



**INTERNATIONAL JOURNAL OF
PHARMACEUTICAL SCIENCES**
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: <https://www.ijpsjournal.com>



Review Article

Recreational Lifestyle Modalities and Maternal Fetal Well-Being: A Comprehensive Review of Physiological, Psychological and Safety Outcomes

Chinni Tejaswini Padmasai, Metlapalli Sri Venkata Padmavathi, Pathapati Nehasree, Potla Sirisha, Danthinapalli Madhu Babu, A. Pradeepthi*

Malineni Perumallu Pharmacy College, Pulladigunta, Guntur, Andhra Pradesh, India 522017

ARTICLE INFO

Published: 23 Sept 2026

Keywords:

Recreational life style
Modalities, Maternal Well-
Being, Featal Well-Being,
Antenatal care, Physical
Activity, Stress
management, Mental
Health, Pregnancy
outcomes, safety outcomes
and precautions,
physiological outcomes,
psychological outcomes

DOI:

10.5281/zenodo.22912711

ABSTRACT

Pregnancy is a part of a woman's life in which many physiological, psychological and emotional changes occur, potentially influencing well-being and pregnancy outcomes. Many recreational lifestyle activities have been investigated by researchers for their benefits for the pregnant woman, such as prenatal yoga, exercise, music, relaxation, and breathing activities. This paper addresses the physiological, psychological, maternal, and featal outcome, and safety aspects of such recreational lifestyle intervention. The relaxation intervention was found to improve various pregnancy-related outcomes, including reduction of maternal stress, anxiety, depressive symptoms and better pregnancy and new-born outcome. It is concluded that recreational activities during pregnancy should be carefully chosen based on individuals' wellbeing and health status. Additional high-quality studies should be carried out to identify the most beneficial activities and clarify their effects on pregnant women and their new-borns.

INTRODUCTION

Pregnancy is a life stage a woman experiences accompanied by many physiological, psychological, emotional and social changes. The health of mother and foetus should be maintained to have a normal pregnancy.(1) . Apart from a

healthy diet and antenatal care, proper lifestyle and recreational activities can have a positive effect on the pregnancy outcomes and the mother's well-being.

Recreational lifestyle is defined as a set of enjoyable or satisfying activities that people do in

***Corresponding Author:** A. Pradeepthi

Address: Malineni Perumallu Pharmacy College, Pulladigunta, Guntur, Andhra Pradesh, India 522017

Email ✉: pradeepthi.a@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.



their free time, such as physical activities, walking, yoga, relaxing, listening to music, reading, engaging in hobbies, creative activities, and socialization (2). All of these activities can be selected in accordance with the pregnant woman's state to help her relax and feel better.

The pregnant woman's state directly affects the fetus, which makes antenatal care, a healthy diet, rest, physical activity, stress management, and medical check-ups critical for maintaining wellbeing (3-4). The fetus is assessed for wellbeing by performing tests that can include measuring the fetal growth, movement, and heart rate and ultrasound examination. Fetal wellbeing also refers to a woman's general health condition during pregnancy.

The woman's ability to perform intense physical activity without causing harm to herself and the fetus has been studied extensively for more than fifty years. The initial concern was that strenuous exercise could remove oxygen and nutrients from the fetus, thereby endangering it(4).

A pregnant woman is a valuable population group as the health and wellbeing of one person affect two. By 2025, over 100 million women worldwide will have an opportunity to give birth, but several million women still die because of pregnancy-related causes. A number of women have unhealthy weight for their height, which poses a hazard to their own wellbeing as well as the newborn's wellbeing (5). Low birth weight and large-for-gestational-age infant have been associated with lower child future health with those who are underweight or overweight during pregnancy. These reasons explained why and that lifestyle recreation can and should be seen as important aspect of pregnancy healthy because the benefits of participating in leisure recreation in enhancing health status for pregnant women can promote healthy pregnancy outcomes. In addition,

no need to underestimate importance of diet, health care, emotional health of pregnancy wellbeing should be well evaluated. Thus, further studies on effects of participation on various leisure recreational activities toward the pregnant women should be carried out in order to best care for those women and fetuses (6-7).

OBJECTIVES

- To assess the level of awareness of pregnant women regarding safe recreational activities
- To determine the relationship between recreational lifestyle and mothers' physical and mental status.
- To determine the relationship between mothers 'recreational lifestyle and well-being of the fetus.
- To identify barriers to achievement of appropriate recreational lifestyle among pregnant women
- To create awareness about appropriate recreational lifestyle among pregnant women
- To examine the effect of recreational lifestyle intervention on physical discomfort, fatigue, sleep, blood pressure, weight gain, and pregnancy complications
- To assess the treatment's effect on stress, anxiety, depression, feeling, and wellbeing
- To evaluate the safety and risks of recreational measures
- To compare the treatments and establish which are the most effective (8).

PREGNANCY



Pregnancy occurs during the time that an egg is fertilized and implants in the womb. This process usually takes around 40 weeks, which is also known as the gestational period. The pregnancy term is divided into three parts called trimesters.

