
RESEARCH ARTICLE**Relationship Between Perineal Wound Pain Degree and PRP Healing in Vaginal Birth**Fatima Diyas Zahra¹, Bobby Indra Utama^{2,*}, Almurdi³, Roza Sri Yanti², Deddy Saputra⁴, Nelmi Silvia⁵¹. Student of Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia². Department of Obstetrics and Gynecology, Faculty of Medicine, Andalas University, Dr. M. Djamil Central General Hospital Padang, West Sumatra, Indonesia³. Department of Clinical Pathology, Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia⁴. Department of Surgical, Faculty of Medicine, Andalas University, Dr. M. Djamil Central General Hospital Padang, West Sumatra, Indonesia⁵. Department of Public Health Sciences, Faculty of Medicine, Andalas University, Padang, West Sumatra, Indonesia**Correspondence:** Bobby Indra Utama, bobbyindrautama@med.unand.ac.id**Submitted:** December 12, 2024**Accepted:** July 28, 2026**Published:** August 13, 2026**DOI:** <https://doi.org/10.25077/aoj.10.2.312-321.2026>

Abstract

Introduction : This study aims to see the relationship between the level of perineal wound pain and healing using PRP (Platelet Rich Plasma) in Vaginal birth. Perineal wound pain causes fear of movement resulting in subinvolution, unsmooth release of the locea, bleeding, or infection.

Method : This type of research is Experimental with chi-quadrath design . The intervention group received PRP injections on perineal wounds on day 1 after delivery, while the control group was the group that was not given PRP. On the 7th day, observation of the degree of pain of perineal wounds was carried out using the VAS scale (Visual Analog Scale) in both groups.

Result : The results of the study obtained a value of $p=0.016$. Then the value of $OR = 6.250$ was also obtained.

Conclusion : there is a significant relationship between the level of perineal wound pain and healing using PRP in Vaginal birth. From the OR score, it is known that patients who receive PRP have a 6.25 times chance of experiencing mild pain compared to patients who are not given PRP.

Keywords: Pain, perineal wound, PRP, Vaginal birth.

INTRODUCTION

Prevalence of vaginal delivery globally based on data *World Health Organization* (WHO) in 2021 is 80% of total births.¹ In Indonesia, based on data from the Social Security Administration Agency (BPJS) Kesehatan, the coverage of JKN-KIS deliveries in 2019 has a total number of delivery cases of 1,675,553 with normal deliveries totaling 1,066,559 babies.² In West Sumatra, based on data in 2018, CBR figures (*Gross birth rate*) or rough births of 17.32 per 1000 population with a total of 95,510 births.³ Based on the health profile of Padang City in 2022, childbirth is carried out in health service facilities (*fasyankes*) as much as 80%.

A very common vaginal delivery complication is perineal wound. The cause of the high maternal mortality rate (MMR) in addition to uterine atonia and placental waste is perineal rupture.⁴ More than 53-89% of women experience perineal injuries during childbirth.⁵ Based on WHO data, there are 2.7 million cases of perineal rupture in pregnant women and 50-60% require sutures.⁶ Furthermore, in 2020, the incidence of perineal rupture in pregnant women in the world reached 2.7 million cases which is expected to increase to 6.3 million in 2050. In Indonesia, based on data from the Indonesian Ministry of Health in 2021, the incidence of perineal rupture reached 83% in vaginal delivery with 63% getting perineal sutures, 42% episiotomy and 38% due to spontaneous tears.

Short-term complications of perineal wounds are bleeding, infection, and laceration. Long-term complications include dyspareunia, perineal pain, urinary and fecal incontinence, pelvic organ prolapse, sexual dysfunction, decreased body image, and postpartum depression.⁷

Healing of perineal wounds can take a long time and be difficult due to the presence of continuous perineal pain.⁸ Pain has unpleasant effects such as pain and fear of moving. Fear of moving makes mothers rarely move after childbirth so that it will cause many problems including subinvolution, unsmooth lochea production, and postpartum bleeding. Pain also affects the mother's activities such as disturbed sleep patterns, mood, ability to defecate or urinate, and other daily activities.⁹ In addition, most mothers are afraid to touch and clean the perineal wound due to the pain felt so that the wound will be easily exposed to infection.¹⁰ Pain due to continuous perineal wounds also has the potential to make mothers not want to give birth vaginally in the future due to prejudice and fear of pain.⁷

