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EDITED AND REVIEWED BY

Alparslan Turan,
Cleveland Clinic, United States

*CORRESPONDENCE

André van Zundert
✉ a.vanzundert@uq.edu.au

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Safety in obstetric anesthesia requires more research and support

André A. J. van Zundert*

Royal Brisbane and Women's Hospital, Department of Anaesthesia and Perioperative Medicine & The University of Queensland, Brisbane, QLD, Australia

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Introduction

In 2022, there were worldwide 140 million births, which is 266 births every minute, resulting in the 8th billion inhabitant of our planet on 15 November 2022 (1). To give you an indication about where the largest need is for obstetric and anesthesia care in the world, it may be helpful to know where the next 1,000 babies will be born in the next five minutes, i.e., in Asia (511), Africa (326), Americas (106), Europe (52) and Oceania (5) (2). But is this really the reality? Is obstetric and anesthesia service to pregnant women equally distributed worldwide? In fact, we see huge differences and inequalities in providing care to women, depending on the location, the country, the availability and quality of obstetric and anesthesia care, with almost no anesthesia involvement in several under-resourced countries.

Obstetric and anesthesia care to women in low-and-middle income countries

In 2005, some 600,000 women and 4 million newborns died annually due to—often preventable—pregnancy-related complications, which means a daily toll of 1,600 mothers and 5,000 babies, who died needlessly. In 2017, these figures were halved, resulting in a 40% drop in the maternal mortality ratio (MMR). Nevertheless, 99% of the more than 300,000 maternal deaths each year still occur in low-to-middle income countries (LMICs), with Sub-Saharan and Southern Asia regions accounting for 86% of these deaths (3–5). Women die as a result of obstetric complications during and following pregnancy and childbirth. The major complications, accounting for 75% of maternal deaths, are due to severe bleeding, infections, (pre)-eclampsia, complications from delivery and unsafe abortions in unhygienic conditions. The MMR in low-income countries in 2017 was according to the WHO, 462 per 100,000 live births, and 11 in high income countries (5). This is in sharp contrast to the figures of The UK Confidential Enquiry into Maternal Deaths, with an MMR rate of 8.7 in 2018. This Report also saw a factor 13 decrease in the rate of maternal deaths over a period of 40 years due to anesthesia interventions, from 1.2 to 0.09 in 100,000 maternities (6). During the triennium 2013–2015, two women died directly from complications of anesthesia in the UK, whereby anesthesiologists took care of some 1.4 million women over that period. Nevertheless, each maternal death is a tragic tip of the morbidity spectrum. These data underpin the need for continuous improvement in the practice of anesthesia in obstetrics.

The key bottlenecks to the provision of safe obstetric anesthesia in LMICs depends on: (a) a paucity or even a total shortage of trained physician anesthesia providers; (b) inadequate supervision and training of associate anesthesia clinicians; and (c) a significant

lack of essential equipment and drugs for the delivery of safe anesthesia. However, to a large extent, it is due to the fact that there is poor quality of antenatal care; with fewer than half of women deliver their infants in health facilities. Between 50% and 60% of women in the world give birth at home without any professional qualified health supervision or a skilled birth assistant present at the time of delivery (7).

A host of factors influence whether or not the pregnant woman delivers in a facility-based delivery, including where you live (which country; rural/urban), the wealth index of the country and household wealth, maternal education, parity, distance to the health facility, and the number of antenatal visits.

In LMICs, many women deliver at home based on social norms and socio-cultural determinants, which are an obstacle to maternal care access: religious beliefs (Islamic principle of *pardah* limits the mobility of women; it is a sin to deliver outside of home—“gods forbid hospital delivery”; it is a sin if pregnant women physically reveal themselves to male doctors), poverty (a major factor influencing people’s decision-making is the cost of care), illiteracy, lack of knowledge, taboos, myths (children born in the hospital are “weaklings” and some of them “die mysteriously”), and superstitions, which often are harmful to the women. Poor utilization of healthcare services and harmful practices during pregnancy and childbirth are responsible for the high maternal mortality rates, often as a delay in the decision to seeking care, reaching care or receiving adequate healthcare (4, 7–10).