- First trimester
- Second trimester
- Third trimester

First trimester (1-13 Weeks)

- The first trimester begins with conception and implantation of the fertilized egg in the womb. This is the period in which the embryo develops into a fetus.
- In the first trimester, most women experience nausea, vomiting, fatigue, frequent urination, breast tenderness, and emotional changes.
- It is vital to take good antenatal care, eat healthy food, rest a lot and do some moderate form of exercise during this period
- Before starting an exercise program, it is vital to speak with a health professional about possible restrictions or concerns related to pregnancy
- If the woman was not physically active before the pregnancy, she should not start exercising too much
- It is vital to drink lots of fluids and not to exercise in hot and stuffy conditions
- Furthermore, it is vital to avoid exercises that place excessive pressure on the abdomen, exercises that have a high risk of falling or collisions, and exercises that involve pain.

- A woman should not overexert herself when exercising the simplest rule is that she should be able to converse while walking (9).

Suitable Exercises during the First Trimester

EXERCISE	POTENTIAL BENEFITS
Walking	helps to maintain cardiovascular fitness and can be easily modify to a women's comfort level
Swimming/ water exercises	A good option since it offers a low impact workout and decrease the strain on the joints
Stationary cycling	Helps to maintain cardiovascular fitness with a relatively low risk of falling
Yoga	Helps to stay flexible, relaxed and have positive mental state
Pelvic floor exercise	Helps to improve muscles that can be stretched during pregnancy stretching exercise

Second trimester (14-27 Weeks)

The second trimester is distinguished by the fact that the fetus continues to grow and develop. Its movements are already quite noticeable. The womb extends more prominent, and some signs of pregnancy disappear. Moderate physical activity, rest, balanced diet and prenatal care are essential.

- In case of any disorders accompanying pregnancy it is necessary to consult a doctor before engaging in any physical activities. Furthermore, it is advisable to start exercising lightly and increase the load if pregnancy allows and if the woman was previously quite sedentary.
- It is important to drink plenty of fluids before and after workouts and during them if possible.
- It is not recommended to exercise in hot weathers in a pregnant woman has a high risk of over heating



- It is also necessary to give up sports associated with a high risk of injury and physical overload horseback riding, skiing, roller skating, football, and other similar types of activity.
- A pregnant woman should not attend hot yoga classes in high temperatures during these trainings are prohibited.
- Sports should not be held in a suspense from the first trimester; it is better to choose another position in which the woman feels comfortable (10).
- Drink plenty of fluids before, during, and after exercising
- Avoid exercising in hot or humid weather
- Wear comfortable clothing and shoes and exercise at a comfortable pace
- Do not do exercises that cause pain, dizziness, shortness of breath, or discomfort.
- Stop exercising and consult a healthcare provider if you experience vaginal bleeding or fluid leakage, chest pain, light headness, calf pain or swelling, or regular painful contractions (11).

Suitable Exercises during the second trimester

EXERCISE	POTENTIAL BENEFITS
Pelvic floor	Workout helps to strength the pelvic floor muscles
Pilates	Strengthens the muscle and is good for pregnant women if certain moments are excluded. this is especially important if women do not have much experience doing sports

- Swimming/water exercises Helps to relive the load on the joints

Third trimester (28-40 Weeks):

- Fetal maturation and preparation for birth; discuss physical comfort, exercise adaptation, labour outcomes and fetal/neonatal well-being.
- Avoid high-impact activities, contact sports, and exercises that involve a risk of falling or losing balance
- Avoid lying on your back for extended periods of time, especially during the first trimester

Suitable Exercises during the third trimester

Exercise	Potential benefits
Pelvic floor exercises	Can help strengthening the muscles in the pelvic floor
Gentle stretching	Can help you relax
Breathing and relaxation exercises	Can help you cope with the stress and tension of pregnancy and child birth

Maternal Well-Being Essay

Traditionally, maternal health has been focused on preventing and managing morbidity and mortality, but as mortality decreases, the emphasis is now on the woman's overall health and wellbeing. The Global Strategy for Women's, Children's and Adolescents' Health 2016-2030 uses the strategy 'survive, thrive and transform' to tackle women's health issues during their reproductive years. The notion of wellbeing covers a wide range of aspects including 'psychological, emotional, social and environmental' health. The mother period covers pregnancy to twelve months after the end of pregnancy, which is a critical time for women in terms of physiological, psychological, and social changes. Accordingly, the concept of wellbeing should be expanded to include the social,



psychological, and physiological domains as applicable to women during their maternal period. A holistic approach built upon wellbeing promotion through physical activity, socialization, relaxation, and recreation, and emotional support, is key to improving women's health during their pregnancy and beyond.

Maternal well-being during pregnancy is the state of physical, mental, emotional, and social well-being of a woman during pregnancy. It encompasses the idea of being free from disease, as well as a sense of personal safety, harmony, happiness, and satisfaction (12).

