THE EFFECTS OF EXERCISE ON THE OVERALL HEALTH OF WOMEN AND FETUSES DURING PREGNANCY

Uche T. Oniomovigho, Ph.D
Department of Science Education (Physical and Health Education Unit)
University of Delta, Agbor, Delta State

Abstract

This paper examines the effects of exercise on the overall health of women and fetuses during pregnancy. The overall health of women and fetuses encompasses their physical, mental, and emotional wellbeing. Exercise is a physical activity done for the purpose of getting physically fit, while physical fitness is a state of bodily function that is characterized by the ability to tolerate exercise stress. Certain mild exercise is prescribed for pregnant women on regular basis, depending on the pregnancy stage. Regular exercise done by pregnant women possessnumerous benefits on their overall health, as well asfetuses, and there are also some risk factors associated with exercise on pregnant women and thefetuses, if not administered by exercise experts. Given the importance of exercise intensity and duration to the specific benefits and dangers to the mother and fetus, it is important to recognize that what may be good for mothers could be detrimental to the fetus. However, experts are of the opinion that care should be taken to prescribe exercise that can be beneficial to both mother and fetus. Exercise were recommended for pregnant woman and also the general guidelinesfor exercise programmes were prescribed and recommendations were made from the study.

Key Words: Effects. Exercise, Fetus, Pregnancy, Prescribe, Women.

Introduction

Health they say is wealth**,** so,the health of every individual is very paramount to their wellbeing, hence the constant practice to improve on it. Excellent health is not only beneficial to individuals per see, but to the productivity output of the nation as well. Exercise on a regular basis, has been recommended according by numerous research findings, as a vital way to sustaining, maintaining and improving one's health status for wellness and longevity purposes (American College of Sports Medicine, 2015). Exercise is a physical activity done for the purpose of getting physically fit (Smith, 2019). Exercise is as activity that is performed for the purpose of improving,

maintaining or expressing a particular type(s) of physical fitness.Physical fitness as a state of bodily function that is characterized by the ability to tolerate exercise stress. Health is the optimal well-being that contributes to one's qualityof life, and it is more than freedom from disease and illness, though freedom from disease is important to good health. Health varies greatly with income, gender, age, and family origin, and reducing health disparities among adults over eighteen is a major national health goal (US Department of Health and Human Services, 2019).

Physical fitness attributes are increased with regular exercises and good nutritional status. The health status of women at any stage of their lives requires adequate regular exercise by improving their physical fitness components. Health benefits of exercise and the increasing participation by women in exercise have raised the concern of the role of exercise on women and fetuses during pregnancy. This paper is therefore, concerned with the effects of exercise on the overall health of women and fetuses during pregnancy. To conceptualize the title of this paper, the following subtitles were highlighted; brief history of exercise and health, exercise on woman, the effects of exercise on pregnant women, the effects of exercise on fetus, recommended exercises for pregnant women, summary, conclusion and recommendations.

Brief History of Exercise and Health

The relatively recent recognition of the beneficial nature of exercise to health and wellbeing might be viewed as evidence of the inability of past research to provide credible links between exercise and improved health (Messengale& Swanson, 2017). However, this conclusion is far from the truth. As early as 1880s, evidence exist linking regular physical activity with the prevention of death due to heart disease and stroke (Berryman, 2015). The discipline of exercise physiology was partly developed on the basis that exercise influences the incidence and development of heart disease (Messengale& Swanson, 2017).

The first half of the twentieth century was largely influenced by both wars, and therefore exercise physiology was focused on military training. However, after World War II, there was a reemphasis on the influence of exercise on preventing heart disease (Morris &Paffenger, 2018). Since the classic studies of the latter authors, dozens of additional studies have identified exercise and physical activity as associated with a reduced incidence and severity of disease.Women who exercise have an increased likelihood of improved health and decreased risk for developing degenerative delicate nature of the

neuroendocrinological regulation of the female hypothalamic pituitary – ovarian axis, chronic exercise can lead to cycle irregularities (Robergs&Keteyian, 2003).

Exercise on women can cause the following disorders: (i) Athletic amenorrhea; (ii) Bone mineral status; and (iii) the female athlete triad

Athletic amenorrhea: This is the absence of a menstrual cycle induced by endocrinological responses from exercise training that inhibit the release of follicle-stimulating hormones from the anterior pituitary gland (Robergs&Ketoyian, 2003). According to Locks (2016), subgroups of women who exercise have been reported to have a shortened luteal phase of menstrual cycle. The degree of luteal phase shorten in has been shown to correspond to the intensity of training (duration and frequency of training), with more intense training exacerbating the decrease in the length of the luteal phase. For females who train too hard, increasing likelihood of a negative energy balance (De Cree, 2018 and Locks, 2009).There is a risk that the luteal phase will continue to shorten and that they will eventually experience a cessation of a menstrual cycle, a condition called athletic amenorrhea.