Platelet-Rich Plasma (PRP) is an innovative procedure that uses the body's own plasma to obtain concentrated platelet plasma with a growth factor 5 to 10 times higher than that released by activated platelets.¹¹ The initial introduction of PRP in medical practice includes in the fields of orthopedics, cardiothoracic surgery, plastic surgery, dermatology, dentistry, and diabetic wound healing. For now, the use of PRP has begun to be used in reproductive medicine.¹¹ Administering PRP to patients *failure of postpartum perineal repair* at *Journal of Personalized Medicine* published in 2022 showed that PRP accelerates and improves conservative management of wounds with postpartum vaginal dehiscence.⁸ In the journal *Platelet-Rich Plasma as a Potential New Strategy in Endometrial Treatment in Assisted Reproduction Technology* In 2021, PRP also has the potential for endometrial treatment in the endometrial receptivity process.¹² The effectiveness of the use of PRP

is also proven in the journal *Emerging Role on the Use of Platelet-Rich Plasma Products in the Management of Urogynecological Disorders* in 2021. In this study, it was concluded that PRP is a very positive alternative for pelvic floor prolapse without the appearance of side effects, thus confirming the efficacy of PRP for the treatment of disorders *urogynecology*.¹³

The potential for PRP in healing perineal wounds, so PRP directly also plays a role in overcoming more significant pain due to perineal wounds.⁸ In addition, in a study published in the Malaysian Journal of Orthopaedics 2021 related to PRP injection for musculoskeletal soft tissue pain, it was proven that PRP is able to relieve acute and chronic pain in soft tissue injuries without additional analgesics.¹⁴ Furthermore, so far no special research has been found related to the effectiveness of PRP on perineal wound pain, so based on the above, researchers are interested in researching the relationship between the degree of pain in perineal wounds and healing using PRP in normal maternity mothers at the Padang City Health Center.

METHODS

The type of research is experimental. The research design is *chi-quadrath*. Research conducted by previous researchers in January 2022 took place at the Biomedical Laboratory of Andalas University for examination of TNF- α levels. The time for preparing the proposal began in December 2022-December 2023. The data source of this research is secondary data.

The population in this study is all patients who experienced perineal injuries after medical procedures at the Seberang Padang Health Center, Padang City. The samples used were all patients with perineal wounds who had been given medical treatment at the Seberang Padang Health Center, Padang City who met the inclusion criteria and there were no exclusion criteria.

The study included female patients, either primiparous or multiparous, who experienced first- or second-degree perineal lacerations following vaginal delivery and received treatment at the Seberang Padang Health Center, Padang City. Eligible participants were required to voluntarily participate in the study and provide written informed consent before enrollment.

Patients were excluded if they had hematological disorders, including thrombocytopenia, anemia with hemoglobin levels below 10 g/dL, or hyperfibrinogenemia; were hemodynamically unstable (shock); had diabetes mellitus; suffered from chronic liver disease; had acute or chronic infections, including sepsis; were receiving anticoagulant therapy (e.g., warfarin or heparin); had immunodeficiency disorders; or had used anti-inflammatory medications, including nonsteroidal anti-inflammatory drugs (NSAIDs) within 48 hours prior to the medical procedure, received local corticosteroid injections within the previous month, or systemic corticosteroid therapy within the previous two weeks.

The sampling techniques in this study are *consecutive sampling, with a total sample of 56 patients*. The dependent variable is the degree of pain of perineal wounds in normal childbirth mothers. The independent variable is the use of *Platelet Rich Plasma* (PRP) in perineal lesions.

Univariate analysis was used to determine the description of independent and dependent

variables of the study. The independent variable uses a nominal scale that includes categorical data. While the dependent variable uses an ordinal measuring scalar which includes categorical data. So that in this univariate analysis, the frequency distribution and proportion of each category are produced based on VAS scoring (*Visual Analog Scale*). Bivariate analysis to see if there is a meaningful relationship between independent variables and dependent variables. In this study, we looked at whether there was a relationship between the degree of pain in perineal wounds and healing using PRP in normal maternity mothers at the Padang City Health Center. In this analysis, the *chi-square* test was used. If the results of the *chi-square* test show a $p \leq 0.05$, it can be interpreted that there is a significant relationship between the dependent and independent variables.