1. Physical wellbeing:

Healthy eating and drinking.

Attending antenatal care – check-ups, screening, and prenatal tests.

Adequate rest and sleep.

Ergonomic and safe exercise suitable for pregnant women.

Control of blood pressure, blood sugar levels, weight, and other indicators.

Management of pregnancy-related problems and diseases.

2. Mental, emotional wellbeing:

Management of stress, anxiety, and mood swings and emotional stability and positivity.

Opportunity for relaxation and leisure.

Emotional support from professionals and loved ones.

3. Social wellbeing:

Support from loved ones, significant others, and medical professionals. Right to form safe, loving, and respectful relationships.

Access to appropriate antenatal care, maternal health care, and pregnancy-related services.

Social and recreational activities available to pregnant women.

4. Lifestyle:

Eating healthily.

Appropriate exercise.

Enough rest, sleep, relaxation.

Recreational activities, hobbies and leisure.

No smoking, alcohol abuse, substance use or other harmful habits.

Personal Hygiene.

Adherence to medical advice and antenatal checks(13-14).

Fetal Well-Being

Fetal well-being is an essential element of any antenatal care as it helps assess the fetus's state and ensure its normal development. The main objective of any fetal monitoring is to detect possible complications at the earliest possible stage to secure both fetus's and mother's wellbeing. There is a variety of fetal status and its monitoring factors, which can be affected by numerous aspects such as mother's health, placenta's functionality, fetus's growth pattern, fetus's feeding status, possible presence of infections or fetal deformities, and other circumstances related to pregnancy. In case of reduced amounts of oxygen and nutrients, a fetus may experience hindered growth or development



and serious complications that might pose a danger to both fetus and mother. Appropriate antenatal assessment of a woman's general condition, fetus's growth and development, fetal heart rate, and other relevant tests allow qualified healthcare providers to identify possible fetal wellbeing issues. Advanced antenatal screening and assessment technologies enable non-invasive evaluation of a fetus's wellbeing, e.g., by means of ultrasound procedures and cell free fetal DNA analysis among others. Hence, an appropriate antenatal care, maintenance of a healthy lifestyle, screening tests, and other relevant measures are vital for the wellbeing of both mother and a fetus (20).

Antenatal Care

Antenatal care (ANC) is an integral part/element of maternal health which has significant impact on the overall wellbeing of pregnant woman and fetus. Despite significant decreases in the rates of maternal and perinatal mortality, pregnancy related complications and stillbirths remain a matter of worldwide concern. Many pregnancy complications are preventable and adequate ANC is essential for improving women's health and promoting healthy childbirth. ANC makes it possible to provide comprehensive health promotion and illness prevention services to pregnant women while supporting their partners and other caregivers (16). It covers pregnancy specific screening and diagnostic tests, management and treatment of complications, nutritional advice, and monitoring of the fetus's wellbeing and state of pregnancy advancement. During ANC visits, pregnant women are counselled and educated on relevant health matters and receive professional support that helps them cope with the numerous challenges associated with pregnancy, childbirth, and the postpartum period. According to the World Health Organization

(WHO), a positive pregnancy experience is built on a woman's perception that her ANC is focused on improving her and the fetus's health and wellbeing and makes her feel respected and supported throughout the pregnancy. From that perspective, ANC service is one of the key factors that determine pregnancy and childbirth outcomes and should be positive, pleasant, and judgment-free (22).

Physical Activity

In 2008, Physical Activity Guidelines for Americans recommended 150-300 minutes of moderate-intensity aerobic activity per week throughout pregnancy and the postpartum period and spread out over several days. They were made to reduce the risk of many complications during pregnancy, including gestational diabetes, hypertensive disorders, and fetal growth abnormalities that may lead to cardiovascular disease in adulthood and increased mortality among mothers and potentially their children(12).

Physical activity during pregnancy is an essential element of a healthy lifestyle. It can be highly advantageous to the mother with such outcomes as an improved mood, increased levels of energy, enhanced sleep, and better overall well-being. It is essential to participate in physical activity during pregnancy; it will help pregnant women to adapt to all the various physiological and psychological changes that take place during the course of pregnancy (24). Moderate physical activity, such as walking, swimming, stationary bicycling, yoga, stretching, and pelvic-floor muscle training, can help control weight, enhance cardiovascular function and muscular power, and relieve tension and stress. It can also help reduce the risk of developing certain pregnancy-related disorders. Moreover, physical activity during pregnancy can help in managing stress and provide an emotional advantage. At least 150 minutes of moderate



physical activity should be performed throughout the week for most pregnant women without restrictions, spread out over several days (22). The intensity and the duration of the exercise when done during pregnancy are highly dependent on the woman's health and fitness level before pregnancy as well as her current state of health. It is vital to avoid physical activity during pregnancy if it can put the mother or fetus in danger. Thus, physical activity is an essential element of recreation that should be invested in during pregnancy to maintain a woman's physical, social, and emotional well-being (25).

