MANAGEMENT OF STEREOTYPE BEHAVIOUR IN AUTISM: Efficacy of Structured Physical Exercises on Gender

By

Edna Thangu Katiwa, Peter Mwangi Wanderi and Andanje Mwisukha
Department of Recreation Management and Exercise Science, Kenyatta University, Nairobi, Kenya

Abstract

Autism is a developmental disorder, which is typically characterized by an inability to develop normal social relationships, compulsive and ritualistic behaviour and failure to develop normal intelligence. A characteristic feature commonly seen among people with autism is the abnormal stereotype behaviours. These behaviours engaged in at various times also inhibit the ability to learn or take part in activities appropriately. This study set out to investigate the efficacy of using structured physical exercises as an intervention for managing stereotype behaviours amongst boys and girls with autism. The study targeted 34 autistic children from the Nairobi Autism Unit for individuals with autism which was purposively selected. All the children constituted the sample of the study. The children were given treatment using physical exercises for a period of eleven weeks. The adaptive exercise routine used structured teaching principles explained by Hong (2001) and Schopler, et al., (1995). The Autism Treatment Evaluation Checklist was used as the main tool for collecting data. The dependent variables considered were those behaviours found in the ATEC evaluation checklist and included: Speech/ Language/ Communication, Sensory/ Cognitive awareness, Sociability and Health/ Physical behaviours. To test the hypotheses, dependent t-test was used where hypotheses were either rejected or not rejected at 0.05 alpha level. From the findings there was a reduction in stereotype behaviour in both male and female autistic children. The male recorded significant changes in three behaviour domains except in speech/ language/ communication, which had no significant difference at post-test. The girls had slightly better changes at post-test that were significant. From the findings, the following recommendations were proposed: Structured physical exercise should be used as a means to manage the challenging behaviour and enhance better health and wellness amongst individuals with autism. Studies also need to be carried out to establish the physical fitness levels of individuals with autism in Kenya for the establishment of more specific fitness programmes for this population.

Key words: Stereotype Behaviour, Gender, Autism, Structured Physical Exercises
Introduction

Despite the voluminous amount of research that has been published in the field of exercise science over the past decades, there remains a paucity of information on the activity patterns and physiological responses to exercise in persons with disability (Rimmer et al., 1996). In Kenya, autism is one of the disabilities that require urgent attention. This is a pervasive developmental disorder, which affects the whole personality and lasts throughout life. Autism also typically appears during the first three years of life (Shirley, 1998). This is as a result of a neurological disorder that affects the brain and its associated behaviour has been estimated to occur in as many as 1 in 500 individuals as noted by Grandin (1995). Autism is manifested through impairments in communication, social relationships and flexible organisation of behaviour and interest. According to Quill (1995), the spectrum of autism is quite wide: it includes persons with multiple handicaps, who have practically no contact with the environment, as well as persons with occasionally excellent intelligence, who have mild autism and just may seem strange and lonesome. Grandin (1995), further reports that autism is four times more prevalent in boys than in girls (usually the first born). It affects people equally regardless of ethnicity, intelligence, geographical location or socioeconomic background all around the world. It has become more prevalent in both developing and developed countries.

In Kenya today, cases of children diagnosed with this disorder have been reported. Over 400 cases have been identified around Nairobi’s environs between the year 2000 and 2005 as the awareness continues to grow. It is believed there are even more cases (Autism Society of Kenya, 2006). Despite having been 68 years since autism was first diagnosed, Kenyan parents with afflicted children are only just beginning to seek professional help. They have had to wait for decades to get direction from the health authorities as the government grappled with how to handle this neurological disorder (Kithaka, 2006). This is due to lumping autistic children with other mental cases with little regard to their care and treatment (Autism Society of Kenya, 2006).

