Original Article

Difference in the Level of Physical Activity in Three Trimesters: Perspectives of Pregnant Pakistani Women

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Abstract

Objective: To determine a difference in the level of physical activity in three trimesters.
Methodology: This analytical cross sectional study was conducted in Razi Hospital, Gynae & Peads Clinic (Sir Syed Chowk Rawalpindi) and Pakistan Railway Hospital, Rawalpindi, from June 2020 till March 2021. A total of 377 pregnant women in three different trimesters of pregnancy were convenience-selected during antenatal visits. The data was collected on pregnancy physical activity questionnaire (PPAQ) to measure the level of activity. Qualitative variables (parity and marital status), frequency and percentages were calculated.
Results: Total participants were 377 with a mean ± SD age of 26.51 ± 3.57 years. There were 105, 127 and 145 participants in 1st, 2nd and 3rd trimesters, respectively. There was significant difference in the level of physical activity while comparing the 1st and 3rd trimesters; and the 2nd and 3rd trimester for total activity, light, moderate and vigorous activity; sedentary activity, household activities and sports related activates ($p<0.05$). There was no statistical difference between the level of physical activity in the 1st and 2nd trimesters. Occupational activity showed no statistical difference ($p>0.05$) at any trimester.
Conclusion: It was concluded that women during their pregnancy period are actively involved in various type of activities. Specifically women in 3rd trimester were found to be more engaged in physical activities.
Keywords: Physical activity, Pregnancy physical activity questionnaire, Trimesters

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Introduction

Physical activity plays an important role in achieving a healthy pregnancy outcome, for both the mother and the baby.[1] Globally it has been recognized as an important factor for health promotion in general population as well as in pregnant women.[2] Being physically active throughout pregnancy not only improves cardiovascular function, promoting the physiological changes of pregnancy[3] but also cause significant reduction in maternal complications like gestational diabetes[4], hypertension[5] and problems associated with excessive weight gain in pregnancy.[6]

World Health Organization recommended moderate intensity aerobic physical activity of 2.5 hours in a week for adults.[7] Considering this recommendation, American college of sports medicine (ACSM) advised pregnant women to engage in 30 min of moderate exercise per day on most days of the week, equivalent to 7.5 MET-h/week.[8]

Whereas a low or moderate intensity exercise (3-5 times/ week) is advantageous for both maternal and fetal health[8], high level of physical activity on the other hand increases maternal oxygen demand thereby compromising fetal oxygen supply. Hence low intensity exercises during pregnancy benefits both the mother

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and the fetus.[7] It prevents congenital abnormalities and miscarriages.[9] Moderate intensity exercises performed during pregnancy reduces complications like gestational diabetes and hypertensive disorders of pregnancy.[10] It can reduce maternal weight gain in pregnancy, lower cesarean births, and exert a positive effect on maternal mood both during antenatal and postnatal period.[11] Vigorous intensity exercises can also be performed during a healthy pregnancy and can be helpful in preventing low birth weight[12] and other pregnancy complications.

Hence, it is established that Physical activity is directly correlated with the quality of life of pregnant women.[13] Despite the proven benefits of physical activity during pregnancy, the type and level of physical activity differs during the three trimesters of pregnancy, due to cultural norms and myths related to the level and type of physical activities during three trimesters. In this context, although overall physical activity level has been assessed during pregnancy in some studies, the difference in the type and level of activities according to the three trimesters is still a question.[14] The amount of energy expenditure during different level of activities has also not been assessed. This study aimed to address this gap and its purpose was to determine the level of physical activities during three trimesters the use of PPAQ tool indicated the level of energy expenditures in relation to different types of activities during three different trimesters.

