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Practice of regional anesthesia and analgesia in Ethiopian hospital

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Series of studies have shown that regional anesthesia offers many advantages to the patient care compared to general anesthesia, and the patient has the right to participate in the type of anesthesia techniques planned. Contrastingly, the practice of regional anesthesia in Ethiopia is underutilized and the patient choice of regional blocks limited. The aim of this study was to assess both the extent of practice and need for training in regional anesthesia among anesthetists practicing in Ethiopian public hospital. A cross-sectional survey study was conducted for 28 days from November 5, 2014 to December 2, 2014. An online survey questionnaire was circulated to one hundred and five anesthetists currently involved in clinical service in the country. Questions concerned on the extent of practice, barrier to perform and need for training workshops. Among one hundred and five anesthesia providers that participated in the survey, 61% of anesthetists are practicing regional anesthesia mainly in the operation theatre while 39% had never utilized any type of blocks and only 25.7% used nerve stimulation guidance, while the use of ultrasound or x-ray was zero percent. Of surgical procedures performed under different type of regional anesthesia within the past 2 months by respondent, orthopedic procedures accounts 56 (53.33%) while utilization of regional anesthesia for labour pain was almost nil. 18.1% anesthetists reported they were satisfied with the quality of education received from their education source. Academic qualification of the anesthetists (P = 0.01058), and years of experience of the anesthetists in the field of anesthesia (P < 0.00672) have shown a significant association at P < 0.05. The practice of regional anesthesia in the Ethiopia could be improved, with continuous supply of resource (regional kits and medication) and conduction of workshops in the field of regional anesthesia with special reference to nerve stimulator and ultrasound regional anesthesia blockade techniques.

Key words: Regional anesthesia, post-operative pain, peripheral nerve block, Ethiopia.

INTRODUCTION

Regional anesthesia offers many advantages to the patient care compared to general anesthesia. It provides an excellent post-operative analgesia; it reduces the stress response, post-operative cognitive dysfunction, and duration of hospital stay. Moreover, it has an anti-inflammatory and usually protective reflexes of the patients

remain intact (Tripkovic, 2012; Steinmetz et al., 2010; Ilfeld et al., 2007; Kang et al., 2012).The current aspects of regional anesthesia indicates that, even after a major cancer surgery, long time outcome is improved with the use of regional anesthesia techniques. On the other side, regional anesthesia and local anesthetics have significant effects on the human immune system, which also could be an explanation for the better outcome for cancer surgery using regional anesthesia alone or in combination with general anesthesia (Biki et al., 2008; Boughey, 2007). Multimodal analgesia techniques that include regional anesthesia and analgesia are essential to providing effective postoperative pain management with minimal side effects (Klein et al., 2000). However, the results of recent attitude surveys suggest that most practicing physicians are inadequately treating postoperative pain (Fortier et al., 1998; Chung et al., 1997). Among the reasons that postoperative pain is undertreated are inadequate educations in pain management for healthcare professionals, lack of adequate exposure and proficiency in peripheral nerve blocks. Changes are needed in the training processes to enable residents to graduate with enough confidence to perform a wide variety of blocks in clinical practice (Harmer and Davies, 1998; Martin et al., 2002). A survey of the Canadian orthopedics on 768 questionnaire revealed that only 40% directed their patients to regional anesthesia (Oldman et al., 2004). Those that are in favor of regional anesthesia thought regional anesthesia resulted in less postoperative nausea and vomiting and good pain control postoperative. Those who are not in favor of regional anesthesia thought it results in delay of the operating room time and unpredictable success with possible conversion to general anesthesia. In such situations, the availability of a designated area to perform the regional anesthesia namely “the block room” will expedite the flow of the operating room and reduce the delay which may happen while performing regional anesthesia blocks and enhance residents teaching (Martin et al., 2002). Armstrong and his colleagues reported that brachial plexus block when performed in the block room can significantly reduce the total anesthesia time when compared to brachial plexus performed in the operating room (Armstrong and Cherry, 2004). Recently, regional anesthesia is frequently performed with ultrasound guidance because it provides high success rates, reduces complication rates and improves quality, performance time, and time to onset of blocks (Walker et al., 2009). Generally, despite considerable progress and technological advances over the past two decades in regional anesthesia, many developing countries like Ethiopia still do not perform regional anesthesia. Widespread uptake of regional anesthesia is prevented by the combination of lack of drugs, equipment and training. The goal of this study was to provide a comprehensive overview of the current state of regional anesthesia in Ethiopia and also presents a critical review of the barriers encountered by anesthetist and addresses what can be done with that poor situation with regional anesthesia practice.