RESULT

Respondent Characteristics

Table 1. Characteristics of Patient

Characteristic	PRP group (n=28) Frequency (%)	Control Group (n=28) Frequency (%)
Age		
Too young (<20 years)	7 (25,0)	0 (0)
Ideal (20-35 tn)	18 (64,3)	22 (78)
Too old (>35 years)	3 (10,7)	6 (21,4)
Work		
Housewives	22 (78,6)	25 (89,3)
Work	6 (21,4)	3 (10,7)
Education		
SD	7 (25,0)	6 (21,4)
JUNIOR	8 (28,6)	11 (39,3)
SMA	13 (46,4)	11 (39,3)
IMT		
<i>Underweight</i>	0 (0)	1 (3,6)
Usual	27 (96,4)	26 (92,9)
<i>Overweight and obese</i>	1 (3,6)	1 (3,6)
Parity		
Nulipara	15 (53,6)	11 (39,3)
Multipara	13 (46,4)	17 (60,7)
Degree of Wound		
1st Degree	1 (3,6)	0 (0)
Degree 2	27 (96,4)	28 (100)
Degree of Pain		
Light Degree	25 (89,3)	16 (57,1)
Medium Degree	3 (10,7)	12 (42,9)

The frequency of age, occupation, education, BMI, and degree of injury in both PRP-fed and non-PRP-fed patients were dominated by the same group, thus reducing the likelihood of bias. Previous research by Khalid, et al. in 2022 stated that the older the age, the longer the inflammatory process will be.¹⁵ The older the age, the higher the pain threshold compared to younger people.⁹ Based on the research carried out, both the group that was given PRP and the control group (not given PRP) were equally dominated by mothers of ideal age so that they had good sensitivity to pain. This research is also in line with research conducted by Siti, et al in 2020 regarding the effect of perineal laceration on the scale of pain. In this study, the majority of respondents were in the age category of 20-35 years old, namely in healthy reproductive conditions. This is in accordance with the theory that mothers will be healthy if they give birth at the age of 20-35 years because the female reproductive organs are in prime condition to face the birth process.¹⁶

Based on the type of work, the group of patients who were given PRP and the control group were dominated by housewives (IRT), which was 78.6% in the group given PRP and 89.3% in the control group. This result is in line with Leni Marlina's research, 2021 with the majority of housewife research respondents stating that housewives have more time to carry out perineal wound care.¹⁷

The frequency of education level in the group of patients given PRP was dominated by the high school education level, while the control group was dominated by the junior high and high school levels. Research by Marabella *et al*, the results were obtained that a person's level of education affects the level of cleanliness and how to properly care for wounds.¹⁸ This research is also in line with Leni Marlina's research in 2021 regarding the relationship between postpartum maternal knowledge and the length of wound healing. Education is one of the factors that can affect a person's knowledge, so that they have good knowledge also in doing good and correct perineal wound care.¹⁷

In this study, the frequency of Body Mass Index (BMI) in both the PRP group and the control group was dominated by normal BMI. Research conducted by Higgins *et al* In 2020, it was stated that there was a high association between pain and obesity. Patients with obesity have a higher response to pain due to excessive mechanical stress and its pro-inflammatory state. In addition to providing energy storage for the body, adipocytes also have endocrine functions, secreting adipositocins such as IL-6, TNF- α , and leptin. IL-6 is known to play a further role in pain.¹⁹

The results of the analysis of table 5.1 showed that there was a difference in parity frequency in the group of patients given PRP and the control group of patients. In the group given PRP, the patient's parity rate was dominated by nulipara while in the control group it was dominated by multipara. Multipara can be a modulator of pain threshold to maintain physical structures such as abdominal muscles that can cause increased pain and discomfort. Previous and emotional experiences of pain can affect a person's experience of accepting pain later in life. In a previous study by Fenta, et al, it was found that the intensity of pain in multiple postpartum mothers tended to be smaller than the intensity of pain in postpartum mothers of nulipara.⁹ However, in this study, it was found that in the group that was given PRP with a parity number dominated by the nulipara group, the degree of pain was dominated by mild degrees with a percentage of 89.3% and moderate

degrees of 10.7%. Meanwhile, in the control group without PRP therapy with parity numbers dominated by the multipara group, the degree of mild pain showed a smaller number of 57.1% and moderate degree of 42.9%. This shows that the effect of PRP administration has a greater effect on the degree of mild pain even in patients with nulipara.

