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## The Effect of Lavender Aroma Therapy on the Sleep Quality of Pregnant Women in the Third Trimester

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### ABSTRACT

Good quality sleep will maintain maternal health during pregnancy and provide maternal health by providing sufficient energy during labor. This has an impact on normal physiological changes during pregnancy such as increasing the size of the uterus, physical discomfort and increasing the hormone progesterone. The solution to improving the quality of mother's sleep is by providing lavender aromatherapy. This research is to prove the effect of lavender aromatherapy on third-trimester pregnant women. The research design is a quasi-experimental, pretest-post test one group design approach. Population of all third-trimester pregnant women in Bantarjaya Village, Pebayuran, Bekasi. Sampling was carried out using a purposive sampling technique with a total of 31 respondents. Sleep quality was measured using the PSQI questionnaire. The data obtained were analyzed using the paired sample t-test. The results of the data analysis show that the p value = 0.000. So the hypothesis in this study is accepted, namely that there is an influence of lavender aromatherapy on sleep quality in third-trimester pregnant women. Based on research results, the use of lavender aromatherapy can be a safe choice for pregnant women to improve sleep quality.

Keywords: Lavender Aromatherapy; Sleep Quality; Pregnant

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#### *Article history :*

*Received: 20 January 2024*

*Received in revised form: 11 March 2024*

*Accepted: 12 May 2024*

*Available online: 15 June 2024*



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## INTRODUCTION

Pregnancy is a physiological adaptation process, when the mother is in the final trimester <sup>1</sup>. A mother experiences anxiety regarding the birth process, uncomfortable sleeping positions, active fetal movements at night, fear of pain and physical danger that will arise during childbirth, worry that the mother and baby will be born in an abnormal condition, dreaming that reflects attention and worry, this can cause the mother's sleep quantity to be disturbed. If the mother does not get enough sleep, it will result in the mother suffering from hypertension or pre-eclampsia, intrauterine fetal growth restrictions, and psychological changes <sup>2</sup>.

Pregnancy is a long adaptation process, especially when the mother is in the final trimester. The mother experiences various worries, related to the birthing process, uncomfortable sleeping positions, fetal movements at night, fear of pain and physical danger that arise during childbirth, worry about her safety, worry that the baby will be born in an abnormal condition, dreams that reflect her concerns and worries, This can cause the mother's sleep quality to be disturbed <sup>3</sup>.

There are more and more complaints when entering the third trimester. The complaints felt can be in the form of psychological or physical complaints. Physical complaints include lower back pain, heartburn, shortness of breath, anxiety, pelvic pain, frequent urination and uncomfortable sleeping positions. The large number of complaints experienced during the third trimester can result in a decrease in the duration of sleep for pregnant women. 79% of pregnant women experience sleep disturbances and 72% of pregnant women experience waking up more frequently at night according to The National Sleep Foundation Women. Pregnant women entering the third trimester have a two-fold higher risk in the third trimester compared to the first trimester of experiencing sleep disorders <sup>4</sup>.

The results of a preliminary study in Bantarjaya Village showed that 70% of TM III pregnant women experienced sleep disorders which resulted in less than optimal rest for pregnant women, resulting in both physical and psychological complaints. Many factors cause poor sleep quality in pregnant women. Normal physiological changes during pregnancy such as an increase in uterine size and physical discomfort, as well as an increase in the hormone progesterone contribute to poor sleep quality in third-trimester pregnant women. Increased progesterone has the effect of relaxing muscles, including the bladder <sup>5</sup>.

The occurrence of problems in the form of sleep disorders which are more common in pregnant women can cause complications in the pregnancy which in this case will affect the fetus. This can also worsen the body's inflammatory response which causes excess production of cytokines due to sleep disorders in pregnant women. Conditions in the body that experience excess cytokines can disrupt the spinal arteries that lead to the placenta, this can result in blood vessel disease and also increase the risk

of premature birth <sup>6</sup>. The solution to the problem of sleep quantity disorders can be overcome by non-pharmacological methods <sup>7</sup>.