METHODOLOGY

Study design and setting

A cross-sectional survey study was conducted for 28 days from November 5, 2014 to December 2, 2014. A list of 11 public teaching hospitals and 11 district hospitals from the nine regions and two city administrations of the country were randomly selected, and anesthesia department head from each hospital was requested to register their anesthesia providers currently practicing in their institution. A total of 105 anesthetists were registered from different 22 selected hospitals. Questionnaire was circulated to anesthesia providers currently practicing in the nine regions and two city administrations of the country of the randomly selected health institutions. Regional anesthesia procedures performed within the past 2 months of September 1, 2014 to October 31, 2014 in the public hospitals were included while privet hospitals, anesthetist retired from job and merely involved in academic areas were excluded from the study.

Method of data collection and measurement

A pre-tested and self-administered questionnaire was distributed to a registered 105 anesthetists who are currently involved in clinical service; participants were requested to complete questions in the context of their current routine practice in regional anesthesia and analgesia. The questionnaire was designed to obtain information on demographic data (age, sex, hospital category, year of experience) and question concerned on how frequent they perform, how did they locate nerves to be blocked, why did they use this regional block, for which surgical procedure did they use and barriers to perform the procedures and specific questions like opioids and adjuvant used including types of drug and dose with which block it is used were addressed. We also administered questionnaire for anesthesia department head to identify the root causes related to the barriers to perform regional anesthesia procedures and if there was any planned solution for mentioned as challenges also addressed.

Statistical analysis

The collected data were analyzed using descriptive statistics. Results were analyzed and compared by dividing the samples into different subcategories, for each sub-analysis, results were compared with the whole sample using the x^2 -test or Fisher’s exact test for a sample size below five items. All tests were two-sided.

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Table 1. The characteristics of respondents and practice of regional anesthesia.

Variables	N (%)
Respondents age (n = 105)	
20 - 30 years	29 (27.6)
30 - 40years	50 (47.6)
40 - 50years	16 (15.2)
50 - 60years	10 (9.5)
Years of experience in anesthesia(n=105)	
< 1years	7 (6.7)
1 - 5years	39 (37.1)
5 - 10years	31 (29.5)
10 - 15years	16 (15.2)
> 15years	12 (11.2)
Sex	
Male	80 (76.2)
Female	25 (23.8)
Qualification	
Level 5/Diploma	36 (34.3)
*BSC	57 (54.3)
*MSC degree	10 (9.5)
Anesthesiologist	2 (1.9)
Where regional block/s performed	
Operating rooms	60 (93.3)
using a designated block room	4 (6.7)
Satisfaction with nerve education (n = 105)	
Very dissatisfied	8 (7.6)
Dissatisfied	16 (15.2)
Neutral	57 (51.4)
Satisfied	9 (18.1)
Very satisfied	5 (4.8)
Method of nerve localization of extremities	
using surface anatomy	48 (75)
nerve stimulation	16 (25)
ultrasound possession or x-ray	0

* BSC; Bachelor of Science, *MSC; Masters of Science.

The P - value (< 0.05) was considered to be significant.

RESULTS

The characteristics of respondents

A total of 105 questionnaires were appropriately completed by participants and received for subsequent analysis, which corresponded to a response rate of 100%. Of these respondents 2 (1.9%) were physician anesthesiologist, 10 (9.5%) MSC anesthetist, 57 (54.3%) and 36 (34.3%) were BSC and diploma holders, respectively (Table 1). Pertaining gender distribution, there was a significant highly male predominance 80 (76.2%) and 50 (47.6) of the respondents were between the age group of 30 to 40 years. The mean age of respondents was 35.7 ± (SD) (16.4) years. Majority of the respondents 45 (42.86%) have 1 to 5 years of experience while 13 (12.38%) served less than one year and 85 (80.95%) were working in teaching hospital (Table 1). Academic qualification of the anesthetists (P = 0.01058), category of the hospital (P < 0.00001), and years of experience of the anesthetists in the field of anesthesia (P < 000672) have shown a significant association with the number of practice of regional anesthesia at P < 0.05.

