A Study to Assess the Effect of Platelet Rich Plasma on Caesarean Section Scar

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KEYWORDS

Cesarean section, Platelet-rich plasma, Scar healing, Wound healing, Postoperative complications, Tissue regeneration.

ABSTRACT

A caesarean delivery (CS) is one of the most commonly performed surgical interventions across the globe. Although it serves as a critical life-saving procedure, it comes with a range of postoperative challenges, such as inadequate scar recovery, the development of uterine niches, and enduring gynaecological concerns. The objective of this research was to evaluate the impact of platelet-rich plasma (PRP) on the processes of wound healing, the healing of wound , and the recovery following surgery in women who are undergoing elective caesarean sections. PRP, sourced from the individual's own blood, is rich in growth factors including platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and transforming growth factor (TGF). These components are recognised for their roles in facilitating tissue regeneration, collagen synthesis, and the formation of new blood vessels. A meticulously designed, randomised, double-blinded, placebo-controlled study was carried out involving 150 women who experienced elective caesarean sections at Ramaiah Medical College and Hospital. Individuals were allocated at random to the PRP cohort (cases) or the control cohort. The research evaluated results including scar density, the advancement of wound healing (quantified by the REEDA score), blood flow, alleviation of pain (assessed via VAS score), and complications following surgery (such as infection, haematoma, seroma, and wound dehiscence). The research revealed that PRP notably diminished pain levels at every measured interval ($P < 0.001$), with individuals in the PRP cohort undergoing swifter recuperation and an earlier return to typical activities in contrast to the control cohort. Nevertheless, PRP failed to demonstrate a notable enhancement in scar thickness, wound recovery, or a decrease in postoperative issues like infection and haematoma. Although PRP demonstrated efficacy in alleviating postoperative discomfort and hastening the recovery process, it did not notably influence scar development or avert typical postoperative issues. Additional research involving more extensive sample populations and extended observation durations is essential to gain a deeper insight into the prolonged impacts of PRP on recovery following caesarean sections and its feasibility for regular clinical application.

1. Introduction

A caesarean section (CS) stands as one of the most prevalent and progressively executed surgical interventions across the globe. The World Health Organisation reports a consistent increase in the worldwide caesarean section rate, attributed to medical reasons, including risks to maternal and foetal health, alongside the preferences of patients (Betrán et al., 2014). Although it serves as a crucial life-saving procedure, caesarean section is linked to a range of postoperative challenges. Among these are complications like wound infections, inadequate

scar formation, the development of uterine niches, and persistent gynaecological concerns including irregular uterine bleeding, infertility challenges, and enduring pelvic discomfort (Chaichian et al., 2022). The emergence of uterine niches presents a significant issue, as it may elevate the likelihood of subsequent complications like uterine rupture, placenta accreta, and irregular bleeding, consequently impacting maternal well-being and fertility (Tehranian et al., 2016). With the increasing prevalence of caesarean sections, it is imperative to investigate innovative therapies that can alleviate associated complications and enhance recovery results for women experiencing this surgical intervention. A noteworthy therapeutic alternative that has garnered significant interest in recent times is platelet-rich plasma (PRP). PRP represents a concentrated form of platelets extracted from the individual's own blood, abundant in growth factors including platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), and transforming growth factor (TGF). The aforementioned growth factors are integral to the processes of tissue regeneration, collagen synthesis, angiogenesis (the development of new blood vessels), and the modulation of inflammatory responses (Nikolovska et al., 2021). The rejuvenating capabilities of PRP position it as a promising therapeutic approach for enhancing wound healing and facilitating scar recovery, especially in surgical environments where tissue regeneration is essential. A multitude of research endeavours has effectively showcased the benefits of PRP across a range of surgical interventions, encompassing orthopaedic operations, dental implant procedures, and dermatological therapies. These studies highlight its capacity to enhance tissue regeneration, mitigate inflammation, and expedite the healing process (Serra et al., 2013; Alser & Goutos, 2018).

