Effects of Aerobic Exercise Programme on Quality of life of 
Intellectually Disabled Individuals in Ibadan, Nigeria

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ABSTRACT
The benefits of physical activities are universal for all including those with intellectual disability. Individuals with intellectual disability are mostly neglected and hardly exercised. Hence, the opportunities for improved health and wellness are limited. Paucity of data that could guide ameliorative measures also presents another challenge. Therefore, this study examined the effects of aerobic exercise programme on quality of life and physiological parameters of intellectually disabled individuals in Ibadan.

Pretest-posttest, control group experimental design was adopted for the study. Participants were 65 individuals with intellectual disability drawn from four schools for the handicap in Ibadan, and were assigned into three experimental groups (Down syndrome, Autism and Cerebral palsy) and control group. The interval training programme was adopted for the study. This was administered three times a week for ten weeks. The instruments used were: comprehensive quality of life scale (importance, r = 0.74 and satisfaction, r = 0.73). Hypotheses tested at 0.05 level of significance. Data were analysed using Analysis of Covariance, Analysis of Variance.

Aerobic exercise programme improves the productivity \( F(2, 62) = 39.5; p < 0.05 \), intimacy \( F(2, 62) = 329.9; p < 0.05 \), and emotion \( F(2, 62) = 40.01; p < 0.05 \). Aerobic exercise programme was effective in improving the quality of life of intellectually disabled individuals. Therefore, aerobic exercise programme should be an integral part of the physical education curriculum for the intellectually disabled individuals.

Key words: Intellectual disability, Aerobic exercise, quality of life.

INTRODUCTION
Intellectual disability is usually characterized by a low intellectual functioning level of intelligence quotient (IQ), mostly below 70-75 and this exists concurrently with significant limitations in two or more of the adaptive skills such as communication, self care, home living, social skills, community use, self direction, health and safety, functional academics, leisure and work (Merrick, 2004). Eni-Olorunda (2001) notes that of all the categories of children with special needs such as the deaf, the visually impaired, the learning disabled and the orthopedically impaired, intellectually disabled individuals are the most neglected. Mba (1995) points out that universally, families are concerned about their image in the society, and as such instead of identifying with their intellectually disabled children, prefer to hide them at home, which invariably contribute to their late recognition for education and physical activity. Merrick (2004) asserts that persons who are intellectually disabled have been found by many researchers to be a population with deficient physical fitness measures, which result from inactive lifestyle, lack of awareness of the positive effects of physical exercise and lack of motivation for any motor activity. According to Healthy Children 2010 Report (2002), the intellectually disabled are more unlikely to participate in sustained or vigorous and rigorous exercise than people without disabilities. Therefore, children with disabilities tend to be weaker and are more susceptible to early fatigue than their physically active peers. They have higher metabolic, cardio-respiratory and mechanical costs of mobility, which lead to early fatigue and decreased exercise performance.

There are three classes of the intellectually disabled: The Totally Dependent, The Trainable and the Educable (Mba, 1995). The Federal Government of Nigeria in the National Policy on Education (2004) classifies them as the bedridden, the trainable and the educable. Although there are different categories of intellectual disabilities, which include Down syndrome, Autism, Prader-Willi Syndrome, Williams Syndrome, Fragile X, Inborn Errors, Cerebral Palsy, Neural Tube Defect. Only Down syndrome, Autism and Cerebral palsy will be examined for the purpose of this study and this is because they are easily accessible in schools. Down syndrome is the most common and easiest to identify. It is a chromosomal condition of intellectual disability, which is as a result of genetic aberration, which leads to the formation of 47 chromosomes instead of the normal 46. The additional but unnecessary chromosome disrupts the normal development of the body and brain. However, to confirm Down syndrome in an individual, a chromosome test is carried out on the individual. Individuals suffering from Down syndrome are characterized by poor strength; poor muscle mass and high percent body fat and so are predisposed to cardiovascular health problems (Andriolo, 2007; Hernandez, 1996).
Autism is an abnormality that starts in early childhood with very debilitating effects on social and communicative skill development. The cause of autism is yet to be discovered, so it is not preventable and has no known cure or any effective treatment. Its symptoms are quite heterogeneous but involve deficits in social relatedness and communication. It also includes the presence of restricted interests and repetitive behaviours (Sigma & Spence, 2005).