Peripheral block practice and common identified barriers

Of the respondents (n = 64) practicing different regional anesthetic techniques, 60 (93.3%) of respondents were doing regional blocks in the operating room and 4 (6.7%) were using a designated block room. Concerning localization techniques of the nerves to be blocked, most of the participants (75%) used surface anatomy, 25% used nerve stimulation guidance while the use of ultrasound or X-ray was zero percent (Table 1). Among different types of regional anesthesia techniques performed within the study period, 62 (59.05%) of the respondents had performed spinal anesthesia while the practice of epidural and inter-scalene block were 5 (4.76%) and 7 (6.67%), respectively (Figure 1). 20 (31%) of the respondents were practicing regional anesthesia daily and about 14 (22%) reported giving regional anesthesia at least once per month (Figure 5). Concerning the education/trainings attended, almost all (94.3%)of the respondents did formal training/courses while 6.7% reported practicing regional anesthesia from workshop/self-learning. About 8 (7.6%), 16 (15.2%), 57 (51.4%), 19 (18.1%) and 5 (4.8%) were very dissatisfied, dissatisfied, neutral, satisfied and very satisfied with the quality of education source attended, respectively (Table 1).

The main reasons to undertake regional anesthetic techniques as stated by respondents were 57 (89.1%) used as a sole anesthesia for surgical procedures, 33 (51.6%) to supplement with GA, 41 (64.1%) used for post-operative analgesia purpose and 35 (54.7%) utilized due to patient preference and it is less expensive (Figures 2 and 3). However, lack of regional anesthesia kits, lack of practical skills and lack anatomic knowledge, Knowledge of the procedure itself and traditional concept

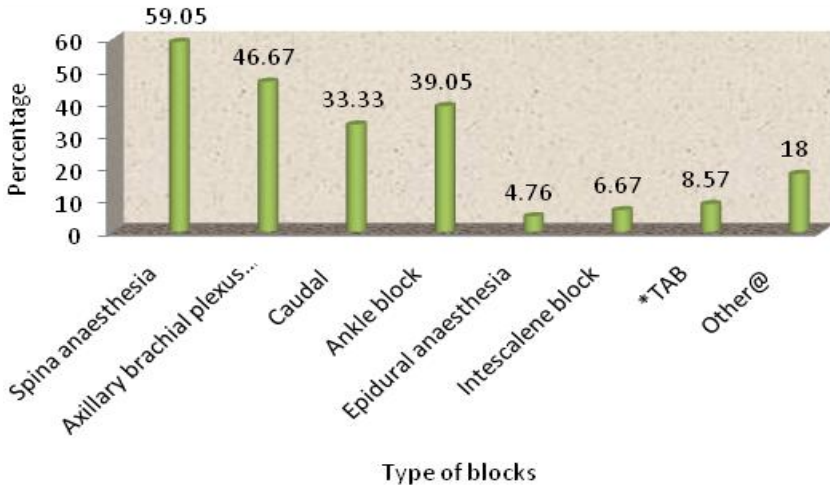

Figure 1. Percentage of regional block performed by respondents within the past 2 months. *TAB: Transversus Abdominis plane Block; @ = (biers, intercostal, femoral, sciatic blocks).

