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Research Article

The Association Between Exercise and Birth Outcomes

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Abstract

Background and Aim: Healthy women who participating in physical activity prior to pregnancy can safely continue to exercise during and after pregnancy. Exercise during pregnancy is associated with minimal risk and have indicated benefits such as reduce birth complication and enhance quality after pregnancy. The aim of this investigation is to identify the association between exercise and birth outcomes.

Methods: This investigation was designed to assess the relation between exercise and birth outcomes. Medical data was collected from hospital medical record. Data was gathered from approximately 133 healthy women from Randwick Hospital for Women, Sydney and Wollongong Hospital, NSW, Australia. Data was analysed using descriptive statistics; Pearson correlation was conducted to evaluate the association between exercise and birth outcomes.

Results: No association was observed between participation in physical activity prior to pregnancy, during the first, second and the third trimester and birth outcomes such as the baby's physical condition, birth weight and risk of developing gestational diabetes mellitus.

Conclusion: Despite the few associations that were found, strong support for increased effect of exercise during pregnancy on birth outcomes was not observed for most of the birth-outcome variables.

Keywords: *Women; Pregnancy; Birth Outcomes; Exercise*

Introduction

Within groups of active women during pregnancy, there was no disparity indicated in duration of pregnancy, maternal weight or length of the initial period of delivery or its complications [19,29]. Benefits of exercise during pregnancy included that many women who participated in physical activity experienced a less complicated labour and recovered more rapidly postpartum [31]. Most women (94%) believed that exercise during pregnancy may improve delivery and the baby's health [7,12].

In a study to evaluate the relationship between leisure activity and preterm birth, pregnant women participating in leisure activities were found to reduce their risk of delivering preterm by 66% compared to less active women [20]. Women who did not participate in regular physical leisure activity prior to and during pregnancy expected higher rates of extremely low-birth-weight babies, as compared with women who stayed active prior to and during pregnancy. In addition, previously active women who stopped being active during pregnancy were more likely to deliver at a lower birth weight than were women who stayed active prior to and during pregnancy [24]. It can be concluded that participating in regular physical activity both before and throughout pregnancy decreases the risk of birth complications.

Evidence suggests that health behaviours during pregnancy, such as participating in physical activity, can affect the health of both the foetus and the mother [5,6,9,13,18,28,30]. The safety of physical activity throughout gestation has been contested, mainly due to the fear of foetal development limitation, hypoxia and hyperthermia, which may cause possible foetal teratogenic impacts [1,6,16]. Even so, studies suggest that physical activity is connected with greater general health advantages for pregnant women and their foetuses [1,22,29], including in terms of enhanced growth of foetus [12,21,28,30]. Sufficient levels of physical activity, a healthy diet and an appropriate plan for limiting weight gain throughout gestation have been connected with positive maternal and baby health results [4,21,23,28]. In addition, studies have indicated that sufficient physical activity at different stages resulted in decreased danger of pregnancy difficulties, caesarean sections, low labour weight, preterm delivery, inadequate limitation of weight gain through pregnancy and chronic illness in women's lives.

Methods

This investigation examined the association between exercise and birth outcomes. Hospital medical data of birth outcomes and results from oral glucose tolerance tests were also retrieved from existing data sets on each participant. Medical data was collected from 133 women post birth from Randwick Hospital for Women, Sydney and Wollongong Hospital, Wollongong, NSW, Australia.

Data analysis

Descriptive statistics were conducted using mean ± SD and proportion. The association between physical activity during pregnancy and medical data was examined via Pearson correlation coefficients on continuous variables, and mean differences were used for combined qualitative and quantitative continuous variables. An alpha level of 0.05 was set to assess statistical significance.

Results

Descriptive statistics (Table 1) gathered from respondents showed an average birth weight of 3396.3g (SD = 561.1); 3% of infants had birth weight less than 2500 g. The mean of participants' reported weeks of gestation at birth was 39.1 ± 3.7wk. The proportion developing gestational diabetes mellitus reported from the (n = 133) was 9% of pregnant women. The percentage of babies needing a stay in the neonatal unit for intensive care was 9%. Most women (64%) had a normal vaginal birth, whereas 23% of women had a caesarean section, 10% required the use of an instrument in their delivery and 4% had vacuum delivery.

Type of birth	N	Proportion %
Normal vaginal birth	85	64%
Caesarean section	30	23%
Instrumental	4	4%
Vacuum delivery	14	10%
	Mean	SD
Birth weight	3396.3g	561.1g
Gestational weeks at birth	39.1 wk.	3.7 wk.
Maternal age	35.4 yr.	5.5 yr.

Table 1: *Proportion, mean and standard deviation (SD) of birth outcomes for 133 women.*
Notes: Medical data collected from the hospital's records (n = 133).