In some countries, lack of empowerment of women in deciding themselves (women have the least access to decision-making related to care seeking during delivery in the family), with a dominant role of the male partner and the trusted support by the—non-trained—traditional birth attendants in which they put all their faith in, because it is the family tradition, and home delivery is the traditional attitude, which gives them more privacy and it is a sign of faithfulness to their husband. These women just wait until the traditional birth attendants can no longer manage it to get professional help. Village midwives are often perceived as too young, too inexperienced, showing a rude behaviour and poor treatment and their numbers are woefully inadequate to attend to the overwhelming number of women in labor. Furthermore, they believe that midwives are only there for those women with delivery complications. Childbirth is often perceived as a normal event and normal work and is not considered an event requiring medical attention (4, 7).

Based on the belief that the doctor will conduct a cesarean delivery instead of trying a vaginal delivery, which cost a lot of money and the surgery might result in physical harm whereby the parturient even may die, makes that women are scared to go to seek help in a health facility and therefore opt for a home delivery. Illiteracy and lack of knowledge of modern medical treatments further contributes to more home deliveries in LMICs.

Transportation challenges (dilapidated road conditions especially during the wet season, lack of availability of ambulances, limited transportation) and long distances from a health facility, remarkably also determine where delivery takes place in far remote and chronically under-resourced areas in the world lacking essential road infrastructures (4, 8–10).

Furthermore, pain management has a low priority in many LMICs, underpinning the inequality of pregnant women to receive adequate, professional and safe pain relief during the delivery process.

The global pain divide in obstetrics

Pain relief during childbirth is a human right. A painless labor is every woman’s right

Women have always sought pain relief during labor and childbirth. Labor pain is a subjective experience, that can vary in intensity and sometimes it can be the most severe pain a woman will ever experience. This “natural” pain is a symptom of contractile activity of the uterus. Therefore, pain is a physiologic alarm feature of the uterus and a critical and important sign for the pregnant woman that birth may be imminent and that actions need to be taken to be prepared for a delivery. That warning sign of pain is of no further use during the delivery process and therefore, it is only human to take away the pain that accompanies vaginal and cesarean deliveries. Often pain increases as labor increases depending on the rate of labor progression, size and position of the fetus and maternal pain tolerance.

There are pharmacological and non-pharmacological options to treat pain during vaginal delivery (11–13). The list of non-pharmacological options is large with strategies such as breathing and relaxation techniques, applying heat or cold, water immersion (shower, bathtub), touch and massage, acupuncture, transcutaneous electrostimulation, music and aromatherapy. Pharmacological pain management can be realised with neuraxial analgesia (epidurals, spinals, or a combination of the two), or other regional anesthesia blocks, i.e., pudendal nerve block to relief pain during the second stage of delivery. Systemic analgesia includes opioids and inhaled anesthetics such as nitrous oxide in oxygen, delivered via a facemask. Here you see the 10–90 pain divide, with the 10% richest countries possessing 90% of the distributed morphine-equivalent opioids and the 50% poorest world population having access to only 1% of the opioid medication (12).

The WHO recommends the use of epidural analgesia for women requesting pain relief during labor, pending the woman’s preferences with respect of a woman’s choice, culture and needs. Epidural analgesia is widely considered the most effective pain relief method (14). Furthermore, according to a study in New York hospitals, including 575,524 women undergoing epidural analgesia for vaginal delivery, epidurals are associated with a 14% decreased risk for severe maternal morbidity, in part from a reduction in postpartum hemorrhage (15).