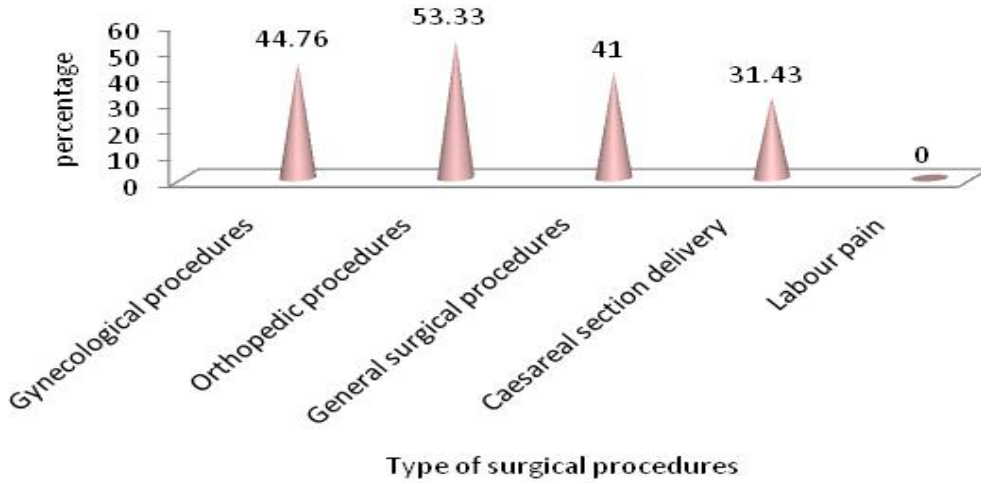

Figure 2. Percentage of surgical procedures performed under different type of regional anesthesia within the past 2 months.

like time consuming, fear of complications, conversion to general anesthesia were the main challenges respondents encountered to undertake different types of regional blocks (Figure 4).

DISCUSSION

In Ethiopia the numbers of trained physician anesthesia providers are known to be deficient and anesthesia is usually delivered by non-physician providers, further training in regional anesthesia is difficult as many anesthetists have limited opportunity in further education in field of anesthesia and inadequate access to teaching resource, as this survey reveals among 105 of respondents, 10 (9.5%) of anesthetist upgraded to MSC level and there were 2 (1.9%) physician anesthesiologists while the rest of the majority were at BSC and diploma level. As this finding shows among the respondents of (n = 105) only 64 (61%) had been practicing regional anesthesia, most of them; 62 (59.05%) have been trained and have experience in spinal anesthesia, and the rest 41 (39%) were not practicing any type of regional

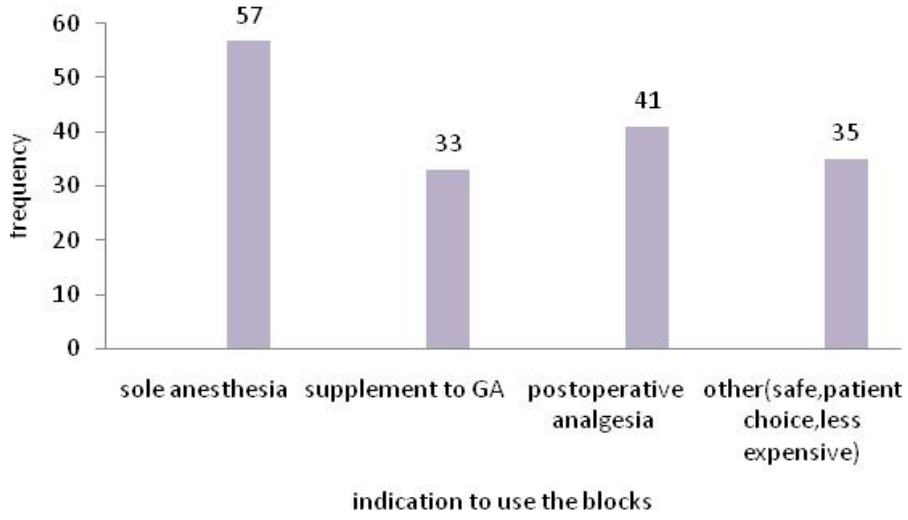

Figure 3. Frequency of indications to use regional anesthesia by respondents.

