Journal of Physical Education and Sport ® (JPES), Vol. 23 (issue 12), Art 388, pp. 3385- 3390, December 2023
online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES

Original Article

Reducing back pain intensity using a combination of music therapy and yoga: Case study in pregnant women

MAIDAWILIS[1*], MIKE ASMARIA[2], ALIMUDDIN[3], SANDRA DEWI[4], PRIMA MINERVA[5], MISWARTI[6], JUFRIKA GUSNI[7]
[1.2.4.6.7]Departemen of D3 Nursing, Faculty of Health and Psychology Universitas Negeri Padang, INDONESIA
[3]Departemen of Health and Recreation, Faculty of Sport Science Universitas Negeri Padang, INDONESIA
[5]Department of cosmetology and beauty, Faculty of Tourism and Hospitality Universitas Negeri Padang, INDONESIA

Published online: December 31, 2023
(Accepted for publication : December 15, 2023)
DOI:10.7752/jpes.2023.12388

Abstract
Back pain is an uncomfortable sensation in the lumbosacral area involving the lower spine and pelvis. This pain is one of the low back pain that almost all pregnant women feel. Based on the data obtained, 70%, of back pain often occured in pregnant women with pregnancy in the third trimester. Low back pain can be acute and last a few days to weeks. Pregnant women have relatively minimal movement activities, so it is not possible to do sports activities as a form of healing therapy. One of the treatments that can reduce low back pain is music therapy combined with yoga. This study was conducted to know how much influence and impact can be obtained from using yoga combined with music as a form of back pain therapy in pregnant women. The research was a *quasi-experimental* study using a one-group pre-test and post-test research design on 34 pregnant women respondents by providing treatment of yoga activities and music therapy. The instrument used in this study was a pain level questionnaire validated by material experts, media experts, and linguists with a reliability of 0.80. The results showed that classical music combined with yoga has a therapeutic effect on reducing back pain intensity for pregnant women. The results of the analysis found Sig. (2-tailed) worth 0.000, z - 3.771. It showed that the intervention can reduce the level of back pain in pregnant women, which can be seen from the difference between the pain scale levels during the pre-test and post-test. Treatment was given to respondents, namely, doing yoga while listening to classical music to reduce pain scales.
Keywords: **Therapy, sport, yoga, low back pain, pregnant**

Introduction

In the third trimester, 60% of pregnant women experience discomfort due to shortness of breath (Puspasari, 2019). Some discomforts arising in the trimester usually a pregnant woman urinates more often 50%, has constipation 40%, and flatulence 30%, then vaginal discharge 15%, then subsequently experiences swelling of the legs 20%, cramps in the legs 2 10%, headaches 20%. Then striae gravidarum 50%, hemorrhoid 60%, shortness of breath 60% and 70% back pain (Franisia et al., 2022). Based on the data above, it can be said that back pain often occurs in pregnant women in the third trimester (Casagrande et al., 2015). Pain in the back of pregnant women has become a common symptom often felt mainly when entering the third trimester (Kesikburun et al., 2018). There are several factors that cause this, namely weight gain, changes in posture, production of relaxed hormones that aim to stretch the hip joint, enlargement of the uterus, and stress that occurs in the muscles.

Back pain is a pain in the lumbosacral area (Förster et al., 2013). The pain will increase as the gestational age increases (Gibbins et al., 2008). This pain is caused by a shift in the center of gravity and a change in its full shape (Kanzaki et al., 2008). Changes in the weight of the uterus that are getting bigger and bigger result in changes in posture (Artal & O'Toole, 2003), walking without rest, lifting weights, and excessive bending. This back pain symptom is also due to the processing of the hormone estrogen and progesterone (Marnach et al., 2003), which makes the joints, bone and muscle ties braided.

The impact of back pain on pregnant women varies, and each woman's experience is different (Berber & Satılmış, 2020). However, some common effects of back pain involve physical discomfort and general well-being. This physical discomfort can be pain, tension, and stiffness in the back area (Ramadhania & Idhayanti, 2020). This will have a major effect on the ability of pregnant women to move. In addition, back pain can impact sleep disorders, restrictions on activities that can be done, and affect emotions (Nijs et al., 2018). Some pregnant women have been able to find that their back pain can be managed with lifestyle changes, light stretching, or the use of pillows as a medium of back support.