Aromatherapy is a method of healing therapy using pure essential oils mixed from various parts of plants, flowers and trees, each of which contains different therapeutic properties <sup>8</sup>. Providing lavender flower aromatherapy by inhalation is beneficial directly into the body. Lavender flower aromatherapy contains linalool which has a sedative effect. This sedative effect results in that when someone inhales lavender flower aromatherapy, the aroma released can stimulate the olfactory nerve cilia receptors located in the olfactory epithelium so that the aroma is transmitted to the bulbusolfactorius via the olfactory nerve. Bulbusolfactorius is related to the limbic system <sup>9</sup>.

### METHOD

This research uses a quasi-experimental design with a pretest post test one group design method. Sampling used a non-probability sampling technique using consecutive sampling with a total sample of 31 pregnant women in the third trimester. The research was carried out in Bantarjaya Village, Pebayuran, Bekasi. Measurement of sleep quantity of pregnant women using the PSQI Questionnaire. The procedure in this study was to approach potential respondents according to the inclusion and exclusion criteria. After the mother agreed to be a respondent, ensured the legality of the agreement by signing the informed consent agreement, the researcher prepared the tools and materials to be used by dripping 5 drops of lavender essential oil into a diffuser that was turned on for a while. 15 minutes, the intervention was given for 7 days to assess the sleep quality of respondents before and after giving aromatherapy using the PSQI questionnaire and recording all results in observations. The variables in this study were giving lavender aromatherapy and the variable level of sleep quality for pregnant women in third-Trimester. The data analysis technique uses the paired t-test because the data is normally distributed..

### RESULTS

Table 1. The Effect of Lavender Aromatherapy on the Sleep Quality of Pregnant Women in the Third Trimester

Sleep Quality	Pretest		Posttest		P value
	f	%	f	%	
Poor	24	38,7	5	16,1	0,000
Good	7	11,3	26	83,9	
<b>Total</b>	<b>31</b>	<b>100 %</b>	<b>31</b>	<b>100 %</b>	

Based on the table above, it shows that the quality of sleep of pregnant women during the pretest or before being given lavender aromatherapy, most often had poor sleep quality, namely 24 people or

38.7% compared to good sleep quality. After being given lavender aromatherapy, good sleep quality increased for 26 people (83.9%). Meanwhile for poor quality it decreased to 5 people (83.9%). Based on the Paired Sample t-test in the table above, it is found that the p value is 0.000, which means  $<0.05$ . So the hypothesis in this study is accepted, namely that there is an influence of lavender aromatherapy on sleep quality in third-trimester pregnant women.

## DISCUSSION

The sleep process is a process that takes place physiologically where a process occurs that rotates alternately over time when a person is awake longer than before <sup>10</sup>.

Every human being must obtain physiological needs in the form of sleep. Everyone needs different sleep needs, where sleep needs depend on age and gender <sup>11</sup>.

The sleep process is a state where a person is unconscious, and a person can wake up from sleep if there is stimulation or stimulus from exposure to the external environment. The sleep period in this case is a process in the rest phase carried out physically and spiritually from all previous activities. A person is in a sleeping position, the body will be in a resting phase, but the brain does not experience full rest and is still in the working phase even when sleeping. A person's position while sleeping, even though a person's physical body is resting, the brain is recovering to reach a better level of consciousness<sup>12</sup>.

A person's amount of sleep or sleep quantity is a person's duration or time calculated while sleeping. A person's entire sleep time is a quantity of sleep. People need different amounts of sleep according to their needs. Each adult needs an average of 6-8 hours of sleep a night, this depends on a person's internal conditions. A person is said to have good sleep if the duration or time spent sleeping is sufficient and in accordance with their time needs. Vice versa, someone is said to have bad sleep, if the time is fulfilled or not achieved as it should be <sup>13</sup>.