However, a WHO Multicountry Survey on Maternal and Newborn Health (2010–2011) database in 29 countries in Africa, Asia, Latin America and the Middle East, revealed that the use of analgesia for vaginal birth was only 4% of the women in facilities in low-income settings. The epidural rate during labor and delivery of women having vaginal births significantly depends on

the Human Development Index (HDI). In countries with a very high HDI (Argentina, Qatar the epidural rate is 15–17%), in countries with a high HDI (Brazil, Lebanon and Mexico, it varies between 13% and 33%), whereas in countries with a medium HDI (Philippines, Thailand, India, Jordan) and those with a low HDI (sub-Saharan countries, Pakistan, Afghanistan) epidurals are virtually inexistent (16). Overall, epidural use is low in the regions of Africa (0.1%), Asia (2.8%) and Latin America (10.6%), which is often due to a poor maternal educational level and the absence of knowledge about epidural analgesia (16). The attitude in low resource settings is often “We know it is labor pain, so we don’t do anything”. Many HCWs in LMICs do not routinely offer pharmacological pain relief during labor, even in case of availability of some resources (11).

A survey among 64 hospitals in Uganda showed that the key bottleneck to the provision of safe obstetric anesthesia is the lack of anesthesia care as 84% of hospitals do not have a trained physician anesthesiologist and 8% have no trained providers for anesthesia at all. Only 5% of the hospitals had all requirements available to meet the World Federation Society of Anesthesiologists International guidelines for safe anesthesia. For every 1,000 cesarean sections, there is an average presence of 0.1 physician anesthesiologist and 4 associate clinician anesthetists (17).

The above describes the poor treatment options of obstetric anesthesia care in LMICs, which is reflected by the global income and wealth inequality. The global bottom 50% countries capture 8.5% of total income and owns 2% of wealth, whereas the global top 10% countries capture 52% of total income and owns 76% of wealth (18).

Although one is aware of the good quality pain relief options of epidural analgesia, this service is not always available in LMICs, given the limited number of trained anesthesiologists, the lack of essential equipment (needles, catheters, drugs) and the limited education and opportunity to practice these pain relief methods. Therefore, epidural services are more widely available in well-resourced settings in high income countries (HICs) in the west.

A Norwegian register study included more than 800,000 deliveries during a 16-year period, and showed that there is a global significant effect of birthplace on the use of epidural analgesia, with immigrants from Latin America/Caribbean consistently more likely to be provided with an epidural (45.6%), compared to native-born Norwegian women (29.9%), with the lowest rates offered to women born in Sub-Saharan Africa (22%) or East Asia/Pacific (27.5%). Longer residence time in Norway showed a higher likelihood of being provided epidural analgesia (19). The lower take up could be influenced by suboptimal communications, real differences in women’s own wishes, needs, cultural norms and perceptions of labor pain.

A 2020 multinational cross-sectional study focusing on the variations in use of childbirth pain relief interventions in 13 HICs, based on data of 4,729,307 singleton births, revealed that rates among nulliparous vs. multiparous women varied from 50% to 93% vs. 25% to 86% for any intrapartum pain relief, and 19% to 83% vs. 10% to 64% for epidural anesthesia (20). So, even in HICs, there is a wide variety of pregnant women who obtain epidural analgesia during childbirth. Whereas in the USA, Finland and Belgium, about 80% of the parturients receive epidural

analgesia, in contrast, only 6.1% of Japanese parturients receive help from an epidural. This may have to do with the fact that several maternal deaths associated with labor analgesia have been reported in Japan linked to shortcomings in the safe management of labor analgesia. Furthermore, contributing factors to this low epidural rate are: common Japanese spiritual or traditional belief holds that pain is a necessary part of labor and delivery; only few hospitals are available to have 24-h coverage from obstetric anesthesia team; and that the Japanese healthcare system requires patients to self-pay for labor analgesia costs. However, the listed MMR in Japan (6.4) is much less than that in the US (26.4) (21).

Safety issues in anesthesia for obstetric patients

All medical interventions have side effects. Although epidural analgesia is the best method to provide optimal comfort to the parturient, there are potential complications.

Indeed, obstetric anesthesia is all about using a meticulous anesthesia technique, inserting an epidural catheter in the right space, correctly timed and fine-tuned to the situation of the adequately monitored laboring woman and administering a local anesthetic solution that is just enough to do the job to provide safe, effective anesthesia, without having an impact on the woman’s progress of the birth process, nor on the unborn baby.