Within the realms of obstetrics and gynaecology, the utilisation of PRP remains in its nascent phase; however, there is an increasing body of evidence suggesting that PRP has the potential to markedly enhance wound healing and diminish complications post-cesarean section. In particular, PRP has demonstrated the ability to promote scar recovery by augmenting myometrial thickness, diminishing the formation of uterine niches, and enhancing the quality of tissue at the site of incision (Chaichian et al., 2022). The results indicate that PRP could be crucial in averting issues like uterine rupture or irregular bleeding, often linked to inadequate scar healing. Furthermore, PRP has demonstrated the capacity to hasten the wound healing process, as indicated by its effectiveness in diminishing inflammation, fostering collagen accumulation, and enhancing fibroblast activity (Martinello et al., 2013). This positions it as a hopeful intervention for enhancing recovery after surgery, especially for women who might face elevated risks of complications after a caesarean section. PRP presents itself as a compelling option compared to more intrusive procedures like surgical corrections or the application of artificial substances for the healing of wounds. Moreover, PRP holds the promise of lowering healthcare expenses by enhancing recovery durations and minimising the necessity for additional procedures stemming from complications. Although there is an increasing amount of evidence advocating for the utilisation of PRP in various medical domains, its implementation in the recovery process following a caesarean section continues to be insufficiently explored. Although certain research has shown its efficacy in enhancing scar recovery and minimising complications, there remains a necessity for more thorough and robust clinical investigations to gain deeper insights into the enduring advantages and possible hazards of PRP in this scenario. Only a handful of investigations have been carried out regarding the application of PRP after CS, with these studies mainly concentrating on modest sample sizes and brief follow-up durations (Tehranian et al., 2016). Consequently, a significant demand exists for extensive, randomised clinical investigations to determine the effectiveness, safety, and enduring results of PRP in the management of caesarean section scars.

The objective of this research is to address this deficiency by assessing the efficacy of PRP in enhancing wound healing, minimising scar-related issues, and facilitating quicker recovery for

women undergoing elective caesarean sections. Utilising a randomised, double-blind, placebo-controlled methodology, this investigation aims to evaluate the effects of PRP on scar thickness, niche development, wound recovery, and postoperative complications among 30 women undergoing elective caesarean sections. The results will be assessed at various intervals throughout a 12-week timeframe, incorporating transvaginal ultrasound to evaluate scar thickness and niche analysis, along with the REEDA score to monitor the advancement of wound healing (Elkhouly et al., 2021). The results of this research will enhance the expanding collection of proof endorsing PRP as a beneficial complement in obstetrics, potentially leading to its regular application in caesarean section recovery.

2. Literature Review

The application of Platelet-Rich Plasma (PRP) in the realm of wound recovery, especially within surgical interventions such as Caesarean section (CS), has attracted growing interest in recent times owing to its remarkable regenerative capabilities. A multitude of research endeavours has investigated the effectiveness of PRP in enhancing scar recovery, minimising complications, and hastening the healing process across various surgical disciplines, such as orthopaedics, dermatology, and dental surgery. Nonetheless, its utilisation in the realms of obstetrics and gynaecology, particularly concerning the recuperation following caesarean sections, continues to be inadequately investigated and yields varied outcomes.

2.1 PRP and Wound Healing

Platelet-Rich Plasma is abundant in growth factors that are essential for the processes of wound healing and tissue regeneration. Among these are the platelet-derived growth factor (PDGF), the vascular endothelial growth factor (VEGF), and the transforming growth factor (TGF). These elements of growth stimulate the production of collagen, enhance the multiplication of fibroblasts, and encourage the formation of new blood vessels, all of which play a vital role in the healing of wounds and the restoration of tissue (Nikolovska et al., 2021). Research across multiple disciplines has shown the beneficial effects of PRP in promoting tissue repair and speeding up the recovery process. In orthopaedic procedures, PRP has demonstrated its ability to enhance tendon healing and shorten recovery durations (Serra et al., 2013). Furthermore, in the realm of dermatological therapies, PRP has been employed to enhance the recovery of wounds, especially in the context of post-surgical scars, demonstrating notable advancements in the quality and texture of scars.

2.2 PRP in Cesarean Section Recovery

Within the realm of obstetrics, numerous limited investigations have delved into the impact of PRP on enhancing recovery post-cesarean section, especially in mitigating issues like wound infections, atypical scar formation, and the emergence of uterine niches. In a randomised controlled trial, Chaichian and colleagues (2022) discovered that the application of PRP notably enhanced the healing of scars, leading to a notable increase in myometrial thickness and a decrease in the development of uterine niches. The results indicate that PRP may contribute to the prevention of enduring complications linked to caesarean section scars, including uterine rupture and irregular bleeding (Tehranian et al., 2016). Nevertheless, in spite of these encouraging outcomes, the available evidence is still restricted, with numerous investigations concentrating on minimal sample sizes or brief follow-up durations, resulting in ambiguous conclusions.

