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Comparative assessment of pain management strategies in labor: Utilization, barriers, and maternal awareness in Kyrgyzstan

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Abstract

The delivery of pain relief during childbirth stands as an essential requirement for both maternal comfort and emotional well-being and safe delivery results. The Kyrgyz Republic offers spinal block and general anesthesia as modern pharmacological methods yet these methods remain underutilized in clinical practice. This study aimed to assess the current use of pain relief techniques during childbirth, identify barriers to their implementation, and evaluate women's preferences and awareness regarding available options. A survey-based study with quantitative elements was conducted among 131 women who gave birth in private maternity hospitals in Osh. All participants provided voluntary participation while obtaining their informed consent before the study began. The participants received information about their right to withdraw from the study at any time while their confidentiality remained protected. The online questionnaire gathered information about participants' experiences with pain relief methods together with their satisfaction levels and their understanding of available options. The research showed that spinal block and general anesthesia were among the most frequently used pain relief methods. The main obstacles to wider implementation of these methods were their absence from national protocols and insufficient trained personnel and insufficient medical equipment. The respondents showed restricted knowledge about contemporary pain relief methods while their preferences were shaped by their existing understanding and their beliefs about safety. The study demonstrates a discrepancy between existing medical choices and their practical application which requires fundamental changes to the system. The Kyrgyz Republic needs to update clinical protocols and enhance medical staff training and patient awareness to improve anesthetic care during childbirth. These research gaps need to be addressed to optimize pain management strategies and support informed maternal choice and improve outcomes for both mothers and newborns.

Keywords: Childbirth, Analgesia, Maternal care, Obstetrics, Kyrgyzstan

Introduction

Human beings experience their most severe physiological discomfort through labor pain which affects both maternal health and labor duration and newborn results. Obstetric care has evolved through modern pharmacological analgesia which includes neuraxial techniques such as spinal or epidural blocks and systemic methods such as general anesthesia to provide fast and effective pain relief [1]. The advantages of these interventions reach past pain relief because they affect maternal blood pressure and mental state and result in better neonatal responses [2]. The Kyrgyz Republic along with other low- and middle-income countries faces unequal access to these methods because of limited resources and workforce shortages and different clinical guidelines. The achievement of equitable high-quality maternity care requires addressing these disparities [3].

The proven effectiveness of modern pain relief methods remains underutilized in many public healthcare settings of Kyrgyzstan because of structural limitations and insufficient trained anesthetists and national clinical guidelines [4]. Private maternity hospitals provide these techniques but their availability creates more maternal care disparities. Women face challenges in making informed decisions about childbirth pain relief because they do not have sufficient knowledge about available options [5,32]. The current systemic problems continue to cause unnecessary pain while blocking patient-focused care and potentially leading to adverse results for mothers and newborns. The worldwide effort to humanize birth practices and enable women's active participation in healthcare

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decisions makes this challenge more severe.

The research delivers the first comprehensive study of pharmacological pain relief approaches in private maternity facilities across the Osh region through an assessment of maternal and newborn results together with patient opinions and structural obstacles to broader implementation. The research establishes a path for public facility pain management expansion through its quantitative assessment of awareness gaps and clinical adoption barriers and its development of policy recommendations. The research findings provide both local health policy direction and global knowledge about equitable obstetric analgesia in LMICs which enables the development of targeted training programs and protocol reforms and patient education initiatives to transform maternal care in similar worldwide settings.

2. Research Methods

2.1 Study design

This study used a cross-sectional, survey-based methodology with quantitative analysis. The methodology was chosen to assess the prevalence of various pharmacological pain management techniques utilized during labor, as well as the attitudes, preferences, and awareness of women who underwent these treatments. The survey design facilitated the systematic gathering of patient-reported data, assuring comparability among respondents.

