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Original Research Article

EMPLOYMENT DURING PREGNANCY IN RELATION TO RISK FACTORS

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ABSTRACT

Background: A number of complications of pregnancy that might occur during the period that women are still working can be regarded as adverse maternal outcome. Since studies on occupational risk factors during pregnancy showed conflicting results, it is unclear how pregnant women should manage. So, the present study aims to find out such occupational risk factors and energy expenditure of working pregnant women in Aurangabad city, Maharashtra, India.

Materials and Methods: 120 working pregnant women in their second trimester who were visiting the antenatal clinic at Mgm medical college and hospital, Aurangabad were selected. They were interviewed using demographic data and pregnancy physical activity questionnaire [PPAQ]. Sample was chosen according to inclusive and exclusive criteria and scoring was done which divides the physical activity into sedentary, light, moderate, vigorous, household, occupational and sports.

Results: It was however observed that the higher amount of energy 18.58% was expended on occupational activities. Maximum participants in this study 46.66% were sedentary worker Energy expenditure for occupational activities was highest 28.01% for other heavy type of work and lowest for the sedentary work 16.64%.

Conclusion: The study recommended that most of the pregnant working women were physically active in their second trimester of pregnancy and most of their energy was expended on occupational activities. The present study also concludes that risk factors of working pregnant ladies are less as the percentage of sedentary type of workers in this study are more than heavy type of workers.

KEY WORDS: weighing machine, height measurement scale, BMI calculator app, PPAQ (pregnancy physical activity questionnaire).

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INTRODUCTION

Modernization and equality have bought women to global stage matching shoulders with men at each steps and field. Prior during times of pregnancy, women would be limited to house hold chores but today they have step forward and manage personal and professional life significantly. But while doing so during pregnancy, she has to undergo many physical and psychological changes.

Nowadays, it is common for women to work during pregnancy. There has been increase in worldwide prevalence of women working during pregnancy. At least 50% of working women get pregnant in their active years and more than 40% of them have normal pregnancy with healthy babies while other may experience some reproductive disorders. Presently 45% workers are young women that 83% of them will be pregnant at some point during their employment [1].

Pregnancy and transition to parenthood involves major social and psychological changes. Hormonal changes in the mother lead to symptoms of anxiety and depression. Pregnancy affords 20% of woman leads to chances of miscarriage preterm delivery or low birth weight. In fact many encounter feelings of low and anxious mood are reluctant to inform others. There they need vital support and assistance during pregnancy [2].

The second trimester marks a period during which the developing fetus becomes active, and begins to move, kick and swallow. The second trimester is also marked by the development of outward symptoms of pregnancy. Abdomen is going to expands and uterus grows in size. Women experiences marked symptoms such as backache, pain in thighs, groin, abdominal pain, heart burn, constipation, shortness of breath as fetal growth exerts pressure over organs including lungs [3].

Overall studies found that 70% of women had taken sick leave at some point during pregnancy and most common time for taking sick leave was the third trimester. Main reason for taking was fatigue, pelvic girdle pain , nausea and vomiting, back pain, anxiety and depression [4].

Pregnant working women are on raising concern about ergonomic risk factors that may affect them as well as baby. The main ergonomic risk factors include awaked postures, no rest or repetitive work and high force. A number of studies pointed to an increased risk of adverse pregnancy outcome in certain occupation [5].

The work participation rate for women was 25.68 per cent in 2001. Women workers constituted 19 per cent of the total organized sector employment in the country, as compared to 18.4 per cent in the previous year. As on 31st March, 2004, there were about 49.34 lacks women workers employed in the organized sector (Public and Private Sector). As far as industries are concerned, in 2005..An increase of 7.8 per cent was registered in Wholesale and Retail Trade followed by 5.6 per cent in Mining and Quarrying, 5.5 per cent in Agriculture, Hunting, Forestry & Fishing, 5.2 per cent in Financing, Insurance Real Estate & Business Services, 1.7 per cent in Electricity, Gas & Water, 1.5 per cent in Construction, 1.4 per cent in Community, Social and Personal Services and 1.2 per cent in Transport Storage & Communication [6].