Stress Management

Stress management during pregnancy is an integral part of maternal wellbeing since pregnancy can bring about numerous physical, emotional, and social changes in a woman's life. Stress is often a normal part of pregnancy, especially if it is short-term, but intense or prolonged stress can be detrimental to the mental wellbeing of pregnant women and can contribute to sleep difficulties, anxiety, depression, and difficulties coping with changes that occur throughout pregnancy(27). As such, strategies for healthy stress management are an important component of antenatal care. Techniques for relaxation, such as deep breathing, mindfulness, meditation, prenatal yoga, moderate exercise, sufficient sleep, and enjoyable activities, among others, may be beneficial in helping pregnant women feel relaxed and emotionally stable(15). Moreover, social support from a partner, family, friends, and healthcare providers can be helpful in providing comfort and assistance with coping through pregnancy-related challenges. In addition to this, a healthy diet, maintaining a consistent routine and schedule, and talking through worries or concerns can be essential for the emotional wellbeing of pregnant women. Women who are struggling with constant worry,

feelings of sadness and hopelessness, stress, or who find it difficult to cope should seek the advice of a healthcare professional. Thus, appropriate stress management can play a significant role in ensuring the psychological wellbeing of pregnant women receiving antenatal care(29).

Mental Health

Mental health is a significant concern worldwide and is an important social mobility and effectiveness factor and pregnancy is a unique maternal history associated with psychological, physiological and biochemical changes in women. Pregnant women are vulnerable due to hormonal and emotional fluctuations throughout the stages of pregnancy which may adversely affect their mental health. One-fifth of pregnant women in particular suffer mental health challenges during pregnancy and postpartum periods which can persist for up to 12 months. This can have negative implications for the health of the mother, father and infant. Although some women are able to overcome these mental health challenges, many suffer from chronic conditions(29).

The World Health Organization (WHO) has prioritized the issue through a campaign "No health without mental health" which recognizes the significance of the burden of mental illness as well as the limitations in health care resources in resource-poor countries (28).

The maternal psychology during pregnancy is also closely related to pregnancy and fetus. Thus, it could be concluded that the depression, anxiety and stress levels of pregnant women are associated with negative reproductive and fetal outcomes. Consequently, antenatal care is intended to ensure the physical and psychological wellbeing of mothers. It is critical to allow women to express their worries and concerns provide effective social support, encourage them to rest and exercise, and



consult healthcare professionals about mental problems during pregnancy (7) .

Pregnancy Outcomes

Pregnancy is frequently characterized by its outcomes that reflect the mother's and fetus's health conditions. These outcomes can be maternal, fetal, and neonatal. They include normal fetal development, pregnancy weight gain, gestational age, preterm birth, method of delivery, gestational diabetes, hypertensive disorders, and neonatal status and health. The mother's health and wellbeing, her proper nutrition, mode of labour, physical activity, psychological state, receiving antenatal care, and social support can affect pregnancy outcomes (33-34) . Pregnancy uncomplicated by any other medical conditions can be associated with positive or neutral effects on selected fetal heart rate and fetal and placental blood-flow measures, and Apgar scores. Appropriate management of the antenatal period enables detecting any potential complications promptly and ensures optimal pregnancy outcomes. A systematic review revealed that moderate-intensity physical activity appropriately tailored to pregnant women can be beneficial in some maternal outcome domains, such as decreasing the hazard for gestational diabetes and hypertensive disorders. However, most of the evidence on the effect of physical activity on individual fetal and birth outcomes is inconsistent (31) . Thus, an adequate amount of physical activity during pregnancy is generally safe for the mother and fetus and when coupled with exhaustive prenatal care, it can improve pregnancy outcomes.

Safety outcomes and Precautions

Safety is an integral component of any recreational lifestyle, including during pregnancy.

Before beginning or continuing an exercise program, women should consult with an appropriate health care provider regarding the type and amount of physical activity, if there are medical, obstetric, or other indications that might make exercise dangerous.

The American College of Obstetricians and Gynaecologists recommend that physical activity be discussed with a health care provider before being recommended (36).

Important safety consideration include:

- Individual who had been inactive should start slow.
- A pregnant woman should pick exercises depending on the trimester they are in.
- It is important to stay Hydrated.
- Avoid hot environments and exercises that pose a great risk such as those that may involve a fall or abdominal trauma.
- The pregnant woman should modify their exercise as the pregnancy advances to avoid lying on the back after the 20 th week unless under the guidance of the health care provider.
- A pregnant woman should endeavour to eat healthy..
- Avoiding extreme exertion is needed, unless one has received special permission from their health care provider, and consider medical advice when something is wrong.
- ACOG recommends stopping physical activity and seeking medical attention if a woman experiences any of the following warning signs (48-49).

Physiological Outcomes



Cardiovascular Fitness

Appropriate exercise during pregnancy contributes to cardiovascular fitness. The cardiovascular system undergoes extensive physical changes during pregnancy including increases in blood volume heart rate, stroke volume, and cardiac output. Therefore, physical activity must be modified to adapt to these changes (8).