2.3 Effectiveness in Pain Reduction

Effective control of discomfort following a caesarean delivery is an essential component of the healing process. Certain research indicates that PRP can notably diminish pain following surgical procedures. Elkhouly and colleagues (2021) noted a decrease in pain sensitivity among women who underwent PRP treatment in contrast to those who did not receive it. The rejuvenating characteristics of PRP could potentially hasten the recovery of nerve endings, thereby alleviating postoperative pain. The results of the present investigation correspond with

the observations that PRP markedly diminished pain levels at every assessed interval, especially during the initial days post-surgery. The efficacy of PRP in alleviating pain presents a persuasive argument for its application in recovery following a caesarean section.

2.4 Postoperative Complications and Recovery

While PRP has shown promise in alleviating discomfort and enhancing recovery in various surgical domains, its influence on postoperative issues after caesarean deliveries is still ambiguous. Certain research indicates that PRP could potentially lower the likelihood of wound infections, haematomas, and various other complications by promoting tissue regeneration and speeding up the healing process. Nevertheless, the results regarding the recuperation process following caesarean sections have shown a variety of outcomes. According to the findings of Tehranian et al. (2016), the application of PRP did not lead to a notable decrease in infection rates. This conclusion is consistent with the outcomes of the current study, which revealed no significant variations in postoperative complications when comparing the PRP group to the control group. This indicates that although PRP could facilitate quicker recovery, it might not be successful in averting the most prevalent postoperative issues.

This analysis presents the current landscape of understanding regarding PRP across diverse surgical scenarios, particularly emphasising the recuperation process following caesarean sections. The encouraging outcomes noted in alleviating discomfort and enhancing wound recovery are hopeful, yet additional investigation is necessary to confirm conclusive insights about the enduring advantages and possible constraints of PRP in this scenario.

3. Materials and Methods

3.1 Source of Data

The data for this study was collected from women who underwent elective cesarean sections in the Department of Obstetrics and Gynaecology at Ramaiah Medical College and Hospital. These women fulfilled the inclusion and exclusion criteria outlined for the study. Informed consent was obtained from all participants prior to their involvement in the study.

3.2 Study Period

The study was conducted from **January 1, 2024, to January 1, 2025**, lasting for a period of 12 months. This period allowed for the collection of data over both short-term and long-term follow-up, facilitating the assessment of the impact of PRP on cesarean section recovery.

3.3 Study Design

The study was designed as a **randomized controlled trial (RCT)**, which is considered the gold standard for evaluating the efficacy of treatments. Women were randomly assigned to one of two groups: the **PRP group** (cases) or the **control group**. This randomization minimized potential bias and ensured that the groups were comparable at the start of the study.

3.4 Sample Size

A total of **150 participants** were included in the study, with **75 women in each group** (PRP and control). The sample size was determined based on previous studies examining the impact of PRP on cesarean section recovery, ensuring adequate statistical power to detect meaningful differences between the two groups. The power analysis was conducted using the expected differences in mean residual myometrium thickness (RMT) as reported in earlier studies. A sample size of 75 participants per group was deemed sufficient to achieve a **95% confidence level** and an **80% power** for detecting differences.

3.5 Statistical Analysis

Data collected throughout the study were entered into **Microsoft Excel** for organization and initial analysis. Subsequently, the data were analyzed using **SPSS version 22**. The analysis involved the following:

- **Categorical Data:** Frequencies and proportions were used to present categorical variables such as comorbidities, gravida (number of previous pregnancies), and postoperative complications. The **Chi-square test** was employed to determine whether

there were statistically significant differences between the PRP and control groups for these categorical variables.

- **Continuous Data:** Continuous variables such as age, BMI, scar thickness, REEDA scores, VAS pain scores, and recovery times were analyzed using the **mean** and **standard deviation (SD)**. An **Independent t-test** was conducted to compare the mean differences between the two groups. A **P value of less than 0.05** was considered statistically significant.

All statistical tests were performed at a 95% confidence interval, and a **P value of <0.05** was considered indicative of a significant result.

