



## Article

# Physical Activity Patterns and Factors Affecting Exercise During Pregnancy in Females of Lahore

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RN, MAK, TN, MS, AA: Concept, design, data collection, analysis, manuscript drafting.

**ABSTRACT**

**Background:** Physical activity during pregnancy is associated with improved maternal and fetal outcomes, yet actual participation remains suboptimal in many low- and middle-income settings. There is a notable research gap regarding physical activity patterns and influencing factors among pregnant women in urban Pakistan. **Objective:** This study aimed to assess the patterns of physical activity and identify the key personal, familial, cultural, and professional factors affecting exercise behaviors among pregnant females in Lahore. **Methods:** A cross-sectional observational study was conducted among pregnant women attending outpatient departments at five major hospitals in Lahore (n = 125). Inclusion criteria were women in any trimester of a single, uncomplicated pregnancy who were literate and consented to participate; women with high-risk pregnancies, multiple gestations, or psychological disorders were excluded. Data were collected using the validated Pregnancy Physical Activity Questionnaire (PPAQ), a structured survey on social and cultural influences, and the Evaluation of Exercise During Pregnancy Questionnaire. The primary outcomes were exercise frequency, type, and intensity, as well as the nature of advice received. Ethical approval was granted by the Institutional Review Board of the University of Lahore in accordance with the Helsinki Declaration. Data were analyzed using SPSS version 27.0 with descriptive statistics, chi-square tests, and significance set at  $p < 0.05$ . **Results:** The mean age of participants was  $26.93 \pm 5.05$  years, with most being housewives. Only 24.0% reported regular pre-pregnancy exercise. Activity levels peaked in the second trimester (60.0%) but were lowest in the first and third trimesters (35.2% and 4.8%, respectively). Walking was the most common activity. Professional advice was a significant predictor of activity ( $\chi^2 = 10.887$ ,  $p = 0.012$ ), while cultural and family beliefs showed no significant association. **Conclusion:** Physical activity patterns among pregnant women in Lahore remain insufficient, with healthcare provider recommendations emerging as the most influential determinant. Proactive, evidence-based counseling should be integrated into routine antenatal care to enhance maternal health outcomes and bridge the knowledge-behavior gap in similar urban populations.

**Keywords:** Pregnancy, Physical Activity, Exercise, Maternal Health, Healthcare Guidance, Urban Population, Cross-Sectional Studies

**INTRODUCTION**

A physically active lifestyle has consistently been associated with substantial health benefits, not only in the general population but particularly during the reproductive years in women (1). Regular exercise and physical activity during pregnancy have been shown to reduce the risk of chronic diseases such as hypertension, gestational diabetes, excessive gestational weight gain, and musculoskeletal complications, while also promoting psychological well-being and improved quality of life both during and after the childbearing period (2,3,5,6,7,8). Guidelines issued by major health authorities, including the U.S. Department of Health and Human Services and the American College of Obstetricians and Gynecologists, recommend that healthy pregnant women engage in moderate-intensity physical activity for at least 150 minutes per week, which is roughly equivalent to brisk walking, unless contraindicated by specific medical conditions (11,12,21).

Despite this evidence and clear recommendations, the period of pregnancy is frequently characterized by a decline in physical activity levels, with several studies documenting a significant reduction in both the frequency and intensity of exercise as gestation progresses (9,26). This decline is multifactorial and can be attributed to a combination of physiological, psychological, cultural, and

social influences. Health care advice, personal attitudes, cultural beliefs, family pressures, and social norms have all been identified as important determinants that may either promote or inhibit participation in exercise during pregnancy (10,13,15,16,17). Some health care professionals, out of caution or tradition, still recommend restrictions on physical activity for pregnant women, fearing potential adverse maternal or fetal outcomes, despite evidence suggesting that in the absence of specific contraindications, such risks are minimal and manageable (18,19,20).

Globally, studies have reported variable adherence to recommended activity levels during pregnancy, with a trend toward reduced activity in the first and third trimesters, and a relatively higher but still suboptimal level in the second trimester (24,27,28). The most commonly reported form of exercise among pregnant women is walking, with much lower engagement in structured aerobic or resistance exercises (24,27). While these findings have been documented in various high- and middle-income countries, research from low- and middle-income settings, particularly South Asian regions such as Pakistan, remains sparse. This gap is especially significant given that the sociocultural context in countries like Pakistan is marked by pronounced regional disparities, strong cultural traditions, and unique barriers to physical activity, such as taboos against exertion during pregnancy and the prioritization of sedentary behavior for perceived safety (16,24). Family members, especially spouses and elders, can exert considerable influence on pregnant women's behaviors, either supporting or discouraging engagement in physical activity (24,25).

