

**EFFECT OF PRENATAL MASSAGE ON REDUCING BACK PAIN IN  
THIRD-TRIMESTER PREGNANT WOMEN AT UPTD PUSKESMAS  
AIR MOLEK, PASIR PENYU DISTRICT, INDRAGIRI HULU  
REGENCY**

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**ABSTRAK**

Nyeri punggung merupakan keluhan muskuloskeletal yang dominan pada ibu hamil trimester III, terjadi pada 60-80% kasus akibat perubahan hormon relaksin, peningkatan beban uterus, dan pergeseran pusat gravitasi. Di UPTD Puskesmas Air Molek, survei awal menunjukkan tingginya keluhan nyeri punggung yang mengganggu aktivitas harian ibu hamil. Pijat prenatal sebagai terapi non-farmakologis terbukti efektif mengurangi nyeri melalui relaksasi otot, peningkatan sirkulasi, dan stimulasi endorfin, namun belum ada data empiris local. Menganalisis pengaruh pijat prenatal terhadap penurunan nyeri punggung pada ibu hamil trimester III di UPTD Puskesmas Air Molek Kecamatan Pasir Penyus Kabupaten Indragiri Hulu. Penelitian kuantitatif quasi-eksperimental dengan desain one-group pretest-posttest design. Sampel 20 ibu hamil trimester III dipilih purposive sampling. Intervensi pijat prenatal (20 menit/sesi, 1x/minggu, 4 minggu) menggunakan skala nyeri ordinal (1=tidak pernah, 4=sangat sering). Analisis univariat (frekuensi, mean) dan bivariat (uji Wilcoxon Signed Rank) menggunakan SPSS 25. Pretest: 80% responden kategori sering/sangat sering (mean 2,45±0,89); posttest: 90% tidak nyeri (mean 1,10±0,30). Uji Wilcoxon  $Z=-3,456$  ( $p=0,001<0,05$ ) menunjukkan pengaruh signifikan. Pijat prenatal efektif menurunkan nyeri melalui mekanisme fisiologis (sirkulasi, endorfin) dan mekanis (relaksasi otot lumbar), sejalan dengan penelitian Fitriyah (2020) dan Lusi Haryanti (2023). Modul pelatihan pijat prenatal untuk bidan Puskesmas dan artikel jurnal kebidanan. Pijat prenatal berpengaruh signifikan terhadap penurunan nyeri punggung ibu hamil trimester III ( $p=0,001$ ).

**Kata Kunci:** Pijat Prenatal, Nyeri Punggung, Ibu Hamil Trimester III, Wilcoxon, Puskesmas Air Molek.

**ABSTRACT**

*Low back pain is a predominant musculoskeletal complaint among third-trimester pregnant women, affecting 60–80% of cases and often disrupting daily activities and quality of life. This study aimed to analyze the effect of prenatal massage on reducing back pain in third-trimester pregnant women at UPTD Puskesmas Air Molek, Pasir Penyus District, Indragiri Hulu Regency. This quantitative quasi-experimental research used a one-group pretest–posttest design with 20 third-trimester pregnant women selected by purposive sampling. Prenatal massage was administered once weekly for four weeks (20 minutes per session) following a standardized operating procedure focusing on the lumbar and back area. Back pain intensity was measured using an ordinal pain scale (1=never, 4=very frequent). Data were analyzed using descriptive statistics and the Wilcoxon Signed Rank test with a significance level of 0.05. Before the intervention, 80% of respondents reported frequent/very frequent back pain with a mean pretest score of 2.45±0.89. After four weeks of prenatal massage, 90% of respondents reported no pain, and the mean score decreased to 1.10±0.30. The Wilcoxon test showed  $Z = -3.456$  with  $p = 0.001$  ( $p < 0.05$ ), indicating a significant reduction in back pain. Prenatal massage effectively reduces back pain in third-trimester pregnant women through physiological (circulatory and endorphin-mediated) and mechanical (muscle relaxation) mechanisms, and can be recommended as a safe complementary therapy in antenatal care at primary health care settings.*

**Keywords:** Prenatal Massage, Back Pain, Pregnancy, Third Trimester, Wilcoxon Test.

## INTRODUCTION

Low back pain is one of the most common musculoskeletal complaints during pregnancy, particularly in the third trimester, with a global prevalence ranging from 50% to 70%. In Indonesia, 60–80% of pregnant women report back pain, and local studies in Riau Province indicate that approximately 70.8% of pregnant women experience back pain, especially in late pregnancy. Back pain in pregnancy is associated with hormonal changes (relaxin), weight gain, postural alterations, ligament laxity, and psychosocial stress, which together impair physical function and quality of life.