In the process of a person's sleep, a process occurs that involves alternately connecting cerebral mechanisms that aim to activate and suppress brain centers that enable a person to sleep and wake up. The reticular activating system regulates a person's sleep activity. In this system, all activity processes organize the central nervous system, including the regulation of a person's wakefulness and sleep <sup>14</sup>.

The process of regulating balance and sleep activities is located in the mesencephalon and upper parts of the pons. When a person is still conscious, neurons in the reticular activating system (RAS) will release catecholamines such as norepinephrine. Apart from this, the RAS system will provide stimuli such as hearing, sight, touch and pain and can also receive stimuli from the celebrity's cortex in the form of emotional stimulation and also thought processes. When a person sleeps, serum serotonin will be

released from special cells in the pons and midbrain stem, namely the bulbar synchronizing region (BSR). A person in a waking state will depend on the balance of impulses received in the brain center and limbic system. RAS and BSR are very important because they are systems in the brain stem that regulate sleep cycles and physiological changes <sup>7</sup>.

Sleep is one of the basic human needs that can be influenced by various factors that will influence a person's sleep fulfillment, such as physiological, psychological and environmental factors which often change the quality and quantity of sleep. Pregnant women who have poor quality sleep will result in physical deterioration, serious mental disorders such as irritability, memory loss, hallucinations, illusions, and also have an impact on the fetus <sup>15</sup>.

A woman who experiences pregnancy will experience many obstacles in the pregnancy process where during pregnancy, a woman will experience many changes that are followed by the growth and development of the fetus in the womb and involve physiological changes and psychological changes. A woman in this condition needs support and attention from her family and everyone closest to her, in order to make a pregnant mother feel comfortable and calm until the birth of the baby goes smoothly <sup>16</sup>. The time needed for a pregnant woman to sleep at night ranges from 8-10 hours, besides that, pregnant women still need naps during the day. Especially intended for pregnant women in the third trimester who really need enough time to rest such as lying down, sitting, relaxing even though they are doing daily activities. In the third trimester, many people experience physical complaints so they need lots of adequate rest <sup>17</sup>.

As the time approaches for delivery, the size of the uterus will increase and this will be followed by a larger stomach. When pregnancy enters the third trimester, the abdominal area will become more tense and the center will become more prominent. A pregnant woman will position her body towards the back, this will create and form a lordosis posture as a result of holding the weight of the stomach which changes the body's balance point <sup>18</sup>.

This process is a physiological mechanism because if a pregnant woman forces herself to follow her body weight forward, the pregnant woman will fall because the gravitational pull is greater on that part of her body (the pregnant woman's stomach). By pulling backwards on the mother's body, the curve of the back will increase over a long period of time, which will result in comfort problems such as pain in the back area and body aches. Many of these discomforts can interfere with the mother's activities during the day and even disrupt sleep at night <sup>19</sup>.

Breast changes in pregnant women are also changes in the physiology of pregnancy in the third trimester. A pregnant woman will experience enlargement of the breasts and feel that the breasts are getting bigger and even feel pain in the breast area. As labor approaches, pregnant women will

experience changes such as the breasts storing food in the form of liquid (colostrum) for the future baby after birth and fetal movements becoming more active in this trimester. Complaints that occur in the third trimester of pregnancy include swelling of the hands and feet, although many of these changes have also been experienced in the second trimester of pregnancy and are also accompanied by weight gain. This will also disturb the mother's comfort during sleep, especially in adjusting her sleeping position. In theory, maternal age does not directly affect sleep quality during pregnancy. However, the age of the pregnant woman will influence the maximum response readiness both in terms of learning something or adapting to certain things. Apart from that, biologically, pregnant women at that age are in optimal condition for pregnancy so that they can reduce the emergence of complications during pregnancy <sup>16</sup>.

