opportunities on Plexus blocks ,plane blocks and Nerve block practices , provided by Ministry of health/ Institutional level
35 responses



4.3 Qualitative data analysis

Suggestions to improve Nerve block practices in their respective hospitals were asked from all the participants. Their suggestions were documented and analysed using word cloud software. Results are demonstrated in the following image.



5. Conclusion

Practices related to peripheral nerve blocks in Sri Lankan settings need improvements in all aspects such as training and education, equipment availability, Drug availability and infrastructure improvement.

6. Recommendations.

1. Arrange regular workshops to keep up the practice and knowledge of medical officers. provide opportunities and encourage and motivate medical officers to continue with continuous medical education.
2. Enlighten the health staff about the benefits of the procedure.
3. Educate patients, surgeons, and supportive staff regarding the benefits of nerve blocks for surgeries.
4. Ensure Continuous supply of equipment -Provision of needles, provide separate USS machine to perform peripheral nerve blocks.
5. Ensure the availability of drugs which are necessary to perform nerve blocks. emergency drugs such as infra-lipid
6. Infrastructure development- Establish a pre-operative room setting for surgical patients for regional blocks
7. Practices more with experienced personal supervision.

5. Ethical Considerations

Consent

Prior informed consent was obtained from all participating medical officers. All participants were provided with consent form and information sheet through an email. The questionnaire prepared as a Google sheet has a separate question asking whether consent was given or not. Confidentiality was ensured, and any personal detail will not be discussed /included in results at the individual level.

Data storing:

Data was collected and stored securely and confidentially, with all personal identifiers removed.

Anonymity: Participants' identities will remain anonymous in the reporting of results.

Ethics Approval: Ethical clearance was obtained from the Ethical Review Committee Faculty of Medicine University of Colombo.

6. Significance of the Study

Research findings can contribute to enhancing the quality of healthcare in Sri Lanka by improving the adoption of ultrasound-guided nerve blocks. It may lead to the development of targeted training programs and resources for medical officers. Findings can inform healthcare policy decisions regarding the integration of ultrasound-guided nerve blocks into standard practice.

7. Limitations of the study

The study was performed among medical officers who participated in training in USS-guided regional anaesthesia. There might be a selection bias and the sample size also might not be adequate. The study has no conflicts of interest.

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