Cerebral Palsy is basically a disorder of movement and posture due to non-progressive abnormality of the immature brain. It is a condition in which the part of the brain controlling movement and posture does not develop properly. Though the brain continues to develop into early adulthood, the crucial events of its development occur during intrauterine life and early childhood (Batshaw, 2000). Individuals with cerebral palsy have low physical work capacity and low aerobic power. However, work done by Maria, Stephen Jeffrey and Kharasch (2004) has discovered an increase in maximal oxygen consumption, physical work capacity and aerobic power after an aerobic training for intellectually disabled individuals.

Aerobic exercise can be sustained for a long period of time without a build-up of oxygen debt in the muscles (Wuest & Bucher, 2003). Aerobic exercises are physical activities where the predominant means of ATP (adenosine triphosphate) resynthesis is by aerobic metabolism provided by dynamic and continuous activities with large muscle groups (ACSM, 1998). Individuals with intellectual disability experience low level of work capacity, low peak oxygen consumption, low aerobic fitness scores because of the low cell count present in individuals with intellectual disability (Pitetti & Fernhall 2005; Fernhall & Otterstetter, 2003). Aerobic exercises are the best way of improving cardio-respiratory capacity and achieving maximal fatty acid oxidation in individuals with intellectual disability (Achten, 2003; Leijssen et al., 2002). It is an established fact that physical activity is directly related to perceived quality of life. Quality of life (QOL) is an overall sense of well-being. It is an individual’s perception of their position in life in the context of the culture and value system in which he or she lives and relation to their goals, expectations, standards and concern (Wuest and Butcher, 2003).

Research in quality of life of the intellectually disabled was first promoted with the most vocal and capable individuals, namely, adults who were young with mild disabilities (Krykou, 2005).

**METHODOLOGY**

At the conceptualization of this study, an approval was obtained from the University of Ibadan Research Ethical Review Committee. The research design for this study was pretest, posttest control group experimental design. Participants were made up of purposively selected individuals who are intellectually disabled from Home School for the Handicap, Ijokodo, Cheshire Primary School, Poly Road, School for the Handicap, Gate and servant of Charity, all in Ibadan, Nigeria. Different categories of intellectual disability that were used include the Down syndrome, Autism and Cerebral Palsy this Children whose class of disability ranges between Mild (IQ 55 -65) and Moderate (IQ 40-54) were further randomly divided into experimental and control groups. The descriptive statistics of mean, standard deviation, range and inferential statistics of analysis of covariance were used to analyze the obtained data at 0.05 alpha level.

**Hypothesis Testing**

**Hypothesis 1:**

There will be no significant difference in the productivity subjective quality of life Subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10 weeks of aerobic exercise programme.

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>SS</th>
<th>MS</th>
<th>Df</th>
<th>F</th>
<th>P</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>2763.6</td>
<td>2763.6</td>
<td>1</td>
<td>39.5</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td>Explained</td>
<td>3166.5</td>
<td>1583.2</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>4330.3</td>
<td>69.8</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7496.9</td>
<td></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at 0.05 level

Table 1 shows an observed F-ratio (2, 62) = 39.5, P < 0.05 was significant. Therefore, the null hypothesis which states that there will be no significant difference in the productivity subjective quality of life of Subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10 weeks of aerobic exercise programme was rejected.
Hypothesis 2:
There will be no significant difference in the intimacy subjective quality of life of Subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10 weeks of aerobic exercise programme.