Methodology

This analytical cross sectional study was conducted in Razi Hospital, Gynae & Peads Clinic (Sir Syed Chowk Rawalpindi) and Pakistan railway hospital, Rawalpindi from June 2020 till March 2021. The study was started after getting approval from the research ethical committee of Riphah College of Rehabilitation Sciences. Data was collected after getting informed written consent on 32 items based valid and reliable pregnancy physical activity questionnaire (PPAQ)[15] Compendium-based metabolic equivalent (MET) values were used to estimate the intensity of each activity. The average weekly energy expenditure was calculated by multiplying intensity of activities with duration of time spent on each activity. Metabolic equivalent task (1 MET = 1 kcal/kg × hour) values were used for classification of each activity by intensity.[16]

Sample size for the study was calculated using WHO sample size calculator version 2.0. 17 considering a 16% prevalence of physical actiovity among pregnant women.

A total 377 pregnant females were conveniently selected for the study. Pregnant women aged between 18-40 years, carrying a singleton pregnancy (not multiple), receiving antenatal care were selected for the study. Women with preexisting health conditions or debilities at the time of recruitment, limiting their activity were excluded. The Pregnant women with contraindications for physical activity e:g vaginal bleeding, those with history of Gestational diabetes mellitus, Hypertension, Heart disease with chest pain and shortness of breath, renal disease and with Hb level <7mg/dl were excluded from study.

Data was analyzed through SPSS version 21. Descriptive statistics were used to characterize the sample. Anova statistical significance tested using 95% confidence interval and P value (< .05).Turkey test and Post Hoc Analysis were applied to analyze the level of physical activity within three trimesters.

Results

Out of 377 pregnant woman total 27.8% were from 1st, 33.68% from 2nd and 38.46% from 3rd trimesters. Mean age of the participants was 26.51+3.57 years. Total 91.8 % pregnant women were housewives and 8.2 % were working. The 65.7% women were with secondary level of education and 34.2% had completed only primary education level.

For total physical activity, including light activity such as house hold chores, moderate (30 mins of walking at one level), vigorous (dedicated 30-60 minutes per day to sports or exercise), sedentary life style (e.g. watching TV, sitting etc.), and sports activities per week, statistical difference was found between 1st & 3rd and 2nd & 3rd trimesters ($p<0.05$) and no statistical difference was found between 1st & 2nd trimesters ($p>0.05$). For the occupational activity no statistical difference was found between 1st & 3rd, 2nd & 3rd and 1st & 2nd trimester $p>0.05$ (Table I).

Discussion

Pakistani women during 3rd trimester engage themselves in various types of physical activities rather than bed rest with the concept, that it will facilitate in engagement and decent of fetal head during labor.[18] As the current study indicated that the level of physical activity was higher during 3rd trimester in pregnant women ,In contrast, Justyna Krzepota et al conducted a

Table I: Intensities and type wise activities difference in three trimester.

Variable	Duration	Mean ± SD	MD	F(df)	P-value
Total PPAQ Activity Score (MET-h/week)	1st and 2nd	102.03±100.12 , 90.05±86.09	11.97	17.149(2,373)	0.57
	1st and 3rd	102.03±100.12,150.53± 85.57	-48.50		0.00
	2nd and 3rd	90.05±86.09, 150.53± 85.57	-60.47		0.00
Intensity Wise Activities					
Light Intensity activity	1st and 2nd	47.70±42.01, 38.84±32.05	8.86	10.926(2,373)	0.17
	1st and 3rd	47.70±42.01,60.11±39.0	12.07		0.00
	2nd and 3rd	38.84±32.05, 60.11±39.0	-21.27		0.02
Moderate intensity activity	1st and 2nd	31.32±47.94,28.11±38.12	3.20	5.703(2,373)	0.84
	1st and 3rd	31.32±47.94,44.88±44.37	-13.55		0.04
	2nd and 3rd	28.11±38.12,44.88±44.37	-16.76		0.00
Vigorous activity	1st and 2nd	0.25±0.84,0.34±1.20	0.09	5.640(2,373)	0.84
	1st and 3rd	0.25±0.84,0.74±1.49	-0.48		0.01
	2nd and 3rd	0.34±1.20, 0.74±1.49	-0.39		0.00
Sedentary activity	1st and 2nd	14.07±23.44,13.70±22.35	0.36	10.239(2,373)	0.99
	1st and 3rd	14.07±23.44,25.78±27.72	-11.7		0.00
	2nd and 3rd	13.70±22.35,25.78±27.72	-12.07		0.00
Activity Types					
House hold activity	1st and 2nd	68.9±70.92,55.74±51.92	13.23	12.025(2,373)	0.22
	1st and 3rd	68.9±70.92,91.44±60.02	-22.46		0.00
	2nd and 3rd	55.74±51.92,91.44±60.02	-35.7		0.00
Occupational activity	1st and 2nd	7.69±37.15,9.53±33.91	1.84	0.143(2,373)	0.91
	1st and 3rd	7.69±37.15,10.03±34.49	2.33		0.86
	2nd and 3rd	9.53±33.91, 10.03±34.49	0.49		0.99
Sports activity	1st and 2nd	0.68±1.37,0.81±1.89	0.12	19.499(2,373)	0.83
	1st and 3rd	0.68±1.37,2.08±2.45	1.39		0.00
	2nd and 3rd	0.81±1.89, 2.08±2.45	1.26		0.00