2.2 Study setting and participants

The research was carried out in Osh city, Kyrgyz Republic, concentrating on women who delivered at private maternity institutions. These hospitals were selected as they serve as the principal centers for contemporary pharmacological pain management procedures in the region, including spinal block, epidural anesthesia, and general anesthesia. Eligible participants consisted of women aged 18 years and older who had given birth within the preceding 12 months at one of these institutions.

2.3 Sampling and recruitment

131 women took part in the study. Targeted outreach using hospital records and maternity care networks was used to find new employees. We sent participants an email to encourage them to take the survey. Everyone who took part in the study did so of their own free will and gave their informed consent before doing so. There were no monetary or material rewards offered.

2.4 Data collection procedures

Data were collected using an online structured questionnaire developed particularly for this study. The survey contained sections for sociodemographic information (age, education level, parity, and job position), Obstetric history and details of the most recent childbirth, pain relief methods used during labor, including perceived effectiveness and side effects, awareness and preferences for various pain relief techniques, satisfaction with the childbirth experience, and perceived decision-making participation. The online survey style was chosen to enhance reach, reduce costs, and keep participants anonymous.

2.5 Ethical considerations

This study was conducted in full accordance with the ethical principles outlined in the Declaration of Helsinki [6]. The Ethical Committee of the of the IRB commiitte of Osh State Univeristy approved the study. Informed permission from the IRB was waived since data were collected anonymously from survey.

2.6 Data analysis

Quantitative data were analyzed using descriptive statistics to summarize sociodemographic characteristics, prevalence of pain relief methods, awareness levels, and satisfaction ratings. Frequency distributions and percentages were used for categorical variables, while means and standard deviations were calculated for continuous variables. Comparative analyses explored relationships between awareness, preferences, and use of pain relief methods. Statistical analysis was conducted using standard software packages.

3. Overview of Pharmacological Pain Relief Methods in Childbirth

3.1 Traditional pain relief methods in Kyrgyzstan

The traditional pain relief methods of epidural block and general anesthesia play a crucial role in childbirth practices throughout Kyrgyzstan. Both women in labor and hospitals continue to choose these methods because they are accessible and effective [7]. But these methods have some challenges. The main issue with these methods is their potential to cause baby distress which requires close monitoring. General anesthesia causes maternal stress that subsequently impacts the baby according to this problem [8].

The combination of epidural block with reduced local anaesthetic doses presents a promising alternative to traditional pain relief approaches. The method reduces narcotic and muscle relaxant consumption substantially which in turn decreases adverse effects [9]. The study by Pan Li et al. (2025) demonstrates that combined anaesthesia (CA) using epidural blockade (EB) with decreased local anaesthetic doses provides an acceptable treatment option which decreases narcotic drug and muscle relaxant use and subsequently reduces their negative effects on newborns. The extensive implementation of these methods enhances medical care quality while decreasing newborn complications [10,34].

Finding a way to relieve pain that is both easy to get to and safe for both mother and baby is the toughest part. Modern methods need more advanced tools and highly trained medical staff, which might make them less useful in some places. However, using them can lead to better outcomes for mothers and babies, so developing and using these kinds of methods in obstetric care is a good idea. It is very important to let women know about the pain relief options that are available to them and what might happen if they use them. This helps them make informed decisions and makes childbirth safer overall.

3.2 Advantages and disadvantages of different methods

Modern methods of pharmacological pain relief during childbirth are very important in lowering the amount of drugs that both the mother and the baby are required to consume. These techniques are currently being incorporated into medical practice in Kyrgyzstan, predominantly in private maternity hospitals, facilitating safer and more gentle delivery conditions for women. In situations where there aren't many resources and there are a lot of different clinical situations, pharmacological anesthesia is the best choice because it lowers health risks for both the mother and the baby [11] .

Research shows that the combined anesthesia method works well because it cuts down on the need for narcotic drugs and muscle relaxants. This is especially important for babies, as it greatly lessens the effects of depression [12]. Studies have shown that combining epidural blockade with lower doses of local anesthetics can cut down on the need for narcotic drugs and muscle relaxants, which can have a big impact on the newborn's mood. This method is slowly becoming a part of everyday medical practice thanks to the work of medical professionals. It is improving perinatal outcomes and making childbirth safer overall [13].

