

Effectiveness of an Eight-Week Fundamental Skills Intervention Programme on the Motor Skills of Children with Visual Impairment, Nairobi City County, Kenya

Judy Githinji¹, Jane Mwangi² & Yasmin Goodwin³

¹Department of Physical Education, Exercise and Sports Science, Kenyatta University, Nairobi, Kenya
(githinji.judy0@gmail.com)

²Department of Physical Education, Exercise and Sports Science, Kenyatta University, Nairobi, Kenya

³Department of Physical Education, Exercise and Sports Science, Kenyatta University, Nairobi, Kenya

<https://doi.org/10.62049/jkncu.v4i1.50>

Abstract

Physical activity has been included in early intervention programmes involving fundamental motor skills among children with differing disabilities. Though research has documented improved motor skills performance generally, few have focused on intervention programmes as a means towards improving motor skill performance in children with visual impairment (VI). This study aimed to determine the effectiveness of an eight-week fundamental motor skills intervention programme on motor skills of children with visual impairment in Nairobi City County, Kenya. The study targeted children with VI aged between six to eleven years. Out of the two public integrated primary school with special unit for VI, the school with the highest number of children with VI was purposively selected. Twelve out of the 20 targeted children with VI in grade one and two met the inclusion criteria. Ethical clearance and consent were acquired before the study. One group pre and post-test quasi experimental design was used. The study utilised Test of Gross Motor development which include two subsets: locomotor and object manipulation skills. The motor skills were assessed before and after the intervention programme. The results showed significant improvement of both the locomotor and object control skills. The study therefore recommends implementation of motor skill intervention programmes for children with VI at an early age.

Keywords: Visual Impairment, Motor Skills, Intervention Programme, Fundamental Motor Skills

Introduction

Fundamental motor skills form the basis of many specific and complex movement skills performed in games, sports and everyday life (Haegele et al., 2015). They include the locomotor skills of leaping, running, sliding, hopping, jumping; manipulation skills/object control skills include dribbling, catching, throwing, and kicking (Haibach et al., 2014). Developing high proficiency in fundamental motor skills early in life is very important as it is a prerequisite for active participation in the sports (Haegele et al., 2015). Competence in fundamental motor skills has also been associated with increased cardiorespiratory health (Vlahov et al., 2014), increased physical activity (Robinson et al., 2015), and decrease in obese and overweight person (O' Brien et al., 2016).

Unfortunately, children with visual impairment, concomitant with poor motor skills are at a higher risk of living inactive lifestyle. In Kenya, Mogaka et al. (2017) noted that persons with visual impairment do not meet the recommended 60 minutes of physical activity daily. This may be because children with less developed motor skills face greater challenges during physical activities compared to those with better developed motor skills (Williams et al., 2012). Consequently, benefits of physical activities are compromised (Abdullah et al., 2014).

The acquisition of complex motor skills is greatly influenced by fundamental motor skills, though for persons with visual impairment, chances to move for enjoyment or for sports are severely limited (Haibach et al., 2014). This is because vision plays a vital role in motor skill performance as it motivates a child to move, provides information about direction and distance of objects, helps to detect and anticipate dangerous situations and also provides feedback on movement (Houwen et al., 2009). Therefore, children with visual impairment suffer from motor dysfunction since monitoring and control of movement is dependent on visual information. It is impossible to fully compensate for whole or partial visual loss with other senses (kinesthesia, touch, or hearing). Therefore, it is conceivable that those with decreased vision will experience motor challenges (Brambring, 2016). Hence, children with VI show adaptation in their gait patterns during locomotion to allow for more stability. They exhibit a shorter stride length, slower walking pace and take longer duration in stance stage of gait.

This study, therefore, concentrated on practical methods of learning and exercising specific motor skills, as opposed to the previous study's concentration on the motor development patterns of children with visual impairment. As confirmed in numerous studies (Morelli et al., 2016; Brambring, 2016; Cervantes & Porretta, 2013), children with total or partial vision loss exhibit poor motor skills, however, as noted by Haegele et al. (2015) very few studies focus on intervention programme to enhance the fundamental motor skills of children with visual impairment. Hence, there is need for a fundamental motor skill intervention programme to bridge this gap. This study establishes a baseline for the motor skills of visually impaired children in Nairobi City County in the absence of adequate data that can be used to compare other studies. The study sought to determine the effectiveness of an eight-week intervention programme on motor skills among children with visual impairment in Nairobi City County, Kenya.

Objective

To determine the effectiveness of an eight-week fundamental skills intervention programme on locomotor and object manipulation skills among children with VI in Nairobi City County, Kenya

Research Design

The research employed one-group pre-test post-test quasi experimental design. The study lacked a control group, and the simple group was purposively selected. White and Shagun (2014) advocate for the use of quasi-experimental research designs when is not possible to randomize individuals and groups to treatment and control.