In the body, in addition to there are substances that can stimulate pain sensitivity (Świeboda et al., 2013), The body also has substances that can inhibit (inhibitor) pain, namely endorphins and encephalin, which can reduce a

Corresponding Author: MAIDAWILIS, E-mail: maidawilis73@fik.unp.ac.id

little pain (Roques et al., 2012). The impact that can occur from complaints of back pain in pregnant women in the third trimester is that the mother feels uncomfortable doing activities or disturbed activities, experiencing changes in the shape of the body structure, as well as experiencing back pain in the long term (Saptyani et al., 2020) thus increasing the tendency to postpartum back pain and pregnant women can be at risk of suffering from venous thrombosis (Dargaud et al., 2009).

Various efforts have been made to reduce back pain in pregnant women pharmacologically and nonpharmacologically (Wahyuni et al., 2019). Pharmacological therapies are more expensive than non-pharmacological ones (Ambrose & Golightly, 2015). One of the modalities that can reduce back pain is appropriate exercise (Trofa et al., 2020). One of the appropriate exercises is yoga (Atkinson, 2010). Yoga is currently very much favored by various circles of society (Goldberg, 2016). For pregnant women, yoga can be a valuable and fun physical exercise (Campbell & Nolan, 2016). Yoga can help improve flexibility, strength, and balance while giving the body time for relaxation (Petric et al., 2014). However, the yoga given to pregnant women is much different from that given to ordinary women. Yoga in pregnant women tends to avoid movements that involve excessive pressure on the abdomen (Oyarzabal et al., 2021), such as supine positions or movements that require extreme balance.

In addition to exercise, nowadays, it has also been used in the form of classical music therapy (McFerran, 2010). Music and sound contain excitatory power (Panicker et al., 2002). Music is a vibration of harmonious air (Thaut, 2015). The nerves in the ear catch it and pass it on to the nerves of the brain, and in the brain, music will affect the pituitary to release endorphins so as to reduce pain (Rokade, 2011). Music therapy, whether heard passively or together with a guided imagination, has an impact not only on the senses but also on perception, in particular, the perception of pain (Hanser, 2014). Music becomes a source of concentration for individuals experiencing different types of pain (Guptill, 2011).

Therapy with music is believed to be a fun and beneficial way to provide emotional and physical support to pregnant women (Shimada et al., 2021). Music will relax the body (Clark & Tamplin, 2016), helping manage pain and discomfort, mainly when used in conjunction with other relaxation techniques. The right music selection will also significantly affect the relaxation carried out, especially for pregnant women (Liu et al., 2016). Pregnant women must have different musical preferences (Baltacı et al., 2023). The selection of the right music will be aligned with the positive effects that can be received by the body and on the fetus itself.

Some of the latest research results show a link between music therapy and pregnancy, namely research conducted by (Rezaei et al., 2023) to see the effects of aromatherapy and music therapy. A survey study has also been conducted, finding music as one of the resources in pregnancy (Cheung et al., 2023) Previously, it has also been studied related to the effect of music therapy on the anxiety level of pregnant women (Aba et al., 2017) In addition, research related to women's perceptions during pregnancy with yoga practice has been carried out by (de Campos et al., 2020) but has not provided directly to see the effects that can be felt in real terms. In addition, the latest is related to yoga research conducted (Makhija et al., 2021) in the form of a randomized control trial to study the effect of yoga on integration on pregnancy outcomes. However, the research conducted only focused on hypertensive disorders of pregnancy. The most recent studies (Boopalan et al., 2023) found antenatal yoga's effectiveness in reducing labor pain
intensity.

Much information obtained regarding the study results concluded that music and exercise therapy are very good at reducing pain (Espí-López et al., 2016). However, the proper exercise for pregnant women is an exercise that can help calm them. Therefore, in this study, it is crucial to conduct the latest research that has never been done, namely trying to provide music therapy and yoga exercises to pregnant women in the third trimester of pregnancy because it is essential in petrifying and reducing pain in pregnant women.

Materials and Methode

Design study

The research was quasi-experimental, using one group pre-test and post-test design. Participants or study subjects were measured at two different times, namely at the beginning before the treatment and the end after the treatment.