In the third trimester, disturbances experienced during sleep will be very high. Difficulty sleeping experienced by pregnant women will cause a decrease in sleep duration, especially in the third-trimester. There are several factors that also influence sleep quality in third trimester pregnant women, such as increased urination. Increased frequency of urination, which is caused by the capacity of the bladder due to the effect of the enlarging uterus as the gestational age increases. The lowest part of the fetus will also increasingly press against the lower part of the pelvis. The bladder will quickly feel full because it is increasingly under pressure and its capacity is also decreasing. Pregnant women complain that they experience frequent urination and this often causes pregnant women to wake up in the middle. Waking up too often in the middle actually causes reduced sleep duration which will result in poor sleep quality in pregnant women. This condition of lack of sleep is due to the condition during pregnancy where you experience frequent urination and your condition will return to its original state after giving birth <sup>20</sup>.

When entering the third trimester, the condition of pregnant women will experience psychological changes that are influenced by increasing gestational age. The increasing gestational age makes pregnant women feel uncomfortable and want to end labor immediately. For pregnant women entering the third-trimester, they will be busy preparing for the needs of the new born baby. In the phases leading up to the last week, a pregnant mother will feel impatient waiting for the birth of her baby. In these phases, pregnant women will experience a lot of looming anxiety and worry. Pregnant women will feel a lot of negative thoughts about whether they can give birth normally, how during the birthing process something happens to them and their baby, whether giving birth is very painful, and whether the baby is born healthy.

The waiting period for the birth of a baby is eagerly awaited when pregnant women enter the third trimester of pregnancy. A pregnant mother will enter an anxious phase of waiting for birth. The phase that begins at the end of the third trimester will further increase anxiety because pregnant women have

a lot of fear about giving birth, this also makes a pregnant woman's sleep disturbed and also causes her to frequently wake up in the middle of the night <sup>21</sup>.

Stressors appearing in pregnant women can stimulate the sympathetic nervous system and adrenal gland modulus resulting in increased secretion of the hormone adrenaline (epinephrine), which can increase tension in pregnant women so that they will be restless and unable to concentrate properly. This condition makes it difficult for third-trimester pregnant women to sleep. The influence of lighting, changes in temperature, activities and work routines are other factors that influence sleep in general, where these factors will influence the rhythm and daily sleep and wake cycles. Each person certainly has a different biological time for them to sleep. Of course, this also affects pregnant women who clearly have different sleeping hours from other pregnant women. Apart from differences in sleep times, how quickly or slowly someone starts sleeping also varies from person to person <sup>22</sup>.

Dement (2011) stated that 40% of pregnant women complained about sleep quality problems during the first and second-trimesters, and this increased in the third-trimester by 57% <sup>23</sup>. Normal physiological changes in pregnancy, namely the increasing size of the uterus and physical discomfort, as well as an increase in the hormone progesterone contribute to poor sleep quality in third-trimester pregnant women <sup>24</sup>.

An increase in the hormone progesterone can relax muscles, including the bladder, resulting in disturbed sleep due to the urge to urinate at night, causing poor sleep quality <sup>5</sup>.

A person's need for sleep is a natural need for rest for the body which must be fulfilled every day. Each individual has different sleep patterns due to the influence of age, environmental conditions, lifestyle, activity patterns and the individual's health condition. The recommended time for adults aged 18-64 years to sleep is 7-9 hours of sleep per day <sup>13</sup>.

A pregnant woman is expected to sleep 8-10 hours. During pregnancy, if a mother cannot sleep well or the number of hours of sleep is less than 6 hours, especially at night. This will increase the risk of cesarean birth by 4.5 times and can also increase the risk of the baby's birth weight being less than normal. Meanwhile, a person's condition that is carried out and endured so that he is refreshed and fit when he wakes up from sleep is sleep quality <sup>25</sup>.