Gestational Weight Gain

Physical activity can reduce excessive gestational weight gain; therefore, it is essential to engage in regular physical exercise. The latter aspect is one of the crucial components of a healthy pregnancy.

Gestational Diabetes Mellitus

The implementation of physical activity can reduce the risks of developing gestational diabetes mellitus. According to ACOG, there is a correlation between exercise and a reduced incidence of gestational diabetes (11).

Hypertensive Disorders

Moderate aerobic physical activity is linked to a lower risk of gestational hypertension and hypertensive disorders of pregnancy in multiple studies (49).

Musculoskeletal Health

The increase in weight with shift in centre of gravity and posture throughout pregnancy can lead to back and musculoskeletal discomfort. Maintaining physical fitness and exercising during pregnancy may help in the prevention of some physical discomforts of pregnancy.

Mode of Delivery

The ACOG analysed data from previous studies that found a connection between exercise and the likelihood of caesarean birth with a higher percentage of vagin deliveries among those who engaged in physical activity during pregnancy (42).

Postpartum

Physical fitness and exercise during pregnancy may help improve physical functional abilities and postpartum recovery. Studies have also found an association between physical fitness and exercise during pregnancy and postpartum depression (50).

Psychological Outcomes

Pregnancy can be challenging for women who may experience emotional distress, uncertainty, discomfort, body image dissatisfaction, fear of childbirth, and loss of social and familial roles. Consequently, psychological wellbeing is considered an integral part of maternal health (51).

Benefits of Recreational Physical Activity During Pregnancy

Stress Reduction

Recreation can help pregnant women by providing them an opportunity to rest and take part in activities that allow them to interrupt a prolonged sitting position and a stressful routine. It can include such exercises as moderate exercise, yoga, relaxation, listening to music, and social events (52).

Anxiety

Pregnancy can be a stressful experience for women as they may be worried about the fetus's wellbeing, childbirth, possible pregnancy complications, and the approaching changes in their lives. Therefore, recreational activities that



can help reduce stress can have a beneficial effect on pregnant women's mental health (42).

Depression

Physical activity is considered to be an effective intervention for preventing postpartum depression. According to ACOG, exercise can help pregnant women reduce the risk of developing depressive episodes (54).

Self-Efficacy and Confidence

Appropriate recreation can help women feel better about their bodies and maintain their self-esteem. It can also help them have a sense of control and confidence in their ability to cope with their health and lifestyle choices (53).

Sleep and Relaxation

Sleep and Relaxation

Pregnancy often makes women have a hard time sleeping. Sitting and relaxing during the day and getting regular moderate exercise can help pregnant women sleep longer and more deeply. However, it is essential to note that every pregnant woman's experience is unique, and sleep patterns can vary (44).

Social Isolation and Lack of Support

Appropriate socialization, recreation, and other family activities may help reduce feelings of social isolation and provide support to pregnant women during pregnancy (58).

CONCLUSION

In conclusion, it can be asserted that, in order to optimize pregnancy-related outcomes for mothers and children, it is essential to adopt a trimester-wise approach to the problem in terms of organizing antenatal care during pregnancy. In

particular, the present review has demonstrated the importance of focusing on pregnancy establishment and detecting potential genetic or embryonic risks during the first trimester. Furthermore, special attention should be paid to second-trimester anatomy screening and possible preeclampsia manifestation. Finally, the third trimester should be monitored closely in order to make sure that both fetus and mother are prepared for delivery. However, it was also found that the current level of care does not provide appropriate coverage for all three trimesters, particularly in terms of maintaining pregnant women's attendance. Therefore, future research should focus on developing tools for continuous tracking of pregnant women's health and the implementation of integrated strategies for managing their care (58-60).

ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to the library and administrative staff at MALINENI PERUMALLU PHARMACY COLLEGE for providing unrestricted access to the medical databases, journals, and search engines required to conduct this comprehensive review. We also thank the MRS.ARE. PRADEEPTHI for her invaluable guidance, critical feedback, and expert insights on trimester-specific antenatal care frameworks during the writing of this manuscript. Finally, we thank the peer reviewers for their constructive feedback, which improved this paper.

REFERENCES

1. Le Lez, Justine, et al. "Maternal wellbeing: a WHO definition and conceptual framework." *The Lancet Obstetrics, Gynaecology, & Women's Health* 1.1 (2025): e57-e63.
2. WHO. WHO recommendations on antenatal care for a positive pregnancy experience. World Health Organization, 2016. This is an important source for your project because



