

Effects of Exercise on Infant Birth Weight and Gestational Age in Pregnant Women

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Objective: When a lady becomes pregnant she surely must be anxious and excited on when is she is going to embark on a journey full of mysteries, surprises and revelations. Birth weight plays an important role in infant mortality and morbidity, childhood development, and adult health low birth weight babies are at an increased risk for mortality short terms and long terms morbidities. The Aim of the study is to find out whether a supervised exercise programme is effective on infant birth weight, gestational age at delivery in pregnant women.

Design and setting: A Experimental study design done with 5 subjects who underwent interventional training of aerobic and strength training for a period of 12 weeks were given .

Subjects: Five subjects of nulliparous woman, subjects within their 24weeks of pregnancy who didn't participate in walking exercise for the last 6 months were included. The procedure was done in Physiotherapy Department at Masterkill College of Nursing and health.

Outcome Measurement: The outcome measurement based on Infant birth weight measured in grams and Gestational age at delivery.

Results: The birth weight of new born infant is noted in gms and gestational age is noted at the time of delivery concludes adherence to exercise protocols among previous sedentary pregnant women are warranted.

Conclusion: Aerobic-dance exercise for sedentary pregnant women appeared to be safe and was not associated with any reduction in newborn birth weight, preterm birth rate (or) neonatal well-being.

Key words: Gestational Age, Birth weight, Aerobic exercise.

I. INTRODUCTION

When a lady becomes pregnant she surely must be anxious and excited on when is she is going to embark. She is on a journey full of mysteries, surprises and revelations too. Therefore it is crucial to arm yourself with proper knowledge about the whole thing including pregnancy symptoms complications, fetus development, diet, checkup tips for healthy, pregnancy and almost every other thing about each stage of pregnancy².

More information makes the mother to enjoy her pregnancy is a period of expectant waiting and one that all of us aspire to experience at least once in our life time. As we set foot on the path that transmutes one from a woman into a mother, several responsibilities and concerns become ours alone⁴. Among these is our duty to the life that is yet to be and how we can give of ourselves in body and spirit to form and nurture the new life that we seek to bring into existence.

Giving life is powerful. It is vital, therefore that we prepare our body to become a suitable environment for the baby to grow in while staying happy and healthy emotionally and mentally as well. Each week of pregnancy brings with it new changes and feelings that may require some explanation and support⁵.

This section touches on those aspects you held to be aware of in the time before, during and after your pregnancy. There are massive hormonal changes for a bit we'll begin with the physical changes that occur after pregnancy⁶. Think of your uterus. It went from the size of your fist to large enough to wrap around a baby now going to shrink and going to bleeding the day you give birth will likely be one of the most physically, mentally and emotionally challenging days you'll ever experience.

Historically, and largely based on socio-cultural reasons more than on scientific evidence, pregnant women have been encouraged to reduce Physical Activity⁷ (PA) and stop working during pregnancy because of perceived increased risk of problems, e.g., such of early pregnancy, loss or reduced placental circulation.

A potential source of controversy on the issue arises from the fact that more "active" or energy-consuming occupational professional activities that require prolonged standing (>3h/day) and/or carrying loads >10kg, such as in industrial work or as cleaning staff and shopkeepers, might increase the risk of preterm birth and low birth weight in comparison with a more sedentary type of activity, for example in executive staff, teachers or office staff indeed while the results of most studies

show PA during pregnancy to be beneficial overall to the maternal-fetal unit and to prevent the occurrence of maternal disorders such as hypertension⁸. There is no definitive, complete answer regarding the effect of exercise during the total duration of pregnancy on the pregnancy.

Birth weight is affected by gestational age at delivery and several maternal characteristics, including racial origin, age body mass index, parity, and cigarette smoking¹¹.

Placental function in early pregnancy, reflected in the maternal serum concentration of the pregnancy-associated plasma protein-A (PAPP-A) at 11-13 weeks of gestation.