Participants and research locations

Sampling used purposive sampling with inclusion criteria for participants who participated in the study included (1) pregnant women, (2) have back pain, (3) gestational age in the third trimester, (4) good health conditions as evidenced by a health certificate, (5) aged 20-35 years and (6) are under the supervision of the local community health service center. Based on these criteria, 34 pregnant women were willing to participate in research spread across five community health centers in Indonesia. This study was conducted for approximately three weeks in March 2023.

Instruments

The instruments used in this study are **pain level questionnaires** that have gone through a series of stages, such as small-scale and large-scale trials, and expert validation processes consisting of material experts, media experts and linguists, which are then measured for validity and reliability. From these results, the pain level

questionnaire obtained a validity value of 0.59 and a reliability of 0.80. This indicated that the questionnaire used to measure pain levels in pregnant women can be considered adequate.

Research procedure

Prior to the study, all participants had met the inclusion requirements that had been set. Participants were collected in a special place and given an explanation of the research procedure to be carried out, namely by applying yoga and music to reduce the intensity of back pain in pregnant women. Here are the steps of the research conducted:

1. Prior to treatment, all participants were given a questionnaire to measure the level of back pain felt as the first form of observation made
2. Each participant is free to choose the type of music they want
3. Yoga movement can be many types (**tadasana, cat-cow stretch, child pose, prenatal sun salutation and pigeon pose)**
4. The implementation of yoga while listening to music is carried out for 30-45 minutes at each meeting
5. The treatment process is carried out three times a week with a total of 8 treatments.
6. The second observation was made after carrying out the yoga program by again measuring the level of pain felt through a questionnaire.
7. The initial data and final data were then analyzed using difference test analysis.
1. Before conducting the research, the main thing that has been done is to obtain permission for ethical information from the Ethics Committee.

Results

The results of research found significant on pain changes in pregnant women by giving treatment in the form of yoga combined with music. These results revealed that an impact on the level of relaxation provided by yoga movements, and the music heard. The results of the study can support the findings of previous research that music and yoga activities help pregnant women both in reducing stress and helping pain recovery.

The results of research conducted the method of assessing the level of pain scale using a valid questionnaire to be used as a measuring tool. The following described the data from the initial data collection in the form of pain levels obtained from 34 participants juxtaposed with the results of data obtained after treatment. The following is the pain scale distribution data:

Table 1. Distribution Scale Pain Pre-test and Post-test administered yoga and therapy music

Respondent	Pre		Post		p
	f	%	f	%	
Severe Pain	1	2.9	0	0	0,000
Keep	14	41.2	7	20.6	
Light	18	52.9	22	64.7	
No Pain	1	2.9	5	14.7	

Based on Table 1, it was known that from 34 respondents, the group mostly on the pre-test had pain with a weight scale of 1 person (2.9%). At the time of the post-test, respondents with a severe pain scale were reduced to 0 respondents. Respondents with a moderate pain scale numbered 14 people (41.2%) at the time of post-intervention increased to 7 people (20.6%). Respondents with a mild pain scale of 18 people (52.9%) reduced to 22 people (64.7%). Meanwhile, the respondents who did not have pain were one person (2.9%), which increased to 5 people (14.7%).

Furthermore, the data obtained were analyzed in detail through different test analyses to determine the significance of the treatment with a comparison of pain analysis before and after treatment in pregnant women. The following are the results of the difference test analysis that has been carried out:

Table 2. Analysis of pain scores in patients before (pre) and after (post) treatment

Variable	Group	Mean	z	p-value
Skor				
Yoga combined with Music Therapy	pre-test	2.5588	-3.771	0.000
	post-test	3.029		
	Difference	00,471		

The results of the analysis showed that there was an influence of music therapy on back pain in pregnant women known as Sig. (2-tailed) worth 0,000, z -3.771. Because the value of 0.000 is less than < 0,05, it can be concluded that the hypothesis is accepted. It indicated that there is a difference between the level of pain scale for the pre-test and the post-test, so it can also be concluded that there is an influence of yoga and therapy music on the back pain of pregnant women.

Discussion

The results showed that there is an influence of yoga and therapy music on the back pain of pregnant women. From these results, it was clear that pregnant women who experience severe pain and moderate pain are reduced profusely after giving treatment, namely yoga combined with classical music therapy. The function of yoga in pregnancy and childbirth can increase awareness (awarenes), creating an inner bond between the mother and her baby and tightening the muscles so that later, it will facilitate natural childbirth (Mansfield, 2008).