The McDonald series of papers noted that the fetal death, the odds ratio was significantly increased for nursing aids and orderlies' food and beverage services and worker in factories. Late but not early, spontaneous miscarriage were significantly raised in radiology techniques, operating rooms and nurses and those working in agriculture and horticulture [7].

A number of complications of pregnancy that might occur during the period that women are still working can be regarded as adverse maternal outcome. These commonly include gestational HTN, preeclampsia complication about 7% of pregnancies and sever preeclampsia is a major cause of maternal morbidity [8].

Women who worked in metal, electrical, clothing and manufacturing industries in food and drink services tended to have babies born with low birth weight. Low birth weight was thought to be related to high fatigue, exposure to high noise level, shift work, rotating or changing schedules and strenuous working postures [8].

Pregnant women are at her greatest risk for injuries during her third trimester when her abdomen is at her greatest size. The amount of stress on her lower back is greater when object lifted or carried with further away from lower back due to increased size of abdomen [8].

Since studies on occupational risk factors during pregnancy showed conflicting results, it is unclear how pregnant women should manage. So, further studies are needed to evaluate occupational risk factors as the present study aims to find out such occupational risk factors and energy expenditure of working pregnant women in Aurangabad city.

MATERIALS AND METHODS

The following study is based on the co-relation of risk factors of employment during pregnancy. The study was carried out in MGM medical college and hospital, Aurangabad. The sample population consists of working pregnant women aged from 18-40 years. Permission to screen the women was obtained from ethical committee of MGM institute of physiotherapy and HOD of obstetrics and gynecology department. Pregnant working women from the specified sources of

data, were selected and questions been asked recorded in data collection sheet. A consent letter was obtained from each woman for permission to screen them. Further the data collection sheet was given to every women and requested to fill the sheets and thus in the same way the procedure is repeated for all women. Sample was chosen according to inclusive and exclusive criteria and scoring was done which divides the physical activity into sedentary, light, moderate, vigorous, household, occupational and sports.

In the present study we included the subjects with age from 18-40 year, working women with presence of only second trimester of pregnancy and pregnant women who willing to participate in this survey.

In the present study we excluded the working women with presence of first or third trimester and Individual who are not co-operated and not willing to participate.

MATERIALS USED

Demographic data: It consists of patient's name, age ,height, weight, address ,contact no., occupation, no. of pregnancies, no. of days per week she works, expected date of delivery and grading of activities which she doing during her present trimester of pregnancy into easier, slight difficult and very difficult activities.

The following equipments were used for measurement of height and weight;

· Weighing machine

· Height measurement scale

· BMI calculator app

Pregnancy physical activity questionnaires [PPAQ]:

Instructions: Instructions are listed on the questionnaire which is self-administered. Individuals are asked to select the category that best approximates the amount of time spent in 32 activities including Household/ care giving, occupational, sports/exercise, and inactivity during the current trimester. At the end of the PPAQ, an open-ended section allows the respondent to add activities not already listed.

Calculations: The duration of time spent in each activity is multiplied by its intensity to arrive at a measure of average weekly energy expenditure (MET-h·week-1) attributable to each activity.

Scoring of the questionnaire is as follows:

To calculate duration: For questions #4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 20, 21, 22 the following duration scores Correspond to the duration categories: 0, 0.25, 0.75, 1.5, 2.5, 3.0. Multiply values by 7 Days per week. For questions #12, 13, 32, 33, 34, 35, 36 the following duration scores correspond to the Duration categories: 0, 0.25, 1.25, 3.0, 5.0, 6.0. Multiply values by 7 days per week.

For questions #17, 18, 19, 23, 24, 25, 26, 27, 28, 29, 30, 31 the following duration scores Correspond to the duration categories 0, 0.25, 0.75, 1.5, 2.5, 3.0. These values are Already in weekly form.

To calculate intensity: Field-based measurements in pregnant women (5) are used to represent activity intensity for walking and light- to moderate-intensity household tasks, and Compendium-based MET values (6) are used to estimate the intensity of the remainder of the PPAQ activities. The specific MET values assigned to each question follow (question number: MET value): 4:2.5, 5:2.0, 6:3.0, 7:2.7, 8:4.0, 9:3.0, 10:4.0, 11:1.8, 12:1.0, 13:1.1, 14:3.2, 15:2.3, 16:2.3, 17:2.8, 18:2.8, 19:4.4, 20:2.5, 21:4.0, 22:1.5, 23:3.2, 24:4.6, 25:6.5, 26:7.0, 27:3.5, 28:6.0, 29:4.5, 30:see Compendium (6), 31:see Compendium (6), 32:1.6, 33:3.0, 34:2.2, 35:4.0, 36:3.3.