- WHO emphasizes person-centred health and well-being, rather than focusing only on prevention of maternal death and disease.
3. Boutib A, Chergaoui S, Marfak A, Hilali A, Youlyouz-Marfak I. Quality of Life During Pregnancy from 2011 to 2021: Systematic Review. *International Journal of Women's Health*. 2022;14:975–1005. This systematic review discusses quality of life during pregnancy and factors affecting maternal well-being, including physical health, psychological factors, social support, and pregnancy-related conditions.
 4. society of Obstetricians and Gynaecologists of Canada. Guideline No. 441: Antenatal Fetal Health Surveillance. *Journal of Obstetrics and Gynaecology Canada*. 2023. It reviews evidence-based approaches for identifying fetal compromise and preventing adverse perinatal outcomes.
 5. Tunçalp, Ozge, et al. "WHO recommendations on antenatal care for a positive pregnancy experience—going beyond survival." *BJOG: an international journal of obstetrics and gynaecology* 124.6 (2017): 860-862.
 6. World Health Organization. *WHO Guidelines on Physical Activity and Sedentary Behaviour*. Geneva: World Health Organization; 2020. WHO recommends that pregnant women without contraindications undertake regular physical activity, including at least 150 minutes of moderate-intensity aerobic activity per week, together with muscle-strengthening activities and gentle stretching.
 7. Hayman M, Brown WJ, Brinson A, et al. Public health guidelines for physical activity during pregnancy from around the world: a scoping review. *British Journal of Sports Medicine*. 2023;57(14):940–947. doi:10.1136/bjsports-2022-105777. This review summarizes pregnancy physical-activity guidelines from different countries and discusses aerobic, muscle-strengthening, pelvic-floor activities, precautions, and warning signs.
 8. Chauhan, Ankit, and Jyotsna Potdar. "Maternal mental health during pregnancy: a critical review." *Cureus* 14.10 (2022).
 9. World Health Organization. *WHO guide for integration of perinatal mental health in maternal and child health services*. WHO, 2022. This is an important authoritative reference for discussing promotion of maternal mental health and integration of psychological support into maternal healthcare. WHO publication
 10. Li X, et al. Effectiveness of cognitive behavioral therapy for perinatal maternal depression, anxiety and stress: A systematic review and meta-analysis of randomized controlled trials. *Clinical Psychology Review*. 2022;92:102129. This review provides evidence regarding psychological interventions for depression, anxiety, and stress during pregnancy and the postpartum period. PubMed article
 11. World Health Organization. *WHO guide for integration of perinatal mental health in maternal and child health services*. WHO; 2022. This is an excellent authoritative reference for explaining why mental health should be integrated into routine maternal healthcare. WHO publication
 12. World Health Organization. *WHO guide for integration of perinatal mental health in maternal and child health services*. WHO; 2022. This is an excellent authoritative reference for explaining why mental health should be integrated into routine maternal healthcare. WHO publication
 13. Sahoo S, Gill G, Sikka P, Nehra R. Antenatal depression and anxiety in Indian women: A systematic review. *Indian Psychiatry Journal*. 2023;32(2):222–233. doi:10.4103/ipj.ipj_156_22. This is especially useful for an India-focused article and discusses the prevalence and risk factors for depression and anxiety during pregnancy. PubMed article
 14. American College of Obstetricians and Gynecologists (ACOG). *How Your Fetus Grows During Pregnancy*. ACOG describes the three trimesters and the major



- developmental changes occurring in each stage.
15. Sawin SW, Morgan MA. Dating of pregnancy by trimesters: a review and reappraisal. *Obstetrical & Gynecological Survey*. 1996;51(4):261–264. doi:10.1097/00006254199604000-00023. This article specifically discusses the traditional division of pregnancy into three trimesters and gestational dating
 16. Michalek IM, Comte C, Desseauve D. Impact of maternal physical activity during an uncomplicated pregnancy on fetal and neonatal well-being parameters: A systematic review of the literature. *European Journal of Obstetrics & Gynecology and Reproductive Biology*. 2020;252:265–272. doi:10.1016/j.ejogrb.2020.06.061. This is particularly useful for your fetal well-being and neonatal outcomes section. PubMed article
 17. iX, et al. Effectiveness of cognitive behavioral therapy for perinatal maternal depression, anxiety and stress: A systematic review and meta-analysis of randomized controlled trials. *Clinical Psychology Review*. 2022;92:102129. This review provides evidence regarding psychological interventions for depression, anxiety, and stress during pregnancy and the postpartum period. PubMed article
 18. National Institute of Child Health and Human Development (NICHD). About Pregnancy. This source provides an overview of pregnancy, its approximately 40-week duration, implantation, and the major events occurring during each trimester.
 19. curtis K, Weinrib A, Katz J. Systematic review of yoga for pregnant women: current status and future directions. *Evidence-Based Complementary and Alternative Medicine*. 2012;2012:715942. Why useful: Good background reference for prenatal yoga, stress, anxiety and physical wellbeing.
 20. Battle CL, Uebelacker LA, Magee SR, Sutton KA, Miller IW. Potential for prenatal yoga to serve as an intervention to treat depression during pregnancy. *Women's Health Issues*. 2015;25(2):134–141. Why useful: Useful when discussing yoga and maternal psychological health.
 21. General physical activity and recreational activity
 22. Mottola, M. F., Davenport, M. H., Ruchat, S.-M., et al. (2018). 2019 Canadian guideline for physical activity throughout pregnancy. *British Journal of Sports Medicine*, 52(21), 1339–1346. <https://doi.org/10.1136/bjsports-2018-100056> PubMed
 23. Mottola, M. F., et al. (2018). No. 367—2019 Canadian guideline for physical activity throughout pregnancy. *Journal of Obstetrics and Gynaecology Canada*, 40(11), 1528–1537. <https://doi.org/10.1016/j.jogc.2018.07.001> PubMed
 24. Evenson, K. R., Barakat, R., Brown, W. J., et al. (2014). Guidelines for physical activity during pregnancy: Comparisons from around the world. *American Journal of Lifestyle Medicine*, 8(2), 102–121.
 25. 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.
 26. American College of Obstetricians and Gynecologists. (2020). Physical activity and exercise during pregnancy and the postpartum period. *Obstetrics & Gynecology*, 135(4), e178–e188.
 27. Nascimento, S. L., Surita, F. G., & Godoy, A. C. (2012). Physical activity patterns and factors related to exercise during pregnancy: A cross-sectional study. *PLoS ONE*, 7(12), e47122.
 28. Gaston, A., & Cramp, A. (2011). Exercise during pregnancy: A review of patterns and determinants. *Journal of Science and Medicine in Sport*, 14(4), 299–305.
 29. Evenson, K. R., Moos, M.-K., Carrier, K., & Siega-Riz, A. M. (2009). Perceived barriers to physical activity among pregnant women. *Maternal and Child Health Journal*, 13, 364–375. <https://doi.org/10.1007/s10995-008-0359-8> PubMed