Fulfilling a person's sleep needs is closely related to the length of sleep and the quality of sleep. If someone experiences sleep duration that is below normal, then that person will get poor sleep quality and if someone's sleep duration is within normal limits, then automatically the person's sleep quality is good <sup>26</sup>. The use of lavender aromatherapy can help reduce third-trimester pregnant women who experience sleep disorders because it can provide calm and relaxation to tense nerves and muscles and this will help pregnant women to improve the quality and length of their sleep. Giving aromatherapy is

safer for pregnant women than using sleeping pills which are not allowed for pregnant women. Giving aromatherapy by inhalation is absorbed more quickly compared to giving oral medication, because the inhalation process passes through the respiratory tract and lung epithelium and only takes a few seconds to reach the circulatory system. Aromatherapy is often used as an alternative medicine practice. One form of therapy that provides relaxation is aromatherapy <sup>27</sup>.

The process of the aromatherapy system starts from the smell inhaled by the nose and is connected to the cilia. The receiver in the cilia is connected to the inhaler which is at the end of the odor channel. These odors are converted into electrical impulses that are transmitted to the brain by the cilia through the inhalation system <sup>19</sup>. Aromatherapy is a method of healing therapy using pure essential oils that are mixed with various types of herbs, flowers and tree roots and tree trunks, each of which contains different therapeutic properties <sup>28</sup>.

Providing lavender aromatherapy has benefits that are directly felt by the body. Aromatherapy in lavender contains linalool which has a sedative effect <sup>29</sup>.

Providing aromatherapy can aim to influence a person's mood or health, which is often combined with alternative medicine practices. Apart from this, it can also provide benefits for overcoming stress, anxiety, palpitations, nervousness, as well as creating a feeling of calm and relaxation <sup>30</sup>.

When someone inhales lavender aromatherapy, the aroma released will stimulate the olfactory nerve cilia receptors located in the olfactory epithelium to transmit the lavender aroma to the olfactory bulb which is connected to the limbic system <sup>16</sup>.

The part of the brain that is responsible for regulating physiological and emotional responses in the body is regulated by the limbic system. The most important parts of the limbic system related to scent are the amygdala and hippocampus <sup>31</sup>. The amygdala is the emotional center and the hippocampus is related to memory which then through the hypothalamus the aroma will carry into the raphe nucleus. Stimulated raphe nuclei have the effect of releasing serotonin which is a neurotransmitter that regulates the onset of sleep <sup>32</sup>. All information is received by the limbic system from the hearing system, vision system, and olfactory system. The limbic system is an internal structure of the brain that is shaped like a ring located under the cerebral cortex. The amygdala and hippocampus are the most important parts of the limbic system which are related to scent (including the aroma produced by lavender flowers). The amygdala is the emotional center and the hippocampus which is related to memory, then through the hypothalamus as a regulator the aroma produced by lavender flowers is carried to a small but significant part of the brain, namely the raphe nucleus <sup>33</sup>.

The effect of the raphe nucleus being stimulated is the release of serotonin, which is a neurotransmitter that regulates the onset of sleep <sup>7</sup>.

The linalool content stimulates the olfactory nerve, sending impulses to the brain via the olfactory bulb which is related to brain structures/limbic systems such as the amygdala which is the emotional center and the hippocampus which is related to memory (including smells), so inhaling lavender can have a calming effect <sup>34</sup>.

When aromatherapy is inhaled by pregnant women, it will be received by the cilia in the nose and transmitted in the form of impulses to the limbic system in the hypothalamus which helps to feel relaxed<sup>35</sup>. By giving lavender aromatherapy, it can cause a sedative effect which can provide calm to the nerves and soothe the muscles, so that the mother will fall asleep more quickly <sup>36</sup>.