The results of research found a very significant difference in reducing pain felt by pregnant women after doing yoga while listening to music. Data came from 34 people who experienced moderate pain, as many as 14 people and reduced by 50% after being given yoga and music treatment. This can be interpreted that music has a calming effect and can be combined with physical activities such as yoga (Zhu et al., 2021). In the case of pregnant women, the implementation of yoga is very good based on various theories such as relaxation and stress reduction (Lehtoranta, 2019), increased flexibility and balance, and muscle strengthening and stability.

In addition, pregnant women are very vulnerable to mental health such as inadequate emotional support, which affects some disorders such as pain (Kim & Lee, 2022). Other research results are in line with the results of studies that mention the effectiveness of pregnant gymnastics and pregnant yoga against reducing back pain in pregnant women in the trimester (Resmi et al., 2017). Low back pain in pregnant women in the third trimester occurs due to hormonal changes that cause changes in the soft tissues of the buffer and connective so that the elasticity and flexibility of the muscles decrease (Kurniyati & Bakara, 2021). The systematic review found strong evidence for short-term effectiveness and moderate evidence for long-term yoga effectiveness for chronic low back pain on the most important patient-centered outcomes (Cramer et al., 2013). Yoga can be recommended as an adjunct therapy for chronic low back pain patients. In addition, with movement, yoga can support motor activities (Bharathi et al., 2019). Yoga activities can affect functional movement and individual health levels (Lim & Park, 2019). Meanwhile, the function of music therapy is to treat the symptoms of a number of conditions, both in the aspects of mental and physical health (Popa et al., 2021). Music and applications reduce short-term memory impairment through increased cell proliferation (Lee et al., 2016). Similarly, (Gómez-Romero et al., 2017) also explain the good benefits that can be obtained from music therapy. In addition, music therapy can be a useful complementary treatment for chronic pain as well as behavioral consequences (Guétin et al., 2005). These theories strongly support the results of research that carried out with the result that the influence exerted by music therapy is very significant in the reduction of pain in the back.

The music therapy provided was combined with yoga activities so that from the initial number who experienced severe pain and moderate pain, as many as 18 people experienced a rapid decrease after being given treatment. The number has decreased to leave seven people still experiencing pain. The results of another study have also found that classical music therapy exerts a significant influence on reducing the level of the patient's pain scale (Chen et al., 2012). Various factors, both physical and non-physical, usually influence patients who experience lower back pain disorders. One of the things that patients must continue to improve is the increase in hormones. The necessary hormones are hPL, estrogen, progesterone, oxytocin, prolactin, and endorphins. One of the effects of music is the increase in the hormone of happiness, namely endorphins (Situmorang & WİBOWO, 2018). Music can increase the production of endorphin and serotonin hormones, making a person feel happier (Sharma, 2017).

Conclusion

Based on the results of research and discussions that have been carried out, it can be concluded that the treatment given to pregnant women who experience back pain in the form of yoga activities combined with music can have a significant effect on reducing back pain for pregnant women. This can be based on the final analysis of different tests obtained by Sig. (2-tailed) data worth 0.000, z - 3.771. This shows that the intervention can reduce back pain in pregnant women, which can be seen from the difference between the pain scale levels during the pre-test and post-test. The results of this study can be used as a reference and advice for pregnant women who experience back pain in the third trimester to do yoga activities combined with music as a therapeutic medium.

Conflict of interest No potential conflict of interest relevant to this article was reported.

Acknowledgments The implementation of this research is supported and funded by Padang State University.

References

Aba, Y. A., Avci, D., Guzel, Y., Ozcelik, S. K., & Gurtekin, B. (2017). Effect of music therapy on the anxiety levels and pregnancy rate of women undergoing in vitro fertilization-embryo transfer: A randomized controlled trial. *Applied Nursing Research*, *36*, 19–24.

Baltacı, N., Koç, E., Yüksekol, Ö. D., & Çokyeter, B. (2023). The Effects of Listening to Lullabies and Self-selected Music on Distress and Maternal Attachment in Pregnant Women: A Randomized Controlled Study. *Alternative Therapies in Health & Medicine*, *29*(7).