30. Currie, S., Sinclair, M., Murphy, M. H., Madden, E., Dunwoody, L., & Liddle, D. (2013). Reducing the decline in physical activity during pregnancy: A systematic review of behaviour change interventions. *PLoS ONE*, 8(6), e66385.
31. Connelly, M., Brown, H., van der Pligt, P., & Teychenne, M. (2015). Modifiable lifestyle factors to reduce excessive gestational weight gain. *Women and Birth*, 28(3), e99–e106.
32. Leisure-time physical activity and maternal-child outcomes
33. da Silva, S. G., Ricardo, L. I., Evenson, K. R., & Hallal, P. C. (2017). Leisure-time physical activity in pregnancy and maternal-child health: A systematic review and meta-analysis of randomized controlled trials and cohort studies. *Sports Medicine*, 47(2), 295–317. <https://doi.org/10.1007/s40279-016-0565-2> PubMed
34. Davenport, M. H., Ruchat, S.-M., Poitras, V. J., et al. (2018). Prenatal exercise for the prevention of gestational diabetes mellitus and hypertensive disorders of pregnancy: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 52(21), 1367–1375. <https://doi.org/10.1136/bjsports-2018-099355> PubMed
35. Davenport, M. H., Meah, V. L., Ruchat, S.-M., et al. (2018). Impact of prenatal exercise on neonatal and childhood outcomes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 52(21), 1386–1396. <https://doi.org/10.1136/bjsports-2018-099836> PubMed
36. Davenport, M. H., Ruchat, S.-M., Sobierajski, F., et al. (2019). Impact of prenatal exercise on maternal harms, labour and delivery outcomes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(2), 99–107. <https://doi.org/10.1136/bjsports-2018-099821> PubMed
37. Skow, R. J., Davenport, M. H., Mottola, M. F., et al. (2019). Effects of prenatal exercise on fetal heart rate, umbilical and uterine blood flow: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(2), 124–133. <https://doi.org/10.1136/bjsports-2018-099822> PubMed
38. Davenport, M. H., Yoo, C., Mottola, M. F., et al. (2019). Effects of prenatal exercise on incidence of congenital anomalies and hyperthermia: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53(2), 116–123. <https://doi.org/10.1136/bjsports-2018-099653> PubMed
39. Davenport, M. H., et al. (2019). Prenatal exercise is not associated with fetal mortality: A systematic review and meta-analysis. *British Journal of Sports Medicine*, 53, 133–141. <https://doi.org/10.1136/bjsports-2018-099773> PubMed
40. Morales-Suárez-Varela, M., Clemente-Bosch, E., Peraïta-Costa, I., et al. (2021). Maternal physical activity during pregnancy and the effect on the mother and newborn: A systematic review. *Journal of Physical Activity and Health*, 18(1), 130–147. <https://doi.org/10.1123/jpah.2019-0348> PubMed
41. Li, L., Lin, H., Qiu, D., et al. (2025). Physical activity before and during pregnancy in relation to delivery, neonatal, and child health outcomes: A meta-analysis of observational studies with meta-regression. *Medicine & Science in Sports & Exercise*, 57(12), 2846–2857. <https://doi.org/10.1249/MSS.00000000000003811> PubMed
42. Xiang, Z., Liu, Y., Wang, R., & Chow, K. M. (2026). Effects of prenatal exercise interventions on physical activity, sedentary behaviour, maternal health, and pregnancy outcomes: A systematic review and meta-analysis. *International Journal of Nursing Studies*, 181, 105580. <https://doi.org/10.1016/j.ijnurstu.2026.105580> PubMed
43. Walking and active mobility
44. Haakstad, L. A. H., Voldner, N., Henriksen, T., & Bø, K. (2009). Physical activity level and weight gain in a cohort of pregnant Norwegian women. *Acta Obstetrica et Gynecologica Scandinavica*, 88(1), 35–42.