However, there are a number of problems that need to be solved before pharmacological anesthesia can be used by everyone. The most important problems are that you need highly trained specialists and the right equipment [14]. These factors may make it harder to get modern pain relief methods, especially in places that are far away or don't have a lot of resources [15]. In this situation, it is important to keep training medical staff and teaching pregnant women about the benefits of these methods. The successful integration of innovative approaches into clinical practice not only ensures individual patient safety and comfort but also enhances the overall quality of maternity care in the region [13,33].

4. Result

The study results indicated that most participants were married women between childbearing years who had two children. Half of the participants had complications during childbirth and their pain relief options were determined by medical professionals. The pain intensity was severe before anesthesia administration but it reduced after treatment although the results regarding effectiveness and comfort were inconsistent. The majority of participants experienced no adverse effects and expressed satisfaction levels ranging from moderate to high regarding their childbirth experience. Women preferred either no anesthesia or epidural for future deliveries while stressing the need to have control over their pain relief options.

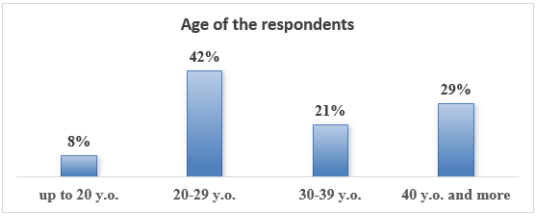

Figure 1. Age of respondents

As it can be seen in Figure 1, the majority of the participants are of reproductive age, which is defined as being between the ages of 20 and 29.

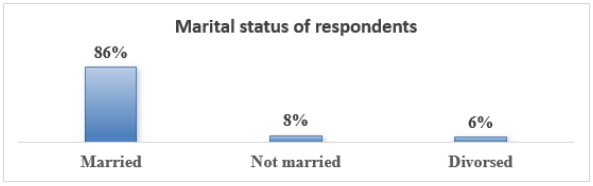

Figure 2. Marital status

The majority of those who participated in the study are married as shown in Figure 2

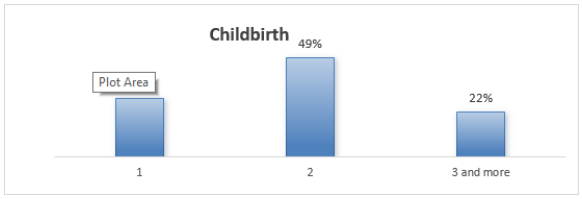

Figure 3. Birth order of the respondent's child

The Figure 3 reveals that the biggest group of people, 49%, had two kids. A lower number, 29%, had one child, and 22% of the population had three or more children.

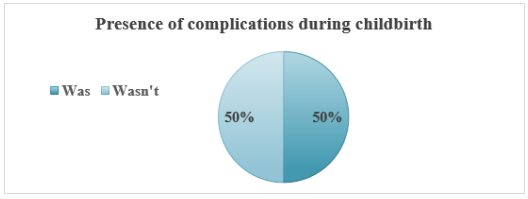

Figure 4. Presence of complications during childbirth

The Figure 4 is split in half, with each half showing 50%. According to the survey, exactly half of the respondents experienced complications during childbirth.

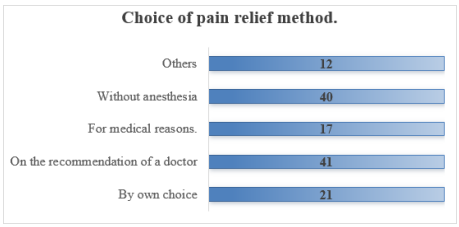

Figure 5. How the method of pain relief was chosen (131 participants)

The doctor's opinion plays a significant role in choosing the method of pain relief. "On the recommendation of a doctor," with a value of 41, was the most common choice. "Without anesthesia," with a value of 40, was the second most common choice. "By own choice" was another important group, with a value of 21. The least common answers were "medical reasons" and "others," with scores of 17 and 12, respectively.