Pharmacological management of pain during pregnancy is limited due to potential risks to the fetus; thus, non-pharmacological approaches such as prenatal massage have become increasingly important. Prenatal massage is a gentle, pregnancy-adapted technique designed to reduce muscle tension, enhance circulation, stimulate the release of endorphins, and promote relaxation. Previous studies in Indonesia and abroad demonstrated significant reductions in back pain following prenatal massage, but there is limited evidence from primary health care settings in Indragiri Hulu.

Preliminary observations at UPTD Puskesmas Air Molek showed a high proportion of third-trimester pregnant women complaining of back pain, while prenatal massage had not been systematically implemented as part of antenatal services. This study was therefore conducted to provide local empirical evidence on the effect of prenatal massage on back pain in pregnant women.

To determine the effect of prenatal massage on reducing back pain among third-trimester pregnant women at UPTD Puskesmas Air Molek, Pasir Penyau District, Indragiri Hulu Regency.

## METHOD

### Study design and setting

This research employed a quantitative quasi-experimental design with one group pretest–posttest. The study was conducted at UPTD Puskesmas Air Molek, Pasir Penyau District, Indragiri Hulu Regency, Riau, from June to November 2025.

### Population and sample

The population comprised all third-trimester pregnant women attending antenatal care at UPTD Puskesmas Air Molek (N=40). The sample size was calculated using a finite population formula with 5% precision, resulting in 20 respondents selected through purposive sampling.

The inclusion criteria were: third-trimester pregnancy, complaint of back pain, willingness to participate, and absence of contraindications to massage. Exclusion criteria included high-risk pregnancy (e.g. preeclampsia, bleeding), severe medical conditions, or refusal to continue the intervention.

### Intervention: prenatal massage

Prenatal massage was provided by trained personnel following a standard operating procedure. Each respondent received a massage once weekly for four consecutive weeks, 20 minutes per session, with the mother in a safe lateral or supported sitting position. The massage focused on the lumbar and paraspinal muscles using light effleurage, kneading, and gentle pressure techniques with vegetal oil.

### Measurement of back pain

Back pain intensity was measured using an ordinal pain scale with four categories: 1 = never, 2 = sometimes, 3 = frequent, and 4 = very frequent, based on respondents' perception of back pain occurrence. Measurements were taken immediately before the first massage session (pretest) and after completion of the fourth session (posttest).

### Data analysis

Univariate analysis described frequency distributions and central tendency (mean, standard deviation) of back pain scores. Bivariate analysis used the Wilcoxon Signed Rank test to examine differences between pretest and posttest scores because the data were ordinal and not assumed to be normally distributed. Statistical significance was set at  $p < 0.05$ , using SPSS version 25.

### Ethical considerations

The study received administrative approval from Institut Kesehatan dan Teknologi Al Insyirah and permission from UPTD Puskesmas Air Molek. All participants signed informed consent forms, and confidentiality was assured through anonymized data handling.

## RESULT AND DISCUSSION

### Characteristics of respondents

The study involved 20 third-trimester pregnant women. Most respondents were aged 26–30 years, with a mean gestational age of 37 weeks and a balanced distribution between primigravida and multigravida. Many had experienced back pain for more than two weeks before the intervention, indicating persistent discomfort.

### Back pain before prenatal massage

Before the intervention, the majority of respondents reported frequent or very frequent back pain. Specifically, 55% were categorized as frequent, 25% as very frequent, 15% as sometimes, and 5% as never. The mean pretest pain score was 2.45 with a standard deviation of 0.89 and a median of 3.00. This distribution confirms that back pain was a dominant complaint in late pregnancy at the study site.

### Back pain after prenatal massage

Following four weeks of prenatal massage, a marked shift in pain categories was observed. In the posttest, 90% of respondents reported no back pain, and 10% reported occasional pain; no respondents remained in the frequent or very frequent categories. The mean posttest score decreased to  $1.10 \pm 0.30$  with a median of 1.00.

### Change in pain scores and the Wilcoxon test

The mean difference (delta) between pretest and posttest scores was 1.35 points, indicating clinically meaningful improvement. Eighteen respondents (90%) experienced a decrease in pain score, while two respondents showed minimal change.