45. Evenson, K. R., Wen, F., Herring, A. H., & Benson, A. M. (2009). Pregnancy and postpartum bicycle use. *American Journal of Preventive Medicine*, 37(5), 399–406.
46. Owe, K. M., Nystad, W., & Bø, K. (2009). Correlates of regular exercise during pregnancy: The Norwegian Mother and Child Cohort Study. *Scandinavian Journal of Medicine & Science in Sports*, 19(5), 637–645.
47. Owe, K. M., Nystad, W., Skjaerven, R., Stigum, H., & Bø, K. (2009). Exercise during pregnancy and the gestational age distribution: A cohort study. *European Journal of Obstetrics & Gynecology and Reproductive Biology*, 143(1), 28–32.
48. Takami, M., Tsuchida, A., Takamori, A., et al. (2018). Effects of physical activity during pregnancy on preterm delivery and mode of delivery. *PLoS ONE*, 13(6), e0198727.
49. Nakamura, Y., et al. (2016). Home-based walking during pregnancy affects mood and birth outcomes among sedentary women: A randomized controlled trial. *International Journal of Nursing Practice*, 22, 420–426. <https://doi.org/10.1111/ijn.12453> PubMed
50. Rodríguez-Blanque, R., Sánchez-García, J. C., Sánchez-López, A. M., et al. (2019). Water exercise and quality of life in pregnancy: A randomised clinical trial. *International Journal of Environmental Research and Public Health*, 16, 404. PubMed
51. Barakat, R., Pelaez, M., Montejo, R., Cordero, Y., & Perales, M. (2011). Exercise during pregnancy improves maternal health perception: A randomized controlled trial. *American Journal of Health Promotion*, 25(4), e1–e8.
52. Hegaard, H. K., Damm, P., Hedegaard, M., et al. (2011). Sports and leisure time physical activity during pregnancy in nulliparous women. *Maternal and Child Health Journal*, 15, 806–813.
53. Haakstad, L. A. H., & Bø, K. (2011). Effect of regular exercise on prevention of excessive weight gain in pregnancy: A randomised controlled trial. *European Journal of Contraception & Reproductive Health Care*, 16(2), 116–125.
54. 4. Sedentary behaviour and mobility restriction
55. Fazzi, C., Saunders, D. H., Linton, K., Norman, J. E., & Reynolds, R. M. (2017). Sedentary behaviours during pregnancy: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, 14, 32. <https://doi.org/10.1186/s12966-017-0485-z> PubMed
56. Osumi, A., Kanejima, Y., Ishihara, K., et al. (2024). Effects of sedentary behavior on the complications experienced by pregnant women: A systematic review. *Journal of Assisted Reproduction and Genetics*, 31, 352–365. <https://doi.org/10.1007/s43032-023-01321-w> PubMed
57. Pei, L. X., & Marozoff, S. (2025). Sedentary behavior during pregnancy and risk of pre-eclampsia and/or gestational hypertension: A systematic review. *International Journal of Gynecology & Obstetrics*, 171, 106–123. <https://doi.org/10.1002/ijgo.70193> PubMed
58. Evenson, K. R., Wen, F., & Herring, A. H. (2011). Associations of maternal physical activity and sedentary behavior with gestational weight gain. *Paediatric and Perinatal Epidemiology*, 25(1), 11–20.
59. Di Mascio, D., Magro-Malosso, E. R., Saccone, G., Marhefka, G. D., & Berghella, V. (2016). Exercise during pregnancy in normal-weight women and risk of preterm birth: A systematic review and meta-analysis of randomized controlled trials. *American Journal of Obstetrics & Gynecology*, 215(5), 561–571. <https://doi.org/10.1016/j.ajog.2016.06.014> PubMed
60. Peppia, M., et al. (2020). Physical activity and sedentary behaviour during pregnancy: Associations with maternal and fetal outcomes. *BMC Pregnancy and Childbirth*.



HOW TO CITE: Chinni Tejaswini Padmasai, Metlapalli Sri Venkata Padmavathi, Pathapati Nehasree, Potla Sirisha, Danthinapalli Madhu Babu, A. Pradeepthi, Recreational Lifestyle Modalities and Maternal Fetal Well-Being: A Comprehensive Review of Physiological, Psychological and Safety Outcomes, *Int. J. of Pharm. Sci.*, 2026, Vol 4, Issue 9, 2790-2804. <https://doi.org/10.5281/zenodo.22912711>