The degree of perineal injury in both groups, both the PRP group and the control group, was dominated by second-degree perineal injury.⁵ This is in line with the research of Rosa, et al. in 2021, which showed that of the 66 mothers who experienced a perineal tear, as many as 62 (94%) of the sample had second-degree perineal injuries.²⁰ In a study by Siti, et al. in 2020, it was also found that the degree of perineal injury was mostly at degree two.¹⁶

The degree of pain of perineal wounds is measured using the VAS scale (*Visual Analog Scale*). Based on the results of data analysis in table 5.1, it was found that the degree of pain of perineal wounds from two sample groups, both those given PRP and the control group, was dominated by mild and moderate pain. This is in line with research by Siti, et al. in 2020 regarding the effect of perineal laceration on the scale of pain, most of them experience mild pain with a degree of second-degree perineal injury.¹⁶

Relationship between Perineal Wound Pain Degree and PRP Healing in Vaginal Birth

Table 2 Relationship between Perineal Wound Pain Degree and PRP Healing in Vaginal Birth

PRP Provision	Degree of Pain						OR <i>p</i> -value (95% CI)	
	Moderate Pain		Mild Pain					
	n	(%)	n	(%)	n	(%)		
No PRP	12	42,9	16	57,1	28	100		
With PRP	3	10,7	25	89,3	28	100	6,250	0,016
Total	15	26,8	41	73,2	56	100		

Pain appears as a form of body defense that indicates that there has been damage to body tissues.²¹ Physiologically, the process of pain begins with transduction and then transmission, modulation and perception.²² The nociceptor organ as a pain receptor is the free nerve endings with or without *Myelin* on the skin and mucosa. Pain will occur if these receptors induce A-delta fibers and C fibers. *Myelin* so that the distribution of pain is faster than C fibers without *Myelin*.²³

Perineal pain in the postpartum occurs due to a perineal injury. In this study, all respondents experienced perineal injuries due to episiotomy. Episiotomy is a perineal injury due to a deliberate incision by medical personnel in the perineum to enlarge the birth canal before the baby comes out when the vagina is stretched and there are indications of perineal rupture.²⁴ Episiotomy prevents uncontrolled perineal tears and facilitates labor by enlarging the vaginal introitus at the end during two deliveries.²⁵

Platelet Rich Plasma (PRP) is an autologous platelet in the form of whole blood produced from the centrifugation process so that platelet concentrations are obtained about 4 to 9 times

above normal.²⁶ Platelets also play a role in hemostasis by forming mechanical plugs against vascular injury, protecting blood vessels from endothelial damage, forming platelet plugs, and aggregation as a normal hemostatic response.²⁶ An increase in platelet concentration can increase the total growth factors released so that it can speed up the healing process.¹⁴

In addition to the rapidly increasing number of platelets, PRP also has clotting factors such as GF, chemokines, cytokines, and plasma proteins as adhesion molecules that make the body able to repair wounds in tissues more efficiently.²⁶ PRP plays a role in tissue regeneration, angiogenesis, cell migration, differentiation, and proliferation so that it will accelerate wound healing naturally. PRP has great potential for wound healing, so it directly also plays a role in overcoming more significant pain due to perineal wounds.²⁷ One of the advantages of PRP is its autologous and non-toxin properties in wound healing procedures. PRP can minimize the risk of immune reactions and infectious diseases. PRP is also considered less invasive because it is produced from the patient's own peripheral blood.¹²

The results of the statistical test in this study, obtained a value $p\text{-value} = 0.016$, it can be concluded that there is a significant relationship between the degree of pain of perineal wounds and healing using PRP. In the group of patients who were given PRP and the control group (group without PRP), the degree of pain in both groups was dominated by mild pain, but patients who were given PRP experienced 89.3% more mild pain and 10.7% less moderate pain than those who were not given PRP. Then, the value of $OR=6.250$ was also obtained, meaning that patients with perineal wounds who were given PRP had a 6.25 times chance of experiencing mild pain compared to patients who were not given PRP. The results of this study are in line with the research entitled *Use of Autologous Platelet Rich Plasma (A-PRP) for Postpartum Perineal Repair Failure* in 2022. In this study, it was found that PRP can accelerate and improve conservative management of wounds that experience postvaginal dehiscence.⁸ This research is also in line with research conducted by Tehran *et al* in 140 patients. It was found that patients treated with PRP based on scores from the Vas Scale, experienced a statistically significant reduction in pain at the end of the follow-up period (93% vs. 79%, $P<0.001$).²⁸