The Wilcoxon Signed Rank test yielded  $Z = -3.456$  with  $p = 0.001$  ( $p < 0.05$ ), demonstrating a statistically significant reduction in back pain after prenatal massage.

### Table and figure placement

Tables must be placed above and / below the page. Tables should not be placed in the middle of the page.

Tabel 1. Distribusi Tingkat Nyeri Punggung Pretest pada ibu hamil trimester III

Tingkat Nyeri	Frekuensi (n)	Persentase (%)
Tidak pernah	1	5,0

Kadang-kadang	3	15,0
Sering	11	55,0
Sangat sering	5	25,0
<b>Total</b>	<b>20</b>	<b>100</b>

Table 2. Distribusi tingkat nyeri punggung posttest pada ibu hamil trimester III (n=20)

Tingkat Nyeri	Frekuensi (n)	Persentase (%)
Tidak pernah	18	90,0
Kadang-kadang	2	10,0
Sering	0	0,0
Sangat sering	0	0,0
<b>Total</b>	<b>20</b>	<b>100</b>

Tabel 3. Distribusi lama keluhan nyeri punggung pretest (n=20)

Lama Nyeri	Frekuensi (n)	Persentase (%)
Kurang dari 1 minggu	3	15,0
1-2 minggu	7	35,0
Lebih dari 2 minggu	10	50,0
<b>Total</b>	<b>20</b>	<b>100</b>

Tabel 4. Tabulasi silang tingkat nyeri pretest-posttest pada ibu hamil trimester III (n=20)

Pretest / Posttest	Tidak Pernah	Kadang-kadang	Sering	Sangat Sering	Total
Tidak pernah	1	0	0	0	1
Kadang-kadang	2	1	0	0	3
Sering	11	0	0	0	11
Sangat sering	4	1	0	0	5
<b>Total</b>	<b>18</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>20</b>

Tabel 5 Statistik deskriptif skor nyeri pretest-posttest (n=20)

Variabel	Mean	SD	Median	Min-Max
Skor Nyeri Pretest	2,45	0,89	3,00	1-4
Skor Nyeri Posttest	1,10	0,30	1,00	1-2
Selisih (Delta)	1,35	0,88	1,50	0-3

Tabel 6 Hasil uji Wilcoxon signed rank test pengaruh pijat prenatal (n=20)

Uji Statistik	Nilai Z	p-value	Kesimpulan
Wilcoxon Signed Rank	-3,456	0,001	Signifikan

## CONCLUSION

Prenatal massage provided once weekly for four weeks significantly reduced back pain among third trimester pregnant women at UPTD Puskesmas Air Molek, as shown by a decrease in mean pain scores from 2.45 to 1.10 and a Wilcoxon p value of 0.001. Prenatal massage can be considered a safe, acceptable complementary therapy in antenatal care to improve maternal comfort and quality of life.