Birth weight plays an important role in infant mortality and morbidity, childhood development, and adult health low birth weight babies are at an increased risk for mortality short terms and long terms morbidities^{12,13}.

American college of obstetrics and Gynecology (ACOG) guidelines promote continuation of pre-pregnancy exercise activities and recommend that sedentary women start exercising during pregnancy¹⁴. According to the present guidelines, all pregnant women are encouraged to be physically active for at least 30 minutes on most days of the week, in the absence of medical or obstetrical contraindications.

A Cochrane review from 2009, found no effects of maternal exercise on infant birth weight and Gestational age. However, the optimal dose for recreational physical activity during pregnancy remains to be determined, and the impact of prolonged and repeated aerobic exercise on clinical outcomes for mother and infant are still unclear¹⁵.

The purpose of the present study was to examine the effects of aerobic dance exercise twice a week, in addition to 30 minutes of moderate self imposed physical activity on the remaining week-days, on birth weight and gestational age in new-born of nulliparous previously inactive pregnant women¹⁶.

II. METHODOLOGY

All the eligible subjects were explained about the procedure and written informed consent was obtained before starting the exercise training.

The base line interview cornered demographic information (e.g. Age, Pregnancy week, smoking habit, education, Occupation) assessment of daily life physical activity and sedentary behavior (at work, transportation and household).

The subjects were asked to include 30 minutes of moderate self-imposed physical activity like walking, during their pregnancy.

Participants at the gestational age of 24-36 weeks are taken as study period. They were encouraged to participate in at least 2 out of 3 possible one hour aerobic dance classes per week for a minimum of 12 weeks according to ACOG exercise prescription guideline each session started with 5 minutes of warm up followed by 35 minutes of aerobic dance which included low impact exercises, [Kicks, Grape vines, Marches and Lunges.

Step training [Stepping on and off the stepper] Followed with this they underwent 15 minutes of strength training like light wt dumbbells, for Iron strengthening, squatting for pelvic floor muscles strengthening, pressing towel

to the wall for back muscle strengthening and 5 minutes of cool down, both the warm-up and cool down included stretches.

All aerobic activities were performed at moderate intensity measured by ratings of perceived rate of exertion at 12-14 on the 6-20 Borg's rating scale.

III. DATA ANALYSIS

The birth weight of new born infant is noted in grams and gestational age is noted at the time of delivery that was as follows.

S.No.	Subject	Birth Weight of New born infant	Gestational age at the time of delivery.
1.	Subject-1	2,900 gms	37 weeks
2.	Subject-2	4,000 gms	40 weeks
3.	Subject-3	3,500 gms	39 weeks
4.	Subject-4	4,300 gms	41 weeks
5.	Subject-5	33,200 gms	38 weeks

IV. RESULTS

There was no statistically significant reduction in birth weight and gestational age at delivery in pregnant women.

V. CONCLUSION

Pregnancy fitness is not only important for the fetus as well. Evidence is clear that aerobic fitness improves brain, heart, immune and metabolic function at all ages, including in uterus.

If continued early in life, healthy physical adaptations that occur in the uterus become reinforced behavior, preparing a good foundation for a healthy lifestyle. Babies are acute observes of movement and activity, and learn from each other.

A Key component of a good mom-baby programme is the interaction of the babies themselves. A good teacher will facilitate healthy activity among our smallest class members.

The AHA/ACSM guidelines to the amount of aerobic exercise needed to improve cardiovascular status hold true for pregnant women just as they do for the rest of the population – a minimum of 150 minutes of moderate, or 75 minutes of vigorous, or a combination of these levels of intensity, per week. If you are not getting this level of activity, you are putting your health and that of your offspring at risk.

By this study it is concluded that, Aerobic-Dance exercise for sedentary pregnant women appeared to be safe and was not associated with any reduction in new born

birth weight, gestational age at delivery and neonatal well being.

