

Research Article

Measuring Physical Activity through Pedometer in Indian Pregnant Women

Vandana Rani¹ and Ravinder Yadav²

¹Guru Jambheshwar University of Science and Technology, India

²Arora Orthopaedic Hospital, India

Background: The importance of physical activity for mother and fetus is well established in western literature. Therefore, now-a-days gynaecologists are encouraging pregnant women to be physically active in order to have a normal delivery without any complication and to deliver a healthy baby. There is no study from India till now that evaluated pedometer in pregnant women. Purpose: To assess physical activity pattern throughout the pregnancy using 5000 steps per day as reference; measured through pedometer. Method: 60 pregnant women (primigravida), aged 18-32 years were recruited for this study. They were provided with a cheap commercially available pedometer [HF 18 Deluxe 3D pedometer, JSB Healthcare, New Delhi, India] which was worn at waist level using belt. Number of steps taken were recorded by pregnant women on a log book at the end of day (i.e.) just before sleeping. Results: Indian pregnant women walked on an average of 3850 steps per day which is 1150 steps lower than the recommended level of 5000 steps to be called as lower end of active category. Individually only 10 out of 60 pregnant women were active (prevalence of inactivity was 83.3%). Conclusion: To measure physical activity throughout the pregnancy, low-cost pedometers proved as a reliable instrument used for this study. So, Pedometer can be used as a motivational tool to improve physical activity during pregnancy.

Keywords: Primigravida, Physical Activity, Pedometer, Step Count.

Introduction:

The importance of physical activity for mother and fetus is well established in western literature. [1] Therefore, now-a-days gynaecologists are encouraging pregnant women to be physically active in order to have a normal delivery without any complications and to deliver a healthy baby. However, pregnant women are not following this recommendation and are less active. There are several factors that limit the physical activity in pregnant women. [2] Both subjective and objective tools such as questionnaires, pedometer and accelerometer could be used to evaluate physical activity in this population. [3] Objective measures such as pedometers are more reliable to assess physical activity than subjective questionnaire and are easy and cheap compared to accelerometers. There is no study from India that evaluated pedometer in pregnant women.

Objectives:

To assess activity pattern throughout the pregnancy using 5000 steps per day as reference; to assess the test-retest reliability, average reliability of step counts measured by pedometer; to assess the activity pattern change (steps per day) over one-week period; to assess activity pattern change at different gestational period (4th to 9th month).

Methodology:

Present study was an observational study of 60 pregnant women recruited by stratified consecutive sampling technique. They were provided with a cheap commercially available pedometer [HF 18 Deluxe 3D pedometer, JSB Healthcare, New Delhi, India] which was worn at waist level using

belt. Participants were asked to wear in the morning immediately after getting-up from the bed and were asked to wear till night except bathing. Number of steps taken was recorded by pregnant women on a log book at the end of day (i.e.) just before sleeping. All statistics was done in IBM-SPSS (ver. 21.0) software.

Result:

The basic characteristics were: age 24 years (range 21-30), height 1.62 m (1.25-1.77), weight 55.17 Kg (42-72), BMI 21.24 Kg.m⁻² (18.50-25.00). Indian pregnant women walked on an average of 3850 steps per day which is 1150 steps lower than the recommended level of 5000 steps to be called as lower end of active category (Table 1).

Month	Mean± SD	95% CI	Minimum-Maximum	Median (IQR)
4th	4311 ± 1299	3382-5240	2680-7169	3880 (3506-5250)
5th	3170 ± 670	2691-3650	1880-4003	3197 (2669-3741)
6th	3418 ± 861	2802-4034	1494-4482	3554 (2965-4046)
7th	4033 ± 1920	2660-5407	1809-8469	3389 (2955-5132)
8th	3976 ± 1286	3056-4897	2533-6239	3714 (2854-4902)
9th	4201 ± 1242	3313-5090	2980-6517	3720 (3181-5359)
Total	3852 ± 1290	3518-4185	1494-8469	3562 (3024-4253)

Table 1: Descriptive statistics of average steps per week according to gestational month (n=10)

Individually only 10 out of 60 pregnant women were active (prevalence of inactivity 83.3%). Inactive women need to increase on average 1610 steps to be called as active (95% CI 1408-1813). There was ~10% rise in steps after two days of pedometer wearing. There was a moderate-to-high test-retest reliability in single measure (test-retest reliability) and high-to-very high test-retest reliability in average measure (internal consistency). There was a moderate-to-high inter-item correlation that was observed (Table 2).

