

THE EFFECT OF WARM WATER FOOT SOAK ON BACK PAIN IN THIRD TRIMESTER PREGNANT WOMEN

Denada Novia Rizky¹, Firda Fibrila², M. Ridwan^{3*}

^{1,2,3} Tanjungkarang Health Polytechnic, Metro Midwifery Study Program, Lampung, Indonesia
Email correspondence: ridwan@poltekkes-tjk.ac.id

ABSTRAK PENGARUH RENDAM KAKI AIR HANGAT TERHADAP NYERI PUNGGUNG PADA IBU HAMIL TRIMESTER III

Latar Belakang: Rasa nyeri pada bagian punggung atau low back pain dialami oleh 20%-25% ibu hamil. Keluhan ini dimulai pada usia 12 minggu dan akan meningkat pada saat usia kehamilan 24 minggu hingga menjelang persalinan di akibatkan pembesaran uterus sehingga beban tarukan tulang punggung ke arah depan akan bertambah dan menyebabkan lordosis fisiologis. Dampaknya pada ibu akan mengalami gangguan tidur, kelelahan serta ketidaknyamanan dalam melakukan aktivitas sehari-hari akan membuat janin menjadi fetal distress. Terapi rendam kaki air hangat salah satu upaya untuk mengurangi nyeri punggung.

Tujuan: untuk mengetahui pengaruh terapi rendam kaki air hangat terhadap nyeri punggung pada ibu hamil trimester III.

Metode: penelitian ini merupakan penelitian kuantitatif menggunakan desain Pra Eksperiment dengan rancangan one group pretest posttest design. Populasi semua ibu hamil trimester III dengan jumlah sampel berdasar perhitungan besar sampel diperoleh sebanyak 34 responden menggunakan teknik pengambilan sampel Quota sampling. Pengukuran nyeri punggung menggunakan NRS (Numeric Rating Scale) dengan tingkat nyeri skala 0-10. Pengukuran nyeri dilakukan sebelum dan sesudah pemberian intervensi. Perendaman kaki dengan air hangat dilakukan sebanyak 2,5 L atau lebih dari 15 cm dengan suhu air 37-39°C yang diukur menggunakan termometer air dalam waktu 15 menit selama 7x pemberian. Analisis menggunakan univariat dan bivariat dengan uji wilcoxon.

Hasil: didapatkan rata-rata intensitas nyeri punggung sebelum dilakukan intervensi adalah 5,06 sedangkan rata-rata intensitas nyeri punggung sesudah dilakukan intervensi adalah 0,35. Hasil uji wilcoxon didapatkan nilai p value = 0,000 ($\leq 0,05$).

Simpulan: terapi rendam kaki air hangat berpengaruh dalam penurunan nyeri punggung pada ibu hamil trimester III. Selain praktis dan mudah dilaksanakan oleh ibu hamil sendiri

Saran: terapi rendam kaki dengan air hangat dapat dijadikan salah satu alternatif dalam penanganan nyeri punggung pada ibu hamil.

Kata kunci: Nyeri punggung, Rendam Air Hangat

ABSTRACT

Background: Back pain or low back pain is experienced by 20%-25% of pregnant women. This complaint begins at the age of 12 weeks and will increase at 24 weeks gestation until before delivery due to enlargement of the uterus so that the burden of the spine to the front will increase and cause physiological lordosis. The impact on the mother will experience sleep disorders, fatigue and discomfort in carrying out daily activities will make the fetus become fetal distress. Warm water foot soak therapy is one of the efforts to reduce back pain. Objective: to determine the effect of warm water foot soak therapy on back pain in III trimester pregnant women.

Methods: This research is a quantitative research using Pre-Experimental design with one group pretest posttest design. The population of all III trimester pregnant women with the number of samples based on the calculation of sample size was obtained as many as 34 respondents using the Quota sampling technique. The analysis used univariate and bivariate with the Wilcoxon test.

Results: It was found that the average intensity of back pain before the intervention was 5.06 while the average intensity of back pain after the intervention was 0.35. Wilcoxon test results obtained p value = 0.000 (≤ 0.05), meaning that there is an effect of warm water foot soak therapy on reducing back pain in III trimester pregnant women.

Conclusion: Warm water foot soak therapy has an effect in reducing back pain in III trimester pregnant women. Besides being practical and easy to implement by pregnant women themselves

Suggestions: foot soak therapy with warm water can be used as an alternative in the treatment of back pain in pregnant women.

