Journal : **Journal of Public Health Science (JoPHS)**
Publisher : Yayasan Nuraini Ibrahim Mandiri
e-ISSN : 3047-3632
Volume / Issue / Year/ Page : Vol. 3 No. 3 (2026): September/ Hal 427-436

THE EFFECT OF LULLABY MUSIC ON ANXIETY LEVELS AND SLEEP QUALITY IN PREGNANT WOMEN IN THE THIRD TRIMESTER

Yeti Ika Juniarti [1] *, Retno Dewi Prisusanti [2]
[1] Undergraduate Midwifery Study Program, Faculty of Health Sciences, Institute of Science and Health Technology, Dr. Soepraoen Hospital, Malang
[1*] yetiikajuniarti@gmail.com , Retnodewi@itsk-soepraoen.ac.id
*** Corresponding author**

Info Article

Submission : 09-07- 2026
Review : 17-07-2026
Revised : 27-07-2026
Accepted : 10-08-2026
Published : 03-09-2026

Keywords:
Sleep Quality, Anxiety, Lullaby Music, Pregnant Women

Abstrak

Sleep disturbances and anxiety are common problems experienced by pregnant women in their third trimester due to physiological and psychological changes before delivery. These conditions can impact the health of both the mother and the fetus, requiring safe, easy-to-implement, and side-effect-free treatment. One non-pharmacological intervention that can be used is lullaby music therapy. This study aims to determine the effect of lullaby music on sleep quality and anxiety levels in pregnant women in their third trimester. This study used a pre-experimental design with a one-group pretest-posttest approach. The study sample consisted of 30 pregnant women in their third trimester selected using a purposive sampling technique. Data collection was carried out by measuring sleep quality and anxiety levels before and after lullaby music therapy using a predetermined questionnaire. Data analysis was performed using the Wilcoxon Signed Rank Test because the data were not normally distributed. The results showed that before the intervention, all respondents (100%) had poor sleep quality, while after the intervention, 90.0% of respondents had good sleep quality. At the anxiety level, before the intervention, most respondents experienced moderate (60.0%) and severe (40.0%) anxiety, while after the intervention, 60.0% of respondents did not experience anxiety and 40.0% experienced mild anxiety. The results of the Wilcoxon test showed that there was an effect of lullaby music on sleep quality ($Z = -2.377$; $p = 0.017$) and anxiety levels ($Z = -3.657$; $p < 0.001$) in pregnant women in the third trimester. Lullaby music therapy was effective in improving sleep quality and reducing anxiety levels in pregnant women in the third trimester so that it can be used as an alternative non-pharmacological intervention in antenatal care.

How to Cite : Juniarti, Y. I., & Prisusanti, R. D. (2026). The Effect Of Lullaby Music On Anxiety Levels And Sleep Quality In Pregnant Women In The Third Trimester. Journal of Public Health Science (JoPHS), 3(3), 427–436. https://doi.org/10.70248/jophs.v3i3.4164

DOI : https://doi.org/10.70248/jophs.v3i3.4164
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INTRODUCTION

The third trimester of pregnancy is the final phase of pregnancy, characterized by increasingly complex physiological and psychological changes. During this phase, pregnant women often experience physical discomfort such as back pain, frequent urination at night, and difficulty finding a comfortable sleeping position.[1]. Sleep disturbances are one of the main problems often experienced by pregnant women in the third trimester. Hormonal changes and physical discomfort cause mothers to wake up more easily at night and have difficulty falling back to sleep.[2]. In addition to physical factors, psychological factors such as anxiety before childbirth also play a role in

reducing the quality of sleep for pregnant women. This condition makes it difficult for mothers to achieve restful, quality sleep.[3].

Globally, sleep disturbances in pregnant women are a significant problem. According to international research, approximately 66%–97% of pregnant women in their third trimester experience sleep disturbances due to physiological and psychological changes during pregnancy[4]. At the East Java provincial level, sleep quality problems in pregnant women are also still quite high, especially in the third trimester. This is caused by increased physical complaints such as back pain and frequent urination, as well as psychological factors such as anxiety before childbirth.[2]. In Malang Regency, conditions of pregnant women in their third trimester with sleep quality disturbances are still frequently encountered in health care facilities, especially in mothers with advanced gestational age who experience physical and emotional discomfort. This is supported by research results showing a relationship between pregnancy discomfort and the quality of sleep of pregnant women[3]. Based on a preliminary study conducted on 3 pregnant women in their third trimester in the working area of the Donomulyo Community Health Center in Malang Regency, it was found that some pregnant women in their third trimester complained of difficulty sleeping, often waking up at night, and feeling unrefreshed upon waking. This condition indicates that sleep quality problems in pregnant women are still a real problem at the primary health care level that requires attention.

