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Exercise Prescription for Stages of Pregnancy and Postpartum Period

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Abstract

Exercise is a component of physical activity done with the intention to get physically fit to carry out daily activities without undue stress. Habitual participation in exercise is beneficial to all categories of people, including pregnant women. The pregnancy period is regarded as a period of inactivity, but an active lifestyle during this period has significant positive health benefits for the mother and the fetus. Despite the positive gains of regular engagement in exercise, many pregnant women do not participate in it. To increase the participation of pregnant women in exercise, there is a need for clinicians and exercise professionals to understand the exercise protocols for all the stages of pregnancy and the postpartum period. It is believed that if clinicians and exercise professionals understand the correct exercise regimen during pregnancy, they will adequately assist pregnant women to engage regularly in exercise. Through this study, clinicians and exercise professionals will be kept abreast of the latest research discussions on exercise during pregnancy.

Keywords: Exercise Prescription, Exercise Protocols, Gestation, Physical Activity, Postpartum,

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INTRODUCTION

Exercise is a component of physical activity done with the intention to get physically fit to carry out daily activities without undue fatigue and stress. It is a principal form of physical activity that is planned, structured, repetitive and a purposive bodily movement engaged in to improve or maintain one or more components of physical fitness such as cardiorespiratory, muscular strength, muscular endurance, power, speed, coordination, balance and flexibility (ACSM, 2009; Ajibua & Michael, 2016). Exercise has preventive and curative mechanisms against diseases. It is a cost-effective and sustainable approach to improve quality of life and life satisfaction. Regular engagement in it has been identified by the United Nations Organization as one of the four (4) strategies to step down global epidemics of non-communicable diseases (Alla & Ajibua, 2012). Akarolo-Anthony and Adebamowo (2014) reported that regular exercise is beneficial to all categories of people, pregnant women inclusive. There have been studies at the global level indicating benefits, knowledge and attitude of pregnant women toward exercise (Bushman, 2012; Dion, et al, 2014). Of course, these studies further confirmed that exercise is very good for human existence and subsistence. However, many pregnant women globally do not meet the minimum guidelines set by the American College of Obstetricians and Gynecologists (ACOG, 2009). The situation in sub-Saharan African countries such as Nigeria is more complicated because physicians and physical education graduates are not well-schooled in exercise prescription for stages of pregnancy. Hence the unavailability of research works in this area in Nigeria in particular and sub-African countries in general.

Research has shown that most women have knowledge of the benefits of exercise during pregnancy (Okafor and Goon, 2021). However, the current low levels of exercise engagement among pregnant women show that having knowledge alone does not translate to positive practice (Okeke, Ifediora, and Ogungbe, 2020). Women need to be encouraged through guidance of correct and result-oriented exercise prescription by trained personnel's.

This study intends to research exercise prescription for stages of pregnancy and the postpartum period. It is believed that if clinicians and exercise professionals are well-grounded in this area, it will have positive effects on the health of the mother and the baby. Consequently, this will encourage pregnant women to continue to participate in exercise.

Literature Review on Exercise during Pregnancy

The first guidelines for exercise during pregnancy were published by ACOG in 1985. It was recommended then that maternal heart rates should be kept below 140 BPM and that moderate intensity activities should be limited to 15 minutes. Wing and Stannard (2016) maintained that no one target heart rate that is right for every pregnant woman. Consequently, these guidelines were removed in 1994 and were replaced by more specific guidelines in 2002 and reaffirmed in 2009. The concept most expert now relies on as a guide is the Rate of Perceived Exertion (RPE). This scale determines how hard a pregnant woman works based on how she feels when participating in exercise. Similar to the general population, ACOG (2020) recommended at least 150 minutes of moderate-intensity aerobic activity (for example, 30 minutes a day, five days a week) for healthy pregnant women and agreed that the benefits of exercise during pregnancy greatly outweigh the risks. The 2018 update on the US Department of Health and Human Services Physical Activity Guidelines for Americans reinforced the 150 minutes of moderate-intensity activity for pregnant women per week (U.S. Department of Health and Human Services Physical Activity Guidelines for Americans, 2021). To test the intensity or exertion of pregnant women, the "talk test" methodology can be used. As long as the woman can have a conversation while exercising, means she is not over-exerting herself.

Pregnancy is regarded as a period of inactivity, but exercise during pregnancy has significant positive health benefits with minimal risk for both the mother and the fetus (Wing & Stannard, 2016). Thus, exercise should be considered a front-line strategy for enhancing maternal physical and mental health. For the mother, exercise is associated with prevention and control of gestation diabetes and excessive weight gain, reduction in low back pain, positive mental health, timely vagina delivery, reduction in stress response and can lead to healthier birth weight (Bushman, 2012). Ruskin (2002) study also maintained that exercise will improve mood, and prevent hypertensive disorder during pregnancy and enhance children language skill development. Another study revealed that language skills in children tested at age five were superior in children whose mother had exercised throughout pregnancy as opposed to those whose mother did not exercise during pregnancy (Mikesta & Quatro, 2004). Therefore, all pregnant women without contraindications should be encouraged to participate in aerobic and strength-conditioning exercises as part of a healthy lifestyle during pregnancy.