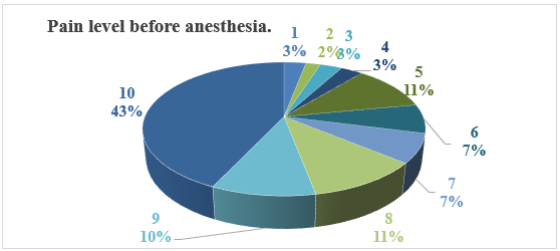

Figure 6. Pain level on a scale from 1 to 10 before anesthesia

The Figure 6, "Pain level before anesthesia" shows how people said they felt discomfort on a scale from 1 to 10. A massive 43% said they had the worst pain level of 10. Following this, 11% of people said their pain level was 5 or 8, and 10% said it was 9. There were only 2% to 3% of the total replies that fell into the lowest pain levels, which were 1 to 4.

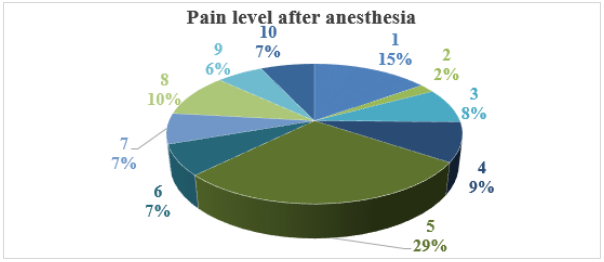

Figure 7. Pain level on a scale from 1 to 10 after anesthesia (where 1 = no pain, 10 = unbearable pain)

Figure 7 shows how many people said their pain level was between 1 and 10 after they had anesthesia. 29%

of the people said their pain level was 5, which is the most common level. After that, 15% said their pain level was 1, and 10% said it was 8. Only 2% of people reported a pain level of 2, which was the lowest. The data shows that after anesthesia, the pain levels were much lower than they were before.

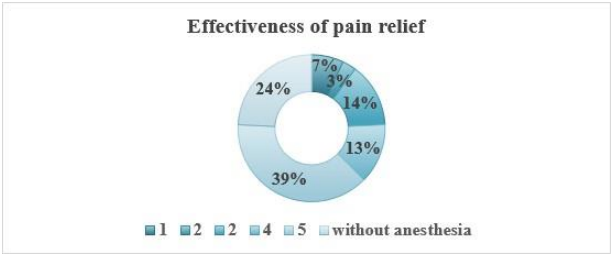

Figure 8. Overall effectiveness of pain relief, rated on a scale from 1 to 5 (where 1 = ineffective, 5 = fully effective)

Figure 8 shows the distribution of self-reported outcomes regarding pain management. The largest segment of the population, 39%, is represented by those who received pain relief "without anesthesia." Among the other groups, the most common perceived effectiveness rating was a score of 5, accounting for 24% of the responses. This is followed by a rating of 2 (14%), a rating of 4 (13%), and a rating of 1 (7%). The least common response was a rating of 3, which made up just 3% of the total.

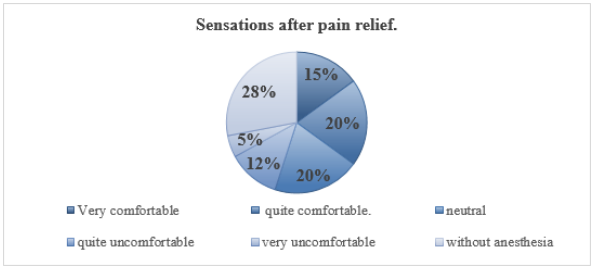

Figure 9. How comfortable participants felt after receiving anesthesia

The biggest part of figure 9, which is 28%, is made up of those who got pain alleviation "without anesthesia." For those who did get any kind of pain alleviation, the most common sensations were "quite comfortable" and "neutral," which each made up 20% of the responses. 24% of people said they felt "very uncomfortable," while 12% said they felt "quite uncomfortable." Only 5% of the respondents said "very comfortable," which was the least common answer.