Kata kunci: Back pain, warm water soak

INTRODUCION

These changes are the basis for complaints of physiological discomfort in pregnant women. The discomfort felt by pregnant women usually varies in each trimester of pregnancy. Changes that occur during pregnancy often become complaints for pregnant women, including nausea, vomiting in early pregnancy, constipation, varicose veins (veins), urinary disorders, hemorrhoids, and cramps and edema in the legs and back pain (Varney, 2006).

Pain in the back or low back pain is experienced by 20% -25% of pregnant women. These complaints begin at 12 weeks of age and will increase at 24 weeks of gestation until delivery. Mothers often feel pain at night, this is caused by increasing gestational age and fetal development which causes the load in the uterus to increase, causing the uterus to continue to enlarge. This enlargement of the uterus will force the ligaments, muscles, nerve fibers, so that the load of pulling the spine forward will increase and cause physiological lordosis. This is what causes back pain in pregnant women (Irianti et al, 2013).

The results of Kurniasih's research (2019) showed that pregnant women from 14 respondents in the control group experienced mild pain as much as 1 respondent (7.1%), and moderate pain from 11 respondents (78.6%) to 7 respondents (50%), and pain 2 respondents (14.3%) became 6 respondents (42.9%).

The incidence of back pain during pregnancy is 48-90%. As many as 50% of pregnant women surveyed in the UK and Scandinavia reported suffering from back pain, in Australia as many as 70% (WHO, 2011). In Indonesia, it was found that 68% of pregnant women experience moderate intensity back pain, and 32% of pregnant women experience mild intensity back pain (Sinclair, 2010). In Indonesia, there are 373,000 pregnant women, 107,000 of whom experience back pain during childbirth (28.7%) (Maharani, Isabella, 2019).

Based on data from the Profile of the Ministry of Health of the Republic of Indonesia in 2019, the estimated number of pregnant women in Indonesia in the last year was 5,256,483 people and in the Lampung region in the last year there were 165,269 people (Ministry of Health of the Republic of Indonesia, 2019). And in the last 1 year at PMB Ari

Saptuti as many as 780 pregnant women visited, including 143 pregnant women in the third trimester.

In pregnant women, it can be treated with warm water foot soak therapy because this is a therapy that is useful for dilating blood vessels, improving blood circulation and triggering the nerves in the soles of the feet to work (Meikha, 2015) deeply (Alviani, 2019). The feet are soaked in warm water, this warm water targets the blood vessels. The working principle of warm water is by conduction where there is movement of warm water into the body (Dilianti et al, 2017) in (Alviani, 2019). Using warm water will increase blood flow and relieve pain by removing inflammatory causes such as bradykinin, histamine and prostaglandins which cause local pain. When the feet are soaked in warm water, the warm water will stimulate the receptor nerves to close the gates so that the transmission of pain to the spinal cord and to the brain is blocked. After warm water therapy is given, the body will send a signal to the hypothalamus via the spinal cord (Trianipurna, 2017) in (Alviani, 2019).

Warm water foot soak therapy is a non-pharmacological intervention that can be used by pregnant women. The working principle of this therapy is that the client is asked to sit on a chair and put his feet in a bucket or basin containing 1 L or more than 15 cm of warm water with a water temperature of 37-39°C as measured using a thermometer within 15 minutes. (Taghavi, et al. 2015).

Based on the results of a preliminary study conducted by Indriani et al, the application showed that after being given a warm water soak, there was a decrease in the scale of leg cramp pain. Mrs. Pain Scale N experienced a decrease from a pain scale of 6 to a pain scale of 1 and Mrs. N's pain scale. A also experienced a decrease from a pain scale of 7 to a pain scale of 1. (Indri Ani et al, 2019).

This study analyzed the effectiveness of giving warm water soaks to reduce back pain in pregnant women at PMB Ari Saptuti Banyumas, Pringsewu Regency, Central Lampung.

RESEARCH METHODS

This research is a quantitative research using a pre-experimental design with a one group pretest posttest design. The population of all third trimester pregnant women. The sample size was calculated

based on the limited population proportion formula taking into account the confidence level of 95%, margin of error of 5%, resulting in a sample size of 30 people. To anticipate the possibility of samples dropping out or being disobedient, 10% was added so that the required sample size was 34 respondents in the intervention group. Data collection using quota sampling technique. Back pain is measured using the NRS (Numeric Rating Scale) with a pain level on a scale of 0-10. Pain measurements were carried out before and after the intervention. Soaking the feet in warm water is done in 2.5 L or more than 15 cm with a water temperature of 37-39°C as measured using a water thermometer within 15 minutes for 7 times.