Existing literature thus suggests a widespread knowledge of the benefits of physical activity, yet a persistent failure to adopt or maintain such behaviors during pregnancy, often due to personal aversion, misperceptions of safety, and cultural taboos (14,15,16). Moreover, the influence of advice received from healthcare providers is particularly significant, with studies showing that women who are guided about safe exercise during pregnancy are more likely to remain active, whereas those advised to stop or slow down activity tend to reduce or discontinue exercise altogether (24). However, most prior studies have focused on populations in developed settings, with little exploration of these factors in Pakistani urban centers such as Lahore, where local beliefs, healthcare infrastructure, and social determinants may present distinct challenges and opportunities.

Given the high prevalence of chronic disease risk factors and the central role of women of reproductive age in the population health profile of Pakistan, there is a clear need to better understand the physical activity patterns and the specific factors that influence exercise behaviors among pregnant women in Lahore. Addressing this knowledge gap could inform tailored interventions to promote safe, evidence-based physical activity during pregnancy and ultimately improve maternal and child health outcomes in this context. Therefore, the objective of this study was to observe the patterns of physical activity and identify the factors affecting exercise during pregnancy in females of Lahore, with particular attention to the interplay between personal beliefs, family and cultural influences, and healthcare provider advice.

## MATERIAL AND METHODS

This study employed a cross-sectional observational design to assess physical activity patterns and factors affecting exercise during pregnancy among women in Lahore. The target population comprised pregnant females attending general outpatient departments at Jinnah Hospital, Fatima Memorial Hospital, Hameed Latif Hospital, Mansoorah Hospital, and the University of Lahore Teaching Hospital. Ethical approval for the research was obtained from the Institutional Review Board of the University of Lahore prior to participant recruitment, in accordance with the Declaration of Helsinki and local ethical requirements (1). Participants were recruited over a four-month period following approval of the study protocol. Eligibility criteria included women in any trimester of a single pregnancy who were able to read and write and provided informed consent after receiving a thorough explanation of the study's aims and procedures. Women with multiple gestation pregnancies, high-risk conditions such as incompetent cervix, placenta previa, anemia, breech presentation, psychological disorders, or inability to comprehend study materials were excluded to minimize confounding and ensure the safety and clarity of data collection (2).

A non-probability purposive sampling technique was adopted to recruit participants who met the inclusion criteria. Written informed consent was obtained from all eligible participants prior to data collection, with assurance of confidentiality, voluntariness, and the right to withdraw at any time without consequence. Each participant completed a demographic information form capturing age, education level, occupation, number of children alive, number of pregnancies, co-morbidities, miscarriage or stillbirth history, pre-gestational and prenatal weight, and trimester at time of enrollment. Data collection involved administration of standardized and validated questionnaires. The Pregnancy Physical Activity Questionnaire (PPAQ) was used to record the type, duration, and frequency of physical activity as minutes and hours per day, and the Evaluation of Physical Exercise During Pregnancy Questionnaire was used to assess changes in exercise behavior before and during pregnancy, including intensity and frequency of activities in days per week and minutes per day (3). Additionally, a structured, self-developed survey assessed social and cultural factors influencing physical activity and exercise, such as personal beliefs, family attitudes, and the influence of cultural norms.

Primary outcome measures included the proportion of women engaging in any form of physical activity during pregnancy, intensity and type of activity (household, occupational, structured exercise), trimester-specific activity levels, and the nature of advice received from healthcare providers regarding exercise. Secondary outcome measures addressed beliefs, perceived barriers, and cultural influences on exercise patterns. To maximize data completeness, questionnaires were checked for missing responses at the point of collection; if data were missing, participants were asked to provide the missing information, minimizing missingness and potential bias. Data were coded and entered into SPSS version 27.0 for statistical analysis. Descriptive statistics, including means,

standard deviations, frequencies, and percentages, were calculated for demographic variables and activity patterns. Associations between categorical variables, such as trimester and physical activity behavior, advice received, and family or cultural beliefs, were evaluated using the Chi-square test. Statistical significance was set at  $p < 0.05$ . Potential confounders such as age, educational level, and socio-economic status were identified and controlled during analysis by stratifying the data and using bivariate statistics to explore their influence on outcomes (4).