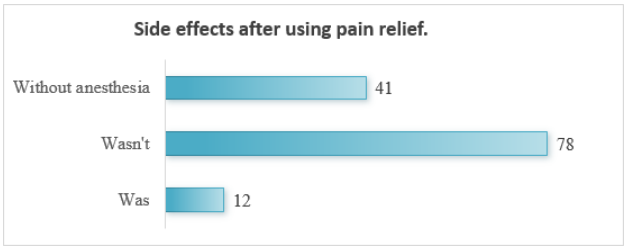

Figure 10. Presence of side effects after medical pain relief

Figure 10 shows how often people said they had adverse effects after pain management. The most common answer, with a value of 78, was "Wasn't," which means that most people didn't have any negative effects. The next category is "Without anesthesia," which has a value of 41. "Was," which had a value of 12, was the least common answer. This means that a tiny number of people did have negative effects.

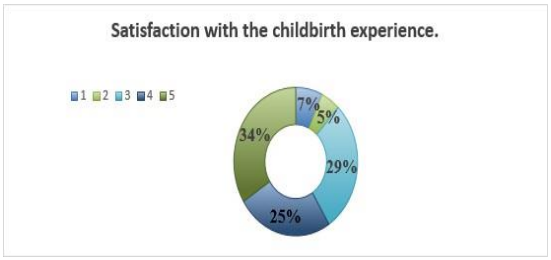

Figure 11. Overall satisfaction with the childbirth process, rated on a scale from 1 to 5 (where 1 = completely dissatisfied, 5 = completely satisfied)

As shown in Figure 11, more than 50% of respondents were sufficiently satisfied with the overall childbirth experience.

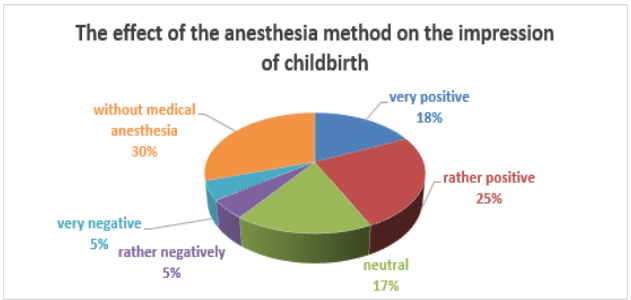

Figure 12. The impact of the chosen pain relief method on participants' childbirth experience

The Figure 12 illustrates the distribution of patient impressions. The largest single category, accounting

for 30% of the responses, was "without medical anesthesia." Among the subjective impressions, "rather positive" was the most common response at 25%, followed by "very positive" at 18%, and a "neutral" impression at 17%. The least common responses were the negative impressions, with both "rather negatively" and "very negative" each accounting for 5% of the total.

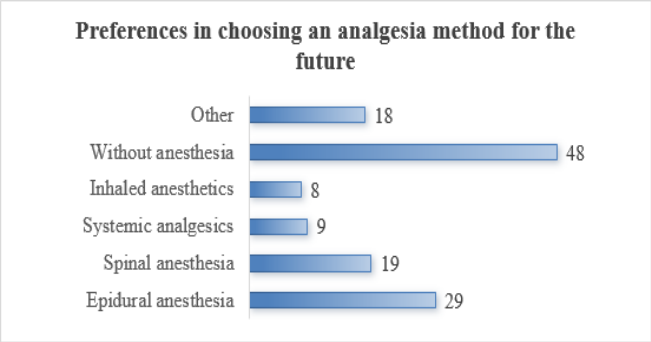

Figure 13. Preferred pain relief method for future deliveries

Epidural anesthesia remains the most popular and widely recognized choice among participants as shown in figure 13. It shows the distribution of preferred pain relief methods. The most common preference, with a value of 48, is "Without anesthesia." Following this, "Epidural anesthesia" is the second most preferred method at 29, and "Spinal anesthesia" is the third at 19. The least preferred methods are "Inhaled anesthetics" and "Systemic analgesics," with values of 8 and 9, respectively. "Other" methods account for 18.