Research data analysis used univariate analysis to describe and analyze the average level of pain before the intervention was given and after the intervention was given. Bivariate analysis used the t test with the Wilcoxon Signed-Rank Test. If the p value < α (0.05) then H_a is accepted and H_o is rejected, which means "There is an effect of giving warm water foot soaks on back pain in pregnant women in the third trimester.

Ethical approval was obtained from the Tanjungkarang Ministry of Health Health Polytechnic Ethics Commission number No.030/KEPK-TJK/II/2021. The official letter for conducting the research was obtained from the Pringsewu District Health Service number 444/4670/D02/2021. Letter from UPTD Puskesmas Jatidatar Bandar Mataram Central Lampung 800/028/10.122.188/XI/2021. Consent to participate was obtained from respondents. Previously given an explanation of the purpose of the research, and confirmed willingness to participate. Proof of willingness by including the signature of the willing respondent.

RESEARCH RESULT

Table 1

Description of the age of pregnant women and the third trimester of pregnancy of mothers

Respondent Characteristics	N = 34	%
Pregnant Mother's Age		
18-20	2	5,90
21-35	27	79,40
36-48	5	14,70
Gestational Age		
28-30 weeks	16	47,05
31-35 weeks	16	47,05
36-39 weeks	2	5,90

Table 1 above shows the age of most pregnant women in the 21-35 year age group (27 people / 79.40%) with a gestational age in the range of 28-35 weeks.

Table 2

Description of the degree of back pain in pregnant women in the third trimester before and after warm water foot soak therapy

Derajat Nyeri	Sebelum Intervensi		Setelah Intervensi	
	Sum	%	Sum	%
0	0	0	27	79,4
1	0	0	2	5,9
2	0	0	5	14,7
3	0	0	0	0
4	12	35,3	0	0
5	8	23,5	0	0
6	14	41,2	0	0
7	0	0	0	0
8	0	0	0	0

Table 2 shows that of the 34 pregnant women in the third trimester who experienced back pain, before intervention, most were at a pain level of 4-6, most with a pain level of 6 (moderate pain). Meanwhile, after the intervention, the back pain scale decreased until the pain disappeared.

Table 3
Distribution of back pain intensity in third trimester pregnant women before and after foot soak therapy with warm water

Intensitas Nyeri Punggung	Mean	SD	Minimal - Maksimal
Pengukuran sebelum diberi intervensi	5,06	0,886	4 - 6
Pengukuran nyeri setelah diberi intervensi	0,35	0,734	0 - 2

Table 3 shows that the mean back pain in third trimester pregnant women before being given

the warm water foot soak intervention with a temperature of 37°C was 5.06 and a standard

deviation of 0.886 and after being given the warm water foot soak intervention was 0.35 and a standard deviation of 0.738.

Table 4
The Effect of Warm Water Foot Soak Therapy on Back Pain In third trimester pregnant women using the Wilcoxon test

Perbedaan Intensitas nyeri punggung	N	Mean	SD	P value
Pengukuran sebelum diberi intervensi	34	5,06	0,886	0,000
Pengukuran nyeri setelah diberi intervensi	34	0,35	0.734	0,000

Table 4 shows that the average level of pain before being given warm water foot soak therapy was 5.06 with a standard deviation of 0.886. Meanwhile, after being given warm water foot soak therapy, there was an average pain level of 0.35 with a standard deviation of 0.734. the results of statistical tests obtained a p value of 0.000, where the p value < α (0.05). So it can be concluded that there is an effect of warm water foot soak therapy on the intensity of back pain in third trimester pregnant women.

DISCUSSION

The results of this research are almost the same as those stated by Kreshnanda (2016) that back pain in Indonesia is more often found in pregnant women and in the 40 year age group. Ikhsania's opinion, Annisa Amalia (2020) also explains that during fetal development at 35 weeks of pregnancy, pregnant women often experience back pain because the baby's head is increasingly pointing downwards to prepare for birth. As a result, there is a feeling of pressure on the bladder, rectum, hips and pelvic bones.