**Table 2: ANCOVA of Intimacy Subjective Quality of Life of Subjects**

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>SS</th>
<th>MS</th>
<th>Df</th>
<th>F</th>
<th>P</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>4740.0</td>
<td>4740.0</td>
<td>1</td>
<td>329.9</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td>Explained</td>
<td>4864.1</td>
<td>2432.0</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>890.8</td>
<td>14.36</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>5754.9</td>
<td></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at 0.05 level

Table 2 shows an observed F-ratio (2, 62) = 329.9, P< 0.05 was significant. Therefore, the null hypothesis which states that there is no significant difference in the intimacy subjective quality of life of Subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10-week of aerobic exercise programme was rejected.

Hypothesis 3:
There will be no significant difference in the emotion subjective quality of life of subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10 weeks of aerobic exercise programme.

**Table 3: ANCOVA of Emotion Subjective Quality of Life of Subjects**

<table>
<thead>
<tr>
<th>Source of variation</th>
<th>SS</th>
<th>MS</th>
<th>Df</th>
<th>F</th>
<th>P</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates</td>
<td>1712.0</td>
<td>1712.0</td>
<td>1</td>
<td>40.01</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td>Explained</td>
<td>2057.8</td>
<td>1028.9</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residual</td>
<td>2652.7</td>
<td>42.7</td>
<td>62</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4710.6</td>
<td></td>
<td>64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at 0.05 level

Table 3 shows an observed F-ratio (2, 62) = 40.01, P< 0.05 was significant. Therefore, the null hypothesis which states that there will be no significant difference in the emotion subjective quality of life of subjects in the experimental and control group of intellectually disabled individuals in Ibadan after 10 weeks of aerobic exercise programme was rejected.

**DISCUSSION**

The result shows a significant improvement in the productivity, intimacy and emotion domain of the intellectually disabled individuals. During the programme, some were asked to take care of the equipment used, at some point arguments ensued as to who keeps some of the equipment used. To be productive is to produce good and useful thing out of something. At the pre-stage of the exercise, individuals with intellectual disability could not perform a simple task like catching a ball, throw a ball up and touching their body part, but as the exercise programme progresses, they could execute some of this task that seems difficult at the pre-stage. To be intimate is to have a close relationship. Exercise is a great contributory factor to a close personal relationship. Cooperation, familiarity and intimacy were noticed among them after sometime. After sometimes, they were forming factions to see how they could outshine one another. They were overexcited when their friends or someone in their faction is winning. The result revealed that exercise brings about an improvement in the emotion of intellectually disabled children. Individuals with intellectual disability show a strong feeling towards colleagues and also to themselves after been together as a result of exercise programme. The result of this work is consistent with the research by Lav, cummins & Macpherson, (2005) that used the personal well-being index for intellectually disabled to get domain rating range from 70.5 to 82.1, with a mean score of 77.08. The personal relationship and feeling part of the community domain has the highest mean scores. Also, the result obtained in the Victorian general population sample in which domain scores range from 75.3 to 83.7, with a mean score of 78.8 revealed an improvement in the quality of life of intellectually disabled individuals. A result from larger Australian sample domain also concurs with other findings as appreciable improvements were noticed in the ratings ranged from 72.4 to 80.1 with a mean PLW-ID of 77.6. Although more research is required
in the relationship between exercise and quality of life of intellectually disabled children, there appear to be good support for the comQOL-ID as a measure of subjective quality of life in most individuals with intellectual disability.

CONCLUSION
The benefits of physical activity are universal for all children including those with intellectual disabilities. Exercise should be for everyone because it provides an opportunity to develop an individual’s full physical and mental potentials. An exercise routine or fitness plan can inspire a person with intellectual disability to overcome misperceived limitations and allow for the opportunity to experience true growth. This research has added to the body of knowledge and will undoubtedly support the fact that exercise is found as a veritable tool in improving quality of life of intellectually disabled individuals.

REFERENCES
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