Bupivacaine entered the clinical practice of anesthesia in 1963 and quickly became the popular standard to use local anesthetic in obstetric regional anesthesia for his long duration of action, with greater sensory than motor blockade (22). Bupivacaine came in three concentrations 0.25%, 0.5%, and 0.75%. In 1979, Albright published a startling Editorial in *Anesthesiology*: “*Cardiac Arrest Following Regional Anesthesia with Etidocaine or Bupivacaine*”, based on a series of seizures, cardiovascular collapses and deaths in obstetric epidural analgesia (23). In 1983, the US Food and Drug Administration issued a black box warning that recommended against the use of 0.75% bupivacaine in obstetric anesthesia, the warning remained in place to 1999 (22).

One of the safeguards against toxic reactions is to use a test dose before performing an epidural blockade. Extensive research resulted in the recommendation that “*Every dose given in obstetric epidural analgesia can be a test dose*”, consisting of 10 ml of bupivacaine 0.125% + epinephrine 1:800,000, which is 12.5 mg of bupivacaine and 12.5 µg of epinephrine. This dose allows detection of intravascular injection as it produces an identifiable tachycardia for 30 s, with a slowing of the uterine contractions in such a way that one or two contractions are skipped or reduced in intensity (24–26). Aspiration is recommended before any injection via the epidural catheter but may not be entirely reliable in showing blood. The test dose clearly could demonstrate the intravascular position of the catheter (27). Epidural injections of the test dose resulted in maternal central venous plasma concentrations of bupivacaine and neonatal plasma concentrations in the umbilical venous and arterial blood, well below toxic levels, and lower than in any other study, confirming the safety of the test dose (28).

The dose of local anesthetic (12.5 mg bupivacaine) produces a recognizable and safe level of spinal blockade in case of a subarachnoid injection. As such, no dose injected in obstetric epidural analgesia should be more than a test dose. This test dose is ideal in obstetrics as it produces an effective and safe epidural block that covers the sensory nerves involved during childbirth (T10-S5). Furthermore, if this dose is injected in the subarachnoid space, it is limited in sensory blockade to the upper limit that is needed for a cesarean section, i.e., T4, which allows effective surgical interventions such as a cesarean section without compromising the patient's hemodynamics or respiratory function (29).

Further research demonstrated that using different volumes or concentrations while maintaining a constant dose of bupivacaine during spinal anesthesia does not affect the extent of anesthesia; similar onset and extent of anesthesia and degree of motor blockade were found when using 12.5 mg bupivacaine with 12.5 µg epinephrine dissolved in widely different volumes (2.5 or 10 ml). Dose is more important than volume and concentration as demonstrated in a study on spinal anesthesia with different volumes and concentrations but identical doses of lidocaine (30, 31).

To test the effects of lumbar epidural anesthesia during childbirth on the loss of functionality of the somatic motor power of the rectus abdominalis muscle (RAM-block), we compared the degree of motor blockade in the abdominal muscles, which is the difference in the RAM-tests before and after the block. This RAM-block is a more appropriate test for use in obstetric epidural anesthesia than the Bromage-block, which is based on testing the impact of local anesthetics on the motor function of the lower extremities (32).

The above-mentioned trials proved that the epidural test dose is adequate to be used for effective and safe analgesia during childbirth even if injected accidentally intravenously or in the subarachnoid space. It will not result in toxic reactions and high or total spinal will be prevented. It also shows that there is no need to use more than the test dose at any time. Obviously, this formula works best if injections are administered intermittently. But also, if continuous infusions are used via electronic pumps, the above dose should never be more than the test dose on an hourly basis. As such, calamities such as cardiovascular arrest should be preventable. In order to prolong anesthesia, it is further recommended to add opioids, such as fentanyl, sufentanil or morphine in minute doses to the local anesthetic solution. This allows even further reduction of the local anesthetic dose. At least 23 million epidural anesthetics have been administered to vaginal births in the US, and countless of millions in the rest of the world, showing its safety, provided a number of precautions are taken.