Sleep disturbances are one of the most common problems experienced by pregnant women in their third trimester. This condition occurs due to hormonal changes, increasing uterine size, and limited comfortable sleeping positions. Most pregnant women experience difficulty initiating sleep or maintaining restful sleep[5]. If sleep disturbances are left untreated, this condition can impact the health of both the mother and the fetus. Poor sleep quality can increase the risk of pregnancy complications such as hypertension, preeclampsia, and fetal growth disorders. In addition, pregnant women can also experience excessive fatigue and a decreased quality of life[5]. Efforts to address sleep disturbances in pregnant women in their third trimester can be carried out through pharmacological and non-pharmacological approaches. However, the use of pharmacological therapy tends to be limited due to risks to fetal health, so non-pharmacological interventions are more recommended in obstetric practice.[6] Therefore, safe and effective treatment efforts are needed to improve the sleep quality of pregnant women, especially through non-pharmacological approaches. Based on the results of initial interviews conducted with pregnant women in their third trimester at health service areas, most mothers reported that as they approached delivery they often experienced complaints of increased anxiety, difficulty sleeping at night, and frequent waking due to excessive thoughts about the upcoming delivery process. Pregnant women also report decreased sleep quality, characterized by restless sleep, frequent nighttime awakenings, and morning fatigue. This condition causes mothers to feel less refreshed during the day and experience increased stress leading up to delivery. Health workers report that management of anxiety and sleep disorders in pregnant women in the third trimester has been general, such as education, counseling, and recommendations for rest. However, more specific non-pharmacological interventions such as lullaby music therapy have not been routinely implemented. Lullaby music therapy is a form of non-pharmacological intervention used in pregnant women to help reduce anxiety and improve sleep quality. This intervention developed from the use of music as a relaxation therapy in mental health and was then adapted for obstetric care.[7] Initially, music therapy was used in clinical

practice to help reduce stress and anxiety in patients with various health conditions. As research progressed, music began to be used in pregnant women in the third trimester because it was known to affect psychological conditions by reducing sympathetic nervous system activity and increasing body relaxation.[8] Over time, lullaby music (music with a slow, soft, and repetitive tempo) has begun to be used as a specific intervention for pregnant women because it has proven to be more effective in creating calm and improving sleep quality. Several studies have shown that regular exposure to music can improve sleep quality, reduce sleep disturbances, and lower anxiety levels in pregnant women in the third trimester [9]. Furthermore, various experimental studies have shown that lullaby music therapy can be used as a simple intervention at home or in health facilities to help reduce prenatal anxiety and improve sleep quality, thereby supporting the physical and psychological condition of mothers approaching childbirth[10]. So, based on the background description, the researcher is interested in conducting research with the title: The Effect of Lullaby Music on Anxiety Levels and Sleep Quality in Pregnant Women in the Third Trimester

RESEARCH METHODS

The method used in this study is quantitative research with an experimental approach. The type of research used is Pre-Experimental Design with *One-Group Pretest-Posttest Design* , which is a study conducted by providing treatment to one group without a control group, then measurements are taken before and after the intervention. The population in this study were all pregnant women in the third trimester in the working area of the Donomulyo Community Health Center, Malang Regency. The population in this study was 30 people. The sample in this study was taken using a purposive sampling technique with a non-random sampling approach, namely the deliberate selection of samples based on inclusion and exclusion criteria determined by the researcher. The inclusion criteria in this study include: 1) Pregnant women in the third trimester who are willing to be respondents, 2) Experiencing anxiety disorders and sleep quality, 3) Not currently taking sleeping pills or other sedative therapies. While the exclusion criteria include: 1) Pregnant women with severe pregnancy complications, 2) Mothers with severe hearing impairments so they cannot receive music stimulation, 3) Mothers who do not fully participate in the intervention during the study.

This study was conducted over 7 days. The intervention, which included lullaby music therapy, was administered twice daily, in the morning and before bed. The music was played using audio media (headsets or speakers) for a duration consistent with relaxation therapy standards. Evaluations were conducted on days 3 and 7 to assess changes in the participants' anxiety levels and sleep quality.

The independent variable in this study is lullaby music therapy, while the dependent variables are the level of anxiety and sleep quality in pregnant women in the third trimester.