The results of research conducted on 34 pregnant women in the third trimester showed that the average level of pain in pregnant women in the third trimester before being given warm water foot soak therapy intervention was 5.06 (moderate pain) with the lowest pain scale being 4 and the highest being 6 where the mode value was 6 and variant 0.784. This research is almost the same as what Hutagaol, lin Oktaviana et.all (2022) found in his research in Sausu Village, Sausu District, Parigi Moutong Regency from 14 respondents before being given warm water soak relaxation therapy for leg cramp pain in pregnant women. All 14 respondents (100) experienced moderate pain. (%). Suryanti, Yuli, et al (2022). also found almost the same thing in his research on 28 respondents experiencing back pain before applying a warm compress experienced by pregnant women with a score of 5.857 (moderate pain), standard deviation 0.5882. and the lowest degree of pain is 4.7 (moderate pain)

The results of research conducted on 34 pregnant women in the third trimester showed that the average level of pain in pregnant women in the third trimester after being given warm water foot soak therapy intervention was 0.35 (no pain) with the lowest pain scale being 0 and the highest being 2 where the mode value was 0 and variant 0.538. This research is almost the same as what Hutagaol, lin Oktaviana, found. et al (2022) in their research in Sausu Village, Sausu District, Parigi Moutong Regency, after being given the warm water soak relaxation technique, 13 respondents (92.9%) experienced mild cramping pain and 1 (7.1%) respondent experienced moderate pain.

The results of this study are also almost the same as research by Suryanti, Yuli, et al (2022) on 26 respondents who experienced severe back pain in pregnant women that was no longer 0 (0%) with the average score for back pain experienced by pregnant women being 4.513 (moderate pain), with a standard deviation of 0.6301. The lowest degree of pain is 3.3 (mild pain) and the highest degree of pain is 5.7 (moderate pain).

Back pain in pregnant women before intervention occurs due to changes in body posture in pregnant women, the shoulders are pulled back due to the protruding enlarged stomach, and to maintain body balance, the spine curves inwards excessively, causing back pain. This is in accordance with the theory put forward by Fairuz (2011), changes also occur in body posture to compensate for the enlarging uterus. Postural changes increase when accompanied by poor abdominal muscle tone. The lordosis position causes the mother's center of gravity to shift to the back of the leg. Pregnancy also causes increased mobility of the sacroiliac joints and sacroxygeal joints which contributes to changes in the mother's body posture and can cause lower back pain in the final trimester of pregnancy. According to Saragih KM (2021), body posture gradually changes as the fetus grows in the stomach and body weight also increases. This situation will cause the center of body weight to fall forward. If it lasts for a long time it

can cause pain. One of the pains experienced by pregnant women is leg cramps (Sawitry, Ulya Fh, 2020).

Cramps in pregnant women can occur due to lack of blood flow to the lower part of the body which is usually obstructed due to increased weight and pressure in the uterine area. Another cause is a lack of mineral intake in the body during pregnancy such as potassium, magnesium and calcium (Handayani 2019).

After carrying out warm water foot soak therapy on pregnant women, there is a decrease in the intensity scale of back pain due to the warm feeling that directly touches the skin of the feet which can reduce muscle tension so that people who do foot soak therapy with warm water will feel more relaxed, in this case it is appropriate. with Varney's (2006) theory, namely that back pain experienced by pregnant women in the third trimester can be treated with a warm compress (not too hot) on the back (examples are heating pads, warm baths, sitting under warm water). Soaking your feet in warm water is a faster and more efficient way for pregnant women to deal with pain problems, especially back pain in third trimester pregnant women.

Based on the results of research conducted on 34 pregnant women in the third trimester regarding the effect of warm water foot soak therapy on back pain using the Wilcoxon statistical test, a p value of 0.000 was obtained, where the p value < α (0.05). So it can be concluded that there is an effect of warm water foot soak therapy on reducing back pain in third trimester pregnant women.

This research is almost the same as what Hutagaol, lin Oktaviana et.all (2022) found in their research in Sausu Village, Sausu District, Parigi Moutong Regency on 14 respondents, from the results of the Wilcoxon test for cramp pain in pregnant women before and after administering the warm water immersion relaxation technique, the p value was obtained. = 0.001, which means there is a difference in cramp pain in pregnant women before and after the intervention. The results of this study are also almost the same as research by Suryanti, Yuli, et al (2022), it appears that there is a difference in the average value between the degree of pain before and after treatment. The statistical test results obtained a p value < 0.05, so it can be concluded that there is an influence of warm compresses on the level of back pain in pregnant women in the third trimester.