Due to its complexity, the educational and treatment needs of all individuals with autism have some shared features. The highest possible degree of autonomy and social integration in individuals with autism can only be obtained with intensive developmental programmes aimed at enhancing communicative, social and cognitive skills (Schopler and Mesibov, 1994). Therefore, on the basis of these shared needs, this population has to be handled in an integrated way. Various therapeutic modalities have been used to manage behaviour in autism. Some of these modalities are but not limited to; speech therapy, occupational therapy, physical therapy, nutritional intervention and biomedical treatment. Among these treatments, is the inclusion of physical exercises in the child’s lifestyle (Berkely and Zittel, 1998).

Currently, experimental literature indicates that physical exercise positively influences the characteristic inappropriate behaviour in individuals with autism. However, hardly has any research been done to establish whether engaging in different modes of physical exercise using a structured environment suitable for individuals with autism enhances positive
responses and decreases the use of stereotypic behaviour which in turn affects other aspects of learning. According to the Autism Society of Kenya (2006), the number of reported cases of autism has increased dramatically in the country. This is attributed to increased public awareness through the Autism Society of Kenya and improvement in diagnostic methods. As such, more people are becoming aware of the disorder and the medical professionals are doing a better job with regard to it (Kithaka, 2006). In view of a growing population of children with autism in Kenya, it is important that research focuses on ways of helping these children to live productive lives.

This study served as a step towards using this effective yet affordable means. It is notable that there are very few studies, if any, relating to autism and physical exercise therapy in Kenya. This study therefore was designed to bridge the gap by providing the positive effects of structured physical exercises on the challenging behaviour among children with autism at the Autism Unit situated in City Primary School in Nairobi.

Objectives of the Study
The study was aimed at establishing the effect of a structured physical exercise programme on the stereotypic behaviour and response with regard to gender amongst children at the Nairobi Autism Unit.

Hypothesis
In pursuit of the study objective, the following null hypothesis was tested:

There would be no significant difference in stereotypic behaviour and response after the exercise programme between male and female children at the Nairobi Autism Unit.

Theoretical Framework
The theoretical base of sensory integration guided the use of the structured physical exercise programme as an intervention for the maladaptive behaviour in autism. This theory was developed and refined by occupational and physical therapists in the 1950s and 1960s (Kranowitz, 1998). It attempts to explain the relationship between behaviour and neural functioning with regards to sensory processing or integration. This theory predicts specific relationships among neural functioning, sensorimotor behaviour, and learning (Di Matties and Quirk, 2004).
Physical Exercises

S I Processing
Neural Functioning in the
CNS

Learning

Normal
Development

Sensory Motor
Behaviour

Proper Response to Stimuli
- Emotional stability
- Socially adjusted
- Behaviorally
- Academic Skills

Fig. 1.1: Physical Exercises and Sensory Integration Process (Adapted from Mc Inner and Treffy, 1997 and Di Matties and Quirk, 2004)

Figure 1 shows the contribution of physical exercises to the sensory integration process in all individuals as they promote experience in sensations of tactile, vestibular and proprioceptive systems. Sensory integration according to Mc Inner and Treffy (1997) is an innate neurobiological process that refers to the interpretation of sensory stimulation from the environment by the brain. They assert further that in contrast, sensory dysfunction is a disorder in which sensory input is not integrated or organized appropriately in the brain and may produce varying degrees of problems in development, information processing and behaviour.

Foss et al., (2003) point out that children and adults with autism as well as those with other developmental disabilities may have a dysfunctional sensory system. This renders them unable to interact with their environment or have difficulties adjusting to new situations. They may react with frustration, aggression or withdrawal, and as a result, self-stimulation occurs to overcome the situation. Wilbarger (1995) indicates that this is because attention, emotional stability and self-esteem are related to sensory integration. Physical exercises provide these needed opportunities for sensory integration by autistics.
Through the use of various physical exercises drawn from the principles of sensory integration in this study, the approach sought to encourage the nervous system to process and integrate sensory input in an organized and meaningful way. According to a study by Levinson and Reid (1993), the maladaptive behaviours were managed by the sensory feedback produced that may be eliminated or replaced by physical activities that produced similar sensory consequences on the individuals, and hence the use of different physical exercises in a structured environment as an intervention as the case in this study.