According to Jalenani in Ardilla, he said that lavender aromatherapy is very beneficial for the body, when given lavender aroma therapy, the body will relax the muscles that are tense due to fatigue. Apart from that, the effects of the ingredients in lavender aromatherapy can also influence nerve reflexes received by nerve receptor endings, and can influence brain function activities through the nervous system which is related to the sense of smell. This response will be able to stimulate an increase in the production of brain nerve conductor mass (neurotransmitters), which is related to the recovery of psychological conditions (such as emotions, feelings, thoughts and desires) <sup>30</sup>. Lavender aromatherapy when inhaled can trigger the release of endorphins or happiness and relaxation hormones which have the effect of creating a relaxed and comfortable condition for a person so that the person can fall asleep easily <sup>12</sup>.

According to Junita, in her research, lavender aromatherapy was effective in reducing insomnia in the elderly in Koto Tuo Village, Community Health Center 2 Working Area, Kampar City in 2020, which was caused by the use of lavender aromatherapy which provided stimulation to the olfactory cortex which stimulated the brain to reach the limbic system, thus affecting the liver system. Based on this, it will influence a person to relax and influence mood <sup>37</sup>.

According to Anasari, giving lavender aromatherapy has proven to be effective because lavender itself has a calming aroma and content so that mothers feel more relaxed, which is expected to help pregnant women improve and improve the quality of their sleep. Aromatherapy has the benefit of calming and providing a sense of relaxation to the bodies of pregnant women. And lavender aromatherapy has also been proven to be able to improve the sleep quality of pregnant women due to the linalool content in lavender which is able to provide a sedative effect that can affect the raphe nucleus in the brain. The raphe nucleus is able to provide stimulation in the form of the release of serotonin, which is a neurotransmitter that regulates the onset of sleep <sup>26</sup>.

Jannah in her research also said that there were differences in the post-test results of sleep quality for pregnant women in the third-trimester between the intervention group and the control group. Where

the group is given lavender aromatherapy can reduce sleep disturbances because when pregnant women inhale the aroma of lavender it can increase alpha waves and this state is considered to be relaxing, making it easier for pregnant women to start sleeping and providing a sense of comfort during the pregnant woman's sleep process <sup>17</sup>.

## CONCLUSION

There is an influence of using lavender aromatherapy on improving the quality of third-trimester pregnant women in Bantarjaya Village, Pebayuran, Bekasi in 2022.

## REFERENCES

1. Zafarghandi N, Hadavand S, Davati A, Mohseni SM, Kimiaimoghadam F TF. The effects of sleep quality and duration in late pregnancy on labor and fetal outcome. *J Matern Fetal Neonatal Med.* 2012;25(5):535-537. doi:10.3109/14767058.2011.600370
2. Afshar MK et al. Lavender Fragrance Essential Oil and the Quality of Sleep in Postpartum Women. *Iran Red Crescent Med J.* 2015;17(4). doi:10.5812/ircmj.17(4)2015.25880
3. Laura D et al. Efektivitas Aromaterapi Lavender Terhadap Kualitas Tidur Ibu Postpartum. *J Online Mhs Progr Stud Ilmu Keperawatan Univ Riau.* Published online 2016.
4. Venugopal et al. In vitro evaluation of phytochemical loaded electrospun gelatin nanofibers for application in bone and cartilage tissue engineering. *Biomed Mater.* 2018;14(1). doi:10.1088/1748-605X/AAE3EF
5. Jordan, R., Farley, C., and Grace K. *Prenatal and Postnatal Care: A Woman Centered Approach.* Wiley Blackwell; 2018.
6. Primawati, A.S et al. Penurunan Tingkat Stres Ibu Hamil Dengan Terapi Musik Dan Aromatherapy Pada Kelas Ibu Hamil. *J Kebidanan.* 2018;8(1):37-43. doi:10.31983/jkb.v8i1.3733
7. Slyer MJG and JT. Effectiveness of Silexan oral lavender essential oil compared to inhaled lavender essential oil aromatherapy for sleep in adults: A systematic review. *JBISRIR-2017-003823*
8. Mindell JA, Cook RA NJ. Sleep patterns and sleep disturbances across pregnancy. *Sleep Med.* 2015;16(4):483-488. doi:10.1016/j.sleep.2014.12.006
9. Lillehei AS, Halcón LL, Savik K RR. Effect of Inhaled Lavender and Sleep Hygiene on Self-Reported Sleep Issues: A Randomized Controlled Trial. *J Altern Complement Med.* 2015;21(7):430-438. doi:10.1089/acm.2014.0327