Day	Mean±SD	Inter-item Correlation	ICC (single)	ICC (average) Cronbach's Alpha	Activity level (5000 steps per day)
1st	3592 ± 1724	Ref.			
2nd	3625 ± 1548				16.7% is active
3rd	3927 ± 1443	0.573 (low)	0.638	0.925	83.3% is sedentary
4th	3892 ± 1637		(0.542 -	(0.892 -	[mean difference 1611
5th	3964 ± 1451		0.734)	0.951)	steps per day from 5000
6th	3986 ± 1608				steps (95% CI 1408 to
7th	3975 ± 1435	0.801 (high)			1813 steps per day)]

Table 2: Descriptive statistics of steps per day along with reliability, inactivity prevalence (n=60)

Discussion:

The primary aim of this study was to use pedometer in young Indian pregnant women to see the prevalence of inactivity, test-retest reliability, activity pattern change across one-week as well as gestational period from 4th to 9th month. Total 60, 10 in each gestational month after 3rd month, primigravida with normal-BMI index were recruited for this purpose and were asked to wear pedometer for seven consecutive days. The results showed only one in every sixth women is physically active (>5000 steps per day), which is alarming. Similar finding was observed by Anjana et al. in Indian pregnant women using questionnaire.[5] Physical activity promotion is needed for this population to prevent pre, peri and postnatal complications in both mother as well as baby. Day-to-day (single measure) reliability of pedometer is moderate-to-high whereas average measure (Cronbach's alpha) reliability of pedometer is high-to-very high which encourage the gynaecologist and physiotherapists to use these simple, low-cost pedometers as prehabilitative or preventive tool.

Indian women are far behind the international standard of physically low-active (5000-7500 steps per day) category. They have to increase 1400-1800 steps per day to reach lower-end of low-active stage and pedometer could be used as a feedback tool to set this reasonable target. Finally Indian pregnant women walk less number of steps per day (~500) at 2nd trimester as compared to 3rd trimester hence physical activity promotion should encourage young women to walk more in 5th and 6th months (2nd trimester) of pregnancy.

Low sample size, limited geographical location (only Haryana) and sample from single clinic are limitations of this study.

Conclusion: Low-cost pedometers can be used for physical activity which has been shown as a reliable instrument to measure physical activity throughout the pregnancy. Pedometer can be used to motivate the young primigravida with normal-BMI to be more physically active at the earliest-preferably at 2nd trimester of pregnancy.

References:

1. Mudd LM, Owe KM, Mottola MF, Pivarnik JM. Health benefits of physical activity during pregnancy: an international perspective. *Med Sci Sports Exerc* 2013;45(2):268-77.
2. Coll CV, Domingues MR, Goncalves H, Bertoldi AD. Perceived barriers to leisure-time physical activity during pregnancy: A literature review of quantitative and qualitative evidence. *J Sci Med Sport* 2017;20(1):17-25.
3. Oliveira CS, Imakawa TDS, Moises ECD. Physical activity during pregnancy: Recommendations and assessment tools. *Rev Bras Ginecol Obstet* 2017;39(8):424-32.
4. Anjana RM, Sudha V, Lakshmi Priya N, Anitha C, Unnikrishnan R, Bhavadharini B, et al. Physical activity patterns and gestational diabetes outcomes- The wings project. *Diabetes Res Clin Pract* 2016;116:253-62.