Berber, M. A., & Satılmış, İ. G. (2020). Characteristics of low back pain in pregnancy, risk factors, and its effects on quality of life. *Pain Management Nursing*, *21*(6), 579–586.

Boopalan, D., Vijayakumar, V., Ravi, P., Kunjumon, B., & Kuppusamy, M. (2023). Effectiveness of antenatal yoga in reducing the intensity of labour pain: A systematic review and Meta-analysis. *European Journal of Obstetrics & Gynecology and Reproductive Biology: X*, 100214.

Campbell, V. R., & Nolan, M. (2016). A qualitative study exploring how the aims, language and actions of yoga for pregnancy teachers may impact upon women's self-efficacy for labour and birth. *Women and Birth*, *29*(1), 3–11.

Cheung, P. S., McCaffrey, T., Tighe, S. M., & Mohamad, M. M. (2023). Music as a health resource in pregnancy: A cross-sectional survey study of women and partners in Ireland. *Midwifery*, *126*, 103811.

Clark, I. N., & Tamplin, J. (2016). How music can influence the body: Perspectives from current research. *Voices: A World Forum for Music Therapy*, *16*(2).

de Campos, E. A., Narchi, N. Z., & Moreno, G. (2020). Meanings and perceptions of women regarding the practice of yoga in pregnancy: A qualitative study. *Complementary Therapies in Clinical Practice*, *39*,

Goldberg, E. (2016). *The path of modern yoga: the history of an embodied spiritual practice*. Simon and Schuster.

Kesikburun, S., Güzelküçük, Ü., Fidan, U., Demir, Y., Ergün, A., & Tan, A. K. (2018). Musculoskeletal pain and symptoms in pregnancy: a descriptive study. *Therapeutic Advances in Musculoskeletal Disease*, *10*(12), 229–234.

Lehtoranta, S. (2019). *Stress Management through the Philosophy of Yoga*.

Liu, Y.-H., Lee, C. S., Yu, C.-H., & Chen, C.-H. (2016). Effects of music listening on stress, anxiety, and sleep quality for sleep-disturbed pregnant women. *Women & Health*, *56*(3), 296–311.

Makhija, A., Khatik, N., & Raghunandan, C. (2021). A randomized control trial to study the effect of integrated yoga on pregnancy outcome in hypertensive disorder of pregnancy. *Complementary Therapies in Clinical Practice*, *43*, 101366.

Nijs, J., Mairesse, O., Neu, D., Leysen, L., Danneels, L., Cagnie, B., Meeus, M., Moens, M., Ickmans, K., & Goubert, D. (2018). Sleep disturbances in chronic pain: neurobiology, assessment, and treatment in physical therapist practice. *Physical Therapy*, *98*(5), 325–335.

Oyarzabal, E. A., Seuferling, B., Babbar, S., Lawton-O'Boyle, S., & Babbar, S. (2021). Mind-body techniques in pregnancy and postpartum. *Clinical Obstetrics and Gynecology*, *64*(3), 683–703.

Petric, M., Vauhnik, R., & Jakovljevic, M. (2014). The impact of hatha yoga practice on flexibility: A pilot study. *Altern Integr Med*, *3*(2), 2–10.

Ramadhania, R. S., & Idhayanti, R. I. (2020). Alexander Technique To Reduce Lower Back Pain In 3rd Trimester of Pregnancy. *Midwifery and Nursing Research*, *2*(1), 31–40.

Rezaei, N., Keshavarz, M., Pezaro, S., Sarvi, F., Eshraghi, N., & Bekhradi, R. (2023). The effect of aromatherapy and music therapy upon anxiety and non-stress test results during pregnancy: A randomized clinical trial. *European Journal of Integrative Medicine*, 102307.

Shimada, B. M. O., Santos, M. da S. O. M. dos, Cabral, M. A., Silva, V. O., & Vagetti, G. C. (2021). Interventions among pregnant women in the field of music therapy: a systematic review. *Revista Brasileira de Ginecologia e Obstetricia/RBGO-Gynecology and Obstetrics*, *43*(05), 403–413.

Zhu, Y., Wang, R., Tang, X., Li, Q., Xu, G., & Zhang, A. (2021). The effect of music, massage, yoga and exercise on antenatal depression: A meta-analysis. *Journal of Affective Disorders*, *292*, 592–602.

