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To Explore the Relationship of Physical Activity with Prenatal Depression in Third Trimester of Pregnancy

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ABSTRACT

Background: Regular physical activity has positive impact on mental and physical health of people, protects them from numerous diseases, and also enhance the quality of life. The World Health Organization recommends that pregnant women to engage in at least 150 minutes of moderate exercise each week to improve health outcomes. As in the third trimester of pregnancy, marked by physical, hormonal, and psychological changes at this stage need further investigations. **Objectives:** To explore the relationship between physical activity, prenatal depression in the final trimester of pregnancy. **Methods:** A cross sectional study of 258, last-trimester pregnant mothers were conducted at obstetrics and gynecology OPD 13 liaquat university hospital Hyderabad using non-probability purposive sampling from 11 April to 01 July 2025. The Pregnancy Physical Activity Questionnaire (PPAQ) was used to quantify physical activity, prenatal depression was measured with the geriatric depression scale 15. Spearman correlation analysis and descriptive statistics were used to analysis the relationship of physical activity, and prenatal depression. **Results:** According to data increased physical activity is linked to decreased prenatal depression, Findings revealed a strong inverse relationship between physical activity and prenatal depression (ρ=-0.358, $p<0.01$). **Conclusion:** Conclusion was made that physical activity decreased prenatal depression in third trimester of pregnancy, so it is recommended that health care providers should advise physical activity during pregnancy as a routine guideline for pregnant women.

INTRODUCTION

It is very well-known fact that physical activity during pregnancy have positively effects to the mental and physical health of people, prevents them from nor communicable and communicable diseases, and also improves the standard of life(YILDIRIM et al., 2020). Physical activity (PA) refers to any physical activity generated by the skeletal muscles that requires energy expenditure. According to the World Health Organization (WHO), identify first indicator is physical activity in communities. It is that Physical activity plays a foundation role in socio-physical development. In addition to, Physical activity has been used to control weight and provides wide range of positive effects on physical, social, emotional, and mental health(Laar et al., 2020). During pregnancy and postpartum period, physical activity provides benefits on the mother and fetus health benefits: decrease the chances of pre-eclampsia, weight gain, diabetes and high blood pressure during pregnancy, delivery complications and prenatal and postnatal depression, and fewer newborn complications, maintain baby weight; and decrease the risk of stillbirth. It is highly advised that all women during pregnancy and after baby birth without any restrictions should: perform regular physical activity during pregnancy and postpartum, do minimum of 150 minutes of moderate-intensity aerobic physical activity in a week for desirable health benefits, and combining a variety of aerobic and muscle-strengthening actions. Accumulation of light or moderate stretching may also be helpful. In addition: embodied a range of aerobic and muscle-strengthening activities. women who are already pregnant, routinely engaged in vigorous-intensity aerobic activity, or who were physically energetic, can endure these activities during pregnancy and the post-delivery period(World Health Organization 20, 2020). Daily walk, exercises and everyday activities are recommended for everyone, including during pregnancy(Baran et al., 2022). Most of the pregnant women are inactive, and there is an aggregate drop of physical activity and exercise, especially in the final trimester(Haakstad et al., 2009). It is believed that the small prevalence of Somatic movement in pregnancy observed globally may be due to several primary factors which influence this habit(Hoodbhoy et al., 2018).

Pre natal depression has been identified as a consequential health problem, but is a neglected part of care for pregnant women in the third trimester(Zeng et al., 2015).

Pre natal depression, a kind of mental and emotional condition that arises for the duration of pregnancy, is mainly exhibited through a depressed frame of mind, loss of interest or pleasure in activities for long period of time, with a prevalence ranging from 10 to 29.6%(Zhang et al., 2021). By 2030, depression is prognosticate to be the second leading cause of disease burden in developing countries like Pakistan and the third in low-income countries(Abebe et al., 2025).Depression is a persistent mental and emotional disorder place the third most common disabling illness globally by the World Health Organization. It can be a cause of post-delivery depression. The children of mother with depression may involvement of persistent sadness, lack of interest in pleasuring activities, feeling of worthless and sometimes have suicidal thoughts (Sabir et al., 2019). WHO estimated that approximately 350 million people worldwide suffer from depression, in Europe about 21–30 million people. Depression is spotted double as frequently in women (20–25%) than in men (7–12%.)(Kołomańska et al., 2019). One study shows prevalence rates for India (17.74%) and Sri Lanka (12.95%) were less relation with the overall prevalence, whereas prevalence rates for Pakistan (32%) and Nepal (50%) were higher(Rahini Mahendran,shuby puthussery, 2019). As comparison for different countries the prevalence of pre natal depression was 14.2% in Brazil, 14 19% in Jordan,15.5% in Malta,15 25% in Jamaica(Sabir et al., 2019). Maternal depression is now an known modifiable factor for complicated pregnancy results such as preterm birth (PTB), low birth weight (LBW), intrauterine growth restriction (IUGR) among others(He et al., 2023).