Further studies on strategies to achieve adherence to exercise protocols among previous sedentary pregnant women are warranted.

VI. DISCUSSION

This is one of very few RCTs investigating the effect of a supervised structured exercise programme on birth weight. No negative effects of a twice a week 12 week aerobic dance programme in 2nd and 3rd trimester of pregnancy in previously sedentary women were found, and there was no statistically significant difference between groups in mean birth weight, low birth weight (<2500g) (or) macrosomia (\geq 4000g). Regular exercise during pregnancy did not affect gestational age (or) prematurity.

The strengths of the present study were use of an assessor blinded RCT design, few losses to follow-up and implementation of an exercise programme following ACOG recommendation, conducted by certified personnel in a supervised setting. In addition, we aimed at Integration of exercises into daily life activities, a focus not reported in other studies.

Adherence to the training protocol was registered, and all follow-up procedures were done by the same investigator. A limitation was the adherence to the training program and that variation in nutritional intake was not assessed. However, EG subjects have similar gestational weight gain.

Clapp reported that previously physically inactive women, who were assigned at gestation week 8 to exercise for 20 minutes 3-5 times per week for the remainder of pregnancy, gave birth to significantly heavier newborns than the control women. A meta-analysis based on both experimental, quasi-experimental and cohort studies, concluded that exercise in pregnancy generally does not affect birth weight. Our results support this conclusion.

Another interesting finding in the other study was that mean apgar score of the newborns was higher in the EG compared to the CG at immunity. However, by 5-minutes these were no difference. Clinically the 5 – minutes score may be more relevant as this score assesses how well the newborn is adapting to the new environment, compared to how well the baby has tolerated the birthing process (1-minute score).

The pregnant women in this study were healthy nulliparous with a high educational level, and are therefore not representative for all eligible women.

Study has established a reference range of birth weight for gestation in a large heterogeneous inner-city population of singleton pregnancies in which gestational age was determined by an ultrasound scan in early pregnancy.

Birth weight is significantly influenced by maternal characteristics such as racial origin, weight, height, parity, cigarette smoking, and medical history of chronic hypertension and pre-pregnancy diabetes mellitus.

Birth weight increased with maternal weight and height. It was higher in parous than in nulliparous women and in those with a medical history of pre pregnancy diabetes mellitus and it was lower in cigarette smokers, in all racial

groups other than in Caucasian women, and in those with a medical history of chronic hypertension.

Irrespective of age, weight and height of mother and race. Women who eat well and gain the appropriate amount of weight are more likely to have healthy babies. So if you are eating fresh, whole some foods and adding pounds, relax.