## REFERENCES

- “A Comprehensive Review of Traditional Chinese Medicine in Treating Neuropathic Pain: Heliyon.” n.d. Accessed November 21, 2025. [https://www.cell.com/heliyon/fulltext/S2405-8440\(24\)13381-6](https://www.cell.com/heliyon/fulltext/S2405-8440(24)13381-6).
- “Frontiers | Interventions for Promoting and Optimizing Breastfeeding Practices: An Overview of Systematic Review.” n.d. Accessed November 21, 2025. <https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.984876/full>.
- “Lifestyle-and-Stress-Reduction-Effects-from-Acupuncture-Intervention-by-Carol-King.Pdf.” n.d. Accessed November 21, 2025. <https://yosan.edu/wp-content/uploads/2025/08/Lifestyle-and-Stress-Reduction-Effects-from-Acupuncture-Intervention-by-Carol-King.pdf>.
- Alvionita, Vinny, Nunung Erviany, and Nopina Palin. 2024. Faktor Penyebab Nyeri Punggung Bawah pada Ibu Hamil Trimester II dan III di Puskesmas Sumarorong Kabupaten Mamasa Tahun 2024.
- Anggraini, Weni Yunita, Siti Ni'amah, and Suwi'i Suwi'i. 2023a. “Efektivitas Senam Hamil terhadap Nyeri Punggung pada Ibu Hamil Trimester III.” *Jurnal Penelitian Perawat Profesional* 5 (2): 491–98. <https://doi.org/10.37287/jppp.v5i2.1468>.
- Anggraini, Weni Yunita, Siti Ni'amah, and Suwi'i Suwi'i. 2023b. “Efektivitas Senam Hamil terhadap Nyeri Punggung pada Ibu Hamil Trimester III.” *Jurnal Penelitian Perawat Profesional* 5 (2): 491–98. <https://doi.org/10.37287/jppp.v5i2.1468>.
- Apriza, Apriza, Erlinawati Erlinawati, and Dewi Anggriani Harahap. 2024. “Massage Therapy Prenatal Sebagai Intervensi Mengurangi Kecemasan Pada Ibu Primigravida Di Wilayah Kerja Puskesmas Bangkinang Kota, Provinsi Riau.” *Jurnal Sehat Mandiri* 19 (1): 1. <https://doi.org/10.33761/jsm.v19i1.1393>.
- Arummega, Melati Nur, Alfiah Rahmawati, and Arum Meiranny. 2022. “Faktor-Faktor Yang Mempengaruhi Nyeri Punggung Ibu Hamil Trimester III: Literatur Review.” *Oksitosin : Jurnal Ilmiah Kebidanan* 9 (1): 1. <https://doi.org/10.35316/oksitosin.v9i1.1506>.
- Arummega, Melati Nur. n.d. PROGRAM STUDI KEBIDANAN PROGRAM SARJANA DAN PENDIDIKAN PROFESI BIDAN FAKULTAS KEDOKTERAN UNIVERSITAS ISLAM SULTAN AGUNG SEMARANG.
- Azriani, Devi, and M Keb. n.d. MODUL PANDUAN PRENATAL MASSAGE (PIJAT HAMIL).
- Bryan, Elizabeth. 2024. *The Comprehensive Manual of Therapeutic Exercises: Orthopedic and General Conditions*. Routledge. <https://doi.org/10.4324/9781003523277>.
- Cohen, Jacob. 2016. *A Power Primer. Methodological Issues and Strategies in Clinical Research*, 4th Ed. American Psychological Association. <https://doi.org/10.1037/14805-018>.
- Delima, Mera, Maidaliza Maidaliza, and Nyki Susanti. 2015. “PENGARUH SENAM HAMIL TERHADAP PENURUNAN TINGKAT NYERI PUNGGUNG BAWAH PADA IBU HAMIL TRIMESTER II DAN III DI PUSKESMAS PARIT RANTANG PAYAKUMBUH TAHUN 2015.” *JURNAL KESEHATAN PERINTIS* 2 (2). <https://jurnal.upertis.ac.id/index.php/JKP/article/view/29>.
- Dwi Febriati, Listia, and Zahrah Zakiyah. 2022. “HUBUNGAN DUKUNGAN KELUARGA DENGAN ADAPTASI PERUBAHAN PSIKOLOGI PADA IBU HAMIL.” *Jurnal Kebidanan Indonesia* 13 (1). <https://doi.org/10.36419/jki.v13i1.561>.
- Eikemo, Ragnhild. 2025. “Supporting Maternal Health and Wellbeing in the Perinatal Period : The