Ambrose, K. R., & Golightly, Y. M. (2015). Physical exercise as non-pharmacological treatment of chronic pain: why and when. *Best Practice & Research Clinical Rheumatology*, *29*(1), 120–130.

Artal, R., & O'Toole, M. (2003). Guidelines of the American College of Obstetricians and Gynecologists for exercise during pregnancy and the postpartum period. *British Journal of Sports Medicine*, *37*(1), 6–12.

Atkinson, M. (2010). Entering scapeland: Yoga, fell and post-sport physical cultures. *Sport in Society*, *13*(7–8),

Bharathi, G., Jayaramayya, K., Balasubramanian, V., & Vellingiri, B. (2019). The potential role of rhythmic entrainment and music therapy intervention for individuals with autism spectrum disorders. *Journal of Exercise Rehabilitation*, *15*(2), 180.

Casagrande, D., Gugala, Z., Clark, S. M., & Lindsey, R. W. (2015). Low back pain and pelvic girdle pain in pregnancy. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*, *23*(9), 539–549.

Chen, X., Seth, R. K., Rao, V. S., Huang, J. J., & Adelman, R. A. (2012). Effects of music therapy on intravitreal injections: a randomized clinical trial. *Journal of Ocular Pharmacology and Therapeutics*, *28*(4), 414

Cramer, H., Lauche, R., Haller, H., & Dobos, G. (2013). A systematic review and meta-analysis of yoga for low back pain. *The Clinical Journal of Pain*, *29*(5), 450–460.

Dargaud, Y., Rugeri, L., Vergnes, M. C., Arnuti, B., Miranda, P., Negrier, C., Bestion, A., Desmurs-Clavel, H., Ninet, J., & Gaucherand, P. (2009). A risk score for the management of pregnant women with increased risk of venous thromboembolism: a multicentre prospective study. *British Journal of Haematology*, *145*(6), 825–835.

Espí-López, G. V, Inglés, M., Ruescas-Nicolau, M.-A., & Moreno-Segura, N. (2016). Effect of low-impact aerobic exercise combined with music therapy on patients with fibromyalgia. A pilot study. *Complementary Therapies in Medicine*, *28*, 1–7.

Förster, M., Mahn, F., Gockel, U., Brosz, M., Freynhagen, R., Tölle, T. R., & Baron, R. (2013). Axial low back pain: one painful area–many perceptions and mechanisms. *PloS One*, *8*(7), e68273.

Franisia, C. A., Dahlan, F. M., & Suralaga, C. (2022). The Effectiveness of Prenatal Yoga on Back Pain in Third Trimester Pregnant Women at the Depok Clinic in 2022. *Science Midwifery*, *10*(3), 2075–2081.

Gibbins, S., Stevens, B., McGrath, P. J., Yamada, J., Beyene, J., Breau, L., Camfield, C., Finley, A., Franck, L., & Johnston, C. (2008). Comparison of pain responses in infants of different gestational ages. *Neonatology*, *93*(1), 10–18.

Gómez-Romero, M., Jiménez-Palomares, M., Rodríguez-Mansilla, J., Flores-Nieto, A., Garrido-Ardila, E. M., & González-López-Arza, M. V. (2017). Benefits of music therapy on behaviour disorders in subjects diagnosed with dementia: A systematic review. *Neurología (English Edition)*, *32*(4), 253–263.

Guétin, S., Coudeyre, E., Picot, M. C., Ginies, P., Graber-Duvernay, B., Ratsimba, D., Vanbiervliet, W., Blayac, J. P., & Hérisson, C. (2005). Effect of music therapy among hospitalized patients with chronic low back pain: a controlled, randomized trial. *Annales de Réadaptation et de Médecine Physique: Revue Scientifique de La Société Française de Rééducation Fonctionnelle de Réadaptation et de Médecine Physique*, *48*(5), 217–224.

Guptill, C. A. (2011). The lived experience of professional musicians with playing-related injuries: a phenomenological inquiry. *Medical Problems of Performing Artists*, *26*(2), 84–95.

Hanser, S. B. (2014). Music therapy in cardiac health care: current issues in research. *Cardiology in Review*, *22*(1), 37–42.