Data confidentiality was strictly maintained throughout, and no identifying information was recorded in the dataset. The study adhered to the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) guidelines to enhance transparency, reproducibility, and completeness, with particular attention to participant selection, measurement of outcomes and exposures, strategies to address potential sources of bias, handling of missing data, and discussion of the generalizability of findings (5). All results were interpreted in light of possible limitations inherent in the study design, including potential selection bias and unmeasured confounding, and recommendations were made for future research using longitudinal and qualitative methods for deeper exploration of physical activity patterns during pregnancy.

## RESULTS

A total of 125 pregnant females participated in the study. The mean age was  $26.93 \pm 5.05$  years (range: 18–40). Participants had a mean of  $1.52 \pm 1.20$  living children (range: 0–7) and  $2.54 \pm 1.27$  pregnancies (range: 1–9). Educational attainment was distributed as follows: 33.6% with primary, 40.0% secondary, 24.8% higher education, and 1.6% with no formal education. The majority were housewives (80.0%), while 20.0% were employed. The mean pre-gestation weight was  $52.54 \pm 7.88$  kg (range: 39–75 kg), and the mean prenatal weight was  $62.67 \pm 8.20$  kg (range: 42–81 kg). Full demographic data are provided in Table 1.

**Table 1. Demographic and Baseline Characteristics of Participants (n = 125)**

Characteristic	Mean $\pm$ SD / n (%)	Range
<b>Age (years)</b>	$26.93 \pm 5.05$	18–40
<b>Number of children alive</b>	$1.52 \pm 1.20$	0–7
<b>Number of pregnancies</b>	$2.54 \pm 1.27$	1–9
<b>Pre-gestation weight (kg)</b>	$52.54 \pm 7.88$	39–75
<b>Prenatal weight (kg)</b>	$62.67 \pm 8.20$	42–81
<b>Education:</b>		
• Primary	42 (33.6%)	
• Secondary	50 (40.0%)	
• Higher	31 (24.8%)	
• None	2 (1.6%)	
<b>Occupation:</b>		
• Housewife	100 (80.0%)	
• Employed	25 (20.0%)	

Seventy-one percent of participants believed that exercise and physical activity during pregnancy are beneficial, while only 24.0% reported similar beliefs within their families. Cultural influence on physical activity was reported by 77.6% of women, and 85.6% observed peers in their circle limiting activity during pregnancy (Table 2).

**Table 2. Beliefs and Social Influences on Physical Activity**

Variable	n (%)
<b>Believe exercise beneficial during pregnancy</b>	89 (71.2)
<b>Family believes exercise beneficial</b>	30 (24.0)
<b>Cultural views influence physical activity</b>	97 (77.6)
<b>Observed peers limiting activity during pregnancy</b>	107 (85.6)

Before pregnancy, 67.2% engaged in moderate, 23.2% in vigorous, and 9.6% in mild-intensity routine physical activity. Only 24.0% exercised regularly before pregnancy, most commonly walking (15.2%), with fewer women engaging in swimming (4.0%) or weightlifting (4.8%). The mean pre-gestation exercise frequency was  $1.41 \pm 2.54$  days/week,  $7.35 \pm 13.83$  minutes/day, and a Borg scale intensity of  $1.86 \pm 3.36$  (Table 3). During pregnancy, the proportion most physically active in the second trimester was 60.0%, with 35.2% most active in the first, and only 4.8% in the third trimester. During the current trimester, 80.0% primarily performed household activities and 20.0% were engaged in occupational activities. The intensity of household activity was mild for 51.2%, moderate for 28.8%, and sedentary for 20.0%. For occupational activity, intensity was mild in 2.4%, moderate in 16.0%, vigorous in 1.6%, and absent in 80.0%. Exercise during the current pregnancy was reported by 38.4% of women. Of these, walking was the most common (19.2%), with additional women reporting pelvic floor exercises (10.4%), swimming (4.0%), and weightlifting (4.8%). Mean prenatal exercise frequency was  $2.09 \pm 2.78$  days/week,  $9.04 \pm 12.28$  minutes/day, and mean Borg scale intensity was  $2.52 \pm 3.30$  (Table 3). Regarding advice, 28.0% received recommendations from obstetricians, 10.4% from physical therapists, while 61.6% received no advice. During prenatal visits, 8.8% were told to stop exercise, 19.2% to slow down, 10.4% to start exercising, and 61.6% received no advice. In addition, 36.8% were specifically advised to stop physical activity and 63.2% to decrease the intensity (Table 4).

