Comparative analysis of flexibility among students with three levels of visual impairments in special schools in Cross River State

(scientific paper)

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Abstract: *This paper is about a comparative analysis of flexibility among students with three levels of visual impairments in special schools in Cross River State. It is mandatory for visually impaired students to be assessed before being given adequate training on to participate in flexibility activities. The term visual impairment and flexibility were explained as well as the literature review on flexibility and students with visual impairments. The research design adopted for this study was descriptive survey design. The study area was Cross River State. The entire population of the visually impaired students in all the schools of the study was 72. The sampling procedure used in the study was in stages: stratified, simple random sampling and purposive sampling technique. The sample size for the study was sixty (60). The instrument used in the study was Observational Rating Scale (ORS) and Practical Activities Package (PAP). Measurement of flexibility was done on activities like sit and reach, stand and reach, and trunk extension. The result of the study showed was presented in a table. Based on the statistical analysis, the study revealed that the flexibility of students with low vision, functional blindness and total blindness significantly different. Recommendations and suggestions were also made.*

Keywords: *Comparative, analysis, flexibility students three levels of visual impairment*

1 Introduction

The society has imposed many conditions on individuals wanting to participate in flexibility activities. These conditions make it mandatory for visually impaired students to be assessed before being given adequate training on to participate in flexibility activities.

The term visual impairment is an umbrella term. It covers a variety of visual conditions, some of which could be traceable to the time of birth, and some the time after birth owing to gradual deterioration of sight overtime (Yakubu, 2009). The visual system consists of the eyeball and its inner parts, the muscles that surround it, and the nervous system which connects, or links the eyeball and the occipital lobe, and vision center in the brain.

Little wonder Baumgartner et al (2003) defined flexibility as a range of movement about joint. Visually impaired students have differences in flexibility, which depend on the physiological characteristics which influence the extensibility of the muscles and ligaments surrounding their joints. Hill, Snook & Hill (1996) opposed their maintenance of a sitting position for an extended period. To them, that resulted in muscles becoming much shorter than they should be. They advocated for additional stretching exercises as a necessity for the visually impaired students to enjoy the adequate flexibility of their muscles and their reiteration of their normal length.

Physiologists like Bucher (1989) and Winnick (2005) identified flexibility as one of the physical fitness components. They reiterated that the components of physical fitness to be separate entities should be developed with separate procedures. To them, to improve and maintain physical flexibility assessment of participants before they are involved in active recreational activities is essential. Equally, in their opinion, it is essential that teachers understand the effects of exercises on the body of each student, to plan programmes that may be appropriate for students who have various degrees of visual impairments. Flexibility infers that the body can make a wide range of movements, such as those needed in swimming, diving, and tumbling.

Hence, Adedeji (1985) and Edim, Akah & Emeribe (2010), maintained that specific aims of teaching physical education to secondary schools are to help produce certain desirable qualities, like mobility and social qualities in the individuals. They further highlighted the achievement of the aims and objectives of teaching adapted physical education activities to be realistic only when the interests and needs of visually impaired students are given priority in the development of flexibility.

2 Statement of the problem

Sports are an avenue for participants to show their talents and flexibility skills. There have been many sports competitions for athletes with disabilities organized by different groups in different countries since 1960.

In Nigeria, many National Sports Festivals have been held in different states, (Special sports athlete). For example, in May 2003, Second National Games for the Deaf were held in Kaduna with activities such as athlete food ball cycling. Despite all these recorded histories on sports performance by the physically challenged, most of the participants never came from Nigeria, particularly Cross River State. The reason is sports

for the disabled in Cross River State, is usually under the care of Ministry of Social Welfare and Community Development and not Ministry of Sport. Secondly, special schools hardly host or hold a practical test of flexibility activities for the visually impaired in Cross River State. The visually impaired students rarely have opportunity to participate in all local and international sports competitions. They seem neglected. Their ambition of gaining good interpersonal relationship become therefore frustrated. Their physical body flexibility needs to be assessed based on the degree of vision loss.