The study analysed the outcome variables separately against total physical activity among women who met the physical-activity guidelines (≥ 10 MET-h.wk^{-1}) before and during the third trimester. There was a significant but weak relationship found was between active women during the third trimester and gestational weeks at birth accounted 17% (r = .408, p = 0.05). A significant but weak relationship was observed between total mean energy expenditure prior to pregnancy (r = .243, p = .005), first trimester (r = .334, p = .000) second trimester (r = .282, p = .001) and time the baby spent in the intensive care unit; however, the strength of the relationship is weak (6%, 11% and 7% respectively). No association was observed between participation in physical activity prior to pregnancy, during the first, second and the third trimester and birth outcomes such as the baby's physical condition, birth weight and risk of developing gestational diabetes mellitus. Furthermore, the association between total physical-activity energy expenditure and birth outcomes prior to and during pregnancy. A significant but weak correlation was found between total physical-activity energy expenditure during the first trimester and the bay's physical condition test 12% (r = -.340, p = .000), but no correlation was found between mean total physical-activity energy expenditure at pre-pregnancy, or during the first, second or third trimesters and birth outcomes.

Results indicated that there was no association between normal birth and participating in physical activity prior to and during pregnancy. Results in table 2 showed the proportion in relation to participating in physical activity energy expenditure prior to and during pregnancy and giving a normal and abnormal types of birth, including caesarean section, vacuum, instrument, and vaginal/breech.

	Normal birth					
	Active participants			**Inactive participants**		
	N	**MET**	**%**	**N**	**MET**	**%**
Pre	68	22.7	48	48	5.2	52
T1	48	16.1	50	48	4.9	50
T2	47	17.6	48	41	5.2	52
T3	33	9.7	50	33	6.0	50

Table 2: *The association of physical activity to normal type of birth by mean total energy expenditure (MET-h.wk-^{1}) and proportion.*

Notes: Number of participants in each time point is different between active and inactive at pre (Pre-pregnancy), T1 (Trimester one), T2 (Trimester two), T3 (Trimester three). Medical data was taken from 133 participants.

The results of the study did not clearly support that participation in physical activity during pregnancy is associated with birth outcomes such as the baby's physical condition, birth weight and risk of developing gestational diabetes mellitus. To summarise, despite the few associations that were found, strong support for increased effect of physical activity prior to and during pregnancy on birth outcomes was not observed for most of the birth-outcome variables.

Discussion

The study showed a weak association between exercise and birth outcomes. There are a wide range of studies [5,9,10,28] reporting that exercise is associated with reduction in common complications of pregnancy such as developing hypertension and diabetes reducing related weight gain and birth weight. For example [28] confirms the belief that physical activity during pregnancy offers benefits both to the women and their fetuses. In addition, it is confirmed that physical activity reduces the incidence of preterm labor, operative delivery, and mood disorders.

A significant but weak correlation was found between only the total physical-activity energy expenditure during the first trimester and Apgar scores. This result partly agreed with a previous study that found lower Apgar scores were associated with maternal exercise [3].

Nonetheless, there are other studies that showed no association between maternal exercise and Apgar scores [2,25]. Furthermore, the study results showed a significant association between participation in physical exercise during the first and second trimesters and admission to a neonatal care unit; these findings are consistent with those of [17], who found that pregnant women who exercised and their offspring had shorter hospitalisation than non-exercisers. The current study, results indicated no correlation between physical-activity energy expenditure prior to and during pregnancy and maternal age at birth and birth weight. The study findings showed an agreement with previous studies that had found no significant association between birth weight or weeks of gestation and physical activity among exercising women [2,11,15,25]. For example, the mean maternal age at birth did not vary between the exercise and control groups [2]. Consistent with [3], the current study findings showed no relation between physical activity and lower risk of delivery through caesarean section. Likewise, previous studies indicated that caesarean delivery rates were found to be greater for sedentary women than for active women [26,27].

The study results showed a weak association between exercise and birth outcomes with only few relations observed in Apgar scores and admission to a neonatal care unit. However, such association remains weak, that is, founded only in some stages of pregnancy. Nevertheless, the results of the present study do not fully support and cannot confirm the impact of exercise on birth outcomes or decrease risks of gestational diabetes. In saying that, the study explores the conflicts about the claimed positive association between physical activity during pregnancy and decrease risks of developing gestational diabetes and birth outcomes. There are a wide range of studies [5,9,10,28] reporting that exercise is associated with reduction in common complications of pregnancy such as developing hypertension and diabetes reducing related weight gain and birth weight. For example [28] confirms the belief that physical activity during pregnancy offers benefits both to the women and their fetuses. In addition, it is confirmed that physical activity reduces the incidence of preterm labor, operative delivery and mood disorders.

Conclusion

The study results showed vague associations between exercise and birth outcomes with only few relations observed. Therefore, further research is needed to understand the effect of participation in physical activity on birth outcomes.

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