Cesarean deliveries—general or regional anesthesia?

Worldwide, there is a remarkable rise overall in the trend of cesarean section rate for both emergency and elective surgical deliveries. The cesarean section rate is reported to be 32% (USA), 40.5% in Latin America with exponents as high as 80% in some private clinics, whereas on average it is 25% in Europe, 19.1% in

Asia and 7.3% in Africa (33, 34). Pain or the fear of pain is also one of the most common reasons for women requesting a cesarean delivery in LMICs.

Both general and regional anesthesia are techniques of choice for cesarean delivery. The choice of the anesthetic technique depends on several factors, such as the physiological condition of the woman, experience level of the anesthesiologist and obstetrician, location, healthcare facility, availability of drugs, equipment and the availability of appropriate and knowledgeable helpers. Spinal anesthesia has been favored worldwide as the best choice for elective uncomplicated cesarean deliveries due to its avoidance of problems related to general anesthesia, airway management, risk of aspiration of gastric content and the fact that it is a fast and easy technique to perform, which is safe, effective and reliable, and research is overwhelmingly convincing that RA is the better option, evidenced by better maternal and fetal outcomes (35). Patients are more satisfied with spinal anesthesia for their cesarean delivery, and 1st and 5th minute Apgar scores of the neonates were found much higher than with general anesthesia.

However, performing a spinal block is not more time-consuming than the administration of general anesthesia, and the decision-to-delivery time interval should not be increased with spinal blocks. Therefore, even in emergency cesareans, there are indications for spinal blockade.

If an epidural catheter already is in place, a local anesthetic top-up can be given to extend the block and create a more profound block to allow the obstetrician to do the operation. Usually, lidocaine 2% is used in small incremental doses, depending on the extent of the epidural block. If no previous regional block has been given, a spinal block administered via the L3-L4 interspace using a 25- or 27-gauge spinal needle gives adequate results with high maternal satisfaction rates close to 100% (36), providing the dose of local anesthetic is limited. Obviously, the local anesthetic solution can consist of other local anesthetics to which adjuvants are added to prolong the block.

Neuraxial anesthesia therefore is the gold standard anesthetic for use in obstetrics, both in vaginal and cesarean deliveries (37). It is clear that, we as skilled anesthesiologists, advocate providing safe obstetric anesthesia care to be given in the environment of a well-equipped hospital where better pain relief can be achieved in a safe controlled setting.

Communication is essential in healthcare

Communication between all parties, including the laboring woman, has been shown to be a major contributor to patient safety and patient satisfaction. That requires a culture of safety. Poor communication may be responsible for 80% of all preventable adverse effects, caused by unsafe healthcare processes (38). Safety also includes appropriate documentation in the (electronic) medical record of the patient, reflecting all important aspects of anesthesia care of that particular patient, allowing a later review if needed, but foremost providing all essential information for the whole team, including the next anesthesiologist who has to take over the case. Data from Chan

and Ng in 2000 (39), showed record keeping is poor by most standards reported on epidural analgesia rates in Singapore (16%) and Malaysia (1.6%). Obstetric anesthesia requires expertise, balanced decision-making, good teamwork, adequate record keeping and effective communication, for which simulated continuous training should be encouraged.

What is the global shortage on healthcare workers?

More involvement in obstetric care will also require more healthcare workers in the future, putting pressure on an already exhausted healthcare system. The Global Strategy on Human Resources for Health highlighted a projected health workforce shortage of 18 million health workers by 2030 (40). In 2020, the global workforce stock accounted for 29.1 million nurses, 12.7 million medical doctors, 3.7 million pharmacists, 2.5 million dentists, 2.2 million midwives and 14.9 million additional occupations, tallying to 65.1 million healthcare workers. Unfortunately, this is not equitably distributed with a 6.5-fold difference in density between high-income and low-income countries. The projected health workforce size needed by 2030 is 84 million health workers (40).