To this point, certain questions become pertinent: is the extent of visually impaired student participation and performance in practical daily or test activities dependent upon their flexibility status? Or is it that the practical test activities with which to test their fitness status to identify which activities they are best fit are generally lacking? It is against this background that this study assessed the flexibility status of students with visual impairments and their participation in practical test activities in special schools in Cross River State.

Purpose of the study

The objective of the study is to ascertain the differences in flexibility of students with the three degrees of visual impairments in special schools in Cross River State.

Research questions

How does flexibility differ among students with the three degrees of visual impairments in special schools in Cross River State?

Statement of hypotheses

There is no significant difference in flexibility among students with the three degrees of visual impairments in special schools in Cross River State.

3 Literature review

Flexibility and students with visual impairments.

Flexibility is specific to each joint. It is, therefore, never measured with just one test. Each movement that is possible at each joint is measured or tested if all aspects of flexibility are to be provided with appropriate practical activities (O'Neill, 1995).

Exercise is quite necessary because people who are flexible are less open to injury during physical activity. This is consistent with the findings of Zhang (2007) which revealed that lack of regular exercise was responsible for poor performance in flexibility activities by the students with visual impairments. The researcher identified visually impaired students with a flexible body to have a lower risk of injury and to have the ability to perform daily living routines much more easily.

Wang, Belza, Thompson, Whitncy & Benneth (2006), investigated the effects of aquatic exercise on flexibility, strength and aerobic fitness of middle-aged visually impaired persons with osteoarthritis of the hip or knee. The subjects for the study were randomly divided into two groups. Participants were residents selected through community sources. They were randomly assigned to a 12-week aquatic programme of a non-exercise control condition. Data from 38 participants were collected at baseline, after week 6, and week 12, in 2003 and 2004. Instruments used were a standard plastic goniometer, a hand-held dynamometer; a 6 minutes' walk test, a multidimensional health assessment questionnaire, and a visual analogue scale for pain. Repeated measures analysis of variance showed that aquatic exercise significantly improved knee and hip flexibility, strength and aerobic fitness, but had no effect on self-reported physical functioning and pain. The exercise adherence rate was 81.7%, and no exercise-related adverse effect was observed or reported. Results suggested that aquatic exercises did not worsen the joint condition or result in injury in middle age visually impaired persons.

Thus, conclusions were drawn since short-term effects of aquatic exercise were beneficial to adults with osteoarthritis of the hip or knee flexibility. The implication was that although, the programme may not offer pain relief or self-report on improvement in physical functioning, excitement and interpersonal relationships were developed. Nurses engaging in disease management and health promotion for these patients should consider recommending or implementing aquatic classes for patients.

Pangrazi & Hastard (1995) advised teachers to follow strictly the principles of exercise if physical fitness levels of visually impaired students were to be improved and maintained. They emphasized frequency, intensity and time duration (FIT) to be the three most important principles to be used while considering and structuring flexibility activities for the visually impaired. They further identified some exercises that can develop and maintain flexibility to include exercises involving the lower back and the posterior thigh. They also pointed out that visually impaired students need to be instructed and be continually reminded that, to decrease the possibility of injury, all their stretching exercises must be done slowly and relatives to their ability. They also emphasized that since flexibility is not a general component of physical fitness, it is not possible to measure it just by one type of test.

Houwen (2007), examined gross motor skills of children with visual impairments and its association with the degree of visual impairments and sports participation. Twenty (20) children with visual impairment (Mean age 9.2 years, S.D 1.5) and 100 sighted children (Mean age 9.1 years, SD 1.5) from mainstreaming schools participated in the study. The result showed that children with visual impairments than the sighted had significantly lower scores in object control than in locomotor skill. No significant difference was, however, found between children with moderate and severe visual impairments. Children with visual impairments who participated in

sports had significantly higher scores in object control skill than those who did not. No significant associations were found between motor skills and participation in sports among sighted children.