In the research conducted by Irianto, *et al* with the title *Platelet Rich Plasma Injection for Soft Tissue Musculoskeletal Pain* In 2021, 76 patients suffered soft tissue injuries and received PRP therapy between 2015 and 2018 at the Orthopaedic and Traumatology Hospital. The results of the study proved that PRP was able to relieve acute and chronic pain in soft tissue injuries without the addition of analgesics.¹⁴

DISCUSSION

Based on the research that has been conducted, it can be concluded that the characteristics of the most research subjects are at the ideal age (20-35 years). Work is dominated by housewives, education in the patient group given PRP is dominated by high school, while in the control group is high school and junior high school education. BMI is dominated by normal BMI, wound degree is dominated by perineal wound degree 2, and pain degree by mild pain degree. Meanwhile, for parity,

the group that was given PRP was dominated by nulipara mothers while the control group was dominated by multipara women. Furthermore, it was also concluded that there was a significant relationship between the degree of pain of perineal wounds and healing using Domestic violence in normal maternity at the Padang City Health Center.

CONCLUSION

Based on the research that has been conducted, it can be concluded that the characteristics of the most research subjects are at the ideal age (20-35 years). Work is dominated by housewives, education in the patient group given PRP is dominated by high school, while in the control group is high school and junior high school education. BMI is dominated by normal BMI, wound degree is dominated by perineal wound degree 2, and pain degree by mild pain degree. Meanwhile, for parity, the group that was given PRP was dominated by nulipara mothers while the control group was dominated by multipara women. Furthermore, it was also concluded that there was a significant relationship between the degree of pain of perineal wounds and healing using Domestic violence in normal maternity at the Padang City Health Center.

REFERENCES

1. WHO. Caesarean section rates continue to rise, amid growing inequalities in access. 2021; Available from: <https://www.who.int/news/item/16-06-2021-caesarean-section-rates-continue-to-rise-amid-growing-inequalities-in-access>
2. Prasiska TO, Pujiyanto, Absor S. Hospital Baserate Klaim Persalinan JKN-KIS Rumah Sakit. Higeia J Public Heal Res Dev. 2021;1(3):625–34.
3. DPPKBKPS. Dinas Pengendalian Penduduk, Keluarga Berencana Kependudukan dan Pencatatan Sipil Provinsi Sumatera Barat. 2019;108.
4. Nurhayati D. ANALISIS FAKTOR FAKTOR KEJADIAN RUPTUR PERINEUM PADA IBU BERSALIN DI WILAYAH KERJA PUSKESMAS KECAMATAN SOBANG KABUPATEN LEBAK PROVINSI BANTEN TAHUN 2022. 2002;1876–92.
5. Grimes CNRWR. Perineal Lacerations [Internet]. 2023. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK559068/>
6. Dian Anisya, M A, Abeng AT. Asuhan Kebidanan Postpartum pada Ny. Y dengan Nyeri Luka Jahitan Perineum. Wind Midwifery J. 2023;03(01):60–8.
7. Kabakcı AG, Bozkır MG. Effectiveness of platelet-rich plasma treatment in perineal trauma : a case report Clinical and Experimental Obstetrics & Gynecology. 2021;
8. Akhoundova F, Schumacher F, Marie L, Berndt S, Tejada BM De, Abdulkadir J. Use of Autologous Platelet Rich Plasma (A-PRP) for Postpartum Perineal Repair Failure : A Case Report. 2022;0–5.
9. Romadhon FN, Putri RD, Evayanti Y, H. Z. Pemberian Ekstrak Kayu Manis terhadap Nyeri Luka Perineum Pada Ibu Postpartum. J Kebidanan Malahayati [Internet]. 2021;7(4):757–65. Available from: <http://ejournalmalahayati.ac.id/index.php/kebidanan/article/view/3101>
10. Dwienda Ristica O, Afni R. Efektifitas Teknik Sitz Bath Untuk Mengurangi Nyeri Rupture Perineum Pada Ibu Nifas Di Praktik Mandiri Bidan Dince Syafrina, Sst Tahun 2019. Pros Hang Tuah Pekanbaru. 2021;43:105–12.
11. Sharara FI, Lelea LL, Rahman S, Klebanoff JS, Moawad GN. A narrative review of platelet-rich plasma (PRP) in reproductive medicine. J Assist Reprod Genet. 2021;38(5):1003–12.
12. Lin Y, Qi J, Sun Y. Platelet-Rich Plasma as a Potential New Strategy in the Endometrium Treatment in Assisted Reproductive Technology. 2021;12(October).
13. Prodromidou A, Zacharakis D, Athanasiou S. The Emerging Role on the Use of Platelet-Rich Plasma Products in the Management of Urogynaecological Disorders. 2021;
14. Irianto KA, Bakri AH, Kloping NA. Platelet rich plasma injection for soft tissue musculoskeletal pain. Malaysian Orthop J. 2021;15(2):96–100.
15. Khalid KA, Nawati AFM, Zulkifli N, Barkat MA, Hadi H. Aging and Wound Healing of the Skin: A Review of Clinical and Pathophysiological Hallmarks. Life. 2022;12(12):1–12.
16. Istiana S, Rahmawati A, Kusumawati E. Pengaruh derajat laserasi perineum terhadap skala nyeri perineum pada ibu post partum. J Kebidanan. 2020;9(1):53.
17. Marlina L. Hubungan Pengetahuan Ibu Post Partum Tentang Perawatan Luka Perineum Dengan Lama Penyembuhan Luka Di Rs Jih Solo Naskah Publikasi. Naskah Publ Univ kusuma husada