Data collection was conducted through observation and questionnaires by respondents. The instruments used in this study were the Hamilton Anxiety Rating Scale (HARS) to measure anxiety levels and the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality before (pretest) and after (posttest) the intervention. Data analysis in this study used the *Wilcoxon Signed Rank Test* with the help of SPSS. This test was used to determine differences in anxiety levels and sleep quality before and after the provision of lullaby music therapy in pregnant women in the third trimester.

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RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Characteristics of Pregnant Women in the Third Trimester

Characteristics	Frequency (f)	Percentage (%)
Work		
housewife	26	86.7
Private	4	13.3
Age		
Late Teenagers	9	30.0
Early Adulthood	21	70.0
Pregnancy		
One	10	33.3
Two	12	40.0
Three	8	26.7
Total	30	100.0

Based on Table 1, it is known that the majority of pregnant women in their third trimester work as housewives (26 respondents (86.7%), while 4 respondents (13.3%) work in the private sector. Based on age, the majority of respondents are in the early adulthood category (21 respondents (70.0%), while the late adolescent category is 9 respondents (30.0%). Based on the number of pregnancies, the majority of respondents are currently undergoing their second pregnancy (12 respondents (40.0%), followed by their first pregnancy (10 respondents (33.3%) and their third pregnancy (8 respondents (26.7%).

Table 2. Distribution of Anxiety Levels and Sleep Quality Before and After Providing Lullaby Music to Pregnant Women in the Third Trimester

Variables	Category	Frequency (f)	Percentage (%)
Sleep Quality Before	Bad	30	100.0
Sleep Quality After	Bad	3	10.0
	Good	27	90.0
Anxiety Level Before	Currently	18	60.0
	Heavy	12	40.0
Post-Anxiety Level	No Worries	18	60.0
	Light	12	40.0

Based on Table 2, it is known that before being given lullaby music therapy, all respondents had poor sleep quality, as many as 30 respondents (100.0%). After being given lullaby music therapy, there was an increase in sleep quality, where as many as 27 respondents (90.0%) had good sleep quality and only 3 respondents (10.0%) still had poor sleep quality. In the anxiety level variable, before being given lullaby music therapy, most respondents experienced moderate anxiety, as many as 18 respondents (60.0%) and severe anxiety, as many as 12 respondents (40.0%). After being given lullaby music therapy, most respondents did not experience anxiety, as many as 18 respondents (60.0%), while 12 respondents (40.0%) experienced mild anxiety. These results indicate a decrease in anxiety levels after being given lullaby music therapy.

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Table 3. Results of the Normality Test of Data on Anxiety Levels and Sleep Quality of Pregnant Women in the Third Trimester Using the Shapiro-Wilk

Variables	Shapiro-Wilk Statistics	p-value	Information
Sleep Quality Pretest	0.920	0.027	Abnormal
Anxiety Pretest	0.930	0.048	Abnormal
Sleep Quality Posttest	0.752	<0.001	Abnormal
Anxiety Posttest	0.897	0.007	Abnormal

Based on the results of the normality test using Shapiro-Wilk, the significance value for the sleep quality pretest was 0.027, the anxiety pretest was 0.048, the sleep quality posttest was <0.001, and the anxiety posttest was 0.007. All significance values showed a p-value <0.05, so the data were not normally distributed. Therefore, the analysis was continued using the Wilcoxon Signed Rank Test.

Table 4. The Effect of Lullaby Music on Anxiety Levels and Sleep Quality in Pregnant Women in the Third Trimester Using the Wilcoxon Signed Rank Test

Variables	Negative Ranks	Positive Ranks	Ties	Z	p-value	Information
Sleep Quality Before and After	15	3	12	-2,377	0.017	There is an Influence
Anxiety Levels Before and After	22	7	1	-3,657	<0.001	There is an Influence

Based on the results of the Wilcoxon Signed Rank Test on the sleep quality variable, the Z value was obtained = -2.377 with a p-value = 0.017. Because the p-value is smaller than α (0.05), H_0 is rejected and H_1 is accepted. This indicates that there is an effect of providing lullaby music on the sleep quality of pregnant women in the third trimester.

The anxiety level variable obtained a Z value of -3.657 with a p-value <0.001. Because the p-value is smaller than α (0.05), H_0 is rejected and H_1 is accepted. Thus, it can be concluded that there is an effect of providing lullaby music on reducing anxiety levels in pregnant women in the third trimester.