Cartwright, Cartwright, & Ward (1989), therefore, concluded that visually impaired students with a flexible body had lower risks of injury and more easily performed daily living routines than their counterparts. They highlighted flexibility activities to always help prevent disabling contractions.

4 Research methodology

Research design

The research design adopted for this study was descriptive survey design. The choice descriptive survey was because the researcher wants to survey the flexibility characteristics of the subject as at the time of the research. That is the researcher used the visually impaired students as a subject to assess and determine their flexibility status based on their different level of visual impairments (low vision, functionally blind and totally blind students).

The research area was Cross River State. Cross River State is one of the thirty-six (36) states of the Federal Republic of Nigeria. Cross River State is situated in the South-South geo-political zone of Nigeria and has eighteen (18) local government areas.

Sampling procedure and technique

The sampling procedure used in the study was in stages: stratified, simple random sampling and purposive sampling technique. Stratified random sampling technique was adopted only in St. Joseph Center, Obudu, because Obudu has the largest number of visually impaired students. The visually impaired were grouped into three strata of low vision, functionally blind and totally blind based on degrees of visual impairments.

The researcher used the available 14 low visions. While 12 functionally blind and 11 totally blind selection was done using simple random sampling. This gave a total of 37 visually impaired students. Stratified random sampling was used in selecting the functionally blind and totally blind to ensure that the different groups had an equal number of representatives in the sample, and purposive sampling was used in picking all the available low vision students.

Purposive sampling technique was used in seven schools because the numbers of visually impaired students were small. Therefore, all the available number of visually impaired students in the seven inclusive schools were used for the study. The number comprised 6 low visions, 8 functionally blind and 9 totally blind making a total of 23 students in the seven inclusive schools. The researcher used an equal number

of subjects in the 3 levels of visual impairments (low vision, functionally blind and totally blind), (20 low visions, 20 functionally blind and 20 totally blind students). In the selection of the visually impaired into strata, the researcher used Snellen Chart to test their visual acuity and the help of Orientation and mobility teachers as well as observation by the researcher.

Population

The population of this study consisted of all the visually impaired students in all 8 special and inclusive schools in Cross River State. The entire population of the visually impaired students in all the schools for the study was 72. The sample size for the study was sixty (60) visually impaired students, comprising of 32 males and 28 females. The breakdown showed 20 low visions, 20 functionally blind and 20 totally blind students. Their ages ranged from 15 to 25 years.

Table 1 *Summary of population distribution*

S/N	Schools	Low Vision	Functionally Blind	Totally Blind	Total Number of students
1	St. Joseph Centre Obudu	14	16	19	49
2	Holy child secondary school Mount Camel Ogoja	0	1	2	3
3	Mary Knoll secondary school Okuku	1	2	1	4
4	Government Boy Secondary School Obudu	2	1	1	4
5	Government Girls Secondary School Obudu	1	2	2	5
6	PinMargaret secondary school Calabar	0	1	2	3
7	Bekwara Secondary School	1	0	1	2
8	Government secondary school Obuchiche	1	1	0	2
Total		**20**	**24**	**28**	**72**

Source: field survey (2010)

Instrumentation

The instrument used in the study was Observational Rating Scale (ORS). The Observational Rating Scale (ORS) had two sections A and B. Section A required personal data like age, sex, and type of visual impairments. Section B contained 3 items constructed to elicit information on flexibility.

Practical Activities Package (PAP) was made up of practical activities that were performed by the subjects under flexibility activities. The activities included the

following: sit to reach, stand to reach and trunk extension exercises. A ruler was used for measurement of sit and reach, stand and reach, and trunk extension. A stopwatch was used for checking of the time consumed on each test.