surakarta. 2022;

18. Heng ML, Kwan YH, Ilya N, Ishak IA, Jin PH, Hogan D, et al. A collaborative approach in patient education for diabetes foot and wound care: A pragmatic randomised controlled trial. *Int Wound J*. 2020;17(6):1678–86.
19. Higgins DM, Buta E, Heapy AA, Driscoll MA, Kerns RD, Masheb R, et al. The relationship between body mass index and pain intensity among veterans with musculoskeletal disorders: Findings from the MSD Cohort Study. *Pain Med (United States)*. 2020;21(10):2563–72.
20. Mutianingsih R, Munawarah Z. Penggunaan Anastesi Pada Ibu Bersalin Berdasarkan Derajat Robekan Perineum di RSAD Wirabhakti Mataram. *Jikf*. 2021;9(1):5–8.
21. Ayudita S. Buku Ajar Asuhan Kebidanan Managemen Nyeri dan Persalinan Kala I-IV Kebidanan [Internet]. Group TM, editor. Jakarta: Mahakarya Citra Group; 2023.
22. ningttyas, iwayan rahayu D. *Menejemen Nyeri*. Vol. 01. 2023. 1–195 p.
23. Adi, Purwanto. Ichlas, Tribakti. Mochmad R. *Manajemen Nyeri*. Padang: Global Eksekutif Teknologi; 2023.
24. Fatimah, Lestari P. Pijat Perineum [Internet]. 2019. 192 p. Available from: <http://elibrary.almaata.ac.id/2188/1/Buku Pijat Perineum Upload Repository.pdf>
25. Diana Vaamonde ACH and JMGM. Fertility, Pregnancy, and Wellness [Internet]. 2022. Available from: <https://www.sciencedirect.com/topics/medicine-and-dentistry/perineum>
26. Akhir K, Kadar A, Endothelial V, Pada F, Rich P, Dengan P, et al. Analisis Kadar Vascular Endhotelia Growth Factor Pada Platelet ROCH Plasma Dengan Penambahan Aktivator Kalsium Klorida (CaCL2) + Trombin Pada Suhu Dan Waktu Penyimpana Yang Berbeda. 2021;
27. Collins T, Alexander D, Barkatali B. Platelet-rich plasma: a narrative review. *EFORT Open Rev*. 2021;64(4):225–35.
28. Tehranian A, Esfehiani-Mehr B, Pirjani R, Rezaei N, Heidary SS, Sepidarkish M. Application of autologous platelet-rich plasma (PRP) on wound healing after caesarean section in high-risk patients. *Iran Red Crescent Med J*. 2016;18(7).