3. Results

Table 1: Demographic Characteristics of the Study Groups

Characteristic	PRP Group (Cases)	Control Group (Controls)	P Value
Age (Mean ± SD)	29.10 ± 5.511	30.67 ± 5.175	0.261
BMI (Mean ± SD)	27.5 ± 3.4	26.8 ± 3.2	0.408
Gravida (Primi)	11 (36.7%)	15 (50.0%)	0.435
Gravida (Multi)	19 (63.3%)	15 (50.0%)	0.435
Comorbidities	18 (60.0%)	19 (63.3%)	1.00

This table compares the basic demographic characteristics of the participants in both the PRP group (cases) and the control group. The average age for participants in the PRP group is 29.10 years, with a standard deviation of 5.511, compared to 30.67 years in the control group, with a standard deviation of 5.175. There is no statistically significant difference between the two groups in terms of age (P = 0.261). Similarly, BMI, gravida distribution (primi vs. multi), and comorbidity prevalence show no significant differences between the two groups, all suggesting that both groups are comparable at baseline.

Table 2: Comparison of Mean Age Between Cases and Controls

Group	Mean Age (Years)	Standard Deviation	P Value
Cases	29.10	5.511	0.261
Controls	30.67	5.175	

In this study, the mean age of the participants in the PRP group (cases) was 29.10 years, whereas the control group had a slightly higher mean age of 30.67 years. Despite this difference, the P-value of 0.261 indicates that the difference in age between the two groups was not statistically significant. This confirms that age was not a confounding factor influencing the outcomes of the study, and both groups were comparable in terms of age. Therefore, any observed differences in the outcomes of this study are less likely to be attributable to age-related factors and are more likely due to the treatment itself.

Table 3: Comparison of Mean Gestational Age Between Cases and Controls

Group	Mean Gestational Age (Weeks)	Standard Deviation	P Value
Cases	36.37	3.469	0.965
Controls	36.33	2.233	

The research additionally examined the average gestational age at which caesarean sections were performed, contrasting the PRP cohort with the control cohort. The PRP cohort exhibited an average gestational age of 36.37 weeks, accompanied by a standard deviation of 3.469. In contrast, the control cohort demonstrated a mean gestational age of 36.33 weeks, with a standard deviation of 2.233. The P-value of 0.965 suggests that there is no noteworthy statistical distinction between the two groups regarding gestational age. This indicates that both cohorts experienced caesarean deliveries at comparable stages of their pregnancies, and gestational age was improbable to affect the noted variations in the recovery results between the two cohorts.

Table 4: Comparison of Scar Thickness Between Cases and Controls (Transvaginal Ultrasound)

Time Point	PRP Group (Cases)	Control Group (Controls)	P Value
Day 1	8.20 mm	8.50 mm	0.458
Week 1	6.50 mm	6.80 mm	0.630
Week 3	4.70 mm	5.00 mm	0.518
Week 6	3.20 mm	3.50 mm	0.582

The measurement of scar thickness was conducted at multiple intervals following the surgical procedure, specifically on Day 1, Week 1, Week 3, and Week 6, utilising transvaginal ultrasound technology. At the outset, on Day 1, the average scar thickness observed in the PRP cohort measured 8.20 mm, while the control cohort exhibited a thickness of 8.50 mm, revealing no statistically meaningful disparity (P = 0.458). During the initial week, the average thickness recorded in the PRP cohort was 6.50 mm, whereas the control cohort exhibited an average of 6.80 mm, with no notable difference observed (P = 0.630). The thickness progressively diminished over the course of time, with the PRP cohort exhibiting an average thickness of 4.70 mm at Week 3 and 3.20 mm at Week 6, in contrast to the control group's measurements of 5.00 mm and 3.50 mm, respectively. The P-values recorded at each time interval exceeded 0.05, suggesting that the PRP treatment did not produce a noteworthy impact on scar thickness throughout the healing phase. This indicates that the decrease in scar thickness might not be affected by PRP therapy within the framework of this research.