Methodology

Participants
The participants in this study consisted of children from the Nairobi Autism Unit. This group comprised of children whose ages ranged from 3 to 19 years, among them 14 girls and 20 boys. The center was purposively selected due to its unique nature for catering for only autistic children in Kenya.

Procedures
The subjects were exposed to an 11 week structured physical exercise programme. A pre-test was done one day before the exercise programme began. Other tests were carried out periodically after the 3rd, 6th and a final test after the 11th week of the programme. In this study 2 of the ATEC scores were used to establish changes in the level of the children’s characteristic behaviour and response resulting from the physical exercise programme. The treatment included adaptive physical exercises developed as per the structured teaching approach explained by Hong (2001) and Schopler (1997). Exercises were done during the physical education lessons for a maximum of 30 minutes.

Measures
The research adopted the Autism Treatment Evaluation Checklist (ATEC) as the main tool to assess changes namely, the condition at the beginning, improvement or regression as the research progressed. Documentary analyses were also used to obtain the severity of autism based on the information obtained from the children’s school records. The ATEC test sheet was developed by the Autism Research Institute, San Diego (Edelson and Rimland, 1999) and it uses simple Internet-based scoring procedure which is a valid means of measuring the effectiveness of various treatments for autism. The checklist evaluates behaviour in four different areas namely, speech/ language/ communication, sociability, sensory/ cognitive awareness and health/ physical behaviour.
Findings and Discussion

Table 1: Pre and Post-test Means for Males and Females on the Effect of the Physical Exercise Programme on the Stereotype Behaviour in Autism

<table>
<thead>
<tr>
<th>Behaviour Domain (Points)</th>
<th>Gender</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Mean Change</th>
<th>Corr</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLC</td>
<td>Male</td>
<td>22.45</td>
<td>5.68</td>
<td>21.9</td>
<td>5.39</td>
<td>0.55</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>22.29</td>
<td>6.86</td>
<td>21.50</td>
<td>6.59</td>
<td>0.78</td>
<td>0.99</td>
</tr>
<tr>
<td>SOC</td>
<td>Male</td>
<td>32.2</td>
<td>7.59</td>
<td>24.15</td>
<td>8.79</td>
<td>8.05</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>30.57</td>
<td>9.68</td>
<td>25.07</td>
<td>10.1</td>
<td>5.5</td>
<td>0.91</td>
</tr>
<tr>
<td>SCA</td>
<td>Male</td>
<td>27.1</td>
<td>6.35</td>
<td>20.45</td>
<td>6.64</td>
<td>6.65</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>27.35</td>
<td>5.49</td>
<td>22.5</td>
<td>6.50</td>
<td>4.86</td>
<td>0.92</td>
</tr>
<tr>
<td>HPB</td>
<td>Male</td>
<td>36.65</td>
<td>13.05</td>
<td>27.6</td>
<td>10.1</td>
<td>9.05</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>33</td>
<td>15.41</td>
<td>27.14</td>
<td>13.3</td>
<td>5.86</td>
<td>0.97</td>
</tr>
<tr>
<td>TS</td>
<td>Male</td>
<td>118.4</td>
<td>28.11</td>
<td>94.1</td>
<td>26.5</td>
<td>24</td>
<td>0.93</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>113.2</td>
<td>29.78</td>
<td>96.21</td>
<td>29.1</td>
<td>17</td>
<td>0.98</td>
</tr>
</tbody>
</table>

KEY: SLC-Speech/Language/Communication. SOC-Sociability

SCA- Sensory/Cognitive Awareness. TS- Total Score

HPB- Health/Physical Behaviour

Table 1: shows the means of the males’ and females’ pre and post-test total scores. Results on the table indicate that both males and females improved in their behavioral responses because of exposure to the treatment. This is as observed in a reduction in all the mean scores between pre-test and post-test, which also had high correlations between them. In comparison, the boys showed a higher positive improvement than the girls. The boys performed significantly better than the girls in all the behaviour domains apart from speech/language/communication. Although they recorded a lower mean, there was no significant difference between the boys’ pre-test (22.5 ± 5.7) and post-test (21.9 ± 5.4) results at 0.05 alpha level. The girls had slightly better scores at post-test that were significant.