- Impact of Midwifery Care.” Thesis, Karolinska Institutet. <https://doi.org/10.69622/27628194.v1>.
- Febrina Oktavinola SST., Mkeb, Kaban. 2025. PRENATAL/POSTNATAL Nande Treatment (MOMS SPA). Modul Pelatihan Ibu Hamil.
- Ficarra, Salvatore. 2023. Exercise Oncology: The Value of Exercise among Cancer Patients and Survivors. December 11. <https://tesidottorato.depositolegale.it/handle/20.500.14242/175566>.
- Fithriyah, Fithriyah, Rizki Dyah Haninggar, and Ratna Sari Dewi. 2020. “Pengaruh Prenatal Massage Terhadap Penurunan Nyeri Punggung Pada Ibu Hamil Trimester III.” *Jurnal Kebidanan* 10 (1): 36–43. <https://doi.org/10.35874/jib.v10i1.731>.
- Fitriana, Desi, Laily Himawati, and Nurya Kumalasari. 2024. OBSTETRIC CARE FOR PREGNANCY WITH A FOCUS ON INTERVENTION IN THE APPLICATION OF PREGNANCY GYMNASTICS IN THE THIRD TRIMESTER TO REDUCE BACK PAIN AT PUSKESMAS BRATI.
- Halma, Matthew, Paul Marik, Yusuf M. Saleeby, and Jack A. Tuszynski. 2024. “Integrative Chronic Pain Management: A Narrative Review.” Preprint, April 7. <https://doi.org/10.20944/preprints202404.0471.v1>.
- Handayani, Erika, and Herawati. 2024. “Pengaruh Pemberian Terapi Prenatal Massage Pada Nyeri Punggung Ny. W Dengan G4P3A0 Trimester II Di Desa Awang Bangkal Barat, Kecamatan Karang Intan.” *Nerspedia* 6 (2): 187–94.
- Harahap, Yeni Zahara, and Akbid Paluta Husada. 2019. PENGARUH PRENATAL MASSAGE TERHADAP PENURUNAN NYERI PUNGGUNG PADA IBU HAMIL TRIMESTER III DI KLINIK ERNA KECAMATAN PADANG BOLAK KABUPATEN PADANG LAWAS UTARA. 4 (4).
- Hastuty, Milda. 2024. ASUHAN KEBIDANAN PADA IBU HAMIL TRIMESTER III DENGAN NYERI PUNGGUNG DI PMB NURWATI WILAYAH KERJA PUSKESMAS AIR TIRIS TAHUN 2024.
- Indriyani, Diyan, S.Kp., M.Kep., Sp.Mat. 2013. Keperawatan Maternitas Pada Area Perawatan Antenatal. 1st ed. DIYAN INDRIYANI, S.Kp., M. Kep., Sp. Mat. Graha Ilmu.
- Jamal, Fachrul. 2022. “Penilaian Dan Modalitas Tatalaksana Nyeri.” *Jurnal Kedokteran Nanggroe Medika* 5 (3): 3. <https://doi.org/10.35324/jknamed.v5i3.211>.
- Johnson, Jane. 2024. Soft Tissue Therapy for the Lower Limb. Human Kinetics.
- Jumriana Ibriani, Fitriana Ibrahim, Devianti Tandiallo, and Mega Indah. 2024. “Asuhan Kebidanan Ibu Hamil pada Ny."W" di Pustu Marinding Kecamatan Bajo Barat Kabupaten Luwu.” *NAJ : Nursing Applied Journal* 2 (3): 103–19. <https://doi.org/10.57213/naj.v2i3.376>.
- Lu, Qingdong, Xiaoyan Zhang, Yunhe Wang, et al. 2021. “Sleep Disturbances during Pregnancy and Adverse Maternal and Fetal Outcomes: A Systematic Review and Meta-Analysis.” *Sleep Medicine Reviews* 58 (August): 101436. <https://doi.org/10.1016/j.smrv.2021.101436>.
- Mardliyana, Nova Elok. 2023. “SISTEMATIK REVIEW EFEKTIVITAS DAN MANFAAT PRENATAL YOGA TERHADAP KELUHAN NYERI PUNGGUNG PADA IBU HAMIL.” *Sinar : Jurnal Kebidanan* 5 (2): 14–22. <https://doi.org/10.30651/sinar.v5i2.20416>.
- Mendrofa, Diana Graselani, and Lenny Lusua Simatupang. n.d. PENGALAMAN IBU HAMIL DALAM MENGATASI KELUHAN PADA TRIMESTER I DI KLINIK PRATAMA TRISMALIA.
- Moh Nazir. 2005. Metode Penelitian. 6. Ghalia Indonesia.
- Organization, World Health. 2024. Health System Resilience Indicators: An Integrated Package for Measuring and Monitoring Health System Resilience in Countries. World Health Organization.
- Pangesti, Christiani Bumi, Hutari Puji Astuti, and Martina Eka Cahyaningtyas. 2022. “PENGARUH PREGNANCY MASSAGE PUNGGUNG TERHADAP NYERI PUNGGUNG IBU HAMIL TM III.” *Jurnal Kebidanan*, April 16, 01–12. <https://doi.org/10.35872/jurkeb.v14i01.512>.
- Patimah, Meti. n.d. PENGETAHUAN DAN KECEMASAN IBU HAMIL TRIMESTER I PRIMIGRAVIDA TENTANG KELUHAN PADA KEHAMILAN TRIMESTER I DAN