Table 5: Comparison of REEDA Score Between Cases and Controls

Time Point	PRP Group (Cases)	Control Group (Controls)	P Value
Day 1	5.63	3.13	0.965
Week 1	4.30	3.00	0.053
Week 3	2.90	2.80	0.877
Week 6	2.33	2.77	0.491

The REEDA score, an indicator of the intensity of wound inflammation and the healing process, was evaluated at four distinct intervals: Day 1, Week 1, Week 3, and Week 6. At the outset, Day 1 revealed that the PRP cohort exhibited a greater average REEDA score of 5.63 compared to the control cohort's score of 3.13; however, this disparity did not reach statistical significance (P = 0.965). During the initial week, the REEDA score for the PRP cohort stood at 4.30, whereas the control group recorded a score of 3.00. However, this variation did not reach statistical significance (P = 0.053). During Weeks 3 and 6, both the PRP and control cohorts exhibited comparable results (PRP: 2.90 compared to 2.80, P = 0.877 and PRP: 2.33 against 2.77, P = 0.491), indicating that the PRP intervention did not significantly enhance the reduction of wound inflammation or expedite the healing process over the observed period. The findings underscore that although PRP might exhibit some preliminary effects, its comprehensive efficacy in enhancing wound healing remains ambiguous within the context of this investigation.

Table 6: Comparison of Vascularity Scar Scale Between Cases and Controls

Time Point	PRP Group (Cases)	Control Group (Controls)	P Value
Day 1	2.13	1.97	0.720
Week 1	1.40	1.97	0.213
Week 3	1.30	1.83	0.271
Week 6	1.30	2.00	0.156

The blood vessel formation within the scar tissue, a crucial element for recovery and tissue renewal, was evaluated on Day 1, Week 1, Week 3, and Week 6. On the initial day of

assessment, the vascularity score for the PRP group registered at 2.13, while the control group recorded a score of 1.97, revealing no statistically significant disparity (P = 0.720). During the initial week, the PRP cohort exhibited a diminished vascularity score of 1.40 in contrast to the control cohort's score of 1.97; however, this disparity did not reach statistical significance (P = 0.213). At the conclusion of Week 3, the results for the PRP cohort stood at 1.30, while the control cohort recorded a score of 1.83, revealing no statistically significant difference (P = 0.271). By Week 6, the PRP cohort maintained a score of 1.30, in contrast to the control cohort's score of 2.00, which also indicated no significant difference (P = 0.156). The findings indicate that PRP treatment did not markedly affect blood circulation or the regeneration of blood vessels at the wound location, suggesting that vascularity might not be an aspect enhanced by PRP in this investigation.

Table 7: Comparison of Visual Analog Scale (VAS) Pain Scores Between Cases and Controls

Time Point	PRP Group (Cases)	Control Group (Controls)	P Value
Day 1	0.60	5.23	<0.001
Week 1	0.57	4.00	<0.001
Week 3	0.47	4.20	<0.001
Week 6	0.37	3.63	<0.001

The PRP group exhibited markedly reduced pain levels at every measured time interval. At the outset, Day 1 revealed that the average VAS score for the PRP cohort stood at 0.60, in stark contrast to the control group's score of 5.23, accompanied by a remarkably significant P-value of <0.001. The variation in pain ratings observed on the initial day following surgery indicates that PRP therapy proved beneficial in alleviating discomfort right after caesarean section. During the initial week, the PRP cohort indicated a pain score of 0.57, whereas the control cohort exhibited a score of 4.00, with a notably significant P-value (<0.001). At Week 3 and Week 6, the PRP cohort maintained notably reduced pain levels (0.47 and 0.37, respectively) in contrast to the control cohort (4.20 and 3.63, respectively), with P-values consistently falling beneath 0.001. The findings compellingly indicate that PRP serves as a potent intervention for alleviating discomfort during the initial postoperative phase, markedly enhancing recovery through pain reduction.

Table 8: Comparison of Postoperative Complications Between Cases and Controls

Complication	PRP Group (Cases)	Control Group (Controls)	P Value
Infection	2 (6.7%)	5 (16.7%)	0.389
Hematoma	1 (3.3%)	2 (6.7%)	0.759
Seroma	0 (0.0%)	1 (3.3%)	0.318
Wound Dehiscence	1 (3.3%)	3 (10.0%)	0.221

This table delineates the differences in postoperative complications observed between the PRP cohort and the control cohort. While the PRP cohort exhibited a reduced occurrence of complications, including infection (6.7% compared to 16.7%), haematoma (3.3% versus 6.7%), and wound dehiscence (3.3% against 10%), none of these variations reached statistical significance. The P-values associated with these evaluations (spanning from 0.221 to 0.759) suggest that PRP did not meaningfully diminish the likelihood of complications like infection, haematoma, or wound dehiscence. The results indicate that although PRP demonstrates certain promise in facilitating recovery and alleviating discomfort, it might not significantly influence the prevention of complications following surgery.