Total activity = sum of (duration * intensity) for questions #4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36.

Sedentary activity = sum of (duration * intensity) for questions #11, 12, 13, 22, 32.

Light-intensity activity = sum of (duration * intensity) for questions #4, 5, 7, 15, 16, 17, 18, 20, 34, and question #30 and #31 if open-ended activities are <2.9 METs.

Moderate-intensity activity = sum of (duration * intensity) for questions #6, 8, 9, 10, 14, 19, 21, 23, 24, 27, 28, 29, 33, 35, 36, and question #30 and #31 if open-ended activities are >3.0 and <6.0 METs.

Vigorous-intensity activity = sum of (duration * intensity) for questions #25, 26, and

Question #30 and #31 if open-ended activities are >6.0 METs.

Household/care giving activity = sum of (duration * intensity) for questions #4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 18, 19.

Occupational activity = sum of (duration * intensity) for questions #32, 33, 34, 35, 36.

Sports/exercise = sum of (duration * intensity) for questions #23, 24, 25, 26, 27, 28, 29, 30,31.

RESULTS

The study conducted on the physical activity of pregnant women comprised 120 pregnant women in their 2nd trimester as at the time of data collection period who were attending antenatal clinic in MGM hospital, Aurangabad.

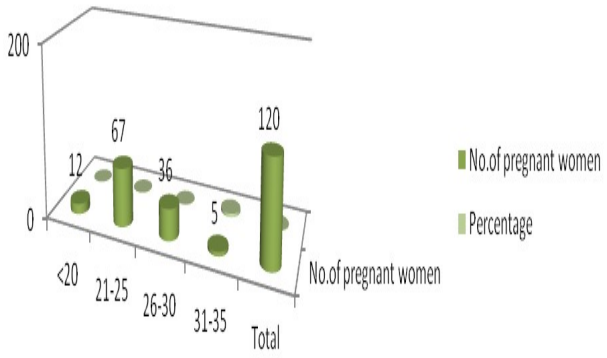
Demographic profile:

Age: Maximum no. of participants 93.83% was seen in the age group of 21-25 years, while minimum no. of 4.266% was seen in the age group of 31-35 years. [Table 1, Graph 1]

Table 1: Age wise distribution of the participants.

Age	No. of pregnant women	Percentage
<20	12	10%
21-25	67	55.83%
26-30	36	30%
31-35	5	4.166
Total	120	100%

Graph 1: Age wise distribution of the participants.

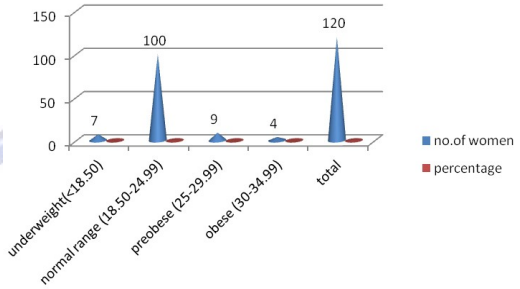


BMI: There was no any significant finding occur in BMI as 83.33% women have normal ranging BMI, 7.50% belongs to pre-obese category, 5.83% women were underweight and 3.33% women were obese. [Table 2, Graph 2]

Table 2: Distribution of participants according to BMI.

BMI	no. of women	percentage
underweight (<18.50)	7	5.83%
normal range (18.50-24.99)	100	83.33%
Pre-obese (25-29.99)	9	7.50%
obese (30-34.99)	4	3.33%
Total	120	100%

Graph 2: Distribution of participants according to BMI.