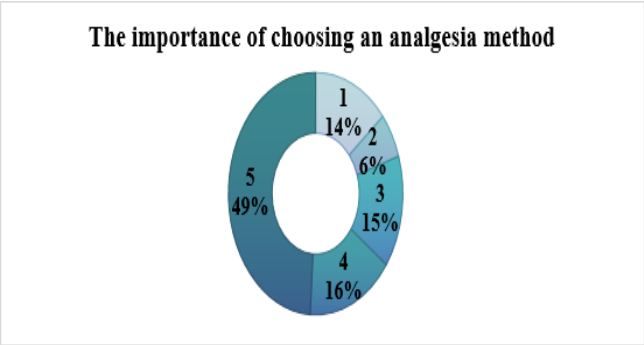

Figure 14. Importance of having a choice of pain relief method, rated on a scale from 1 to 5 (where 5 = very important, 1 = not important)

The ability to choose a pain relief method is highly significant for women, playing a crucial role in both childbirth preparation and the birthing process itself. The largest segment of the population, 39%, is represented by those who received pain relief "without anesthesia." Among the other groups, the most common perceived effectiveness rating was a score of 5, accounting for 24% of the responses. This is followed by a rating of 2 (14%), a rating of 4 (13%), and a rating of 1 (7%). The least common response was a rating of 3, which made up just 3% of the total.

5. Discussion

The research presents new findings about how patients use pain medications during birth in Osh's private maternity facilities and their satisfaction rates and treatment effectiveness. The most preferred and commonly used method was epidural anesthesia. Half of the survey participants indicated their intention to use epidural anesthesia during their future deliveries. The choice of spinal anesthesia favored between 30–40% of women yet systemic analgesics and inhalation anesthetics were chosen by less than 20% of participants [16]. LE Dohlman (2020) shows the prevalent use of neuraxial techniques in this environment shows that numerous women refrain from these procedures or face service delivery limitations which affect both personal preferences and system-wide service constraints [17].

Study by Henning Hermanns et. al (2022) support the findings since epidural and spinal techniques deliver superior pain relief that enhances patient satisfaction when properly administered. The pregnancy-induced changes in drug distribution and plasma protein binding together with hepatic metabolism affect how anesthetic agents work in the body [18]. Ignoring these changes may lead to higher risks of maternal hypotension as well as fetal distress and delayed drug clearance. According to Mamyrov, Ziyabekov, and Urumbaeva (2024) the study results demonstrate why anesthetics should be personalized for pregnant patients who experience altered physiological states particularly in the Kyrgyz Republic.

The importance of these factors increases when resources are restricted. The implementation of epidural blocks requires trained anesthesiologists together with sterile techniques and continuous monitoring for successful administration. The

availability of these resources remains inconsistent outside urban and private healthcare facilities. As per DW Hewson et al (2024), Spinal anesthesia requires specialized healthcare providers and appropriate patient selection even though it has theoretical advantages. Systemic analgesics and inhalation agents present easier usage but deliver less effective pain management during extended periods while causing additional impacts on maternal and fetal health. The situation requires protocols that achieve safety while maintaining effectiveness through feasible solutions [19].