Pregnancy affects every system of the body. Therefore, exercise professionals need to understand the physiological changes, body composition, alterations and biomechanical adaptations to exercise during pregnancy (Rankin, 2002). Pregnancy is one of the most important periods in women's lives, thus, exercise should be carried out safely and correctly. The unique physical and physiological conditions that exist during pregnancy and postpartum period create special risk that does not affect non-pregnant women. Therefore, careful consideration should be given to the additional impact that exercise may have on the progressive anatomical, physiological and psychological changes that may occur during pregnancy. In other words, exercise routines should be designed to fit women as stipulated by the principle of individualization in physical training.

One of the most obvious transformations during pregnancy is weight gain. Currie and Rich (2004) contented that the pregnancy period is the time when a significant weight can be gained, that women who gained more weight than the recommended weight during pregnancy and who fail to lose the weight six (6) months after giving birth are at a much higher risk of being obese nearly a decade later. Weight gain may cause many changes to women both at rest and during exercise. It may take a toll on the women's joints resulting in discomfort. Pregnant women typically experience lordosis in the lumbar spine, creating a shift in their centre of gravity (Martens, Harnandez, Strickland & Boatwright, 2006). This shift can directly affect posture and balance in body alignment This should be acknowledged both during exercise and when at rest; activities that require quick directional changes should be avoided to decrease the risk of injuries. Aside from this, motor skills and balance may affect women as the pregnancy progresses. This suggests that biomechanical and hormonal changes due to pregnancy may influence injury rates in the higher risky physical activities. It must be noted too that changes that occur during pregnancy should not be seen as limitations; rather, women should be encouraged to promote healthy habits such as regular participation in exercise during this period.

To arrange exercise for maximum effect, exercise professionals should start the session with warm-up activities to reduce the risk of injury. Thereafter, he/she proceeds with the actual workout session and end with 'cool down' to prevent blood from pulling to the extremities. Order of exercises may be from large muscle or multiple joint exercises to small muscle groups or single-joint exercises (Pipper, et al, 2012). Davies, et al (2003) asserted that when starting an exercise program, previously sedentary women should begin with 15 minutes of continuous exercise, three times a week and then increase gradually to 30 minutes per day, at least five times a week. The American College of Sports Medicine (ACSM) endorsed these guidelines from the American College of Obstetricians and Gynecologists (ACOG), the Joint Committee

of the Society of Obstetricians and Gynecologists of Canada, and the Canadian Society for Exercise Physiology. However, ACSM (2009) admonished that all exercise should be modified for the safety of the fetus and mother. It suggested, for example, that pregnant women should replace contact sports with non-contact sport or an appropriate exercise class and that women who were not active before pregnancy should be advised to avoid intense exercise as running, jogging, racket games, bouncing while stretching and other strenuous strength training. In addition, they should avoid all sports that are linked to increased risk of falling, trauma and impact injuries. It was advised too that pregnant women should avoid exercise in hot and humid weather, avoid exercise to the point of exhaustion and activities performed above 6,000 feet above (if you are not already at a high altitude) (Depkin, & Zelasko, 1996; American Pregnancy Association, 2019). In general, pregnant women should not perform activities that they are not accustomed to but continue with familiar activities.

When planning exercises, pregnant women should be encouraged to wear loose-fitting, comfortable clothes, a good supportive bra as well as fitting shoes that are designed for the exercise that she is going to do. She must eat at least one hour before exercising, rehydrate by drinking enough water before, during and after workouts. She should also listen to her body (Rankin, 2002). Exercise leads to dangerous overheating and dehydration as earlier mentioned. These situations can be dangerous for the baby particularly in the first trimester. Thus, taking a few precautions can keep a pregnant woman safe while exercising.