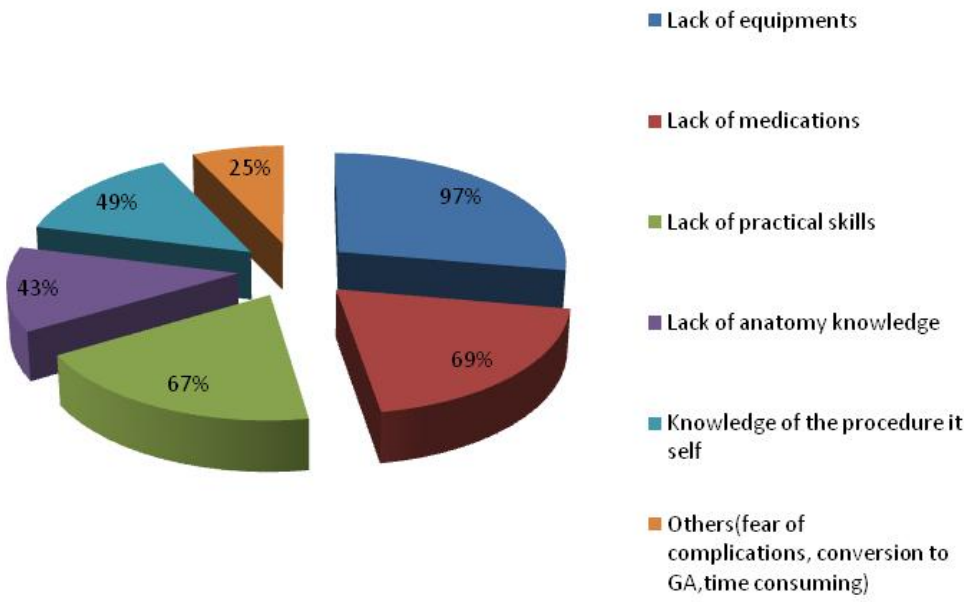

Figure 4. Barriers to perform regional blocks.

anesthesia blocks within the past two months. This finding (61%) is lower than the study conducted by (Harbi et al., 2013) in Jeddah and Riyadh hospital revealed that the practice of regional anesthesia is frequently performed on daily and weekly basis among 88.2% of the respondent anesthesiologists in the Saudi Kingdom, Unfortunately, 5.3% of those who are not practicing regional anesthesia are due to traditional concepts like; time consuming and failure rate of the blocks and lack of the understanding of the surgeons .These differences could be due to lack of resources (equipments, medications) and lack of anesthetists' practical skills and knowledge (anatomic landmarks and the procedure itself) remain the most important barriers for 39% of those who were not practicing regional anesthesia procedures within the last two months. The result was almost comparable (39%) with study done on anesthesiologists practicing in Nigeria hospitals. Rukewe and Fatiregun (2010) reveals

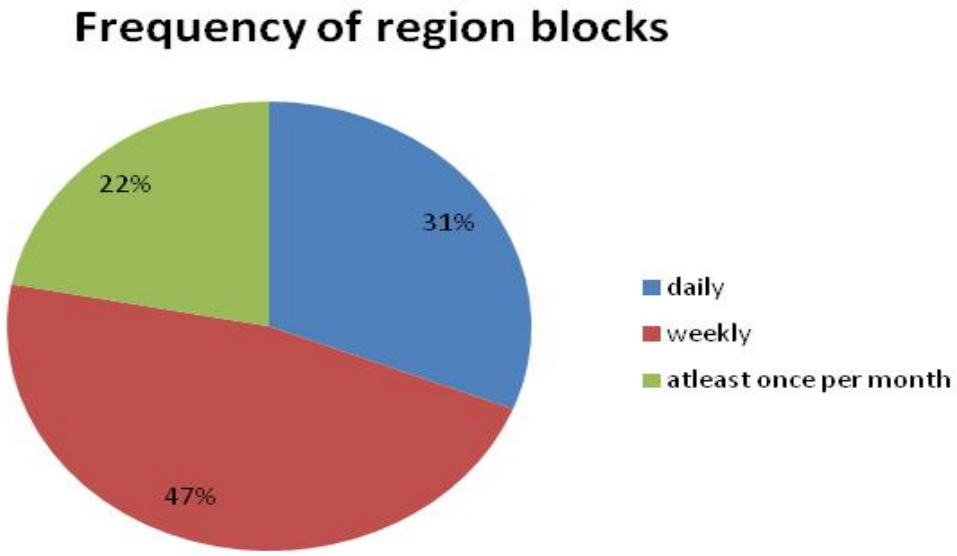

Figure 5. Frequency of practice of regional anesthesia performed by respondents during the past two months.

a high percentage of respondents (47.1%) had never performed a nerve block and only 31.4% had used a nerve stimulator technique .While the study report of anesthesia resources in Uganda found that 30% of anesthetists stated that they never had, and 28% stated that they only sometimes had local anesthetic solution for spinal anesthesia in their hospitals. Equipments for peripheral nerve blocks such as nerve stimulators and block needles are expensive, the techniques are complex to learn and not commonly used in the rural hospital setting (Pandian et al., 2004). Regional anesthesia performed using ultrasound guidance provides high success rates, reduces complication rates and improves quality, performance time, and time to onset of blocks (Walker et al., 2009). But the finding in our study showed that only 25.7% anesthetists used nerve stimulation and one of the challenges to have such equipments as mentioned by respondents were financial constraints, lack of local suppliers/market and lack of knowledge and skill to use.