Damarsanti, P. Anggraini.R, Setianingsih (2018) explains that the warm feeling that directly touches the skin of the feet, which contains many blood vessels and nerves, especially in the flexus

venous skin, from this series, the stimulation is transmitted to the posterior cornus and then continues to the spinal cord. From here it continues to lamina I, II, III of the radixdorsalis, then to the ventro basal thalamus and enters the brain stem, precisely in the raphe area at the bottom of the pons and medulla. This is where the soparific effect (wanting to sleep) occurs, so that people who do foot soak therapy with warm water will become feel more relaxed. Warm water therapy can also be used to treat female reproductive problems such as cramps during menstruation, pain in certain areas such as the abdomen or spine or perineal pain when entering labor (Ancheta, 2005) in (Indri Ani et al, 2019).

Terapi air hangat merupakan bagian dari penatalaksanaan nyeri secara nonfarmakologis. Merendam kaki dengan air hangat merupakan pemberian aplikasi panas pada tubuh untuk mengurangi gejala nyeri akut maupun kronis. Terapi ini efektif untuk mengurangi nyeri yang berhubungan dengan ketegangan otot walaupun dapat juga dipergunakan untuk mengatasi masalah hormonal dan kelancaran peredaran darah. Terapi air hangat didalam penatalaksanaan masalah nyeri bereaksi dengan cara menghambat reseptor nyeri dengan vasodilatasi pembuluh darah sekitar yang diterapi (Nurin K, 2019).

Terapi rendam kaki dengan air hangat merupakan intervensi yang aman, mudah yang dapat membantu mengurangi nyeri punggung yang dialami pada ibu hamil trimester III. Sangat disarankan pada ibu hamil yang mengalami nyeri punggung untuk melakukan terapi rendam kaki air hangat yang tidak menimbulkan efek negative bagi tubuh bila dibandingkan dengan mengonsumsi obat-obatan farmakologi

CONCLUSION

The research conclusions show that there is an effect of providing warm water foot soak therapy to reduce low back pain in third trimester pregnant women

SUGGESTION

Applying a warm water foot soak is an alternative non-pharmacological therapy method that is faster and more efficient for pregnant women in dealing with pain problems, especially back pain in third trimester pregnant women.

REFERENCES

Afroh F, Judha M, Sudarti. 2012. Teori Pengukuran Nyeri dan Nyeri Persalinan, Nuha Medika: Yogyakarta

