

# Effects Of Aerobic Exercises On The Level Of Insomnia And Fatigue In Pregnant Women

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## Abstract

Inadequate sleep resulting from difficulty in falling asleep, waking up frequently during the night, difficulty returning to sleep and un-refreshing sleep is one of the major complaints of women in the pregnancy state. Insomnia may present as difficulty in initiating or maintaining sleep, resulting in non-restorative sleep and impairment of day time functioning. This study was designed to determine the effect of aerobic exercises on level of insomnia and fatigue in pregnant women. Thirty pregnant women participated in an aerobic exercise programme for a period of 6 weeks. They were divided randomly into two groups. Group A participants received sleeping education and aerobic exercises, while Group B participants received only sleeping education. Levels of insomnia and fatigue were assessed pre-and post-intervention using Insomnia Severity Index questionnaire (ISI) and Quality of Life Fatigue Score respectively. Independent t-test was used to compare the levels of Insomnia and fatigue in the two groups. Level of significance was set at  $P < 0.05$ . There was no significant difference in the level of insomnia and fatigue pre-exercise in the two groups ( $P > 0.05$ ). Post intervention, participants in group A demonstrated significantly lower levels of insomnia than the participants in group B ( $P < 0.05$ ). A significant difference in the level of fatigue post intervention was only observed in participants in group A ( $P < 0.5$ ). The outcome of this study showed that the levels of insomnia and fatigue in pregnant women can be reduced with aerobic exercises.

## INTRODUCTION

Pregnancy is one of the most important and exciting periods in a woman's life. It is not surprising then, that a lot of women may experience sensations that they have never experienced in any other periods of their lives<sup>[1]</sup>. While some of these sensations are pleasant, there are some that are not pleasant and if not properly addressed, could lead to lots of complications in the pregnant mother or the foetus in her womb. One of these unpleasant feelings is inability to sleep well during pregnancy (Insomnia) which could be caused by anxiety and panic of realizing that they are moving to a different world in which they are about to take up responsibilities of parenthood<sup>[2]</sup>.

Insomnia is a symptom rather than a disease characterised by inadequate quantity or quality of sleep, though it is a prevalent condition affecting between 9% and 12% of the adult population on a chronic basis<sup>[2]</sup>. Insomnia may involve trouble falling asleep, frequent or prolonged nocturnal awakenings, early morning awakening, with an inability to return to sleep or a combination of all these complaints<sup>[3]</sup>.

Reports of altered sleep during pregnancy range from

13%-80% in the 1<sup>st</sup> trimester and increase to about 66%-97% by the 3<sup>rd</sup> trimester<sup>3</sup>. The marked rise in progesterone during the 1<sup>st</sup> trimester and the added physical discomfort associated with the growing foetus during the 2<sup>nd</sup> and 3<sup>rd</sup> trimesters are some of the obvious reasons for sleep disturbance<sup>[2]</sup>. Most women reported that their sleep is worse during pregnancy than any other time in their lives. Reasons for poor sleep vary by trimester, but mostly, sleep problem begin early in the 1<sup>st</sup> trimester with complaints of urinary frequency as progesterone level rises and creatinine clearance increases.

Insufficient sleep during the 2nd trimester may place a woman at increased risk for longer labour and caesarean births<sup>[4]</sup>. Though much work had not been done in regards to effects of exercise on insomnia but it has been found that aerobic exercises help to reduce the level of insomnia in an average individual<sup>[5]</sup>.

Antenatal education takes the form of a programme designed to meet the physiological and emotional needs of the pregnant woman<sup>[6]</sup>. Varassi et al<sup>[7]</sup>, asserted that physiotherapy when performed according to prescription is

capable of elevating good health level in pregnant women and non pregnant individuals. In general, the beneficial effects of exercise on sleep are most pronounced if the exercise is aerobics<sup>[4]</sup>. There are reports on the effectiveness of antenatal physiotherapy in reducing the level of anxiety and duration of labour<sup>[8]</sup>, in reducing pregnancy induced hypertension<sup>[9]</sup>, in reducing the level of fatigue and increasing the functional capacity and the maximum oxygen Uptake<sup>[10]</sup>. However, the effects of physiotherapy intervention in the form of aerobic exercises on the level of insomnia among the pregnant women have not been extensively studied in this part of the world. This study was therefore designed to investigate the effect of aerobic exercises on level of insomnia among pregnant women.