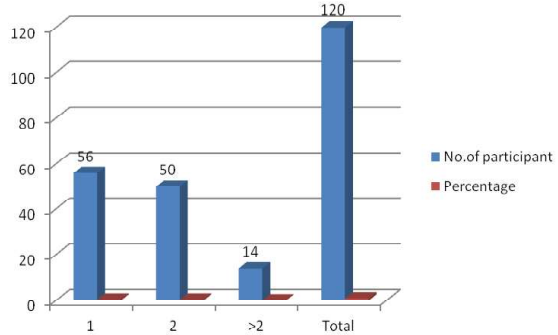


No. of pregnancy: Approximately half of the participants [46.66%] had 1st pregnancy, 41.66% participants have second time pregnancy, while only 11.66% participants were seen to be greater than second time of pregnancy. [Table 3, graph 3]

Table 3: Distribution of participants on the basis of no. of pregnancy.

No. of pregnancy	No. of participant	Percentage
1	56	46.66%
2	50	41.66%
>2	14	11.66%
Total	120	100%

Graph 3: Distribution of participants on the basis of no. of pregnancy.

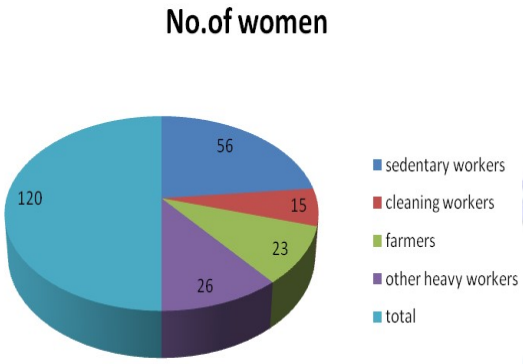


Type of work: Maximum participants 46.66% were sedentary workers; other details on educational workers are prescribed on Table 4. [Table 4, graph 4]

Table 4: Distribution of participants on the basis of type of work.

Type of work	No. of women	Percentage
sedentary workers	56	46.66%
cleaning workers	15	12.50%
Farmers	23	19.16%
other heavy workers	26	21.66%
Total	120	100%

Graph 4: Distribution of participants on the basis of type of work.



Physical activity characteristic of participants:

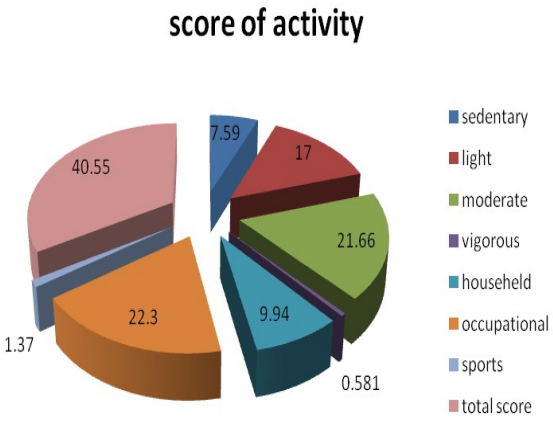
On the basis of score of activities: Overall 32 principle activities were selected for variance in energy expenditure. All those are given in PPAQ questionnaires. Participants 18.05% presented with moderate activity level, while 14.16% presented with light physical activities and 6.62% presented with sedentary based on their performance. None of the women can be classified as having vigorous physical activity level.

The result demonstrated that the women expended energy in all physical activity domain including household, occupational, sport activities. It was however observed that the higher amount of energy 18.58% was expended on occupational activities. [Appendix C; table no.5, graph 5]

Table 5: Distribution of participants on the basis of score of activity.

Name of the activity	score of activity	Percentage
sedentary	7.59	6.32%
Light	17	14.16%
Moderate	21.66	18.05%
Vigorous	0.581	0.48%
household	9.94	8.28%
occupational	22.3	18.58%
Sports	1.37	1.14%
total score	40.55	33.79%

Graph 5: Distribution of participants on the basis of score of activity.