The development of modern pain relief approaches requires both advanced training for medical staff and improved maternal care practices. This study demonstrates that women's insufficient understanding of pain relief options prevents them from making informed decisions about their care which represents a basic principle of patient-centered care. Educational programs that teach patients and healthcare workers simultaneously will help reduce this gap by enabling evidence-based clinical decisions that respect patient values. The improvement of infrastructure together with training and clinical governance must happen simultaneously for every level of maternity care in Kyrgyzstan to establish safe effective pain relief. By using pharmacokinetic and pharmacodynamic principles in healthcare policy and practice health systems can reduce avoidable risks and improve mother and newborn outcomes while increasing maternal happiness. The study advances this process by providing relevant local evidence that indicates specific policy intervention points. The research contributes to advancing the mission of delivering fair and high-quality obstetric care in low- and middle-income countries.

5.1 The impact on the health of the child and perinatal outcomes

The administration of general anesthesia during labor produces immediate and delayed health consequences for mothers that extend past delivery. The body's stress response to anesthetics disrupts HPA axis functioning which leads to longer recovery times and requires longer postpartum medical supervision. The effects of these complications increase the workload on clinical services and negatively affect the health outcomes of mothers in settings with limited healthcare resources. The risks demonstrate the need for selecting anesthetics based on their balance between pain relief and safety and long-term health impacts [20].

The maternal stress response together with the pharmacological burden of general anesthesia creates effects that impact neonatal adaptation. Research shows that general anesthesia combined with artificial ventilation during birth results in decreased creatine kinase (CK) levels in newborns which indicates suppressed neonatal HPA axis function because of maternal stress and drug exposure. This research by RC Moisa et al. (2025) demonstrates that minimizing unnecessary medication exposure and tailoring anesthesia protocols becomes essential for safeguarding the health of mothers and their newborns.

The short-term consequences for mothers include longer recovery periods and increased requirements for endocrine monitoring and delayed bonding between mothers and their newborns. The long-term consequences of these effects remain scarce in medical records but suggest permanent changes to endocrine and metabolic operations. Obstetric and postpartum care must integrate more closely to address these potential risks. The education of mothers about pain relief choices and the development of structured benefit-risk discussions and clinical staff training form the basis of this approach. The most effective strategy to improve safety and outcomes for mothers and their children in resource-limited settings involves careful anesthetic planning as a preventive measure since prolonged postpartum monitoring is often not possible [21].

5.2 Practical application and women's preferences: Analysis of the use of methods in clinical practice.

The Kyrgyz Republic uses institutional resources together with attending personnel clinical proficiency to determine labor analgesia selection. The most commonly used methods for pain relief during labor are neuraxial techniques such as epidural block and systemic approaches including general anesthesia because they are the most accessible options. The effectiveness of these interventions in pain relief for mothers comes with negative effects on neonatal physiology which

requires thorough evaluation of techniques that benefit both short-term and long-term perinatal results [22].

Different anesthesia methods used strategically and adapted to local conditions enhance both maternal and neonatal safety and quality of care during labor. The implementation of these strategies in resource-limited settings reduces the requirement for unnecessary medications while maintaining effective pain relief. The integration of women's preferences into clinical decision-making remains essential for this process particularly when their preferences show a preference for safe low-risk alternatives which protect maternal and neonatal health [23].

Expectant mothers need to receive complete information about all pain relief options along with their advantages and disadvantages and potential risks. This will help them make informed decisions together. A personalized approach which uses clinical evidence together with patient priorities will improve childbirth safety and result in better outcomes for mothers and newborns.

5.3 Women's preferences and expectations regarding pain relief

The selection and application of analgesic techniques during labor in Kyrgyzstan depends mainly on available resources and the competency of medical staff. The modern obstetric practice incorporates conservative approaches yet non-pharmacological methods that are low-intervention do not fulfill the pain relief requirements of most women in labor. The current limitation in pain relief options makes it essential to combine effective pharmacological methods with supportive care [24].

The limited adoption of advanced pain relief techniques stems from insufficient training for healthcare professionals and restricted availability of specialized equipment. The solution to these deficits needs phased implementation strategies together with targeted capacity-building for healthcare providers. The quality of obstetric care and perinatal outcomes improvement and reduction of pharmacological exposure depend on these essential measures [25].