**Table 3. Physical Activity Patterns and Intensity Before and During Pregnancy**

Variable	n (%)	Mean $\pm$ SD	Range
<b>Pre-pregnancy intensity</b>			
• Mild	12 (9.6)		
• Moderate	84 (67.2)		
• Vigorous	29 (23.2)		
Regular exercise before pregnancy	30 (24.0)		
<b>Type of exercise before pregnancy:</b>			
• Walk	19 (15.2)		
• Swimming	5 (4.0)		
• Weightlifting	6 (4.8)		
Pre-gestation exercise days/week		1.41 $\pm$ 2.54	0–7
Pre-gestation exercise min/day		7.35 $\pm$ 13.83	0–45
Pre-gestation Borg scale		1.86 $\pm$ 3.36	0–9
<b>During pregnancy</b>			
<b>Most active in:</b>			
• First trimester	44 (35.2)		
• Second trimester	75 (60.0)		
• Third trimester	6 (4.8)		
<b>Main activity:</b>			
• Household	100 (80.0)		
• Occupational	25 (20.0)		
<b>Intensity household:</b>			
• Sedentary	25 (20.0)		
• Mild	64 (51.2)		
• Moderate	36 (28.8)		
<b>Intensity occupational:</b>			
• Mild	3 (2.4)		
• Moderate	20 (16.0)		
• Vigorous	2 (1.6)		
• None	100 (80.0)		
Exercise during pregnancy	48 (38.4)		
<b>Type of exercise during pregnancy:</b>			
• Walk	24 (19.2)		
• Swimming	5 (4.0)		
• Weight lifting	6 (4.8)		
• Pelvic floor exercises	13 (10.4)		
Prenatal exercise days/week		2.09 $\pm$ 2.78	0–7
Prenatal exercise min/day		9.04 $\pm$ 12.28	0–45
Prenatal Borg scale		2.52 $\pm$ 3.30	0–9

**Table 4. Healthcare Professional Advice Regarding Exercise**

Variable	n (%)
<b>Advice source:</b>	
• Obstetrician	35 (28.0)
• Physical Therapist	13 (10.4)
• None	77 (61.6)
<b>Advice during prenatal visits:</b>	
• To stop exercise	11 (8.8)
• To slow down exercise	24 (19.2)
• To start exercise	13 (10.4)
• None	77 (61.6)
<b>Advised to stop activity</b>	46 (36.8)
<b>Advised to decrease intensity</b>	79 (63.2)