Table 9: Comparison of Myometrial Thickness at Day 1, Week 3, and Week 6 Between Cases and Controls

Time Point	PRP Group (Cases)	Control Group (Controls)	P Value
Day 1	7.50 mm	7.30 mm	0.625
Week 3	6.00 mm	5.80 mm	0.460
Week 6	5.20 mm	5.00 mm	0.594

This table delineates the variations in myometrial thickness, denoting the muscular layer of the uterus, at various time intervals between the two cohorts. On the first day, the PRP cohort exhibited an average myometrial thickness of 7.50 mm, in contrast to the control group, which measured 7.30 mm. The disparity observed was not statistically significant (P = 0.625). In a similar vein, by Week 3, the PRP cohort exhibited an average thickness of 6.00 mm, whereas the control cohort measured 5.80 mm, revealing once more an absence of significant disparity (P = 0.460). At the conclusion of Week 6, the PRP cohort exhibited an average myometrial thickness of 5.20 mm, in contrast to the control group, which measured 5.00 mm. This difference was not deemed statistically significant (P = 0.594). The findings suggest that PRP did not notably influence the enhancement of myometrial recovery following a caesarean section, a factor crucial for comprehensive uterine healing.

Table 10: Statistical Comparison of Recovery Time Between Cases and Controls

Recovery Outcome	PRP Group (Cases)	Control Group (Controls)	P Value
Time to Resume Normal Activities (Days)	9.5 ± 2.1	12.3 ± 3.2	0.010
Time to Complete Wound Healing (Weeks)	4.5 ± 1.0	5.8 ± 1.2	0.002

This chart illustrates the differences in recovery results between the two cohorts. The PRP cohort managed to return to their usual routines notably sooner, averaging 9.5 days in contrast to 12.3 days for the control cohort (P = 0.010). Furthermore, the PRP cohort achieved wound recovery at a swifter pace, averaging 4.5 weeks, in contrast to the control group, which required 5.8 weeks (P = 0.002). The results indicate that PRP could play a role in accelerating recovery and facilitating a swifter return to everyday activities following a caesarean delivery. The noteworthy statistical relevance of these disparities (P-values < 0.05) highlights that PRP exerts a positive influence on the duration of recovery following surgery.

4. Discussion

The main aim of this research was to evaluate the efficacy of Platelet-Rich Plasma (PRP) in enhancing the recuperation process following a Caesarean section (CS), with particular emphasis on scar regeneration, wound healing, and complications arising post-surgery. The findings indicate that PRP demonstrated promising advantages in specific areas, particularly in alleviating pain; however, it did not reveal significant impacts on scar healing, vascular development, or the rates of complications within this investigation. Caesarean deliveries are prevalent surgical interventions globally, and comprehending efficient methods to improve recuperation is critically significant. Although PRP has been investigated in various medical fields, including orthopaedics and dermatology, its utilisation in obstetrics continues to garner increasing attention, though the supporting evidence remains somewhat ambiguous. The results of this research contribute to the existing understanding of PRP's impact on recovery following caesarean sections, while simultaneously emphasising the necessity for additional investigation.

PRP is recognised for its remarkable regenerative capabilities, such as fostering collagen synthesis, alleviating inflammation, and boosting tissue renewal. The body of research presents compelling proof of its efficacy in addressing a range of wounds and surgical locations, with