Modern analgesic methods require more than just technical preparedness to be implemented successfully; policy coordination, institutional planning, and public involvement are also necessary. Giving expectant mothers accurate and comprehensive information about available techniques, their benefits, and potential risks helps them make educated decisions and fosters trust with medical professionals. In Kyrgyzstan, increasing fair access to safe, efficient pain management during childbirth necessitates both patient education and workforce training investments [26].

6. Recommendations for Advancing Practice and Future Perspectives

The process of maternal decision-making about labor analgesia depends on multiple factors which include personal expectations and previous birth experiences and cultural norms and perceived risks to both mother and newborn. Women in various clinical environments show a strong preference for pain relief methods which emphasize safety and reduce drug exposure. Patient education at the right time becomes essential for both obtaining informed consent and improving maternal satisfaction and decreasing anxiety and building trust in maternity services.

6.1 Risk-conscious maternal preferences: Women tend to select pain relief methods which they believe will result in the least amount of harm to themselves and their babies. The risk-averse approach demonstrates an increased concern about the immediate and future consequences of drug treatments and highlights the need for providing alternatives that combine pain relief with safety measures [27,36].

6.2 Central role of patient education: Women can make informed, personalized choices when they get comprehensive, evidence-based counseling on all the pain relief methods available, including how they work, their benefits, and any possible side effects. People who have access to this information are happier and less anxious, especially first-time mothers or those who have had bad experiences in the past [28].

6.3 Need for adaptable, patient-centered medical strategies: Contemporary obstetric care must incorporate maternal preferences with

personalized medical evaluations, especially for women with intricate obstetric or comorbid conditions. This necessitates adaptable protocols that can integrate conventional analgesic techniques alongside novel, customized strategies to address varied clinical requirements [29].

6.4 Institutional readiness and professional competence: For advanced pain relief methods to be effective, there must be the right equipment, infrastructure, and medical staff who have been trained properly. To keep safety standards high and make sure that maternal care is always of the same high quality, anesthetic care professionals need to keep learning [30].

6.5 Integration of structured counseling and consultation services: Standard antenatal care should include pre-labor counseling sessions to create a structured process for discussing pain management options while addressing patient concerns and matching evidence-based practices to patient expectations. The proactive approach helps build trust between the two parties while improving risk management and leading to better outcomes for mothers and babies [31,35].

7. Conclusion

The current research demonstrates that effective pain management plays a crucial role in improving maternal experiences and perinatal outcomes during childbirth in Kyrgyzstan. Private maternity hospitals primarily use neuraxial techniques including epidural block and general anesthesia because these methods are available and have established effectiveness. The need to discover alternative pain management methods becomes crucial because these methods have adverse effects on newborn physiology. Combined anesthesia is a good option because it reduces the need for narcotic drugs and limits the newborn's exposure to drugs, but it is not widely used because it requires special training and equipment. The results show that improving obstetric analgesia in Kyrgyzstan requires a dual focus on both the capacity of the workforce and the involvement of patients. The safety of maternity care and patient needs focus requires teaching healthcare workers modern evidence-based methods and keeping pregnant women informed about their options. Strategic planning will be essential for long-term progress through the implementation of new ideas into national clinical protocols and the expansion of educational programs for both providers and patients. Future research should evaluate specific approaches for implementing advanced analgesic techniques in limited resource environments. These efforts could lead to better outcomes for pregnant women and their babies, more trust in maternity services, and higher overall satisfaction among mothers. This would all help to improve reproductive health in the Kyrgyz Republic as a whole.

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Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethical Approval: The Institutional Review Board (IRB) of the Osh State University, Osh City, Kyrgyz Republic approved the study. Oral consent were taken while collecting data and permission by IRB was waived since the data were obtained anonymously, with no patient characteristics identified.

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