Study Participants

The study targeted the two integrated public primary schools for the visually impaired in Nairobi City County, Kenya. Kilimani primary school with a total of 55 children with visual impairment had the highest number of the targeted group therefore, it was purposively chosen. Out of the 55 only 20 children were within the acceptable age range of six –to eleven years while eight children did not meet the inclusion criteria (three children had multiple disabilities while five had no parental consent). Therefore, a sample size of 12 was registered from grade one and two at Kilimani Primary School.

Methodology

Test of Gross Motor Development second edition (TGMD2, Ulrich, 2000) tool was used to determine the motor skill performance of children with visual impairment after the intervention programme. The Tgmd2 is validity has been verified for children with visual impairment (Houwen et al., 2014). The researcher examined all the 12 subsets available in the TGMD2; six locomotor skills leaping, running, sliding, hopping, and horizontal jumping and six object control skills stationary dribbling, catching, kicking, underhand rolling and throwing.

In the study the Tgmd2 was adapted to make it easier for the children with VI to perform all the skills. The adaptations included wider markings, increased operational spaces and use of brightly coloured balls. These modifications were validated in research done by Wagner et al. (2013). The instrument though, had been used to less extent among children with visual impairment population in Kenya; therefore, it was tested for reliability and validity. Cronbach's Coefficient Alpha was utilized to generate the coefficient and a reliability index of 0.78 was recorded, indicating a satisfactory measure. The acceptable reliability coefficient range is between (0.75 - 0.80) (Hartman et al., 2013). Tgmd2 construct and content validity had been verified in other nations among children with visual impairment (Hartmn et al., 2013) for the sake of Kenyan population, for content it was scrutinized and approved by experts in this area while construct validity was measured using Confirmatory Factor Analysis (CFA) showing satisfactory correlation with the corresponding subset.

Participants underwent two practice trials, followed by two test trials conducted in the presence of assistant teachers for encouragement. A score of 0 (zero) was assigned for poorly performed or absent components, while a score of 1 (one) was granted for each successfully completed motor skill.

Data Analysis

The group was pre-tested to establish a baseline. Subsequently, the same group was exposed to an eight-week fundamental motor skills intervention programme. At the end of the eight-week programme, the same motor skills were assessed again to determine changes that may have occurred. The study utilised quantitative method. Both descriptive and inferential statistics were used. A paired sample t-test was used to show the difference in effect of fundamental motor skill performance after the intervention.

Fundamental Skills Intervention Programme

The programme was executed by the researcher with the assistance of class teacher. The main aim was to specifically teach and engage children with visual impairment in activities that promote their fundamental motor skills. The children were trained three times a week in a 35 minute session.

Results

Table 1: Motor Skills Performance Before and After the Intervention (n=12)

| Motor Skills | Test Nature | Mean | SD | 95% Confidence Interval | | T | Sig. (2 tailed) |
|---------------------|-------------|------|-------|-------------------------|-------|------|-----------------|
| | | | | Lower | Upper | | |
| Locomotor | Pre- test | 23.8 | 12.13 | 2.02 | 4.81 | 5.40 | .001 |
| | Post-test | 20.3 | 11.78 | | | | |
| Object Manipulation | Pre-test | 29.1 | 7.32 | 4.58 | 10.92 | 5.38 | .001 |
| | Post-test | 21.3 | 5.7 | | | | |

Significant $p < 0.05$: $df = 11$

According to the descriptive data presented in Table i a higher mean score of locomotor skills after intervention with a measure of 23.8 ± 12.13 compared to 20.3 ± 11.78 before the intervention, a statistically significant increase was recorded at $t(11) = 5.40$, $p < 0.001$ and for object manipulation, a higher mean score was also recorded after intervention measuring 29.9 ± 7.32 compared to 21.3 ± 5.7 before the intervention, a

Discussion

The main aim of the study was to determine the effectiveness of an eight-week fundamental skills intervention programme on the locomotor and object manipulation skills among children with visual impairment, Nairobi City County, Kenya. The outcome shows the positive effect of using fundamental motor skills intervention programme to improve basic movement skills among children with visual impairment. The findings concur with Bishop et al. (2018) who reviewed twenty-one studies on motor skills interventions and concluded that most of the interventions recorded significant growth of motor skills. A study conducted by Bellows and Anderson (2013) also shows significant improvement of motor skills among pre-schoolers after an intervention programme.

The study shows that there is a need for specific and intentional instruction on fundamental motor skills at an early age for children with visual impairment. Intervention programme specifically designed for children with visual impairment targeting their motor skills has shown improvement for both locomotor and object manipulation skills. Lieberman et al. (2014) reported that an effective and well-planned physical activity programme improves motor skills competence; while Cervantes and Poretta (2013) noted that modification of physical activity programmes can enhance motor skills performance among children with visual impairment.