Significance level P<0.05,1st trimester n=105,2nd trimester n=127,3rd trimester n=145,MET=metabolic equivalents*

study and reported that total level of physical activity, in all three trimesters of pregnancy was same.[19]

Light and moderate intensity activities were found to be higher in 3rd trimester while during 1st and 2nd trimester women revealed no difference. On the other hand a study by Tatiana Papazian et al revealed higher score in 2nd trimester for light intensity activities than 1st and 3rd trimester (p>0.05) among Lebanese women. It might be due to the cultural and educational differences.[20]

In terms of vigorous activities in current study participants of 3rd trimester showed higher score than other two trimesters which is supported by Tatiana Papazian et al study results. In contrast, Lebanese women of 2nd trimester were engaged more in vigorous activity. Likewise another study by Anne Marie Z et al found high incidence of vigorous activity among pregnant women of United States in their 2nd trimester time course.[21]

For the sedentary type of activities, same results were obtained like the light, moderate and vigorous intensity. That 3rd trimester had more score in sedentary activities as they also performs more of moderate and vigorous activities in order to manage time of leisure and sedentary activities. A systemic review by Caterina Fazzi et al also revealed almost 50% of the pregnant women spent time in sedentary life style and leisure activities.[22]

For the house hold activities, 3rd trimester women were having higher score than 1st and 2nd trimesters as we discussed earlier that women in last trimester had themselves engaged in light, moderate and vigorous activities. And results were also significant in terms of house hold activities. In contrast in study of Tatiana Papazian et al women had more house hold activities like other activities of different intensities.[20]

In Current study, majority of the women were house wives (92%) as compared to the women associated with any specific occupation or profession (8%). So the study found no statistical difference among all three trimester women. As in contrast a study by M.Karen Campbell in (2001) determined occupational activities more prevalent in pregnant women of United States, most probably because of the same reason of cultural differences discussed above.[23]

The current study also revealed more engagement of 3rd trimester women in sports activities than other two trimesters. As women in 3rd trimester engage themselves in household activities, morning walks, and stair climbing etc. The pairwise comparison between the trimesters were also found statically significant ($p<0.05$). The participants of early pregnancy showed less score for sports activities, and same results were reported by Deshayne B. Fell et al in (2009) that most of the women reduced their physical activity level during the first 20 weeks of gestation. But the comparison in this study was sports and physical activities before and after the pregnancy.[24]