Many studies recommend that regular physical activity can cause a positive role in preventing prenatal depression by making better mood and reducing stress(Ahmed et al., 2025). Investigations are now concentrated on the encouraging of physical activity as a tool to inhibit and alleviate depression(Demissie et al., 2011). Scientific research confirms that physical activity is a strong preventive measure for nor communicable diseases , but it also has a therapeutic effects on the well-being of mothers-to-be, including decreasing anxiety and reducing the risk of pre natal depression(Baran et al., 2022). In several developing countries, antenatal checkups mainly emphasizes on the physical health of expectant women, with not as much of focus on psychological and mental health issues. Amid mental health problems during pregnancy, prenatal depression has arisen to the focus nowadays(Zhang et al., 2021). We predicted that the prevalence rate of prenatal depression in the third trimester is alarming, and certain demographic variables such as intended pregnancy, higher education level, strong social support, marital satisfaction are forecasting factors(Zhang et al., 2021). A few studies has been done to evaluate the relationship of physical activity and pre natal depression in women during final trimester of pregnancy(Khanghah et al., 2020). World scientific studies support the benefits of physical activity in stimulating and release of mood-stabilizing hormones like serotonin(Dinas et al., 2011). Despite the hormonal fluctuation during pregnancy a limited studies are exploring its effects on pregnancy as along with physical activity, mainly in Pakistan. This gap in research highlights the significance of exploring the relationship of physical activity with prenatal depression this crucial period in Pakistan's have multi dimension culture and society. This research purposes to make a healthier population by encouraging better physical activity, in the end it will reduce the national burden of chronic and nor communicable diseases.

A lack of activity is a global issue linked to health risks (Guthold et al., 2020), social and cultural norms in Pakistan often demotivate activity during pregnancy(Yaseen, 2022). This study supports achieving Sustainable Development Goal 3 (SDG 3) from the united nations'2030 agenda for sustainable development, which goals to support well-being and healthier population (Das et al., 2021),and also aligns with target 3.4 Non communicable diseases and mental health; By 2030, decrease by one third early mortality from non-communicable diseases through protection, treatment and promotion of mental health and well-being. My research will helps contribute to this goal by: promoting maternal mental health, exploring preventive strategies like physical activity, and supporting evidence based care during pregnancy.

There are growing studies on the importance of physical activity, but a few studies are focused relationship of physical activity on prenatal depression during third trimester of pregnancy. This is regarded a highly crucial period for pregnant mothers to deals with hormonal, social, physical and even mental along with emotional changes, which directly or indirectly effect on mother and fetus health. To cope these changes always pharmacological interventions were utilize, but non pharmacological preventive measures remains unexplored. Have a factual knowledge of physical activity on depression will provide a guiding principles for healthcare providers. This study also decided to enhance mental health during pregnancy for valuable information. This study will fill these gaps and ultimately contribute better holistic health of pregnant women.

Objectives

- To identify the levels of physical activity among pregnant mothers in their third trimester, the assessment will be conducted using the "Pregnancy Physical Activity Questionnaire PPAQ".29
- To analyze the correlation of physical activity with prenatal depression in pregnancy in the last trimester. Prenatal depression will be measured using the "Geriatric depression scale 15"

Research Hypothesis

- There is a significant negative correlation between physical activity levels with antenatal depression in the last trimester of pregnancy.

RESEARCH METHODOLOGY

Study Design: Cross sectional study This research used a comparative cross-sectional study design, where data was collected at one specific time to capture a snapshot of the participants' conditions.

Study Setting and Duration: The study was conducted at OPD NO: 13 Outpatient Department (OPD) of Gynecology at Liaquat University Hospital in Hyderabad, The study period was six months from April 11 to 1 July 2025.

Study Population

- The study included 258 pregnant mothers of 3rd trimester.

Sample Size: and the sample size was determined via the calculator from Raosoft calculator with the following parameters:

- Confidence level: 95%
- The margin of error: 5%
- Prevalence: 19 %
- 10% more samples were added to deal with the expected problem.
- According to this formula, the estimated sample size was 234.

Sampling Technique

The sampling technique will be non-probability convenient and purposive sampling.

Sample Selection

Inclusion Criteria:

- **Age:** Females in the third trimester of pregnancy of age ?17 to 42 years.
- **Trimester:** Females must be in their third trimester of pregnancy.
- **Location:** Participants must be attending the Outpatient Department (OPD) of Gynecology at Liaquat University Hospital in Hyderabad.
- **Consent:** Women are required to give informed consent to take part in the study.
- **Health Status:** Participants should not have any severe medical or obstetric complications that could influence physical activity levels, prenatal depression.