Bone mineral status: (Premature osteoporosis): The cessation of the menstrual cycle has ramifications for the female other than a natural means of birth control. The absence of surge in FSH (follicle-stimulating hormone) and LH (Luteinizing hormone) prevents developments of the ovarian follicle, from which estradiol and progesterone are produced. The inability of the female to produce ovarian estradiol chronically lowers circulating estradol concentrations, which increases the rate of bone resorption from the skeleton, thereby increasing the risk of premature osteoporosis (Daisky, 2010). According to Lloyd (2016), evidence also exists that connects females with menstrual irregularities to a higher incidence of musculoskeletal injury.

The female athlete triad: The Americans College of Sports Medicine (2015) publisha position stand on the syndrome comprising disordered eating, a cessation of the menstrual cycle and osteoporosis. These three interrelated conditions have been termed the female athlete triad. The conditions are interrelated because the social and peer pressure of athletic women attempting to attain an unrealistic body weight often results in the ingestion of inadequate number of calories in the diet. Poor diet, when combined with excessive exercises, can exacerbate the endocrine responses to the exercise and dietary stress, causing a cessation of the menstrual cycle (De Cree, 2018).

According to Robergs and Keteyian (2003),amenorrhea causes a reduction in circulating estrogen, producing an increase in bone mineral loss, which when sustained overlong periods of time contributes to the development of

Oestoporosis. De Cree (2018) commented that female athlete triad is not necessarily typical of all athletic women who experience exercise-related menstrual irregularities (ERMI). For example, some women experience ERMI simply from excessive exercise without caloric restriction, or a decrease in body fat or total weight. Thus, the proposed mechanism for the ERMI and amenorrhea of the female triad is a disturbance of the hypothalamic – gonadotropine - releasing hormones axis. This disturbance is believed to be secondary to chronic increases in circulating catecholamine, cortisol, and oploidhomonics.

The ACSM position on the female athlete triad contains nine key features which are summarized as follows according to Locks & Wilmore, (2019):

- The female athlete triad is a serious syndrome that can affect elite athletes, as well as none elite physically active girls and women. The triad can result in declining exercise and sports performance, as well as increase the risk for premature morbidity and mortality;
- The attempt to maintain an unrealistically low body weight is a consistently occurring characteristic of this condition;
- The triad is often unreported because of denial and poor diagnosis. Thus, professionals involved with exercise, sports, and training need to be aware of the triad and should be able to recognize, diagnose, and provide treatment recommendations;
- Screening for the triad should involve the following; menstrual change, disordered eating, weight change, cardiac arrhythmias, depression, or skeletal stress fractures. Because of the specific nature of these symptoms, collaboration with health care professionals (dietitians, clinicians) is recommended;
- Professionals involved with exercise, sports, and training should promote and provide exercise training and support functions that do not exacerbate any of the components of the triad;
- Parents should not pressure their daughters to lose weight. Thus, in addition to the client/athlete, parents and/or additional family members are also a target audience for education and prevention of the triad;
- Sports governing bodies should accept the responsibility of recognizing and preventing the triad in their female athletes;
- Physically active girls and women should be educated about the triad and appropriate ways to ensure proper nutrition and training practices. Further research on the prevalence, causes, prevention, and treatment of the symptoms of the triad is needed.

The Effects of Exercise on Pregnant Woman

The health benefit of exercise and the increasing participation by women in exercise have raised the concern of the role of exercise for the mother and fetus during pregnancy (Robergs&Keteyian, 2003). Initial inquiry into this topic concerned the effects of exercise on uterine and fetal blood flow, core and fetal temperature fluctuations, carbohydrate metabolism, and protection from the physical shock accompanying certain movements.