- Amaliyah. 2017. Identifikasi Prevalensi Low Back Pain Pada Ibu Peserta Senam Hamil Di Kota Malang. Universitas Muhammadiyah Malang.
- Andarmoyo, S. (2013). Konsep dan Proses Keperawatan Nyeri, Ar- Ruzz, Yogyakarta
- Alviani. 2019. Pengaruh Terapi Rendam Air Hangat Garam Epsom Terhadap Penurunan Skala Nyeri Pergelangan Kaki Pada Pekerja Konveksi. University of Muhammadiyah Malang.
- Damarsanti, P. Anggraini.R, Setianingsih. 2018. Pengaruh Rendam Kaki Dengan Air Hangat Terhadap Tingkat Kecemasan Pada Ibu Hamil Trimester III Di Puskesmas Pegandon Kendal. Nurscope.Jurnal Keperawatan Pemikiran Ilmiah. 4 (1). 1-10. <https://jurnal.unissula.ac.id/index.php/jnm/article/download/2866/2082> (Akses: 23-4-23).
- Fairuz, Martini. 2011. Fisiologi Kebidanan (Untuk Mahasiswa Kebidanan). Yogyakarta : Pustaka Rihama. 2011
- Fitriani, Aida, Dkk. 2022. Buku Ajar Asuhan Kehamilan DIII Kebidanan Jilid II. Jakarta Selatan: PT Mahakarya Citra Utama Group
- Handayani Et. (2020). Keaktifan Senam Hamil Dengan Kejadian Kram Kaki Pada Ibu Hamil Tm II dan Tm III. J Kebidanan. Jurnal Ilmiah Ilmu Kebidanan Vo. 9 No.2. pp.1-6. <https://journal.unita.ac.id/index.php/bidan/article/view/308> (Akses: 23-4-23).
- Hutagaol, lin Oktaviana et.all (2022). Pengaruh Teknik Relaksasi Rendam Air Hangat Terhadap Nyeri kram kaki pada ibu hamil. Jurnal Riset Kebidanan Indonesia Vol.6 No.2 Desember 2022, pp. 90-95. <http://www.ejournal-aipkema.or.id/index.php/jrki/article/view/222> (Akses: 23-4-23).
- Indri Ani, dkk (2019), Penerapan Rendam Air Hangat Untuk Mengatasi Nyeri Kram Kaki Pada Ibu Hamil Trimester II Dan III Di Desa Bakungan Karangdowo Klaten
- Irianti Bayu, dkk. 2013. Asuhan Kehamilan Berbasis Bukti. Jakarta : Sugeng Sato
- Ikhsania, Annisa Amalia (2020). Perkembangan Janin di Minggu Ke-35 Kehamilan. Artikel Kejhamilan dan Menyusui. <https://www.nutriclub.co.id/artikel/kehamilan-menyusui/trimester-3/minggu-ke-35> (Akses: 23-4-23).
- Judha, M., Sudarti, Fauziah, A. (2012). Teori Pengukuran Nyeri & Nyeri Persalinan. Yogyakarta: Nuha Medika
- Kementrian Kesehatan RI. 2019. Profil Kesehatan Indonesia 2019. Jakarta: Kemenkes RI.
- Kurniasih. 2019. Pengaruh Senam Hamil Terhadap Nyeri Punggung Pada Ibu Hamil. Sekolah Tinggi Ilmu Kesehatan (STIKes) Cirebon
- Kreshnanda, 2016. Prevalensi Dan Gambaran Keluhan Low Back Pain Pada Wanita di Pasar Bandung. Bandung : Kedokteran Universitas Udayana.
- Maharani, Isabella. 2019. Asuhan kebidanan kehamilan dengan Prenatal Gentle Yoga untuk mengatasi nyeri punggung terhadap Ny.S di PMB Sri Windarti,Amd.Keb Katibung, Lampung Selatan. Diploma thesis, poltekkes tanjungkarang
- Nurin K, A. A. (2019). Keajaiban Terapi Air Putih. CV Agung Seto.
- Notoatmodjo, S. 2018. Metodologi Penelitian Kesehatan. Jakarta : Rineka Cipta
- Robson, S., Elizabeth., & Waugh, Jason. (2012). Patologi pada Kehamilan Managemen dan Asuhan Kebidanan. Jakarta: EKG.
- Saragih KM, S. R. (2021). Terapi Rendam Air Hangat Untuk Edema Tungkai Pada Ibu Hamil trimester III. J Kebidanan., 1(1), 50–80.
- Sawitry, Ulya, F. H., & Adepatiloy, E. J. (2019). Manfaat rendaman air hangat dan garam dalam mengurangi kram kaki Ibu hamil trimester III. Jurnal SMART Kebidanan. Vol.7 No. 2 pp. 76-81. <http://stikesyahoedsmg.ac.id/ojs/index.php/sjkb> (Akses: 23-4-23).
- Sinclair Constance. 2010. Buku Saku Kebidanan. Jakarta : EGC.
- Suryanti, Yuli, dkk (202). Pengaruh Kompres Hangat terhadap Nyeri Punggung Ibu Hamil Trimester III di Puskesmas Sekernan Ilir. Jurnal Akademka Baiturrahim Jambi. Vol.10 No.1 Maret 2021 pp. 22-30. <https://jab.stikba.ac.id/index.php/jab/article/download/264/144> (Akses: 23-4-23).
- Taghavi, S., S. Barband, and A. Khaki. (2015). Effect Of Hydrotherapy On Pain Of Labor Process. 28(1)
- Tri, 2018. Pengaruh Kompres Hangat Terhadap Intensitas Nyeri Punggung Pada Ibu hamil Trimester III di Klinik Pelita hati Banguntapan Bantul. Yogyakarta : Universitas Aisyiyah
- Varney,H., 2006. Buku ajar Asuhan Kebidanan Edisi 4. Jakarta: E
- Wahyuni, Prabowo, E. 2012. Manfaat Kinesiotapping Untuk Mengurangi Nyeri Punggung Bawah Pada Kehamilan Trimester Ke-3
- Wahyuni C. 2016. Pengaruh Terapi Rendam Kaki Air Hangat Terhadap Nyeri Kram Kaki Pada Ibu Hamil Trimester II Dan III. Stikes Surya Mitra Husada Kediri

World Health Organization. The World Medicine
Situation 2011 3ed. Rational Use of Medicine.
Geneva, 2011