### METHOD

Thirty (30) pregnant women from the Obstetrics and Gynaecology (O&G) clinic of the Lagos University Teaching Hospital with the complaint of insomnia and fatigue participated in this study. They were aged 18 to 45 years and were randomly selected into two groups - the aerobic exercise group and the control/sleep education group. Pregnant women with complications such as incompetent cervix, vaginal bleeding, signs of retardation of foetal growth, disease of the thyroid gland, placenta previa, hyperemesis gravidarum, maternal diabetics, hypertension, phlebitis, physiologic anaemia and any other pregnancy induced pathology were excluded.

### ASSESSMENT OF LEVEL OF FATIGUE

Level of fatigue was measured using the Quality of Life (QoL) Questionnaire. Participants were asked to tick the appropriate statements that best describe their fatigue state. The sum of the assigned score was used to identify the subject's level of fatigue. The reliability of QoL fatigue scale was 0.69<sup>[11]</sup>.

### ASSESSMENT OF LEVEL OF INSOMNIA

This was determined using the Insomnia Severity Index (ISI) Scale. Participants were asked to respond to the questions in the questionnaire by circling the most appropriate figure that best described their Insomnia level.

### INTERVENTION

#### AEROBIC EXERCISE GROUP (GROUP A)

Participants in this group were made to undergo aerobic exercise programme in addition to education on practicing good sleep hygiene. The aerobic exercise was carried out in three phases, the warm up phase, the main exercise and the

cool down phase:

I) Warm up phase: The warm up phase consisted of breathing exercises, stretching exercises to the neck, upper limbs, the trunk and lower limbs

II) Main exercises: Consisted of six minutes walk, stair climbing and ball throwing exercises.

#### SIX MINUTE WALK EXERCISES

Participants briskly walked round the gymnasium for duration of six (6) minutes. They were allowed to rest during the exercise when necessary or discontinued with the exercise when the patient could not go further<sup>[12]</sup>.

#### STAIR CLIMBING

Participants were asked to ascend and descend on the stairs for duration of five (5) minutes. Participants were allowed to rest during the exercise when necessary or discontinued when the patient could not go further<sup>[12]</sup>.

#### JOGGING

The participants were instructed to do mild jogging at a spot which lasted for duration of four (4) minutes. Participants were allowed to rest during the exercise when necessary or discontinued when the patient could not go further<sup>[12]</sup>.

#### BALL THROWING

##### POSITION: SITTING ON A CHAIR

Description: participants were seated on a chair, with the therapist seated directly in front, about 30 meters away from the participant, instructions on throwing and catching and holding of football were given. The ball was thrown and caught from different angles. This exercise lasted for five minutes.

#### COOL DOWN PHASE

This involves breathing and stretching exercises as stated under warm up phase.

#### THE CONTROL GROUP

Participants in this group (sleeping education) were educated on practicing good sleep hygiene.

Education was given to the participants in this group on adopting correct posture on the bed while lying down to sleep or relaxing as well as proper pillow support, they were advised to have a normal sleeping time and also avoid any food that might aggravate the level of insomnia in the patients, such as coffee, alcohol and hard drugs<sup>[13]</sup>. This

group of patients were not involved in the aerobic exercise programme given to the study group.

## POST TRAINING ASSESSMENT

At the end of the six weeks aerobics exercise programme, levels of fatigue and insomnia were re-assessed.

## DATA ANALYSIS

Analysis of the effects of intervention on the levels of fatigue and insomnia were carried out using student's t-test. The level of significance was set at  $P < 0.05$ .