The magnitude of many of the above issues has not been comprehensively studied and needs further research. Please find hereby a number of topics that still needs our attention and can be subject of further research to optimize anesthesia care to the obstetric patient.

- **How can we provide better obstetric and anesthesia care in low-and-middle income countries?** Here obviously is the biggest gain to expect for the LMICs. How can we provide adequate pain relief in LMICs with minimal resources? This implies an urgent need to strengthen anesthesia services in those countries, more teaching and training of specialists in anesthesia. These anesthesia services during childbirth may aim for entirely different goals in low- vs. high-resourced countries. Obviously, global initiatives in LMICs traditionally focus on improvements in public health care through immunisation, nutrition, sanitation and infectious diseases. Here, anesthesiologists can further be critical in improving quality care and patient safety. But also, in HICs, we need recommendations on how to further improve pain relief management as we still see huge differences in the prevalence of use of epidurals in vaginal deliveries. This implies we need more anesthesiologists trained in obstetric anesthesia.
- **How can we improve hygienic measures around central neuraxial blocks in obstetric patients?** Still incidents do occur whereby patients get infected, with devastating consequences such as meningitis, brain damage or death as a consequence. Strict hygiene measures are a vital aspect of regional anesthesia.
- **We need a critical review of the sterility of medical devices** (needles, syringes), packages containing regional anesthesia trays and local anesthetic solutions, from the manufacturer,

transportation, distribution within the hospital to the end-user; and subsequently handling of ampules and vials in a sterile way and define the most optimal conditions.

- **We need guidelines preventing the use of the same ampules and vials** for multiple persons undergoing central neuraxial blocks, in an attempt to decrease the risk of potentially fatal meningitis if these ampules and vials are contaminated.
- **What are the minimal requirements to monitor pregnant women during childbirth?** Are we able to detect toxic reactions of local anesthetics and high/total spinals to allow anesthesiologists to address these issues in an effective and timely way. How to recognise the early warning signs when the condition of a parturient deteriorates? How to detect errors? Topics such as improved screening and monitoring of patients to detect complications fast enough before they are even harming the patient.
- **What about staffing rates?** What is the ideal size of a good functioning obstetric unit where regional anesthesia service can be delivered? As this is a 24-hrs service, what is an effective patient:specialist staffing ratio?
- **What about adequate remuneration?** Providing anesthesia service in obstetric care needs to be funded in such a way that there is no need for the anesthesiologist to culminate his activities covering both operating theatres and obstetric care.
- **What is the ideal regional anesthesia technique in obstetrics,** for vaginal and cesarean delivery? What is the optimal dosing, and frequency of top-ups? What techniques are available for continuous administration of anesthesia drugs to parturients in labor? What if the resultant block is insufficient, unilateral, and evaluation shows that the epidural catheter does not sit correctly? How often does the anesthesiologist have to check the extent of the block and its effect on motor blockade? When to recite an epidural catheter? What options does the anesthesiologist have to compensate for substandard/incomplete/no pain relief during vaginal delivery and an insufficient block and pain during a cesarean delivery? What are the dangers of re-siting or topping-up an epidural catheter in case of an incomplete epidural or spinal block? How to test whether the epidural catheter sits in the appropriate position? Is a parturient with an epidural catheter *in-situ* allowed to walk around in the room or not? What is the optimal concentration and dosing of the local anesthetic solution in epidural analgesia for vaginal deliveries? What is the safest technique for a cesarean delivery, both in emergency and elective situations? Is there a still a place for general anesthesia during cesarean section? How to teach trainees in general anesthesia given the vast numbers of cesarean deliveries under RA? What are the disadvantages of general anesthesia for cesarean deliveries? How to prevent complications to occur? How to make parturients more comfortable during their deliveries? What is the maternal satisfaction rate with individual regional anesthesia techniques?
- **What are the risks of using epidural analgesia** on the instrumental delivery rate including cesarean deliveries? Does epidural analgesia have an impact on the duration of vaginal deliveries and is there a direct effect on the neonate's

condition? How to best avoid the impact of local anesthetics on muscle contractions and limit sensory blockade to the areas that are causing pain at a particular stage of vaginal delivery?