Measurement of flexibility

I. Sit and Reach

The degree of the trunk may flexion depend on the length of the trunk extensor muscles of the back and the hamstring muscles. The subject assumed a sitting position with the knees fully extended and the bottom of the feet against the lower board of the bleachers (a constructed bench). The hands and arms are stretched forward as far as possible, and this position is held for 3 seconds. Two rulers were used for measuring the distance in front or beyond the edge of the bench. Measures in the first front ruler are negative, whereas measures beyond are positive. This test may also be taken by standing on a bench and reaching down as far as possible (stand and reach). All the exercises and measurements were taken three times then the best performance scores were recorded as the subject scored.

II. Stand and reach

The degree of trunk flexion may depend on the length of the trunk extensor muscles of the back and the hamstring muscles. The subject assumed a standing position on a bench. The subjects bend their body with their hands and arms stretched down as far as possible, and this position is held for 3 seconds. A ruler was used for measuring the distance in front or beyond the edge of the bench downward. All the exercises and measurements were taken three times then the best performance scores were recorded as the subject scored.

III. Trunk extension

The test is a measure of the range motion when the back is placed in the prone position. The subject lied face down on the floor with a partner holding the buttocks and legs down. The fingers were interlocked, and the head and shoulders are raised as far as possible from the floor. The distance was measured from floor to chin with a ruler. All the exercises and measurements were taken three times then the best performance scores were recorded as the subject scored.

Validation of the instrument

The face and content validity of these instruments were established with the help of experts in Special Education, Human Kinetics and Health Education, Measurement and Evaluation, all in the Faculty of Education, University of Calabar.

Data collection procedure

The researcher obtained permission from principals of the schools under study and introduced herself as a Ph. D research student in the Department of Human Kinetics and Health Education, University of Calabar. One week before the administration of the tests, eight research assistants were given orientation and trained by the researcher on the following: (a) the nature and the scope of the study; (b) the facilities and equipment that were involved in the activities of the practical test; and (c) the research assistants' specific duties during administration of the activities of the practical test.

The following facilities and equipment: mat, none elastic measurement tapes, a ruler, and stopwatch were used to measure performance on the practical activities test of flexibility.

The researcher and the six research assistants helped in conducting the study. Two of the research assistants were nurses. Three of the research assistants were specialists in visually impairment education (one mobility instructor and two physical educators). Others included a timekeeper, a recorder of scores and a photographer who filmed and snapped the practical activities.

The duration of the study was eight weeks. The testing sessions were done three times a week. The tests were carried out in the morning from 8–11 AM and in the evening 4–6 PM. The duration of practical test activities was 30 minutes per subject. For each of the practice days, the subject's first participated in warm-up activities which get them prepared for the practical test activities.

5 Results and discussion

Hypothesis: The flexibility of students with the three degrees of visual impairments is not significantly different.

To test this hypothesis, the performance of students was on flexibility activities like sit and reach, stand and reach and trunk extension. These activities were compared.

Table 2: *Descriptive statistics showing mean (X), standard deviation (SD) and one-way analysis of variance (ANOVA) of the influence of level of impairment on flexibility.*

Flexibility parameters	Level of impairment	N	Mean	SD
Sit and reach	Total blindness	20	10.75	4.327
	Funct. blindness	20	11.00	5.099
	Low vision	20	11.85	5.678
	Total	60	11.20	5.001

Stand and reach	Total blindness	20	3.93	1.321
	Funct. blindness	20	5.50	1.076
	Low vision	20	7.13	1.062
	Total	60	5.52	1.742
Trunk extension	Total blindness	20	12.40	2.037
	Funct. blindness	20	9.70	1.867
	Low vision	20	11.20	1.989
	Total	60	11.10	2.230