## RESULTS

There were no significant difference in the age, weight, height and BMI between the two groups ( $P > 0.05$ ) (Table 1). Five (16.7%) of the pregnant women who participated in this study were in their first trimester, 20 (66.7 %) were in their second and Five (16.7%) were in their third trimester.

**Figure 1**

Table 1: Physical And Physiological Characteristics Of The Participants

| Characteristics          | GROUP A<br>(N=15) | GROUP B<br>(N=15) | t-values | P-values |
|--------------------------|-------------------|-------------------|----------|----------|
|                          | Mean (SD)         | Mean (SD)         |          |          |
| Age (years)              | 31.8 ± 7.7        | 31.0 ± 7.1        | 2.98     | 0.77     |
| Weight (kg)              | 93.4 ± 5.0        | 96.1 ± 9.3        | 1.18     | 0.25     |
| Height (m)               | 1.57 ± 0.3        | 1.60 ± 0.1        | 0.56     | 0.58     |
| BMI (kg/m <sup>2</sup> ) | 37.8 ± 3.5        | 36.7 ± 3.4        | 1.63     | 0.12     |
| SBP (mmHg)               | 110.3 ± 10.4      | 114.2 ± 12.9      | 0.31     | 0.72     |
| DBP (mmHg)               | 64.6 ± 6.7        | 68.9 ± 9.6        | 1.41     | 0.17     |
| HR (beat/min)            | 75.3 ± 8.3        | 73 ± 7.5          | 0.56     | 0.43     |

## EFFECTS OF INTERVENTIONS ON THE LEVEL OF INSOMNIA

The effect of interventions on the level of insomnia is presented in Table 2. The level of insomnia of the participants at the onset of the aerobics exercise using the Insomnia Severity Index Scores questionnaire (ISI) was 18.4 ± 7.9 for the Group A participants while the Group B participants recorded 15.8 ± 7.0.

At the completion of the six weeks intervention, the insomnia level of the participants in Group A had decreased to 2.9 ± 0.4 while the participants in Group B recorded 9.5 ± 1.7. There was a significant difference in the levels of insomnia between the two groups post intervention ( $P < 0.05$ ). Within group analysis of the effects of intervention in both groups also showed a significant reduction in the level of insomnia ( $P < 0.05$ ) (Table 2).

**Figure 2**

Table 2: Effects Of Aerobic Exercises And Sleep Education On The Level Of Insomina In The Participants

| Characteristics | GROUP A<br>(n=16)<br>Mean ± SD | GROUP B<br>(n=14)<br>Mean ± SD | Z    | P-values |
|-----------------|--------------------------------|--------------------------------|------|----------|
| Pre-RX          | 18.4 ± 7.9                     | 15.8 ± 7.0                     | 0.89 | 0.38     |
| Post-RX         | 2.9 ± 0.4                      | 9.5 ± 1.7                      | 5.75 | <0.001*  |
| U               | 9.19                           | 7.69                           |      |          |
| P-values        | <0.001*                        | <0.01*                         |      |          |

(N.B: Level of insomnia decreases as ISI scores decreases)

Key:

\* = significant

n= number of participants per group

Z= Wilcoxon Signed Ranks Score

U=Mann Whitney Score

Pre-RX = Pre treatment

Post-RX = Post treatment

## EFFECTS OF INTERVENTION ON THE LEVEL OF FATIGUE

The level of fatigue in the participants in group A pre-intervention measured 5.0 ± 0.7 while those in group B measured 8.3 ± 2.0 (Table 3). There was no significant difference in the level of fatigue pre-intervention between the two groups ( $P > 0.05$ ). Following intervention, the level of fatigue measured 24.0 ± 1.0 in group A while group B recorded 9.4 ± 1.9. A significant difference in the level of fatigue post intervention was observed in participants in group A only ( $P < 0.5$ ).