During pregnancy, women are advised to use weight machines and or resistance bands in place of free weights to reduce the risk of injuries caused by the changing centre of balance. They should also decreased resistance training, increase repetitions, use shorter sets, avoid powerlifting activities, concentrate on maintaining proper form during lift (Pipper, et al, 2012; Dion, et al, 2014). American College of Obstetricians and Gynecology (2002) considered the following conditions to be “absolute” contraindications to aerobic exercise during pregnancy:

- Significant heart or lung disease
- Incompetent cervix
- Multiple gestations at risk for premature labour
- Persistent second or third trimester bleeding
- Placenta previa after twenty-six weeks
- Premature labour during this pregnancy
- Ruptured membranes
- Pregnancy-induced hypertension

Most women who are active before pregnancy can, and should, continue to exercise. The type and intensity of exercise should be based on the previous history, health and comfort. According to Szumilewz, et. al. (2019), many women can continue to train at moderate-intensity early in the pregnancy. As the pregnancy continues, exercise intensity should be decreased naturally and the type, duration and intensity of exercise are modified with comfort and safety in mind. Most importantly, sedentary women who want to begin exercise during pregnancy should consult their physicians. This is because only a physician can determine the presence and absence of any potential complication factors. Sedentary pregnant women can safely engage in low-intensity exercise. Walking is typically recommended. Exercise professionals should ensure that all their clients who are pregnant have a physician’s clearance

before recommending exercise. Dion, et al (2014) argued that pregnant women should be advised to stop exercising and see their doctors if any of these warning signs occur:

- Vaginal bleeding
- Prolonged dizziness or faintness
- Chest pain
- Persistent headache or out-of-the-ordinary muscle weakness
- Calf swelling or pain
- Uterine contractions
- Big decrease in fetal movement
- Fluid leaking from the vaginal

Exercise Prescription for Stages of Pregnancy

For exercise prescription to attain its goal(s) two (2) basic steps must be observed, namely; pre-exercise screening and the main activity.

- **Pre-Exercise Screening:** To ensure effective exercise prescription, exercise professional must have information on their clients. A sound pre-exercise screening protocols will help the trainer ascertain the health status and exercise goal of her clients. The pre-activity screening according to the FISAF (2019) include diet, exercise history, stress level, family history personal history etc. From the pre-exercise screening, major risk factors can be identified and compared to well-established health status parameters from which individual client can be categorized. Meanwhile, there are three risk stratifications, namely, apparently healthy, individual at risk and individual with disease.
- **The Main Activity:** Training and conditioning programs must be tailored towards attaining individual needs. The basic principles of exercise prescription apply for all people. According to the Federation International Sport, Aerobic and Fitness (FISAF) (2019) these can be summarized under four headings using the acronym FITT.

The FITT Principles

F - Frequency

- Minimum training sessions per week
- Workout every other day

I - Intensity

- Sufficient intensity to generate overload
- Based on Training Heart Rate (THR) Range (* Karvonen Formula)
- Based on Perceived Rate of Exertion (PRE) scale
- Based on % Repetition Maximal Lifts (RM)

T - Time

- Minimum of 15-20 minutes for pregnant women
- Ideal time 30 - 40 minutes
- Duration of exercise more important than intensity

T - Type

- Aerobic in nature using large muscle groups e.g power walking, jogging, swimming, aerobic classes, bike riding etc for cardiovascular improvement
- Resistance training for strength conditioning
- Stretching exercises for joint specific flexibility conditioning

First Trimester: Weeks: 1-13 of Pregnancy

During the first trimester, pregnant woman will experience many changes though the weight gain will be minimal, but the hormone will be in full effect. The energy level may likely drop, with breast tenderness and back pain. The woman should try to maintain balance and make regular exercise key during this period. She should also embrace strength and aerobic exercise routinely. Due to the production of relaxin, the women should abstain from heavyweight training and ensure that temperature does not exceed 102 Fahrenheit. During the workouts, the woman should be made to try two-sentence conversations to determine the intensity of the training (Mikesta et al, 2004).

DAY 1 Monday	DAY 2 Tuesday	DAY 3 Wednesday	DAY 4 Thursday	DAY 5 Friday	DAY 6 Saturday	DAY 7 Sunday
Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 12 Sets: 2	Active Rest	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor Activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 12 Sets: 2	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor Activities	Rest

2nd Trimester: Weeks 14-26 of Pregnancy

At this stage, there are more changes in the body and mood. The body will experience weight gain. The centre of gravity will also begin to change as the belly grows and puts more weight in front. At this point, minor exercise modification should take place. Modification includes lowering the amount of weight and the number of repetitions (Mikesto et al, 2004).

DAY 1 Monday	DAY 2 Tuesday	DAY 3 Wednesday	DAY 4 Thursday	DAY 5 Friday	DAY 6 Saturday	DAY 7 Sunday
Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic Floor Activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 11 Sets: 2	Active Rest	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 12 Sets: 2	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Rest

3rd Trimester: Weeks 27-40 od Pregnancy

During this period, the belly has grown bigger. Despite this condition, the women should still be able to do basic workouts and stay active right up to the delivery day.