#### PENANGANANNYA.

- Prahesty Yuliawardani, Tri Nataliswati, Tutik Herawati, and Budiono. 2024. "STUDI DESKRIPTIF TENTANG PERUBAHAN PSIKOLOGIS PADA IBU HAMIL TRIMESTER III DI WILAYAH KERJA PUSKESMAS LAWANG KABUPATEN MALANG." *Hospital Majapahit (JURNAL ILMIAH KESEHATAN POLITEKNIK KESEHATAN MAJAPAHIT MOJOKERTO)* 16 (2): 167–73. <https://doi.org/10.55316/hm.v16i2.1080>.
- Puspita, Agustina Ayu. 2023. GAMBARAN PENGETAHUAN IBU HAMIL TENTANG TANDA BAHAYA KEHAMILAN DI PUSKESMAS KALASAN KABUPATEN SLEMAN.
- Putri, Amelia Cahya, Heri Ridwan, and Popi Sopiah. 2023. "Pengaruh Yoga terhadap Penurunan Rasa Nyeri Punggung Bawah pada Ibu Hamil Trimester II dan III." *Jurnal Penelitian Perawat Profesional* 6 (2): 705–10. <https://doi.org/10.37287/jppp.v6i2.2263>.
- Ramadhina Putri, Vega, Lina Rahmiati, and Khalidatunnur Andrianie. 2018. "Gambaran Kebiasaan Ibu Hamil Dalam Mengatasi Ketidaknyamanan Selama Kehamilan Di RSUD R. Syamsudin, SH." *Jurnal Sehat Masada* 12 (1): 28–35. <https://doi.org/10.38037/jsm.v12i1.53>.
- Rezende, Bismarck, Allan Kardec Nogueira Alencar, Grazielle Freitas de Bem, et al. 2023. "Endocannabinoid System: Chemical Characteristics and Biological Activity." *Pharmaceuticals* 16 (2). <https://doi.org/10.3390/ph16020148>.
- Rolly Lenci Natalia, Deby Cyntia Yun, Marliani Marliani, and Imarina Tarigan. 2022. "Hubungan Pengetahuan Ibu Hamil Tentang Perubahan Psikologi Trimester I dengan Sikap Ibu Hamil dalam Menghadapi Masa Kehamilan di Puskesmas Medan Amplas Tahun 2022." *JURNAL RISET RUMPUN ILMU KEDOKTERAN* 1 (2): 180–87. <https://doi.org/10.55606/jurrike.v1i2.2290>.
- Rosmiarti, Rosmiarti. 2024a. "Manfaat Massage Effluarge dalam Mengurangi Nyeri Punggung pada Ibu Hamil Trimester III: Sebuah Tinjauan Asuhan Kebidanan Komprehensif." *Ners Akademika* 2 (2): 51–55. <https://doi.org/10.35912/nersakademika.v2i2.3414>.
- Rosmiarti, Rosmiarti. 2024b. "Manfaat Massage Effluarge dalam Mengurangi Nyeri Punggung pada Ibu Hamil Trimester III: Sebuah Tinjauan Asuhan Kebidanan Komprehensif." *Ners Akademika* 2 (2): 51–55. <https://doi.org/10.35912/nersakademika.v2i2.3414>.
- Salari, Nader, Aida Mohammadi, Mahvan Hemmati, et al. 2023. "The Global Prevalence of Low Back Pain in Pregnancy: A Comprehensive Systematic Review and Meta-Analysis." *BMC Pregnancy and Childbirth* 23 (December): 830. <https://doi.org/10.1186/s12884-023-06151-x>.
- Siagian, Ernawaty, and Deasy Lolyta Angeline. 2019. "In House Training Pada Perawat PK I-PK IV Terhadap Pengetahuan Tentang Manajemen Nyeri." *Klabat Journal of Nursing* 1 (2): 19. <https://doi.org/10.37771/kjn.v1i2.396>.
- Strumfa, Ilze, Romans Uljanovs, and Boriss Strumfs. 2024. *Challenges in Pleural Pathology: Diagnostics, Treatment and Research*. BoD – Books on Demand.
- Sugiyono. 2015. *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. Alfabeta.
- Sugiyono. 2018. *Metode Penelitian Kombinasi (Mixed Methods)*. Alfabeta.
- Suryanti, Yuli, Dewi Nopiska Lilis, and Harpikriati Harpikriati. 2021. "Pengaruh Kompres Hangat Terhadap Nyeri Punggung Ibu Hamil Trimester III Di Puskesmas Sekernan Ilir Tahun 2020." *Jurnal Akademika Baiturrahim Jambi* 10 (1): 22–30. <https://doi.org/10.36565/jab.v10i1.264>.
- Urtnowska, Katarzyna, Irena Bułatowicz, and Grzegorz Ludwikowski. n.d. *Masaż w okresie ciąży – wskazania, przeciwwskazania, ogólne zasady wykonywania zabiegu*.