An important European survey (Benhamou et al., 2008), evaluating POP management in European hospitals, identified four topics as major deficiencies in post-operative pain management: professionals' education, patient information, evaluation of pain, and protocols. Conquering to utilization of regional anesthesia protocols of complication management and post-operative pain management, all of, the respondents had never used neither the national nor the international post-operative pain treatment guideline and regional anesthesia complication management protocols due to anesthesia specific guidelines not developed nationally and inadequate awareness on the importance. Conquering, test dose during epidurals block out of three lumbar and two epidural thorax procedures performed, two MSC anesthetist and one anesthesiologist used lidocaine (0.5 to 2%) 2 ml in average was administered. 17 (16.2%) of the participants used pethidine in spinal anesthesia block. As adjuvant for regional anesthesia, 8 (7.6%) and 5 (4.8%) of respondents used neostigmine and epinephrine in caudal epidural anesthesia, respectively. All of, the respondents had an interest to take regional anesthesia workshop training. Almost all of them are interested in peripheral nerve block (upper and lower extremities), biers, TAB and central nurexial block with nerve stimulator and ultrasound guided techniques but it is gloomy for anesthetist as the anesthesia unit/department head from each institution participated in this survey answered that there is no any organized and planned training or other opportunity to update the anesthetists on regional blocks.

CONCLUSION

The practice of regional anesthesia in Ethiopia is underutilized due to shortage of continuous supply of resources and anesthetist knowledge and skill to perform different regional blocks than spinal anesthesia. Majority of anesthetist perform regional anesthesia procedures in operation theatre due to lack of designed block rooms. Majority of anesthetist use regional anesthesia as a sole

anesthesia for intra-operative procedures mainly for orthopedic operations. Regional anesthesia practice with a recent technology development like nerve stimulator and ultrasound block is almost nil. The utilization of regional anesthesia especially in labour like with use of epidural pain control is ignored. Utilization of protocols for the post-operative pain treatment and guidelines for regional anesthesia management hospitals used neither international nor national guidelines.

RECOMMENDATIONS

Concerned bodies should give a meticulous attention on how to continuously supply a resource (regional kits and medication) and organize/arrange the opportunity for the anesthetist to learn from experts on current concept of regional anesthesia and acute pain medicine with the newly emerging development of technology like ultrasound and nerve stimulators guide nerve block. Prepare workshop and describe the anatomy related to regional anesthesia to enable them to identify landmarks to perform different regional anesthesia techniques safely and scientifically. Augment their skill to enable them to administer basic and advanced blocks and use appropriate safe and effective technologies in their practice and should arrange benchmark with the outstanding partners on regional blocks procedures and pain management.

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ABBREVIATIONS

GA, General anesthesia; **RA,** regional anesthesia; **US,** ultrasound; **POP,** postoperative pain; **C/S,** cesarean section.

Conflicts of interest

The authors report no conflicts of interest in this work.

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Annex I

Survey questionnaire on practice of regional anesthesia and analgesia in Ethiopian hospital

The purpose of this survey is to collect data for the research being conducted with a view to determine the extent of practice, barrier to perform and need for training in regional anesthesia and analgesia procedure performed during the past two months of (September 1, 2014 to October 31, 2014) in your clinical setting. As such the information that you will provide would be used only for the purpose of the research. The truthfulness of the information that you give is decisive for the success of the research. Hence, we sincerely request you to provide genuine answers to all questions. Your participation in filling the questionnaire is completely voluntary. All your responses would be completely confidential and the results would only be reported in aggregated form; no individual participant will be identified in any way. Please do not write your name at any place in the questionnaire i.e. Anesthetists (retired and merely involved in academic teaching should be excluded). Thank you for time and cooperation