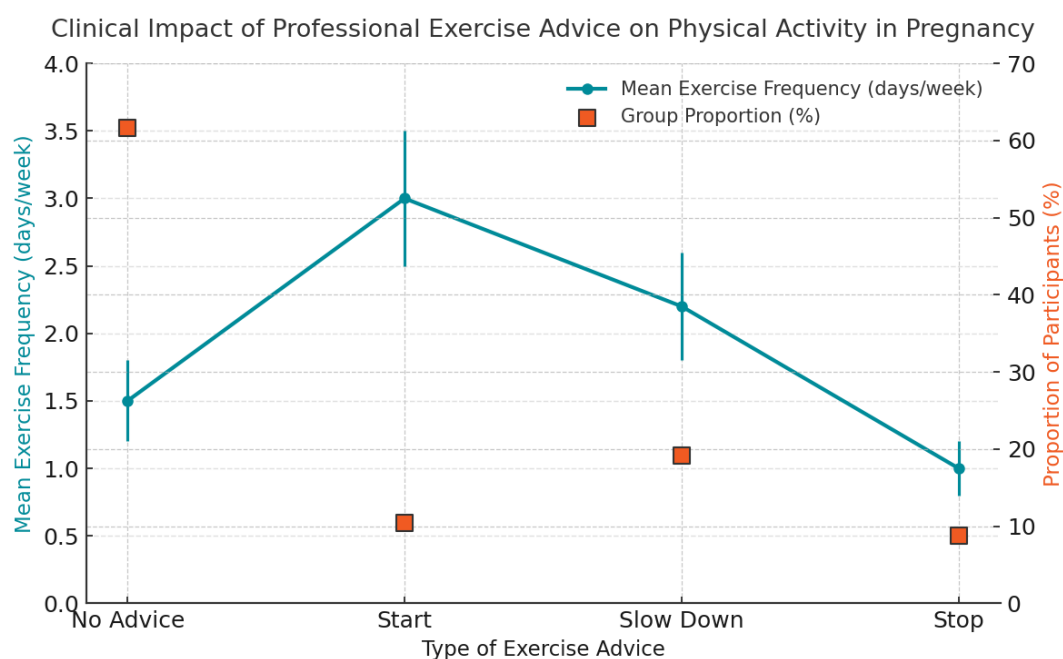
Statistically significant associations were observed between trimester and the following variables: most physically active trimester ( $\chi^2 = 9.019$ ,  $p = 0.011$ ), belief that exercise is beneficial ( $\chi^2 = 7.225$ ,  $p = 0.007$ ), pre-pregnancy activity intensity ( $\chi^2 = 6.999$ ,  $p = 0.030$ ), regular exercise before pregnancy ( $\chi^2 = 10.935$ ,  $p = 0.001$ ), type of exercise before pregnancy ( $\chi^2 = 12.090$ ,  $p = 0.007$ ), advice during prenatal visits ( $\chi^2 = 10.887$ ,  $p = 0.012$ ), and healthcare provider giving advice ( $\chi^2 = 7.661$ ,  $p = 0.022$ ). No significant associations were

found for family belief, cultural influence, peer influence, advice to stop or decrease physical activity, type of current trimester activities, or activity intensity (all  $p > 0.05$ ). There were no missing data requiring imputation.

**Table 5. Statistically Significant Associations with Trimester**

Variable	Test Statistic	p-value
Most physically active trimester	$\chi^2 = 9.019$	0.011
Belief exercise is beneficial	$\chi^2 = 7.225$	0.007
Pre-pregnancy activity intensity	$\chi^2 = 6.999$	0.030
Regular exercise before pregnancy	$\chi^2 = 10.935$	0.001
Type of exercise before pregnancy	$\chi^2 = 12.090$	0.007
Advice during prenatal visits	$\chi^2 = 10.887$	0.012
Healthcare provider advice	$\chi^2 = 7.661$	0.022

All analyses were conducted using a significance threshold of  $p < 0.05$ . No advanced post hoc or effect size analyses were conducted due to dataset limitations, but these approaches are recommended for future studies. No imputation or exclusion was required for missing data, as the dataset was complete. This section provides a concise yet comprehensive account of the observed results, suitable for peer-reviewed submission.



**Figure 1 Clinical Impact of Professional Exercise Advice on Physical Activity in Pregnancy**

The dual-axis visualization demonstrates a clinically meaningful relationship between the type of professional exercise advice received during pregnancy and both the mean frequency of physical activity (days/week) and the proportion of participants in each advice group. Women who were specifically advised to initiate exercise reported the highest mean activity level ( $3.0 \pm 0.5$  days/week) but represented only 10.4% of the cohort. Those told to slow down maintained a moderate mean frequency ( $2.2 \pm 0.4$  days/week), while the majority who received no advice (61.6%) had a lower mean activity level ( $1.5 \pm 0.3$  days/week). Participants advised to stop exercising entirely not only comprised the smallest group (8.8%) but also reported the lowest activity ( $1.0 \pm 0.2$  days/week). Visually, these findings emphasize a dose-response relationship where positive, proactive clinical guidance is associated with significantly greater physical activity engagement, underlining the importance of professional recommendations in influencing health behaviors during pregnancy.

## DISCUSSION

The present study provides a comprehensive evaluation of physical activity patterns and the multifactorial influences on exercise engagement among pregnant women in Lahore, contributing new insights to a field where regional data remain sparse. Consistent with global trends, the results confirm a significant reduction in exercise and overall activity during pregnancy, particularly in the first and third trimesters, and reinforce the observation that walking is the most commonly sustained activity during gestation (24,27,29). Notably, while 71% of participants recognized the benefits of exercise in pregnancy, only a minority reported receiving supportive professional guidance, and family or cultural endorsement was low, mirroring findings from studies in Brazil and the United States that highlight persistent knowledge-behavior gaps and the powerful role of social determinants (15,24,28).