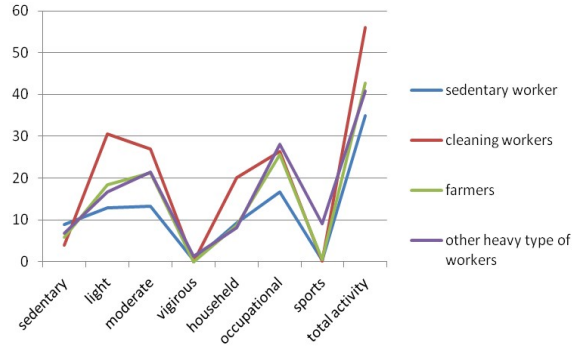


On the basis of occupation wise score of activities: Maximum energy expenditure was seen in cleaning workers 55.96% while farmers 42% and other heavy type of workers 40.82% had similar energy expenditure. The sedentary workers had lowest energy expenditure 34.83%. Energy expenditure for occupational activities was highest 28.01% for other heavy type of work and lowest for the sedentary work 16.64%. [Table 6, graph 6]

Table 6: Occupation wise distribution of the participants.

Activity type	sedentary worker	cleaning workers	Farmers	other heavy type of workers
Sedentary	8.79	3.88	5.79	6.71
Light	12.77	30.46	18.3	16.68
Moderate	13.23	27	21.17	21.35
Vigorous	0.32	0	0	1.17
Household	9.16	20.12	8.63	8.16
occupational	16.64	26.37	25.54	28.01
Sports	0.38	0.15	0.46	9.07
total activity	34.83	55.96	42	40.82

Graph 6: Distribution of participants on the basis of occupation.



DISCUSSION

The study was examined the physical activity level of working pregnant women attending the

antenatal clinic i.e. MGM hospital, Aurangabad. The present study showed that about half of the women were belongs to the age group of 21-25 years while 30% women belong to the age group of 25-30 years. The Minoo Rajaee observed that the risk of preterm labor, placenta previa and low birth weight newborn were more in mothers' under 18 yrs of age and the mothers over 35 showed more risk for abortion, Pregnancy Induced Hypertension, abruption, macrosomia, C/S and Gestational Diabetes [18]. So, the participants in present study were safer for age related risk factors as all were belong to 18-35 years of age group.

In the present study showed that about 46.66% of women had first pregnancy at the time of data collection period, 41.66% had second no. of pregnancy and very fewer women 11.66% had greater than second time of pregnancy. The no. of children, stage of pregnancy, gravidity and employment status had significant influence on physical activity of pregnant women. The most consistent finding in this study is lower parity among working women as only few women have greater than second pregnancy. Increase in the poverty increases the need of money and social status influences the probability of being physically active at occupational level [13].

In this study, about half of the participants 46.66% were sedentary workers, 19.16% were farmers, and 12.50% were cleaning workers while other 21.66% were doing other heavy type of work. Women who worked in metal, electrical, clothing and manufacturing industries or as a chambermaid tended to have babies born with lower birth weight. It may also be related to fatigue, heavy lifting, long working hours, long standing etc. Exposure to high level noise may also tend to low birth weight as well as preterm birth. Occupation that may be more at risk for spontaneous abortion includes industrial workers, sailors, nurses and farmers. In present study, many of women were sedentary workers [46.66%], so, risk factors in present study are less. Increased physical activity, as measured by work in farming or gathering water, was associated with infants of low birth weight, smaller head circumference, smaller mid-arm circumference and lower placental weight [7,8,12].

All women in this study were in their second trimester as at the data collection period. Women are generally active in their work during second trimester which may make them spend more time at work than at home. The dominant expenditure of energy in sedentary activities in itself may not be the problem but the fact that the sedentary activities may not amount to the energy expenditure required for health gain. The increased risk of being sedentary associated with more advanced stage of pregnancy may also be related with the fact that most women are typically more careful during the advanced stage of pregnancy. A situation that may be linked with general fear of possible maternal accidents [17].

The major finding from this study are about half of pregnant women were physically active at moderate level 18.05% with only one of ten being physically active at sedentary level 6.32%, the highest amount of energy were expended during occupational activities 18.58%. Studies found that the women working throughout their pregnancies had a more combination of socio-demographic and maternal risk factors than nonworking women. Peak energy expenditures such as lifting may be more important than averaged expenditures over longer time periods. Measurement of an activity such as lifting and correlation with energy expenditure is a good example of the measurement complexities: lifting may result in a greater intra-abdominal pressure, which could be the potential mechanism for the adverse reproductive outcome rather than increased energy or nutrient expenditure [15].