- **When do we call for help?** This is especially important for trainees in anesthesia, who may be alone in the labor ward as their supervisor may be in the operating theatres complex. But even consultant anesthesiologists may need from time help from a colleague. How are arrangements made to provide essential help in urgent circumstances? How can midwives get urgent help from anesthesiologists?
- **Which drugs should be readily available in the obstetric unit, for immediate use by anesthesiologists?** Challenges for anesthesiologists in poor facilities are the lack of essential drugs, equipment and supplies. There is a need for standards of anesthesia practice during childbirth. Which drugs need to be administered to women undergoing cesarean delivery under general anesthesia in order to prevent aspiration pneumonitis? Which drugs such as antacids and antihypertensives should be available as a minimum? What to do if there is a shortage of drugs? Which fluids are to be administered to patients undergoing RA? What are the guidelines regarding fasting in obstetrics?
- **What are obsolete practices in anesthesia?** What to avoid? What are ethical and non-ethical behaviours and practices? What to do in case of a complaint made by the patient for incomplete pain relief or a complication?
- **Open, honest and transparent communication** is the basis for good healthcare. How do we keep all communications lines open, with all partners involved? Patients need to be informed about all aspects of obstetric and anesthesia care and need to have a prompt input and say in the final decisions about what kind of pain relief method will be used in her specific situation. Therefore, anesthesiologists need to be trained in open communication, but also in de-escalation techniques if expectations by the parturient (and husband) are not met and may result in workplace violence against the healthcare worker.
- **Documentation is also vital in medicine.** Without documentation, there is no defence of the actions taken by the anesthesiologist during anesthetic interventions. This is both important to inform all team members involved, and also for the next anesthesiologist taking over the care of the current patient, and even in case of legal actions before the court. What constitutes minimal documentation? What needs to be documented? Minimal guidelines specify documentation of the used regional anesthesia technique, aspects of difficulties or complications and how these were resolved, minimal instructions of care (fluids, continuous pumps, when to call the anesthesiologist) providing appropriate contact details. If during the labor process, the anesthesiologist is not in the immediate vicinity of the labor ward, instructions for the midwives or obstetricians are essential.
- **What is the global shortage on healthcare workers?** The Global Strategy on Human Resources for Health highlighted a projected health workforce shortage of 18 million health workers by 2030 (Oriol 2022).

This list of topics is non-exhaustive, nor should it be restricted. We need to increase the level of standards of pain relief for all parturients wherever they are in the world to ensure minimal error, while preventing harm and maximising safety by well-trained anesthesiologists. Research and science should be keen balancing forces to drive more equitable access to healthcare globally and focus on gaps. Medicine is continuously improving, providing new techniques and better drugs are discovered, making lifelong study an essential part of the practice of a modern anesthesiologist in an attempt to keep up with all these improvements.

To achieve quality improvement in maternal health and continued reduction in maternal and fetal mortality rate, it is necessary to understand the structures and processes that lead to a maternal death or complications during pregnancies. This approach, described by the World Health Organization as going “beyond the numbers”, is a huge task that requires the collaboration of all involved in this kind of care. More research is needed, published and made available to the wider professional community. More research and better teaching will ultimately result in better obstetric anesthesia practice.

Therefore, it is so important to have journals that report good quality outcome data of research, with the intend to improve our practice. That is the ultimate goal of a good-quality journal, focused on anesthesia topics.

Frontiers in Obstetric Anesthesiology is such a journal. We invite anesthesiologists, both practitioners and scholars, to share their knowledge based on sound research to publish in this specialty field in our journal, to make this obstetric anesthesia specialty one of the core sections of Frontiers. We are awaiting your scientific contributions on all aspects of improvement in anesthesia care for obstetric patients with the final aim to make the experience of birth a pleasant one, pain-free for the mother, with an optimal start of the newborn in this world.

Author contributions

AvZ developed the concept, performed the research, drafted the manuscript and approved the final version.

Conflict of interest

The author AAJVZ declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

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