Most pregnant women in their third trimester worked as housewives (26 respondents (86.7%), while 4 respondents (13.3%) worked in the private sector. Based on age, the majority of respondents were in the early adulthood category (21 respondents (70.0%), while 9 respondents (30.0%) were in the late adolescence category. Based on the number of pregnancies, most respondents were in their second pregnancy (12 respondents (40.0%), followed by their first pregnancy (10 respondents (33.3%) and their third pregnancy (8 respondents (26.7%). The data shows that most respondents were at optimal reproductive age, had previous pregnancy experience, and did not have busy formal work activities. These characteristics can affect the mother's psychological condition during pregnancy, especially in dealing with physical changes, anxiety before childbirth, and sleep quality in the third trimester. Demographic characteristics of pregnant women, such as age, occupation, and parity, are factors that play a role in determining physical and psychological health during pregnancy. In the third trimester, pregnant women experience various physiological and psychological

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changes due to the growing fetus, hormonal changes, and preparation for childbirth. These conditions often lead to anxiety, physical discomfort, and sleep disturbances. Early adulthood is considered the most ideal reproductive period because at this age, reproductive organs have matured and individuals are generally more psychologically prepared to face pregnancy than at younger ages. Furthermore, previous pregnancy experiences also contribute to a mother's ability to adapt to changes that occur during pregnancy. Mothers who have experienced pregnancy and childbirth tend to be better able to manage stress and anxiety than mothers who are pregnant for the first time. Occupation can also affect the psychological state of pregnant women. Job demands, physical exhaustion, and work environment pressures can increase stress, which ultimately affects sleep quality and anxiety levels. Conversely, mothers who have more rest time tend to be more easily able to manage stress and relaxation activities. Pregnant women who experience sleep disturbances generally also have higher levels of anxiety. This study explains that music intervention can help improve sleep quality and reduce anxiety during pregnancy [11]. Anxiety during pregnancy is influenced by various maternal factors, including age, pregnancy experience, and psychosocial conditions. The results of this study indicate that music intervention is effective as a non-pharmacological method to reduce anxiety in pregnant women [12]. Music therapy carried out routinely during pregnancy can provide a relaxing effect, reduce stress, and improve the psychological well-being of pregnant women [13]. Research by Konsam et al. (2023) in a systematic review found that music therapy has significant benefits for maternal mental health during the perinatal period, especially in reducing anxiety and increasing comfort during pregnancy [14]. Music therapy is an effective, safe, and easy-to-implement non-pharmacological intervention to help reduce anxiety and improve maternal well-being during pregnancy [15].

Based on the results of the study, it was found that before being given lullaby music therapy, all respondents had poor sleep quality, as many as 30 respondents (100.0%). After being given lullaby music therapy, there was an improvement in sleep quality, where as many as 27 respondents (90.0%) had good sleep quality and only 3 respondents (10.0%) still had poor sleep quality. In the anxiety level variable, before being given lullaby music therapy, most respondents experienced moderate anxiety, as many as 18 respondents (60.0%) and severe anxiety, as many as 12 respondents (40.0%). After being given lullaby music therapy, most respondents did not experience anxiety, as many as 18 respondents (60.0%), while 12 respondents (40.0%) experienced mild anxiety. These results indicate a decrease in anxiety levels after being given lullaby music therapy. The improvement in sleep quality that occurs can be caused by the relaxation effect produced by lullaby music, which helps mothers enter the sleep phase more easily and maintain better sleep quality. Sleep quality is a state in which an individual obtains sufficient sleep, both in terms of duration and depth, so that the body can optimally recover physically and psychologically. In the third trimester of pregnancy, sleep quality often decreases due to physiological and psychological changes such as uterine enlargement, increased urinary frequency, back pain, uncomfortable sleeping positions, fetal movement, and anxiety before labor. Lullaby music is a type of music with a slow tempo of around 60–80 beats per minute that produces a relaxing effect on the central nervous system. When someone listens to soothing music, brain waves gradually shift from beta (alert) to alpha and theta, which are associated with a relaxed and sleepy state. This condition causes a decrease in sympathetic nervous system activity and an increase in parasympathetic nervous system activity, resulting in more stable heart rate, blood pressure, and respiratory rate. Furthermore, lullaby music