DAY 1 Monday	DAY 2 Tuesday	DAY 3 Wednesday	DAY 4 Thursday	DAY 5 Friday	DAY 6 Saturday	DAY 7 Sunday
Continuous Aerobics Up to 30 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 9 Sets: 1	Active Rest	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor Activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 9 Sets: 1	Continuous Aerobics Up to 30 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Rest

Postnatal: 6 Weeks after Normal Birth (Vaginal Delivery)

It will take six to sixteen weeks for the hormones to return to the normal level, and healing time will take six weeks to three months. Though some women may be ready to workouts within days of delivery, but such pregnant women need a doctor’s clearance. Having said this, it must be noted that this is not the time for maximum workouts.

DAY 1 Monday	DAY 2 Tuesday	DAY 3 Wednesday	DAY 4 Thursday	DAY 5 Friday	DAY 6 Saturday	DAY 7 Sunday
Continuous Aerobics Up to 15-30 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 11 Sets: 1	Active Rest	Continuous Aerobics Up to 45 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor Activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 11 Sets: 1	Continuous Aerobics Up to 15-30 minutes at low to moderate intensity Strength Core circuit Kegel Exercises Pelvic floor activities	Rest

Postnatal Exercise: 8 Weeks after Cesarean-Section Delivery

The appropriate time to commence exercise after delivery depends on how much the woman had been doing exercise during pregnancy. This is the time a woman should listen to her body and honestly communicate with her physician (Avarank & Mudd, 2009).

DAY 1 Monday	DAY 2 Tuesday	DAY 3 Wednesday	DAY 4 Thursday	DAY 5 Friday	6 DAY Saturday	DAY 7 Sunday
Continuous Aerobics Walking up to 15-20 minutes at low intensity Conditioning circuit Kegel Exercises Pelvic floor activities	Strength One UB circuit One LB circuit Circuit 1: Load: Reps: 8 Sets: 1	Active Rest	Continuous Aerobics Walking up to 15-20 minutes at low intensity Conditioning circuit Kegel Exercises Pelvic floor Activities	Active Rest	Continuous Aerobics Walking up to 15-30 minutes at low intensity Conditioning circuit Kegel Exercises Pelvic floor activities	Rest

Key: UB = Upper Body, LB = Lower Body

Differences in Exercise after Normal Birth (Vaginal Delivery) and Cesarean Delivery

Normal birth can simply be referred to as vaginal delivery, while cesarean delivery (C-Section) is a surgery where an incision is made through the abdomen to deliver a baby quickly and safely. The importance of exercise before, during and after pregnancy (postpartum) cannot be overemphasized. Generally, the speed at which a woman returns to a normal training routine will depend on the length and difficulty of delivery; if there are complications during delivery, more rest and recovery time is needed. An advantage of vaginal birth over cesarean delivery is that of recovery. Recovery after C-Section is longer. The risk of discomfort at birth is greater during cesarean section. This is due to expected surgical pain along the incision in the abdomen. Just like any other surgery, the body requires more time to heal. Going into exercise too early and pushing too hard may lead to complications for a woman with C-Section delivery. Therefore, the time of return to exercise may be longer for a woman that delivered through C-Section (Targonskay, 2020).

It must be noted that the volume of training (frequency, duration, intensity) for a woman who delivered through C-Section should be lower than a woman that delivered through vaginal delivery. A woman who delivered through C-section is also expected to have more rest time for recovery. She is expected also to start training with low impact activities such as walking and engaging in less strength training than the woman that delivered through vaginal delivery. Furthermore, she must engage in light stretches (Avarank & Mudd, 2009). While active women who undergo vaginal delivery will benefit from strong muscles when it comes to “push time”, those who end up with C-section who are also active will recover faster with strong and active recovery (Bolaji-Olojo, 2028).

CONCLUSION

This study reviewed exercise prescription for stages of pregnancy and the postpartum period. The study established that regular exercise helps to improve the quality of life of pregnant women. According to the study, pregnant women are aware of the importance of active engagement in exercise. Despite this, their engagement in exercise is still low.

Furthermore, it was discovered that undergraduate curriculum in medicine and physical education do not provide training in the area of exercise during pregnancy. This may have affected the quantity and quality of pre and postnatal exercise professionals. The pregnancy period is not a time to launch a competitive fitness program. Fitness goals should be the focus and must be monitored in conjunction with diet to avoid weight loss. Therefore, woman should study her body system and follow medical advice after pregnancy before engaging in exercise. Pregnant women are urged to be completely honest with their healthcare providers when it comes to exercise routine during pregnancy.

Recommendations

To help improve regular participation in exercise during pregnancy, the following recommendations are made:

1. More research studies are needed in this area to ascertain the level of exercise engagement among pregnant women in various countries and at international level.
2. There should be inclusion of exercise during pregnancy as a course of study in the curricula of health-related academic fields.
3. Pregnant women should be given effective counselling interventions to promote regular exercise during pregnancy.
4. Through advocacy, the traditional belief that considered the period of pregnancy as a resting period should be dispelled.

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