REFERENCES

- [1] Susan M. Balke et al Pregnancy Intentions and Happiness Among Pregnant Black Women at High Risk for Adverse Infant Health Outcomes, 39, 121-2007 Nih Initiative
- [2] Angeles L, 2009, "Do children make us happier?" University of Glasgow, mimeo.
- [3] Blake SM, Kiely M, Gard CC, El-Mohandes AA, El-Khorazaty MN, 2007, "Pregnancy intentions and happiness among pregnant black women at high risk for adverse infant health outcomes," NIH-DC Initiative, Perspectives On Sexual And Reproductive Health 39, (4):194-205.
- [4] Oklahoma State Department of Health, 2009, "Stressors, social support and pregnancy outcomes among African American and White mothers," Pregnancy Risk Assessment Monitoring System, 13(2): 1-6.
- [5] Hummer, Robert, Schmertmann CP, Eberstein IW, Kelly S, 1995, "Retrospective reports of pregnancy wantedness and birth outcomes in the United States," Social Science Quarterly, 76(2): 402-418.
- [6] Hormonal Changes in the Uterus During Pregnancy- Lessons from the Ewe: A Review ABU NASAR MD. AMINOOR RAHMAN * School of Agriculture and Rural Development, Bangladesh Open University, Gazipur, Bangladesh Received 18 July 2004; received in revised form 18 May 2005; accepted 22 June
- [7] Wolfe LA, Davies GA, Canadian Guidelines for exercise in pregnancy. Clin obstet Gynecol 2003; 46(2): 488-95. Dir: 10. 1097/00003081 – 200306000-00027. [Pub Med]
- [8] Madsen M, Jorgensen T, Jensen ML, Juhl M, Olsen J, Anderson PK, Nybo Andersen AM. leisure time physical exercise during pregnancy and the risk of miscarriage: a study within the Danish National Birth cohort. BJOG.2007; 114(11): 1419-26. doi:10.1111/J.1471-0528.2007.01496. X. [PMC free article] [Pub Med]
- [9] Frankel S, Elwood P, Sweetnam P, Yarnell J, Smith GD. Birth weight, body-mass index in middle age, and incident coronary heart disease. Lancet.1996; 348 : 1478-80. doi : 10.1016/S0140-6736 (96) 03482-4 [Pub Med]
- [10] Osler M, fund R, Kriegbaum M, Andersen AM. The influence of birth weight and body mass in early adulthood on early coronary heart disease risk among Danish men born in 1953. Eur J Epidemiol. 2009; 24(1): 57- 61. doi: 10. 1007/S 10654 – 008 -9301-Z. [Pub Med]
- [11] WORK-UP OF STILLBIRTH: A REVIEW OF THE EVIDENCE Robert M. SILVER, MD,¹ Am J Obstet Gynecol. 2007 May; 196(5): 433-444.
- [12] Bell R. Trends in birth weight in the north of England. Hum fertil (Camb) 2008; 11(1): 1-8. doi: 10.1080/14647270701654369.
- [13] Whin cup PH, Kaye SJ, Owen CG, Huxley R, Cook DG, Anazawa S, Barrett – Connor E, Bhargava SK, Birgisdottir BE, Carlsson S. et.al. birth weight and risk of type 2 diabetes : a

systematic review. JAMMA. 2008; 300(24): 2886 – 97
doi:10.1001/Jama.2008.886. [Pub Med]

[14] EXERCISE AND NUTRITION PREVENT EXCESSIVE WEIGHT GAIN DURING PREGNANCY
by Lauren Johnson | Jul 16, 2012 Vol. 44, No. 8, pp: 1419-1426)

[15] Clapp JF, kim H, Buriciu B, Schmidt S, Petry K, Lopez B
continuing regular exercise during pregnancy: effect of exercise volume on fetoplacental growth. Am J obstet Gynecol. 2002; 182(1):142-7. doi:10.1067/mob.2002.119109. [Pub Med]

[16] EXERCISE IN PREGNANT WOMEN AND BIRTH WEIGHT: A RANDOMIZED CONTROLLED TRIAL
Lene AH Haakstad* *BMC Pregnancy and Childbirth* 2011, 11:66

[17] Barakat R, Lacia A, Ruiz JR. Resistance exercise aiming during pregnancy and new born's birth size a randomized controlled trail. Int. J Obes. 2009; 33(9): 1048-57. Dri:10.1038/ijo.2009.150

[18] Bell R, plasma S. Antenatal exercise and birth weight. Aust N Z J obstet Gynaecol. 2000; 40(1): 70-3: 10.111/j.1479-828x.2000.b03171.X. [Pub Med]

[19] Clapp JF, kim H, Buriciu B, Schmidt S, Petry K, Lopez B
continuing regular exercise during pregnancy: effect of exercise volume on fetoplacental growth. Am J obstet Gynecol. 2002; 182(1):142-7. doi:10.1067/mob.2002.119109. [Pub Med]

[20] Collings CA, Curet LB, Mullin JP Maternal and fetal responses to a maternal aerobic exercise programme. am J obstet Gynecol. 1983; 145(6):702-7. [Pub Med]

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