The highest reduction of the stereotype behaviour between the males and females was portrayed in the health/physical behaviour domain. There was a significant difference between the boys and girls pre-test (36.7 ± 13.1), (33 ± 15.41) and the post-test (27.6 ± 10.1), (27.14 ± 13.31) results at 0.05 alpha level respectively. This was followed by sociability, sensory/cognitive awareness then lastly the speech/language/communication domain.

Following the above results, it is evident that there was also a significant difference between the pre-test overall score for both male and female (118.4 ± 28.1), (113.2 ± 29.8) and post-
test (94.1 ± 26.5), (96.21 ± 29.1), respectively. The hypothesis stating that there would be no significant difference in behaviour and response between males and females before and after eleven weeks of a structured physical exercise programme was rejected at \( p < 0.5 \). Therefore, physical exercise had a significant positive effect on the male adaptive behaviour and response of male than female children with autism. The better performance in the males could be attributed to the fact that their values were better even at pre-test and due to their hormonal configuration. Boys possess more muscular strength and endurance than girls and as a result were able to benefit from the physical exercises more. The studies reviewed in this area do not compare performance of male and female as most used males only. This study concurs with the review by Quill (1989) where physical exercise was used to encourage more adaptive and appropriate behaviour for both boys and girls with autism in a Japanese education model. Bumin et al., (2004) also illustrates that females do also benefit from this intervention.

**Conclusions**

Dysfunction in the sensory integration must involve a reorganization of an individual’s entire functional system causing him/her to behave in a qualitatively different manner in order that he/she may adjust and survive. As part of the educational process, Physical Education and Sports, as a medium of expression and learning through movement, can help children with autism acquire and enhance healthy habits. Auxter et al., (1997) note that, teachers and caregivers can make a major contribution to an autistic child’s education by being sensitive to their individual needs. They should also offer physical exercises that are appropriate and acceptable in the Physical Education and Sports Programme.

From the study, the structured physical exercise programme had a positive and significant effect on the behaviour domains evaluated using the Autism Treatment Evaluation Checklist on children at the Nairobi Autism Unit. Both autistic boys and girls in this study benefited from the structured physical exercises. When compared, the results indicated that the males performed better than girls at post-test in sociability, sensory/cognitive awareness and health/physical behaviour apart from the speech/language/communication where the female recorded significant differences and performed better than the male children. However, girls are less likely to develop autism, and when they do they are more severely impaired. As a result, they may need more time for significant improvements to be noted after an intervention (Skuse, 2000). Tsai (1998) notes that, autistic children have reduced social contacts. This leads to reduced opportunity in participation of various sporting activities. It is suggested that parents and significant others of these children should set aside time each day to play with the children. The child should have access to a rich variety of play materials and clearly instructed on how to utilize them when engaging both in solitary or group play.

Children with autism need individual assessment and programmes that will meet their unique needs. Lord and Rutter (1994) note that dysfunction within the sensory systems manifests itself in many negative ways resulting to frustration, aggression, or withdrawal. Gross and/or fine motor coordination problems are also common and may result in speech language delays
and in academic under achievement among many others. Well planned and supervised physical exercise programmes are necessary for children with autism to help in their motor functioning, improve sensory/ cognitive awareness as well as health/ physical behaviour as revealed in this study.

**Recommendations**

From this study it was found out that physical exercise improved the behaviour of children with autism. Therefore children with autism should be encouraged by parents and caregivers to participate in physical exercises that promote successful experiences to increase self-confidence in sociability, sensory/ cognitive awareness and be motivation to further participation. Teachers, parents and caregivers of autistic children should take advantage of physical exercises to curb the destructive behaviour by including a variety of activities that are structured in their daily schedules and ensure that children perform these activities as planned and are carefully supervised for safety purposes.

**References**