Pregnant women in the first trimester (weeks 1-13) go through a lot of physical and emotional changes including mood swings, dizziness, fatigue, frequent urination, lethargy, headaches, nausea and vomiting. First-trimester bleeding is a common complication which affects 16–25% of all pregnancies. Second trimester (weeks 14-27) progresses to the development of fetus and brings changes to the mother's body. These changes include an increase in sense of smell, increased milk production and leakage from the breasts, low back pain, skin changes, baby movement, nasal congestion, and so on. The third trimester (weeks 27 to the end of pregnancy) brings about immense changes in the mother and fetus. The development of fetus increases, fetus gains weight and gets ready for delivery. At the same time mother also gains weight. Other symptoms include frequent urination, pain in the legs, ankles, and heels, insomnia, and headaches to moderate physical activity or maintenance of active lifestyle such as performing household activities or walking can help reduce all the symptoms which are seen in the mother and can result in healthy development of fetus by reducing the risk of complications that the women can face during pregnancy.[25] Exercise is beneficial in pregnancy but in high risk pregnancies, exercise may be ceased on the advice of certified medical personnel. Working mothers who work long hours may be at risk of preterm labor, so caution should be exercised when recommending an exercise programme to these ladies. But the common misconception about exercising during pregnancy, that it reduces the fetal birth weight is not true. In fact it is beneficial to the fetus and children of mothers, who exercise during pregnancy, show better intelligence level at 5 years of age.[26] Women who are dealing with a high risk pregnancy due to their medical conditions like auto immune diseases, cardiovascular conditions, cancer etc. should exercise only if their medical consultant allows them to. Otherwise, they are advised to take rest and report any slight changes in their health during pregnancy.[27]

Exercise acts in accordance with pregnancy to build up pulse, stroke volume, and cardiovascular yield. Nonetheless, during exercise, blood is redirected from stomach viscera, including the uterus to supply practicing muscles. With low intensity exercise, pregnant women have more expansion in respiratory recurrence and oxygen utilization to satisfy their more oxygen need. As exercise increments from moderate intensity and vigorous intensity, pregnant women exhibit diminished respiratory recurrence and lower tidal volume.

Both exercise and pregnancy are related to usage of energy. In the initial two trimesters admission of 150 calories for every day is suggested and increments of 300 calories for each day are needed in the third trimester. Caloric requests with exercise are considerably higher. The maintenance of energy need of pregnant mother and the developing baby is raised with excessive exercise which affects the development of baby.[7]

In our culture, it is believed that exercising during pregnancy may damage the fetal growth and may induce preterm labor but this is just a myth. In fact, exercising during the pregnancy period can cause a wide range of positive effects on both the baby and the mother.[28] As pregnancy progresses, the mother's body under goes a variety of changes that are necessary for the growth of the baby, like her blood volume increases nearly by 45% causing increased load on heart, there's an increased load on lungs, there's an increase in weight, and the joint flexibility is also increased. Exercising during this period can cause women to have an increased VO2 max, the cardiovascular function is improved, and the weight is only increased to the limit to which it is necessary. In other words, excessive weight gain is prevented, there is less fatigue and muscle soreness, edema which is very common manifestation seen during pregnancy can be prevented or made better, mood remains stable, the risk of having gestational diabetes mellitus[29] and gestational hypertension is nearly reduced to negligent level.

Physical activity is beneficial for all three trimesters of pregnancy. A low to vigorous intensity physical activity is safe for the pregnant women not facing any serious health issues. Adapting to an active lifestyle or sticking to an exercise routine before, during, and after

pregnancy can have a positive impact on a pregnant woman's emotional, physical, and physiological health.[11]

Conclusion

It is concluded that pregnant women in their 3rd trimester are more involved in light, moderate, and vigorous energy expenditure activities. Likewise, for the sedentary house hold and sports type of activities, women in late tenure of their pregnancy are actively engaged. Level of physical activity was reduced in 1st & 2nd trimesters in women in their first pregnancy with fear of the risks that could damage the fetus. Others were not active because of the common health issues like fatigue, headaches, nausea and low back pain they faced during the first and second trimesters of pregnancy. The occupational score for pregnant women was less because the majority of the sample was comprised of housewives as compared to occupational or professional ladies. As women in Pakistan follow their beliefs and myths about staying home while they are pregnant, the number of women who are educated, independent and are engaged in any type of physical, occupational activity or gym activity during pregnancy is low. So occupational related activity scores were lower as compared to all other types of physical activities.

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