Lieberman et al. (2014) emphasized that children with visual impairment cannot develop motor skills automatically. As explained by Morgan et al. (2013) motor skills needs to be developed through specific instruction and practice because mature patterns of motor skills do not develop naturally. The intervention program gave children with visual impairment the chance to improve and hone their motor skills. The ability to adapt positive experiences of motor skill development carried out by someone who has the knowledge of how to use modified equipment and adapt activities appropriately are more likely to lead to motor competence (Lieberman et al., 2014).

The results of this study may provide physical educators, education policy makers and persons developing exercise programmes with an approach for improving the motor skills of children who are partially or completely visually impaired

The study makes a contribution to the literature as there are few motor skill interventions among children with visual impairment in Nairobi City County, Kenya.

Conclusion

There was a significant improvement in both, the locomotor and object control skills after the eight-week fundamental skill intervention programme among children with visual impairment, however, the sample size of this study was twelve therefore the results cannot be generalized to the whole population. The study was also limited as it used a pre-test post-test design without a control group. Future studies may conduct similar study by using a control group for more conclusive results.

Acknowledgements

The researcher would like to thank the assistant teachers and the children who participated in this study during the data collection process.

Declaration of Conflict Interests

There are no potential/perceived conflicts of interest with the respect to the research.

References

- Abdullah, N. M., Parnabas, V., Omar-Fauzee, M. S., & Nazaruddin, M. N. (2014). The Correlation between Agility and Performance among Blind and Visually Impaired Athletes. *International Journal of Physical and Social Sciences*, 4(1), 196.
- Brambring, M. (2006). Divergent Development of Gross Motor Skills in Children Who Are Blind or Sighted. *Journal of Visual Impairment and Blindness*, 100(1), 1-22.
- Cervantes, C. M., & Porretta, D. L. (2013). Impact of after school programming on physical activity among adolescents with visual impairments. *Adapted Physical Activity Quarterly*, 30(2), 127-146.
- Haegele, J. A., Brian, A., & Goodway, J. (2015). Fundamental motor skills and school-aged individuals with visual impairments: A review. *Review Journal of Autism and Developmental Disorders*, 2, 320-327.
- Haibach, P., Wagner, M., & Lieberman, L. (2014). Determinants of gross motor skill amongst adolescent youth. *Physical Education and Sport Pedagogy*, 21(6), 557-571.
- Houwen, S., Hartman, E., Jonker, L., Visscher, C. (2013). Reliability and validity of the Tgmd-2 in primary-school-age children with visual impairments. *Adapt Phys Active Q*, 27(2), 143-59
- Houwen, S., Hartman, E., Visscher, C., & Lemmink, K.A.P.M. (2014). Physical activity and motor skills in children with and without visual impairments. *Med Sci Sports and Exercise*, 41, 103-109.
- Mogaka, E., Bukhala, P., & Nguka, G. (2017). Determinants of Participation in Physical Activity among School Going Adolescents with Disabilities in Kakamega County, Kenya. *IOSR Journal of Sports and Physical Education (IOSR-JSPE)*, 4(4), 42-52.
- Morelli, T., Foley, J., Lieberman, L., & Foley, G.I. (2011). Pet-N-Punch: upper body tactile/audio exergame to engage children with visual impairments into physical activity. Paper Presented at the Graphics Interface Conference, Waterloo, ONT, Canada
- O' Brien, W., Belton, S., & Issartel, J. (2016). Fundamental movement skill proficiency performance in children with visual impairments. *Res dev disabil*, 35, 2577-2584

Robinson, E., Stodden, F., Barnett, L., Lopes, P., Logan, S., Rodrigues, L., & D'Hondt, E. (2015). Motor competence and its effect on positive developmental trajectories of health. *Sports medicine* 45(4),1273-84

Ulrich DA: Test of Gross Motor Development: Examiner's manual, 2nd ed. Austin:Pro-Ed publisher, 2000, pp 1-60

Vlahov, E., Baghurst, T. M., & Mwavita, M. (2014). Preschool motor development predicting high school health-related physical fitness: A prospective study. *Perceptual and Motor Skills*, 119(1), 279–291.

Wagner, M., Haibach, P., & Lieberman, L. (2013). Gross motor skill performance in children with and without visual impairments—research to practice. *Res Dev Disabilis*, 34(10), 3446-5

Williams, H. G., Pfeiffer, K. A., O'Neill, J. R., Dowda, M., McIver, K. L., Brown, W. H., & Pate, R. R. (2008). Motor skill performance and physical activity in preschool children. *Obesity*, 16(6), 1421-142