

EVALUATION OF THE PHYSICAL ACTIVITIES AFTER 2 MONTHS OF DISCHARGE, AMONG POSTPARTUM WOMEN WITH PRIOR GESTATIONAL DIABETES MELITIS- AN ORIGINAL RESEARCH

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ABSTRACT

Aim

The purpose of the present research was to evaluate the level of physical activity amongst postpartum women after 2 months of discharge, who were earlier suffering from gestational diabetes.

Methodology

This descriptive cross-sectional component of a large quasi-experimental study was conducted in 100 postpartum mothers. Anthropometric and glycemic parameters were assessed at 2 months postpartum. Pre-tested International PA Questionnaire (short-version) was used to assess PA. The PA level and intensity were calculated in metabolic equivalent task minutes per week (METminutes/ week). Data were analyzed by SPSS 21 version. Both continuous and categorical data were analyzed.

Results

Mean HbA1c value was 6.64 ± 1.95 . Median truncated PA was 3250 MET-minutes/week. The main contributors to energy expenditure in the study sample were moderate intensity household activities and walking with 58% of mothers walking more than 150 min/week. Although in the categorical analysis, 52% of mothers reported high level of PA, only 10% participated in at least one vigorous intensity activity continuously for more than 10 min to achieve reduced metabolic risks. Average sitting time of mothers was about 3 h/day which is in par with the breast-feeding recommendation. None of the PA MET values significantly correlated with the glycemic parameter, HbA1c.

Conclusion

Although it appears that majority of mothers are physically active, these activities are not optimum in terms of reducing the metabolic risk. We suggest designing exercise protocols incorporating day-to-day moderate intensity activities and walking in a structured and scientific manner to achieve maximum benefits for this special group of women.

Keywords Energy expenditure, Gestational diabetes mellitus, Physical activity patterns, Postpartum mothers

INTRODUCTION

Gestational diabetes mellitus (GDM) is associated with a higher risk of maternal type 2 diabetes mellitus (T2DM), metabolic syndrome and cardiovascular disease later in life.^{1,2} In particular, a history of GDM increases a woman's lifetime risk of developing T2DM by at least seven-fold, compared to women who have normoglycemic pregnancies.³ The rates of GDM and T2DM are increasing globally, placing a great economic burden on the healthcare system.⁴

Pregnancy is often described as a 'teachable moment' to promote health behavior change as the risk perception of most women may increase during this special phase of life, and hence they may be more motivated to reevaluate their health needs and redefine their priorities.⁵ The diagnosis of GDM spurs many women to engage in a healthy lifestyle during pregnancy due to concerns of obstetric risks and complications. However, the behavior change is often not sustained as they lose their motivation after giving birth.⁶ Studies have shown that many women with a history of GDM have increased caloric intake, suboptimal levels of physical activity, increased post-pregnancy weight and body mass index (BMI) after delivery,⁷⁻¹⁰ which also increases the risks of postpartum T2DM and prediabetes.¹¹

The postpartum period is a time of vulnerability for most mothers, as they experience many physiological, emotional, and social changes. In addition to coping with competing demands of motherhood, work and family commitments,¹² many Asian women practise confinement and need to observe a set of traditional customs and practices to assist them to recover from pregnancy and childbirth. For example, a special diet is taken to improve personal health and promote milk supply. There are restrictions on personal hygiene such as no bathing or bathing with herbal preparations. Women also rest at home and avoid strenuous physical activities to regain their strength and prevent future illness. Some will engage a confinement nanny to help with household chores and care of the baby.¹³⁻¹⁵

Women with a history of GDM represent a high-risk population identified at an early stage when they are eligible for health interventions. Beyond pregnancy, the postpartum period is an important window of opportunity for healthcare professionals to provide advice and support to these women as lifestyle modification, such as healthy diet and increased physical activity, has been shown to prevent further progression to T2DM.¹⁶⁻¹⁸ There is a need to understand their postpartum lifestyle, which may be influenced by confinement practices, and identify any unhealthy behaviours.

Apart from health beliefs, the literature shows that other factors are associated with postpartum glucose screening. These include socio-demographic characteristics such as age, race, parity, income, education, pre-pregnancy weight or body mass index (BMI) and perinatal characteristics which include insulin use during pregnancy, medication use during pregnancy, postpartum visits, and gestational weight gain.¹⁹ It is important to identify a set of factors associated with postpartum glucose screening in mothers with a history of GDM. Once identified, effective counselling and promotion policies can be therefore implemented to improve rates of postpartum glucose screening. However, limited evidence is available on the association between postpartum glucose screening and health beliefs and other factors among mothers with a history of GDM.

AIM OF THE PRESENT STUDY

The purpose of the present research was to evaluate the level of physical activity amongst postpartum women after 2 months of discharge, who were earlier suffering from gestational diabetes.

METHODOLOGY

100 Postpartum mothers with a history of GDM in their index pregnancy, who delivered a single healthy baby, were invited to the study at 2 months postpartum. The mothers with a history of GDM in their previous pregnancies and/or a history of any other chronic illnesses and employees in health sector were excluded from the study. Informed consent was taken from all the participants. Ethical clearance was obtained from the relevant Ethics Committee.