As noted, type of physical exertion, amount of exertion and the context of the exertion are likely to be relevant to this body of literature. Furthermore, not all physical strain is equal. For example, comparing recreational physical exercise versus workplace physical strain (e.g., long work hours) reflects the difference in the degree of voluntarism between recreational and leisure time activity and physical activity at work. The relationships between physical activity, namely exercise, and nutritional effects on pregnant women are complex [13,14,17].

Thus, making an inference that physical or strenuous activity in the workplace contributes

to the etiology of adverse reproductive outcomes is complicated by the observation that increased physical activity during pregnancy is likely to be beneficial relative to some pregnancy outcomes. However, the factual basis of that statement can be questioned [9].

As fewer studies done on the physical strain or activities, The Seyedeh Negar [1] said that implication of physical strain or activity in the workplace on nutritional status of the pregnant woman is subject to a number of considerations. Foremost is what is being measured. Studies suggested an indirect effect, although not a biological mechanism, that employment can have on the nutritional status of pregnant women. That is, women who are employed may be at risk of compromised diets because of reduced time for shopping and cooking For example, energy expenditure averaged over tasks may not be the relevant measure.

The Ale F. Adeniyi observed on the basis of PPAQ that most of the women seen in their study were sedentary implies that majority of the women did not have the habit of being physically active during pregnancy which was similarly observed by the present study. The Ale F. Adeniyi (13) also found that most of the women expended their energy on household activities as half of the participants in their study were in third trimester which was common period for the women to be on sick leave [13] but this present study included only those participants who were in their second trimester of pregnancy. So, it made difference in the overall energy expenditure with present study. This study demonstrated that most of the energy expended by the pregnant women in their occupational activities which may affect the maternal health and health of the fetus.

The Gary M. Shaw [17] demonstrated that number of mechanisms have been postulated for how increased physical activity, such as strenuous work, could lead to adverse outcomes of pregnancy summarized the physiological changes that occur during physical activity: cardiac output is redistributed from visceral circulation to exercising muscles and skin, energy stores are depleted, body temperature increases, the hormonal milieu abruptly changes and a variety of physical stresses occur, all of which are intensified by either increasing the workload or length of the physical activity. These changes have the potential to adversely affect the course and outcome of pregnancy (e.g., infertility, abortion, congenital malformation, cord entanglement, placental separation, membrane rupture, growth restriction, premature labor or fetal hypoxia) [17]. Thus, the present study with the support of obtained literature suggests that physical exertion is the major risk factor for the pregnant women during employment.

Only few women during their data collection period of present study were doing antenatal exercises. A study on knowledge, attitudes and belief regarding exercise among pregnant women had alluded to issue surrounding safety and cultural norms of pregnant women. It may also that the women in India did not receive adequate and in depth education on the need for them to be physically active during pregnancy. Besides these, another possible reason for inactivity may include a lack of awareness of health benefits of exercise in pregnancy. As compare to participants in previous study, participants in this study had a very lower level of awareness and more perceived barriers to physical activity [13].

Ergonomic risk factors are also the major concern in occupational activities. Generally, workers whose work is physically strenuous should be considered to be at increased risk when pregnant. Physically strenuous work includes prolonged standing for more than 3 hours per day, working on industrial machines, repetitive lifting more than 10kg, assembly line jobs and working in cold, hot or noisy environments etc. So that it is necessary that workstation should be adjustable to reduce any awkward postures and to accommodate pregnant women's changing body [8]. Therefore, there is need of providing awareness and educating people about the ergonomic advice in their occupation which may further help them to decrease their physical strain and decreases further maternal complications.

CONCLUSION

The study recommended that most of the pregnant working women were physically active in

their second trimester of pregnancy and most of their energy was expended on occupational activities.

The present study concludes that risk factors during employment of pregnant ladies are less as the percentage of occupational activity in this study is less 18.58% of energy expenditure.

As well present study also states that there is lack of awareness of exercise during antenatal period is less. Effects to inoculate health educating physical activity into the routine household and occupational activities of pregnant women in their environment are desirable and special attention to paid on group of pregnant workers that have been identified as having higher risk of their occupational activities, whereas physical activity in terms of antenatal exercise is prescribed

ABBREVATIONS

PPAQ - Pregnancy Physical Activity Auestionnaire.

BMI - Body Mass Index.

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Conflicts of interest: None

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