Exercise has obviously benefitted pregnant women, and they are as follows according to (American College of Sports Medicine, 2015; Smith, 2019 and Lloyd, 2016):

Improved Insulin Sensitivity: The insulin present in the body organ will be boosted to a point where it will become enhanced and ready for use when required, and this will assist the health status of pregnant women;

Improved Body Fat Control: Exercise has helped to a great extent in the reduction body fat that would have otherwise by detrimental to health status if in excess. Reduction in body has also reduced the cholesterol content in the body that would have caused problems to the body;

Psychological Interactions: There has been improved tendency of psychosocial interactions of pregnant women with regular exercise. This will assist in public interaction with members of the public, and friendliness will be assumed. Exercise does this when it has brought about effective blood circulation and hormonal functions in the body of pregnant women;

Potential Decreased from Complications: Exercise in the lives of pregnant women has further helped to improve their muscular strength and flexibility, and these muscles come to play during child birth.Complications that would have arisen would be minimized because of the fitness level of the would-be-mother;

Potential Decreased Labour: The stomach muscles of a pregnant woman would have been strengthened during bouts of exercise, and these muscles assist to push the fetus out with vigorous contractions during birth labour.

Table 1: Physiological Changes Resulting from Pregnancy and Potential Benefits of Exercise During Pregnancy

Changes During Pregnancy	Potential Benefits of Exercise
Body weight	Improved posture
↑ Heart size	↓ Weight gain
Altered center of gravity	Back pain
↑ Plasma volume (45%)	↓ Anxiety and depression
Physiological anemia	↓ Risk of gestational diabetes
↑ Heart rate, stroke volume	↓ Diabetes
↑ Cardiac output	↓ improved digestion and intestinal
↑ motility	↓
Peripheral vascular resistance	
↓ Venous compliance	Post partum belly

Source: Adapted from American College of Sports Medicine (2015).

Risks of Exercise on Pregnant Women

Despite the benefits of exercise to pregnant women, certain risks are also inherent, and according to ACSM (2015), Hypoglycemia occurs since prolonged exercise is accompanied by decreased in the body's skeletal muscle and liver glycogen stores. Low skeletal muscle glycogen increases the reliance of skeletal muscle metabolism on blood glucose concentrations, and can cause decrease in blood glucose below normal (< 3.5 to 4.0 mm01/L), resulting in hypoglycemia (Robergs&Keteyian, 2003). Because several tissues of the body are solely reliant on blood as the source of glucose for energy metabolism (e.g. red blood cells, neural tissue), the body must continually regulate blood glucose, and if possible decrease the use of glucose by other tissues during low carbohydrate conditions (Robergs&Keteyian, 2003). Pregnant women are not spared from the disorder.

Hyperthermia: Continuous or intermittent exercise performed for prolonged periods of time is associated with increased sweat rates and a reduction in body water or dehydration (Hubbard & Armstrong, 2017). When exercise is performed in hot or humid environments, "the potential for dehydration is increased. In addition, the heat generated from exercise in combination with the heat stress from the environment can also increase in risk of excessive body heat storage (hyperthermia), resulting in cardiovascular complications, central nervous system and motor function impairment, and in extreme circumstance even death

(Hubbard, 2009; Wilmore, 2018). Pregnant women are not spared from this disorder.

The Effect of Exercise on Fetuses

Fetusesare the unborn children in a pregnant women's wombs. As a pregnant woman gets involved in exercise; it is quite certain that the fetus in the womb will derive some effects of the benefits and risks as well. One method to assess fetal responses during exercise performed by the mother is to record changes in fetal heart rate. Initial research performed on sheep has documented increase in fetal heart rate; however, it is unclear whether similar responses in humans are due to ischemic hypoxia or simply of increased catecholamine levels. The difficulty of performing research on pregnancy and exercise using human subjects has resulted in similar vague findings for temperature changes and glucose metabolism (ACSM 2015; Clapp, 2019).

Benefits of Exercise to Fetuses

The benefits of exercise to fetuses according to Lorkey, Tran, Wells, Myers and Tran (2017) are as follows; Exercise by pregnant female may develop increased capacities for supporting the fetus, such as improved cardio-vascular function and carbohydrate metabolism. Others are:

Potential Decreased Birth Labour: Exercised pregnant women would give birth easily which, in order word, is advantageous to the fetus, who in return will have less problems fighting its way out;

Potential Decreased Birth Complications: Exercised pregnant women obviously give birth with minimum time span and this inturn augur well for fetus because of less complication. Complications that would have had adverse effects on fetus are averted to its advantage;

What are the Risk Factors of Exercise on Fetuses?