Data on socio-demographic variables, anthropometry, glycemic control, and PA were obtained. A pre-tested, self-administered questionnaire was used to collect socio-demographic data. Glycemic control was assessed by HbA1c at and a value of A1c below 5.7% was considered normal while 5.7–6.4% and $\geq 6.5\%$ were considered as pre-diabetes and diabetes, respectively. The International PA Questionnaire (IPAQ) short version was used to assess the levels and patterns of PA. Both the frequency (the number of days per week) and the duration (the average

time in minutes) of moderate and vigorous intensity activities and walking were assessed separately. The PA level and intensity were calculated in metabolic equivalent task minutes per week (MET-minutes/week). The following MET values were used for the analysis of different types of activities: Walking = 3.3 METs,

Moderate PA = 4.0 METs, and Vigorous PA = 8.0 METs. Both continuous and categorical data were analyzed. Energy expenditure was presented as median values with interquartile ranges. The differences between means were compared by independent sample *t*-test and ANOVA. The significance was set at $P < 0.05$. Relationship between the HbA1c and the specific types of physical activities was determined by zero-order correlation utilizing SPSS 25.0.

RESULTS

The mean age (\pm SD) of study participants was 33.6 ± 5.8 years. About half the sample of mothers were housewives ($n = 53$). Exactly half of the sample ($n = 50$) had five or more dependents in their families. The majority of the mothers ($n = 75$) had 1 or 2 children. Fifty-five mothers had a positive family history of diabetes mellitus out of which in 25, both parents were diabetics. (Table 1)

The median (IQR) energy expenditure of the study group (non-truncated) was 3659.50 MET-minutes/week (IQR = 123–12,000) and the truncated PA was 3250 MET-minutes/ week (IQR = 123–5106). Seventy-three percent of mothers participated in at least one moderate intensity activity continuously for more than 10 min in the 1 week period immediately before data collection and the common activities included were hand washing of clothes (67%) and sweeping the house and the garden (65%). In the categorical analysis, it was found that 52% of mothers had a high level of PA while 19% and 29% had moderate and low levels of PA, respectively. The median sitting time of the study group was 1260 min (IQR = 1260–3360)/week. None of the physical activity levels correlated significantly with HbA1c at 2 months postpartum. (Table 2)

Table 1- Anthropometric characteristics and HbA1c values (categorized) of the study sample (n=100).

Anthropometric measurements	n
<i>BMI (kg/m²)</i>	
Mean \pm SD ($n=100$) 25.99 ± 4.67	
Normal weight ($18.5 < 25$)	37
Over weight ($25-30$)	48
Obese (>30)	15
<i>HbA1c</i>	
Mean \pm SD ($n=100$) 6.64 ± 1.95	
Normal ($<5.6\%$)	36
Pre-diabetes ($5.7-6.4\%$)	64

Table 2- Correlation between HbA1c and physical activity levels (MET values) at 2 months postpartum.

	Total activity (MET)	Vigorous activity (MET)	Moderate activity (MET)	Walking (MET)
HbA1c*	$r=0.0115$ $P=0.253$	$r=0.057$ $P=0.576$	$r=0.142$ $P=0.159$	$r=0.045$ $P=0.657$
HbA1c**	$r=0.103$ $P=0.314$	$r=0.023$ $P=0.823$	$r=0.137$ $P=0.18$	$r=0.032$ $P=0.753$

*Zero-order correlation **Partial correlation

DISCUSSION

Type 2 Diabetes has become a rising threat to health globally with increasing number of GDM women playing a vital contribution to it. The discussion is based on the results of a descriptive cross-sectional component of a large quasi-experimental study conducted to assess the effectiveness of a lifestyle intervention program designed for GDM mothers to attenuate the progression of GDM to T2DM. HbA1c, and PA patterns of GDM mothers were explored at 2 months postpartum as part of the baseline information needed for designing the lifestyle intervention protocol. The data, in this study had a diverse sample of women representing urban and rural areas and mixed cultural contexts.²⁰ The study is distinctive as it describes the activity patterns of a group of women whose activities per se are vital in reducing their future risk of T2DM. In postpartum women, it is expected that weight would return to preconception level by 6–12 weeks after the delivery.²¹ Even though we do not have data regarding the preconception weights, according to our results, only one-third of the cohort is in the normal weight category according to the WHO cutoffs at 6 weeks. Although it is reasonable to expect more women to

return to normal weight by 12 weeks postpartum, a major change to the number is unlikely as the hemodynamic and genitourinary recovery mainly occur in the subacute postpartum period which extends from 2 to 6 weeks postpartum.²² HbA1c was performed at 2 months postpartum since early glycemic screening is recommended between 4 and 12 weeks postpartum.²³ Although it is reported that blood glucose levels usually return to normal immediately after the delivery in GDM women,²⁴ in the present study 64% of mothers were in the pre-diabetic category at 2 months postpartum based on HbA1c levels. Anyhow, HbA1c represents the average glucose level over the past 3 months and therefore the value obtained would have got affected by the glycemic control during the latter part of pregnancy. On the other hand, mothers might have had prediabetes instead of GDM which had resulted in the obtained HbA1c values. Activity patterns of GDM mothers were evaluated at 2 months postpartum under four major sub groups, namely, vigorous and moderate intensity activities, walking, and sitting. Although vigorous intensity activities are more beneficial to reduce metabolic and other health risks compared to moderate intensity activities,²⁵ only one tenth of mothers in the present study engaged in vigorous activities at least once for a duration of 10 min continuously during the 1 week period studied. However, a considerable proportion of mothers appear to engage in hand washing of clothes, cleaning the house and garden, and mopping the floor which are considered as moderate intensity activities. These findings seem to go parallel with the findings of a study conducted by De Silva et al.²⁶ As sedentary behavior is associated with multiple chronic diseases which includes T2DM, postpartum women should be encouraged to limit their sitting time as much as they can.

CONCLUSION

Being active was significantly associated with the number of family members including children. None of the PA MET values significantly correlated with the glycemic parameter, HbA1c. However, the challenge is to design an exercise protocol for postpartum women incorporating day-to-day activities in a way to achieve maximum health benefits.

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