10. Sunarti S and H. Gangguan Tidur pada Lanjut Usia. *J Islam Med.* 2018;2(1). doi:10.18860/JIM.V2I1.5009
11. Lily F. Pengaruh Aromaterapi Lavender Terhadap Kuantitas Tidur Ibu Hamil Trimester Tiga. *UMM Institutional Repos.* Published online 2021.
12. Romadhona, S. W., & Primihastuti D. Penerapan Latihan Gentle Yoga dan Inhalasi Aromaterapi Lavender Dalam Meningkatkan Kualitas Tidur Ibu Hamil. *Journals Ners Community.* 2020;11(2). doi:https://doi.org/10.55129/jnerscommunity.v11i2.1135
13. Ohayon, M et al. National Sleep Foundation's sleep quality recommendations: first report. *Sleep Heal.* 2017;3(1):6-11. doi:10.1016/J.SLEH.2016.11.006
14. Kim, M. E. et al. Effects of aromatherapy on sleep quality: A systematic review and meta-analysis. *J Korean Acad Nurs.* 2019;49(6):655-676. doi:10.4040/jkan.2019.49.6.655
15. Arkha Rosyaria Badrus MK. Pengaruh Pemberian Effleurage Massage. *Kebidanan, J Islam Univ.* 2018;10(1):67-71.
16. Munawarah, M and Syuhada S. Pengaruh Aromaterapi Lavender Terhadap Peningkatan Kualitas Tidur Ibu Hamil Trimester Ketiga Di Padang Sidempuan. *J Keperawatan Flora.* 2019;12(1):78-85.
17. Jannah, M and Meihartati T. Efektifitas Penggunaan Maternity Pillow Dan Aromaterapi Lavender Terhadap Kualitas Tidur Ibu Hamil Trimester III. *J Kesehat.* 2022;13:131-137. doi:10.35730/jk.v13i0.811
18. Ayudia, F, A. et al. Pengaruh Aromaterapi Lavender Terhadap Kuantitas Tidur Ibu Hamil Trimester Tiga. *Hum Care J.* 2022;7(3):520-524. doi:10.32883/hcj.v7i3.2024
19. Meihartati, T and Iswara I. Pengaruh Aromaterapi Lavender Terhadap kualitas Tidur Ibu Hamil. *J Med Karya Ilm Kesehat.* 2021;6(2). doi:10.35728/JMKIK.V6I2.750
20. Husniyawati, Y.R and Wulandari RD. Analisis Motivasi Terhadap Kinerja Kader Posyandu Berdasarkan Teori Victor Vroom. *J Adm Kesehat Indones.* 2016;4(2). doi:10.20473/jaki.v4i2.2016.126-135
21. Huda, A et al. Faktor-Faktor Yang Berhubungan Dengan Kejadian Unmet Need Keluarga Berencana Di Puskesmas Bandarharjo Kecamatan Semarang Utara (Studi Di Kelurahan Dadapsari). *Repos Univ Muhammadiyah Semarang.* Published online 2016.
22. Indah, L and Maisaro M. Pengaruh Aromaterapi Lavender Terhadap Kualitas Tidur Ibu Hamil Trimester III. *J Ilmu Kesehat.* 2019;8(1):32-38.
23. Dement, W., Kryger and Roth T. *Principles and Practice of Sleep Medicine Princ. Pract. Sleep Med.* (Saunders E, ed.); 2011.