Certain risks are inherent in exercise to fetus, and they are as follows according to Lorkey et al, 2017:

Hypoglycemia: This is the abnormally low blood glucose. A syndrome which is passed from the pregnant mother to the fetus-in-utero. This condition poses great danger to it because of its potential danger, which might cause death;

Hyperthermia: Deaths have occurred during or as a result of various sports activities due to problems of dehydration (water deficiency) and hyperthermia (overheating). The fetus is not spared from this syndrome, when its intending mother is over-exercised or suffering from it;

Decreased Placental Blood Flow: According to research findings, during intense exercise bout, because of the much blood supply needed by pregnant woman, there will be short supply of blood flow to the fetus. This will not be in the interest of the fetus, because it will be starved of air supply and needed nutrition for survival;

Physical shock: Depending on the stage of the fetal growth, it might be in physical shock after the intending mother has finished exercising and is exhausted. The physical status of a pregnant woman affects that of the fetus;

General Guidelines for an Exercise Programmes

When an inactive individual begins a physical activity programmes there are several very basic and important factors that need to be considered. Wilmore (2017) recommended the following guidelines for exercise programmes:

Clothing: The choice of clothing will obviously depend upon the weather and theactivity in which the individual plans to participate. However, clothing should always be comfortable, reasonably loose, and heavy or light enough to ensure protection from heat, cold, and wind. Because of the heat generated with exercise, it is better to under dress than overdress;

Shoe: A good quality of tennis, basketball, or gym shoe is recommended for most types of activities. For programmes of running, jogging, or walking, however, special shoes are recommended that have been designed specifically for those activities;

When to Exercise: Almost any time of the day is acceptable for exercising, except for an hour or two following a meal and during hot and humid weather;

Illness or Injury: The physical activity programmes should be modified or temporarily stopped during illness, injury, or infection that might be aggravated by such a programmes. Use proper footwear and socks should be used and one should take it easy at the beginning to avoid potential foot and leg problems;

Motivation: Since the physical activity programmes is intended to be a lifetime pursuit, it is important that the individual be properly motivated. Several helpful suggestions are listed below to help overcome the motivation problem;

Either select activities you enjoy or learn to enjoy the activities in which you feel you must participate exercise with a partner or become member of a formal group. however, do not get talked into competition, take related physiological and medical measurements and attempt to chart your improvement on each of these become educated in what you are doing by reading attempting

lectures or seminars and by group discussions; attempt to understand the importance of a physical activity programmes relative to your health.

Recommended Exercise for Pregnant Women

However, the following are the recommended exercise for pregnant women such as:

- Certain exercises are recommended for pregnant women since it is not regular for them to be involved in complex ones.
- The intensity and durations as well as its frequency programmes should be designed, specifically, on the basis of the results of the medical evaluation which should be designed, specifically, on the basis of the results of the medical evaluation which should have been earlier carried out as well as on the basis of the individual exercise, capacity interests and personal needs and it should be designed to bring to a reasonable time interests (Wilmore, 2018).
- Based on a metanalysis of the effects during pregnancy on the mother and fetus, no evidence exists to indicate that exercise performed 3 times a week for up to 45-minute duration at a heart rate of 144 b/mm is harmful (Lorkey, et al, 2007).
- The bicycle ergometer that involves static movement is okay for pregnant women at low duration and intensities. Duration of exercise should not exceed more than 15 minutes. Because of the decrease in the potential for trauma and risk from falling, non-weight-bearing exercises such as risk for falling, non-weight-bearing, cycling, swimming, or other water-based exercise are recommended for the pregnant female (Lorkey et al, 2017).

Conclusion

Exercise is useful tool to the human being because of its valuable importance to preparing him physically, mentally and socially for life's endeavour. Pregnant women and fetuses are not left out of the usefulness of exercise, for they need physical activities to tone their muscles as well, no matter how minimal they may be in their muscles, other physical fitness attributes will be worked on, and this will assist in preparingwomen for child birth. The benefits of exercise to pregnant women at a regular basis will also help in the positive development of fetuses. Care should be taken for every exercised pregnant woman not to over- stress themselves to exhaustion, because this might result to risk factor and the fetus.

Recommendations

The following were the recommendations for the paper:

1. Medical checkup should first be conducted

2. Pregnant women who have symptoms of infection, cardiovascular disease, orother illness may not be suitable for exercise performed 3 times per week for up to a 45 - minutes duration at a heart rate of 144b/min.

Exercise performed for longer durations, at higher intensities, at high attitude or during increased thermal stress (hot or humid conditions) may be unsafe.

4. To avoid the risk of hyperthermia when exercising in a swimming pool with warm water. Pregnant females should exercise in cool water (< 88^{o}F0).

5. Given the importance of exercise intensity and duration to the specific benefits and dangers to the mother and fetus, it is important to recognize that what may be good for the mother may be detrimental to the fetus.

6. Future research needs to moreclearly identify exercise intensities and conditions associated with unacceptable risk to fetal well-being.

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