Kanzaki, H., Nankaku, M., Kawanabe, K., Nakamura, T., Shimada, T., Yoneda, T., & Miki, A. (2008). The recovery of the walking ability of patients at early stages after total hip arthroplasty from the perspective of the displacement of the center of gravity. *Journal of Physical Therapy Science*, *20*(4), 225–232.

Kim, S.-J., & Lee, Y.-H. (2022). Effectiveness of yoga training programs to reduce depression and improve resilience of single mothers. *Journal of Exercise Rehabilitation*, *18*(2), 104.

Kurniyati, K., & Bakara, D. M. (2021). Pelvic Tilt Exercise Against Lower Back Pain For Third Trimester Pregnant Women In Rejang Lebong Regency. *Journal of Midwifery*, *5*(1), 1–7.

Lee, S.-M., Kim, B.-K., Kim, T.-W., Ji, E.-S., & Choi, H.-H. (2016). Music application alleviates short-term memory impairments through increasing cell proliferation in the hippocampus of valproic acid-induced autistic rat pups. *Journal of Exercise Rehabilitation*, *12*(3), 148.

Lim, E. J., & Park, J. E. (2019). The effects of Pilates and yoga participants on engagement in functional movement and individual health level. *Journal of Exercise Rehabilitation*, *15*(4), 553.

Mansfield, B. (2008). The social nature of natural childbirth. *Social Science & Medicine*, *66*(5), 1084–1094.

McFerran, K. (2010). *Adolescents, music and music therapy: Methods and techniques for clinicians, educators and students*. Jessica Kingsley Publishers.

Panicker, H., Wadhwa, S., & Roy, T. S. (2002). Effect of prenatal sound stimulation on medio-rostral neostriatum/hyperstriatum ventrale region of chick forebrain: a morphometric and immunohistochemical study. *Journal of Chemical Neuroanatomy*, *24*(2), 127–135.

Popa, L.-C., Manea, M. C., Velcea, D., Şalapa, I., Manea, M., & Ciobanu, A. M. (2021). Impact of Alzheimer's dementia on caregivers and quality improvement through art and music therapy. *Healthcare*, *9*(6), 698.

Resmi, D. C., Hadisaputro, S., & Runjati, R. (2017). Effect of yoga and acupressure on pain and functional capability of lower back in pregnant mothers during the third trimester of pregnancy. *Belitung Nursing Journal*, *3*(6), 722–728.

Rokade, P. B. (2011). Release of endomorphin hormone and its effects on our body and moods: A review. *International Conference on Chemical, Biological and Environment Sciences*, *431127*(215), 436–438.

Roques, B. P., Fournié-Zaluski, M.-C., & Wurm, M. (2012). Inhibiting the breakdown of endogenous opioids and cannabinoids to alleviate pain. *Nature Reviews Drug Discovery*, *11*(4), 292–310.

Saptyani, P. M., Suwondo, A., & Runjati, R. (2020). Utilization of Back Movement Technique to Intensity of Low Back Pain in Third Trimester Pregnant Women. *STRADA Jurnal Ilmiah Kesehatan*, *9*(2), 535–542.

Sharma, V. (2017). Power Of Music To Cope With Global Pandemic Covid-19. *Vindhya Bharti*.

Situmorang, D. D. B., & WİBOWO, M. E. (2018). Comparison of the effectiveness of CBT group counseling with passive vs active music therapy to reduce millennials academic anxiety. *International Journal of Psychology and Educational Studies*, *5*(3), 51–62.

Świeboda, P., Filip, R., Prystupa, A., & Drozd, M. (2013). Assessment of pain: types, mechanism and treatment. *Pain*, *2*(7).

Thaut, M. H. (2015). Music as therapy in early history. *Progress in Brain Research*, *217*, 143–158.

Trofa, D. P., Obana, K. K., Herndon, C. L., Noticewala, M. S., Parisien, R. L., Popkin, C. A., & Ahmad, C. S. (2020). The evidence for common nonsurgical modalities in sports medicine, part 1: kinesio tape, sports massage therapy, and acupuncture. *JAAOS Global Research & Reviews*, *4*(1).

Wahyuni, S., Rahayu, T., Distinarista, H., Wuriningsih, A. Y., & Nofitasari, S. D. (2019). Spiritual Intervention and Thermal Stimulation in Pregnant Women with Back Pain. *Indian Journal of Public Health Research & Development*, *10*(8).