Exclusion Criteria

- Expectant women who did not consent to participate in the study were excepted.
- Pregnant women who were advised against physical activity due to medical reasons were excluded.
- Pregnant women with any physical disability affect physical activity.
- Pregnant women with any psychological disability, and taking psychological medications.

Data Collection Instruments

Data was gathered from participants using different sections of the questionnaire.

Part 1: Demographics and Other Variables:

It encompasses participant details, including Patient Identity, Age, Education, month of pregnancy and no of pregnancy.

Part 2: To assess physical activity Questionnaires: Pregnancy physical activity questionnaire (Papazian et al., 2020) PPAQ was used its previously validated yielding a Cronbach's alpha of 0.80(Adanaş Aydın et al., 2020)

Part 3: Geriatric depression scale 15 was used its previously validated yielding a Cronbach's alpha of 0.70(Durmaz, 2017)

Study Variables

1. Independent variable; physical activity
2. Dependent variable is prenatal depression.

Data Analysis

Data analysis was carried out utilizing the Statistical Package for Social Sciences (SPSS) version 23 was used.

- Descriptive statistics, including frequency and percentage were calculated for all continuous variables, providing a detailed overview of various factors.
- To examine the relationships between variables, the Spearman's correlation test was utilized.
- A p-value of less than 0.05 was considered significant for determining associations.

Ethical Consideration

This Study includes these Ethical considerations:

- Approval was granted by the Medical Superintendent of Civil Hospitals in Hyderabad and Jamshoro.
- Informed consent was taken in written format from participants after explaining to them about the study.
- The identity and confidentiality of participant's information were kept private throughout the data collection, analysis, and interpretation process.

RESULTS

A total of 258 women in their final trimester contributed in the study. The sample demographic characteristics offer a significant context for understanding the study findings. Most of the participants were between the ages of 17 to 25 years that is 51.2% in the age range of from 17 to 42 years. Secondly 54.3% collectively participants were primary and secondary and above in education level, while 45.7% below half have no education. Among 258 participants 54 (20.9%) were primigravida and 204 (79.1%) were multigravida. These all above characteristics may have influenced the result, which are interlinked with physical activity and prenatal depression.

Table 1

Socio demographic characteristics of participants

Variable	Category	Frequency	Percentage (%)
Age (years)	17-25	132	51.2
	26-34	92	35.6
	35-42	34	13.2
Education	None	118	45.7
	Primary	56	21.7
	Secondary and above	84	32.6
No of pregnancy	Primigravida	54	20.9
	Multigravida	204	79.1

The investigation of physical activity levels amongst participants shows that maximum number of the women were engaged in light activities like preparing meals, light cleaning making bed, laundry, ironing, sweeping the house , put things away and so on, and utilizing 11946 (74.39%) of MET(metabolic equivalent of task) value. It is also shown by participants that they utilize 2607 (16.24%) of MET value on moderate activities like dressing, bathing, feeding children while standing and playing children while walking followed by sedentary activities sitting and using

screen like smartphone, sitting and watching TV and video, and reading and listening to music, talking, or on the phone, its MET value was 1482 (9.23%). Vigorous physical activities jogging, walking quickly up hills for fun or exercise were MET value 21 (0.13%). These finding shows that health care practitioner should continue encouraging light and moderate activities as they help improve sleep, mood , and delivery outcomes.

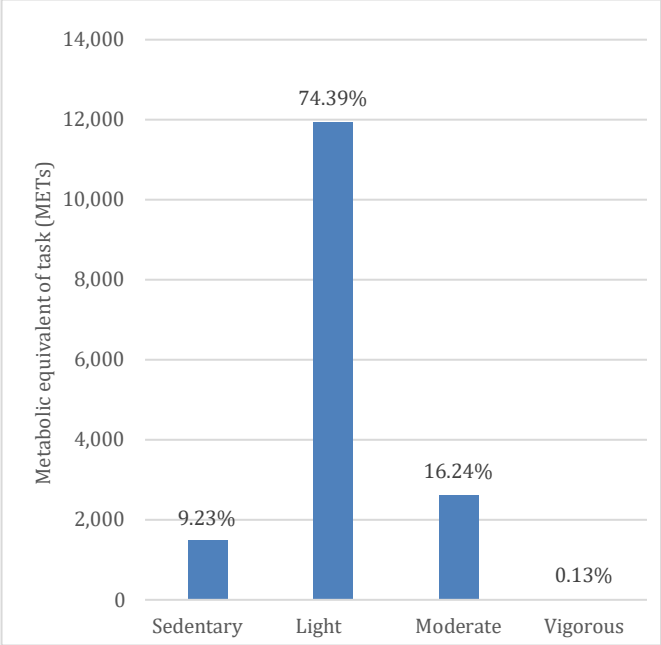
Table 2

Physical activity level during third trimester

Physical activity level	MET value	Percentage%
Sedentary	1482	9.23
Light	11946	74.39
Moderate	2607	16.24
Vigorous	21	0.13