can stimulate the release of neurotransmitters such as serotonin and dopamine, which play a role in creating a feeling of comfort and increasing the production of the hormone melatonin. Melatonin is a hormone that regulates the sleep cycle, so increasing melatonin levels can help someone fall asleep more easily and maintain their sleep quality. Music therapy significantly improves sleep quality in individuals with sleep disorders through relaxation mechanisms and reduced physiological activity before bedtime[16]. According to Wang et al. (2023), slow-tempo music can shorten sleep latency (the time it takes to fall asleep), increase sleep efficiency, and reduce the frequency of nighttime awakenings[17]. Lullabies are not just simple melodies, but rather a stimulus proven to deeply calm the body and mind. When listening to slow, soft music, our brains respond through the neuroendocrine pathway, a system that connects the nervous system with the release of hormones in the body. This process works wonders by reducing the production of stress hormones such as cortisol, while also triggering the release of calming hormones such as melatonin and oxytocin. These hormones are fully responsible for regulating our sleep cycles and maintaining emotional stability. As a result, the heart rate slows, tense muscles relax, and feelings of anxiety gradually fade, so that the body gets the signal that it is safe to start sleeping[18].

Listening to music before bed for several weeks can significantly improve sleep quality compared to the control group[19]. Lullabies with sedative characteristics—such as slow tempos and consistent melodies—scientifically work as an effective biological therapy that reduces cognitive activation and reduces overthinking before bed. This reduction in brain workload triggers a deep relaxation response through the neuroendocrine pathway, which connects the nervous system to the body's hormones. This process suppresses the production of the stress hormone cortisol while stimulating the release of melatonin and oxytocin, resulting in a slowed heart rate, stabilized emotions, and a smooth transition into a deep, quality sleep phase [20]. Furthermore, de Witte et al. (2020) concluded through a meta-analysis that music therapy has a moderate to strong effect in reducing stress and increasing relaxation, contributing to better sleep quality [21]. Classical lullaby music therapy has been scientifically proven to break the chain of anxiety and improve sleep quality in pregnant women in the third trimester, who are often disturbed by anxiety before delivery. When pregnant women listen to slow, calm, sedative music, this stimulus works to reduce overthinking, triggering a positive biological response through the neuroendocrine pathway. The nervous system then suppresses the production of the stress hormone cortisol and stimulates the release of natural calming hormones like melatonin, which play a vital role in regulating sleep cycles. These hormonal changes instantly create physical relaxation, such as slowing a racing heart rate caused by anxiety and relaxing tense muscles. This harmonious combination of a peaceful mind and a relaxed body drastically reduces anxiety, stabilizes emotions, and makes it easier for pregnant women to enter a deep, quality sleep phase, preventing the risk of postpartum parenting stress.[22] According to researchers, improved sleep quality in pregnant women in their third trimester after being given lullabies occurs because music can create a state of physical and psychological relaxation. The gentle rhythm and slow tempo help reduce tension, anxiety, and discomfort often experienced during pregnancy.

This relaxed state makes it easier for mothers to fall asleep and achieve better quality sleep. Therefore, lullabies can be a safe, easy, and effective non-pharmacological therapy alternative to improve sleep quality in pregnant women in their third trimester.

CONCLUSION

The results of this study indicate that lullaby music can be used as a non-pharmacological therapy in midwifery care for pregnant women in their third trimester. Providing lullaby music can help pregnant women achieve relaxation, improve sleep quality, and provide a sense of comfort during pregnancy. Therefore, midwives can integrate lullaby music therapy into antenatal care as a promotive and preventive effort to support the physical and psychological health of pregnant women. Besides being easy to implement, this therapy is also safe, economical, and can be done independently by mothers at home as part of efforts to improve maternal well-being and prepare for childbirth.

Statement on the Use of Artificial Intelligence.

Artificial intelligence was used in the preparation of this manuscript solely to assist with language improvement, grammar checking, and editing for clarity and readability. The authors remain fully responsible for the accuracy, originality, integrity, and academic content of the manuscript. All AI-assisted content was reviewed, verified, and approved by the authors before submission**.**

Conflicts of interest

The authors declare no conflict of interest.

Author contributions

Yeti Ika Juniarti: Conceptualization, study design, data collection, data curation, formal analysis, and writing—original draft preparation. Retno Dewi Prisusanti: Methodological supervision, data validation, interpretation of results, and writing—review and editing. Yeti Ika Juniarti and Retno Dewi Prisusanti: Manuscript review and final approval of the version to be submitted for publication. All authors have read and approved the final version of the manuscript.

Acknowledgments

The authors would like to express their gratitude to the Donomulyo Community Health Center, Malang Regency, and all pregnant women who participated in this study. The authors also gratefully acknowledge the support and assistance provided by the Institute of Science and Health Technology, Dr. Soepraoen Hospital, Malang, during the implementation of this research.

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