Variable	Source of variance	Sum of squares	df	Mean square	F-ratio	p-level
Sit and reach	Between groups	13.300	2	6.650	.259*	.773
	Within groups	1462.300	57	25.654		
	Total	1475.600	59			
Stand and reach	Between groups	102.408	2	51.204	38.115*	.000
	Within groups	76.575	57	1.343		
	Total	178.983	59			
Trunk extension	Between groups	73.200	2	36.600	9.474*	.000
	Within groups	220.200	57	3.863		
	Total	293.400	59			
Overall Flexibility	Between groups	186.308	2	93.154	3.788*	.029
	Within groups	1401.875	57	24.594		
	Total	1588.183	59			

Significant at .05 *P < .05 df = (2,57) critical f = 3.15
Source: field survey (2010)

Table 2 result indicated that the F-ratios associated with stand and reach (38.115) and the overall flexibility (3.788), to be statistically significant at .05 levels ($p < .05$), where, the F-ratios associated with sit and reach (.259), were not statistically significant at .05 levels ($p > .05$). The result equally indicated the F-ratios associated with trunk exercises (9.474) not to be statistically significant at .05 level ($p < .05$). In all, the hypothesis was rejected, suggesting there was a statistically significant difference in the flexibility of the low vision, functionally blind and totally blind students in the special schools.

Using Fisher's least significant difference the result in the table indicated in respect to stand and reach, significant group differences between low vision and total blindness; low and functional blindness. It also indicates functional and low vision groups had a higher mean score ($x = 7–13$), followed by the total blindness group

(x = 5.50) and the total blindness group which had the least mean score (x = 3.93). This result indicated that the low vision group was superior to its counterparts in terms of the stand to reach activity, while the total blindness group was least in that activity.

The result also showed that significant group differences existed between functional blindness and total blindness groups and between functional blindness and low vision groups for trunk extension activities. The low vision group was statistically superior to the functional blindness group, while the total blindness group was statistically superior to the functional blindness group in trunk extension activities. This suggested functional blindness tend to account for significant group differences in trunk extension activities.

In terms of flexibility, the performance in sit and reach activity was greater than maximum, while in trunk extension it was less than minimum. However, in stand and reach activity performance was to be noted average. This result suggested subjects exhibited a good level of flexibility with regards to sit and reach activities; acceptable level of flexibility with regards to stand and reach activities; and a poor level of flexibility in trunk extension.

Discussion of findings

The results of the study revealed that the flexibility of students with low vision, functional blindness and total blindness was significantly different. Contrary to the stated null hypothesis of the study. This finding indicated that flexibility problems to show more on the level of effect of visual impairments. This simply meant that careful assessment must be done of the ability and limitation of visually impaired students' conditions as a first step to determining the eligibility of their participation in sports (flexibility activities).

This study is consistent with the findings of Zhang (2007) which revealed that lack of regular exercise was responsible for poor performance in flexibility activities by the students with visual impairments. The researcher identified visually impaired students with a flexible body to have a lower risk of injury and to have the ability to perform daily living routines much more easily.

Also, the result of this finding is in line with the findings of Houwen (2007) which concluded that there is no significant difference was, however, found between children with moderate and severe visual impairments. Children with visual impairments who participated in sports had significantly higher scores in object control skill than those who did not.

This finding is also in line with the findings of Cartwright, Cartwright, & Ward (1989) which concluded that visually impaired students with a flexible body performed daily living routines more easily than their counterparts. They highlighted flexibility activities to always help prevent disabling contractions.

6 Conclusion

Based on the research finding, it was concluded that the flexibility of students with visual impairments was significantly different.

Recommendations

Based on the finding of the study, the following recommendations were made:

1. Assessment of flexibility students with visual impairments should be carried periodically.
2. Basic flexibility activities package should be put in place by school curriculum planners to motivate teachers.

Suggestions for further study

Based on the limitation of the study, the following suggestions were made:

1. Similar studies should be carried out to cover other states and larger samples of visually impaired students.
2. A replication of this study should be carried out again on regular students.
3. Further studies should be carried out on flexibility relative to other types of impairments.

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