24. Wardani, H. W. et al. Tingkat Kecemasan Dengan Kualitas Tidur Ibu Hamil Primigravida Trimester III. *J Dunia Keperawatan*. 2018;6(1).
25. Malahayati I. Aromaterapi Minyak Esensial Bergamot Menurunkan Resiko Postpartum Blues. *J Penelit Kesehatan "SUARA FORIKES."* 2021;12:99-103. doi:10.33846/SF12NK118
26. Anasari, L et al. Terapi Non Farmakologi Yang Berpengaruh Terhadap Kualitas Tidur Ibu Hamil Literature Review. *J Ilmu Kesehat*. 2022;10(2):139-148. doi:10.32831/JIK.V10I2.398
27. Khotimah, A.H and Sulastri E. Penerapan Rendam Kaki dan Pernapasan Diafragma (Napas Dalam) serta Aromaterapi Lavender untuk Mengurangi Kecemasan pada Ibu Hamil Trimester III di PMB Sugiyastuti, Amd. Keb. In: *Proceeding of The URECOL.* ; 2019:162-170.
28. Siagian H. Pengaruh Aromaterapi Lavender Terhadap Penurunan Insomnia Pada Lanjut Usia Di Panti Werdha Guna Budi Bhakti Medan. *J Ilm Keperawatan Imelda*. 2018;4(1):387-392. doi:10.2411/JIKEPERAWATAN.V4I1.279
29. Tang, Y et al. The Therapeutic Effect of Aromatherapy on Insomnia: a Meta-Analysis. *J Affect Disord*. 2021;288:1-9. doi:10.1016/J.JAD.2021.03.066
30. Maharani A. Aroma Terapi Lavender untuk Mengatasi Insomnia pada Remaja. *J Penelit Perawat Prof*. 2021;3(1):159-164. doi:10.37287/JPPP.V3I1.372
31. Sari, D and Leonard D. Pengaruh Aroma Terapi Lavender Terhadap Kualitas Tidur Lansia Di Wisma Cinta Kasih. *J Endur*. 2018;3(1):121. doi:10.22216/JEN.V3I1.2433
32. Dewi, I. G. A. D. S. et al. Pengaruh Aroma Terapi Lavender (*Lavandula Angustifolia*) Terhadap Insomnia Pada Lansia Banjar Tangtu Puskesmas II Denpasar Timur. *Bali Med J*. 2018;5(1):101-117. doi:10.36376/BMJ.V5I1.24
33. Owais S et al. Pharmacological Interventions for Improving Postpartum Maternal Sleep. *Sleep Med Rev*. Published online 2018. doi:10.1016/j.smr.2018.01.005
34. Mu'alimah et al. Pengaruh Aromaterapi Lavender Terhadap Kualitas Tidur Ibu Hamil Di Wilayah Kerja Puskesmas Tiron. *J Nusant Med*. 2022;6(1). doi:doi.org/10.29407/judika.v6i1.17932
35. Wantini NA. Faktor Yang Berhubungan Dengan Kualitas Tidur Ibu Hamil Trimester III Di Wilayah Puskesmas Berbah, Sleman, DIY. In: *Prosiding Seminar Nasional Multidisiplin Ilmu*. Unriyo; 2020:526–534.
36. Ropika, H and Meliati KL. Pengaruh Aromatherapi Lavender Terhadap Kualitas Tidur Ibu Postparum Secsio Sesarea. *Wind Heal J Kesehat*. 2021;4(4):326-336. doi:10.33368/WOH.V4I04.604
37. Junita E et al. Pengaruh Pemberian Aroma Terapi Lavender Terhadap Insomnia Pada Lansia Di

Desa Koto Tuo Wilayah Kerja Puskesmas 2 XIII Koto Kampar. *J Ners.* 2020;4(2):116-121.  
doi:10.31004/JN.V4I2.1128