1. Region of your work institution_____
2. Category of the hospital teaching/referral district hospital ☐ ☐
3. Your age: ___ years. Sex: Male ☐ Female ☐
4. Your Positions (Qualification)
Level V/ Diploma anesthetist ☐ BSC anesthetist ☐ MSC anesthetist ☐ Anesthesiologist ☐
5. Years of experience in anesthesia field
<1years ☐ 1-5years ☐ 5-10years ☐ 10-15years ☐ >15 years ☐

List of regional anesthesia procedures (Mark 'X 'in front of your answer)

6. Have ever performed regional anesthesia within the past two months of (September 1, 2014 to October 31, 2014) in your clinical setting? Yes ☐ No ☐
7. If yes to Q6 please indicate the procedure you have performed in the past 2 months (multiple options possible)
Spinal anesthesia ☐ Epidural (lumbar ☐ thorax ☐)
Ankle block ☐ Supraclavicular block ☐

Caudal Epidural Block ☐ Sciatic nerve block ☐
Femoral nerve block ☐ Interscalene Block ☐
Axillary nerve block ☐ Intercostal nerve block ☐
Biers block ☐ (Transverses abdominal plane block) ☐
Ilioinguinal and iliohypogastric nerve block ☐ TAB ☐
Infraclavicular block ☐
8. How frequent do you perform the procedures in your clinical settings?
9. How did you locate nerves while doing extremities block?
Nerve stimulator ☐ Surface anatomy ☐ Using ultra sound or x-ray other (specify)☐
10. Why did you use this regional block? (Multiple answers possible)
As a sole anesthesia ☐ To supplement for GA ☐ For post-operative analgesia ☐ it is Safe ☐
Less costly ☐ Other (specify) ----------
11. For which surgical diagnosis/procedure did use regional blocks? (Multiple answers is possible)
Gynecological procedures ☐ Labor pain ☐ C/S ☐ Orthopedic procedures ☐
General surgery (such as BPH, hernioraphy ……) ☐ Other (specify). ----------
12. What are the major challenges in practicing regional anesthesia service in your set up?
☐ LACK of equipment (regional procedure kit) ☐ Lack of practical skills to perform the procedure
☐ Lack of drugs/medications ☐ Knowledge of the procedure itself
☐ Knowledge fear of complications Other /Specify ----------
13. Do you use opioids in RA block? Yes ☐ No ☐
14. If 'yes' to Q13 with which regional block/s? Please state the name of the block/s_____
15. If 'yes' to Q13 which opioids did you use? (More than one is possible)
Opioid/s used _____ Dose (mg/kg) _____ Route _____
16. Did you use adjutants in regional anesthesia? (Mark 'X 'in front of your answer)
Yes ☐ NO ☐

17. If Yes to Q16: Adjuvant used _____Dose_____ (mg/kg) Route_____
18. Did you give test dose while performing epidural block? Yes ☐ No ☐
19. If yes Q18, Drug/s used _____dose_____ (mg/kg) Concentration_____
20. Learning of regional anesthesia: Sources
Courses ☐ Workshops ☐ Self -learning ☐ Formal training ☐ Other (specify)
21. Satisfaction with the extent of training in nerve blockage technique
Very dissatisfied ☐ Dissatisfied ☐ Neutral satisfied ☐ Very satisfied ☐
22. Do you use guideline for pain management? No ☐ International ☐ National ☐ other specify
23. Do you use protocols /guidelines for regional anesthesia complication management?
Yes ☐ No ☐ If yes name it _____
24. If no to Q22 and 23 please state out your reasons_____
25. Do you have an interest to take regional anesthesia training? Yes ☐ No ☐
26. If yes to Q 25 which type of block(s) are you interested in? (Please mention):_____

Questions related to the administration issues (To be filled by anesthesia department/unit head only)

27. Why your department does not have/use equipment which guide to locate nerves for extremity blocks (nerve stimulator, ultrasound or x-ray)? (Please verify if it is not available or not used in your set up)
28. Is there lack or shortage of resources (regional anesthesia kit /equipment and drug supply in your department)
Yes ☐ No ☐
29. If 'Yes' Q28 what are the challenges to have continuous regional anesthesia kit /equipment and drug supply in your set up? List your reasons and are there designed directions/solutions to solve mentioned constraints? Please list them
30. Do you have any organized and planned trainings or other opportunities to update the anesthetists on regional anesthesia procedures? Please mention it.