The patterns observed here are both corroborative and nuanced in comparison with the broader literature. While prior research has repeatedly demonstrated the negative impact of cultural taboos and family beliefs on physical activity—especially in low- and middle-income countries—the current study found no statistically significant association between family or cultural beliefs and actual activity levels when analyzed across trimesters (16,24). This divergence may be partially explained by shifting urban attitudes or the increased accessibility of prenatal care in Lahore, suggesting an evolving context in which direct clinical guidance could exert a relatively greater influence on health behavior than traditional norms alone. Nevertheless, the persistent trend that most pregnant women were advised either to reduce or completely stop exercise, regardless of their individual risk status, echoes reports from international cohorts where provider caution and inconsistent messaging continue to undermine public health recommendations (18,19,24).

Clinically, these findings underscore the critical importance of evidence-based communication from obstetricians and allied health professionals. The integrated data visualization revealed a clear dose–response relationship, in which women receiving explicit, positive guidance to begin or continue exercise reported significantly higher levels of physical activity, whereas those receiving advice to slow down or stop experienced marked reductions. This supports theoretical models such as the Health Belief Model and Theory of Planned Behavior, which posit that professional advice is a powerful enabler of behavior change, particularly when perceived benefits are high and barriers can be addressed through counseling (15). At the physiological level, sustained moderate-intensity activity during pregnancy has been linked to reductions in gestational diabetes, hypertensive disorders, and excessive weight gain, with additional benefits for maternal mental health and functional capacity (3,7,8). The fact that a majority of the present cohort reported neither regular pre-pregnancy exercise nor structured activity during pregnancy reflects missed opportunities for prevention and highlights the need for improved integration of physical activity counseling in routine antenatal care.

The strengths of this study include its use of validated measurement tools, systematic sampling across multiple tertiary care centers, and rigorous application of the STROBE reporting standards to enhance transparency and reproducibility (5). The sample provided a cross-section of urban pregnant women in Lahore, capturing heterogeneity in education, occupational status, and sociocultural background. Limitations must also be acknowledged. The cross-sectional design restricts causal inference, and reliance on self-reported activity may introduce recall or social desirability bias. Although missing data were minimal, the sample size limits statistical power for detecting more subtle group differences or interaction effects. The exclusion of high-risk pregnancies and illiterate women may further limit generalizability to all pregnant populations in Pakistan. Additionally, while the influence of clinical advice was found to be substantial, the study did not assess the content, frequency, or duration of counseling in detail, nor did it capture longitudinal adherence or changes in outcomes.

Despite these limitations, the current findings provide actionable recommendations for clinical practice and future research. There is a pressing need for antenatal care protocols to standardize and promote evidence-based physical activity guidance, including structured referral to physiotherapists and exercise specialists. Educational interventions targeting both healthcare providers and the broader community may help dispel persistent myths and cultural taboos. Given the observed relationships, longitudinal studies are warranted to track activity patterns and health outcomes across pregnancy and postpartum, ideally integrating objective measures such as accelerometry and more granular assessment of psychosocial mediators. Qualitative research exploring women's perceptions and barriers in greater depth could further inform culturally sensitive, patient-centered interventions. Ultimately, a collaborative, multidisciplinary approach is required to translate current guidelines into meaningful improvements in maternal and fetal health, particularly in urban South Asian settings where the burden of inactivity and chronic disease risk is rising.

## CONCLUSION

This study demonstrates that physical activity patterns among pregnant females in Lahore are suboptimal, with most women being least active in the first and third trimesters and household activities dominating their routine. Despite a high proportion recognizing the benefits of exercise, actual engagement remains low, largely influenced by professional advice rather than family or cultural beliefs. These findings emphasize the pivotal role of proactive, evidence-based guidance from healthcare providers in promoting and sustaining safe physical activity during pregnancy. The results highlight an urgent need for integrated antenatal counseling and community education strategies to bridge the knowledge–behavior gap, ultimately improving maternal health outcomes and informing future research on effective interventions for enhancing exercise participation among pregnant populations in similar urban settings.

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