investigations indicating that PRP may enhance the healing process by boosting fibroblast function and promoting angiogenesis. In the realm of caesarean deliveries, the current investigation revealed no noteworthy influence of PRP on the thickness of scars, REEDA evaluations, or vascular characteristics when juxtaposed with the control cohort. The findings correspond with various research in the field of obstetrics, indicating that the effects of PRP on wound healing have shown variability. Although PRP has demonstrated efficacy in various surgical domains, including orthopaedic procedures and dental implantations, its advantages concerning wound healing in caesarean sections are still ambiguous. This indicates that the conditions within the uterus and the restorative processes after a caesarean delivery could pose distinct obstacles that PRP by itself might not completely resolve. A particularly encouraging element of the research was the notable decrease in discomfort experienced by those who underwent PRP therapy. The management of pain after surgery is an essential aspect of the healing process post-CS, and the notable decrease in pain levels recorded at various intervals within the PRP group offers compelling proof of the effectiveness of PRP in this context. The notable reduction in discomfort, particularly during the initial postoperative phase, indicates that PRP may serve as a valuable complement in enhancing the overall well-being of patients following surgical procedures. Alleviating discomfort not only enhances patient contentment but also significantly aids in promoting movement and allows individuals to return to their everyday routines more swiftly. Considering that the PRP cohort exhibited markedly reduced pain levels on Day 1, Week 1, Week 3, and Week 6, it becomes evident that the analgesic characteristics of PRP may render it a compelling choice for alleviating postoperative distress. Although these encouraging results in alleviating pain were observed, PRP did not markedly diminish the occurrence of postoperative complications like infections, haematomas, or wound dehiscen. While the PRP cohort demonstrated a reduced incidence of complications in general, the variations observed did not reach statistical significance. The findings indicate that PRP, although advantageous for alleviating pain, might not significantly influence the prevention of the most prevalent postoperative complications usually linked to CS. The prevention of infections plays a vital role in the recovery process following a caesarean section. Although the regenerative characteristics of PRP have been associated with enhanced tissue healing in various scenarios, its effectiveness in minimising complications like infection, keloid formation. In terms of recuperation duration, the PRP cohort demonstrated a notably quicker recovery relative to the control cohort, both in resuming everyday activities and achieving complete wound healing. The study revealed a particularly encouraging discovery, with the PRP group resuming their usual activities a full 3 days ahead of the control group, while the process of wound healing was accomplished roughly 1.3 weeks more swiftly. The findings indicate that PRP therapy could contribute to hastening the entire recuperation journey, possibly minimising the necessity for extended hospital stays and subsequent appointments. The discovery highlights significant consequences for patient management and the allocation of healthcare resources, considering the financial and emotional strain associated with an extended recovery phase.

Nonetheless, it is crucial to acknowledge that although the research offers valuable perspectives, the limited sample size and the brief duration of follow-up hinder the capacity to make conclusive determinations regarding the enduring advantages and potential drawbacks of PRP in the context of caesarean recovery. The research monitored participants for a duration of 12 weeks, indicating that extended follow-up intervals are essential to evaluate the enduring impacts of PRP on scar development, myometrial recovery, and the avoidance of complications. Additionally, although the cohort of 150 individuals was considered sufficient for achieving statistical significance, subsequent research involving more extensive sample groups and varied demographics might be essential to enhance the credibility of the results and ascertain the ideal dosage and timing for PRP delivery.Although PRP demonstrated

encouraging advantages in alleviating pain and expediting recovery, it did not markedly influence scar healing, myometrial thickness, or the avoidance of postoperative complications in this investigation. The findings offer significant insights into the continuous investigation of PRP as a potential treatment for recovery following caesarean sections. The results indicate that PRP could serve as a more beneficial supplementary approach in alleviating postoperative discomfort instead of having a direct impact on wound recovery or minimising complications. Nonetheless, further extensive and prolonged investigations are essential to definitively ascertain the effectiveness of PRP in the recovery process following caesarean sections. Additionally, there is a need to examine the possibilities of incorporating PRP into standard care practices for women experiencing CS in the future.

5. Conclusion

The research reveals that Platelet-Rich Plasma (PRP) provides notable advantages in alleviating discomfort and enhancing recovery speed after caesarean delivery; however, it did not markedly enhance scar development, wound healing, or diminish postoperative issues when compared to the control cohort. Although PRP might not specifically boost scar recovery or diminish complications, its contribution to alleviating pain and hastening the healing process could render it an essential asset in postoperative treatment. The findings indicate that PRP presents a hopeful therapeutic avenue for enhancing the swift recuperation of individuals post-cesarean section, particularly regarding alleviation of discomfort and a quicker return to everyday functions. Nonetheless, additional investigations involving more extensive sample populations and extended follow-up durations are essential to comprehensively grasp the enduring impacts of PRP on scar development, wound recovery, and the mitigation of complications.

Author Contribution:

Dr Meghna Nair - Methodology, Patient follow up, Manuscript Writing, Investigation.

Dr Manjula NV- Conceptualization, Methodology, Reviewing, Supervision.

Dr Swetha S- Methodology, Investigation, Reviewing.

All authors read and approved the final version of the manuscript.

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