**Figure 3**

Table 3: Effects Of Aerobic Exercise And Education On Levels Of Fatigue In The Participants

| Characteristics | GROUP A<br>(n=16)<br>Mean ± SD | GROUP B<br>(n=14)<br>Mean ± SD | Z    | P-values |
|-----------------|--------------------------------|--------------------------------|------|----------|
| Pre-RX          | 5.0 ± 0.7                      | 8.3 ± 2.0                      | 1.28 | 0.29     |
| Post-RX         | 24.0 ± 1.0                     | 9.4 ± 1.9                      | 1.04 | 0.03*    |
| U               | 10.01                          | 8.07                           |      |          |
| P-values        | <0.001*                        | 0.29                           |      |          |

(N.B: Level of fatigue decreases as Fatigue scores increases)

Key:

\* = significant

n= number of participants per group

Z= Wilcoxon Signed Ranks Score

U=Mann Whitney Score

Pre-RX = Pre treatment

Post-RX = Post treatment

## DISCUSSION

From this study, it was observed that aerobic exercises combined with education or education on sleep hygiene alone, could reduce significantly the level of insomnia during pregnancy, however, the aerobic exercise group

(group A) demonstrated significantly lower levels of insomnia than the education group (group B) post intervention. This finding agrees with the reports of Atkinson and Davenne<sup>[5]</sup>, who in a study on the effects of exercise on nocturnal sleep of healthy elderly people with insomnia reported that the changes in body temperature brought about by exercises trigger specific brain areas to initiate sleep. Nevertheless, little is known about how the core and distal thermoregulatory responses to exercise fit into this hypothesis. Such knowledge could help in reducing sleep problems associated with pregnancy. Pregnancy impacts common symptoms of major depressive disorder (MDD), such as energy, appetite, weight change, sleep and somatic complaints. The beneficial effects of exercise on insomnia could be linked to its potential to effect reduction in the levels of depression via the production and the release of amines such as serotonin<sup>[13]</sup>. It could also be as a result of other mechanisms which are yet to be identified.

A multi-research strategy will also be needed to identify what the optimal amounts and timing of exercise will be useful for reducing pregnancy-related sleep problems. The cardiovascular safety of exercise timing should also be considered, since recent data suggest that the reactivity of blood pressure to a change in general physical activity is highest in the morning<sup>[5]</sup>. This time is associated with an increased risk in general of a sudden cardiac event, but more research work is needed to separate the influences of light, posture and exercise per se on the haemodynamic responses to sleep and physical activity following sleep taken at night and during the day as a nap during pregnancy.

### EFFECTS OF AEROBIC EXERCISE ON THE LEVEL OF FATIGUE

The results of this study showed a significant reduction of fatigue in the participants in group A which was not seen in the participants in group B. This finding corroborates previous study by Tella et al<sup>[10]</sup> and Horns et al<sup>[14]</sup>. It is not unusual for women to get fatigued during pregnancy as the body is adjusting to too many changes. However, with an ever-increasing proportion of women continuing their employment late into pregnancy, the potential impact of occupational fatigue in obstetric outcome is a legitimate concern<sup>[15]</sup>. This is especially so since the risk of maternal antenatal morbidity could be increased by fatigue during the second and third trimesters<sup>[16]</sup>.

The therapeutic effects of aerobic exercises on the levels of fatigue observed in this study might not be unconnected with

the effect of exercise training on neuromusculoskeletal efficiency and improved cardiovascular endurance, which in turn decreases the levels of fatigue and increases the overall physical performance<sup>[17]</sup>.

### CONCLUSION

The outcome of this study had shown that aerobic exercises combined with education on sleep hygiene could reduce significantly the levels of insomnia and fatigue in pregnant women, which was not possible with the use of education only.

### RECOMMENDATIONS

Based on the outcome of this study it is therefore suggested that a regular aerobic exercise programme combined with education on sleep on hygiene should become an integral part of routine antenatal programme for all pregnant women.

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