Figure 1

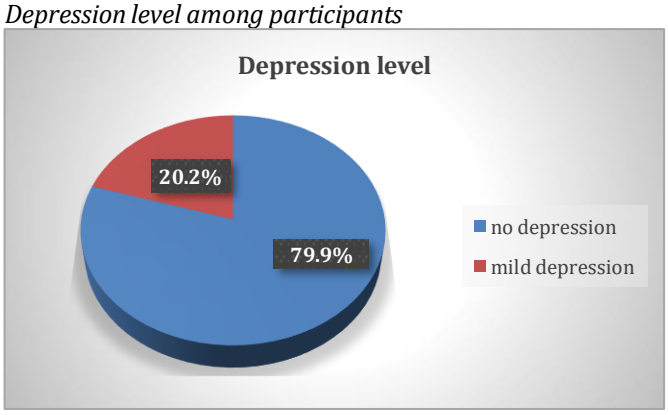
Physical activity level graph during third trimester



Prenatal depression were assessed among participants, showing that 79.9% (score range 0-4) experienced normal depression level, however only 20.2% (score range 5-8) had mild depression. This study shows minor have mild depression needs intervention which prevent to fall into moderate or severe depression.

Figure 2

Depression level among participants



Spearman's correlation analysis a negative and moderate relationship with physical activity and prenatal depression (r= -0.378, p<0.01), which means high physical activity levels is related lower prenatal depression. (table3).

Table 3

Spearman's correlation analysis between Physical Activity and Prenatal Depression

Variable	Physical Activity	Prenatal Depression
Physical Activity	1.000	-0.378 (p<0.01)
Prenatal Depression	-0.378 (p<0.01)	1.000

DISCUSSION

As it is known fact that age play a very central role in influencing level of prenatal depression, age (17-25) showed lower percentage because they are more active than older women, higher energy levels, and more fixed to routines and physical activity may have influenced by on prenatal depression., Physical activity increases in mid-age and rapidly declines in older age(Nemoto et al., 2024). This positive association between exercise or physical and the prevention of maternal pre natal depression has been proved by certain studies with controlled exercise programs and high adherence of the participants as compares to older women are prone to more physical discomforts, co morbidities and additional roles and responsibilities. The study presents that participants had varying levels of physical activity patterns were observed, majority of physical activity was light 74.39%, moderate activity was 16.24%, sedentary was 9.23% and more specially only 0.13% were in vigorous activities in third trimester of pregnancy. Australian Physical Activity and Sedentary Behavior Guidelines for Adults, recommendations on moderate-vigorous strength physical activity, muscle firming up activities, and on decreasing and breaking up time spent in lengthy sitting(Brown et al., 2022). Result also showed that 79.8% had no depression, while only 20.2% exhibited mild depression, this shows that the majority of participants had no signs of prenatal depression, while only few shown mild depression. The overall low prevalence of depression may be related to high level of physical activity, as it plays a vaccine role in prenatal depression. Among physically active pregnant women the occurrence of prenatal depression is lower when matched to inactive women(Goławski & Wojtyła, 2022). The Spearman's correlation analysis revealed that a significant moderate negative correlation between physical activity levels and depression scores (r= -0.378, p<0.01), it indicating that more physical active is related to lower prenatal depression level, which supports the depression reducing benefits of physical activity. A unhappy mood, but not pregnancy-related apprehensions, may be linked to less physical activity. The authors determined that the collective risk of poor mental health and low physical activity levels made women susceptible to pregnancy complications(Mourady et al., 2017). These findings highlights the importance of incorporating physical activity guidance into prenatal care programs as a no pharmacological strategy for improving mental health encourage safe moderate physical activity like walking, yoga and educate about mental health benifits(Sánchez-Polán et al., 2021). It is also suggested that health care providers should reassure pregnant women to engage in

safe, regular physical activity as part of routine prenatal care.

CONCLUSION AND RECOMMENDATIONS

This study found a significant negative correlation between physical activity and prenatal depression in the third trimester, indicating that increased physical activity helps reduce depressive symptoms. These findings highlight the importance of incorporating physical activity into routine antenatal care. Health care providers should encourage pregnant women to engage in regular moderate exercise, following WHO guidelines, to enhance mental well-being. Additionally, early screening and support for prenatal depression should be prioritized to ensure better maternal mental health outcomes.

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