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Teachers' Knowledge of Vision Disorders in Primary School Children in Port Harcourt

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Summary

Tabansi PN, Anochie IC, Pedro-Egbe CN, Nkanginieme KEO. Teachers' Knowledge of Vision Disorders in Primary School Children in Port Harcourt. *Nigerian Journal of Paediatrics* 2009; 36: 33.

Background: Vision disorders are important causes of childhood morbidity worldwide and if undetected, can lead to poor academic performance. Teachers can be trained to heighten their awareness and knowledge of common childhood vision disorders, thus enabling them to observe visual difficulties in pupils and notify caregivers for further evaluation and treatment in the context of the "School Health Programme."

Objective: To determine the effects of training on teachers' knowledge of childhood vision disorders.

Subjects and Methods: Using multi-staged sampling technique, a self-designed and self-administered questionnaire was used to obtain information on teachers' knowledge of common childhood vision disorders, before and after six hours training. The pre and post test results were compared and analyzed.

Results: The teachers consisted of 110 females (84.6 percent) and 20 males (15.4 percent). Seventy (53.8 percent) were from public schools, while 60 (46.2 percent) were from private schools. Before training, 74 (56.9 percent) teachers were aware of school entry vision screening and 14 teachers (10.8 percent) affirmed that vision problems might cause poor academic performance. With training, there was a significant improvement in the awareness to 76.9 percent and knowledge of vision disorders such as hypermetropia ($p=0.002$) and corneal opacity ($p=0.000$) increased significantly. School-type and educational qualification were found to affect the knowledge of childhood vision disorders.

Conclusion: Primary school teachers had significant improvements in their knowledge of childhood vision disorders and ways to identify affected children in the classroom, following short term training. Such training should enable early detection of school children with vision disorders by their teachers, for purposes of early intervention and treatment.

Key words: School children, Vision disorders, Teachers' knowledge.

Introduction

The World Health Organization estimates that there are about 110 million people with low vision (visual acuity <6/18 to 3/60) worldwide.[1] Globally, there are 1.5 million blind children, three quarters of whom live in developing countries including Nigeria, where the child population is high.[2] Studies carried out in Africa have shown that 8.9 percent to 11.6 percent of school children had significant ocular anomalies requiring treatment.[3,4] These anomalies include refractive errors, strabismus, amblyopia, leukoma cornea, and cataract.[3] In Nigeria, 7.3 percent to 10.4 percent of primary school children have one or more ophthalmic defects requiring attention.[5-7] The common problems reported include refractive errors, and squint.[5,6] Undetected ocular disorders can cause serious problems in a child's mental and social development.[8] The ability of a child to participate in

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the educational experience is partly dependent on good vision, and in children, refractive errors have been shown to have significant association with academic failure.[9]

The school health services component of the School Health Programme (SHP) provide for routine school medical examination of children at school entry, mid-way through school, and at completion.[10] Many developing countries including Nigeria, have no established vision screening programme for children on commencement of school,[11] because the SHPs are not optimally functional. In developing countries where there is a shortage of basic eye care services, teachers can be trained to deliver simple health screening services, and refer children for treatment as need be.[11] Some studies have shown that training teachers on vision disorders and vision screening enhances their ability to detect vision problems in their class children,[12-16] and thus facilitate prompt intervention and treatment. In Nigeria, there is scarce data on teachers' knowledge of common childhood vision disorders and how affected children may be identified in the classroom. The aim of the present study was to determine the effect of training on teachers' knowledge of common vision disorders in children.

Subjects and Methods

The study was carried out over three weeks [July 2-20] in 2007. Ethical clearance was obtained from the University of Port Harcourt Teaching Hospital (UPTH) Ethics Committee and permission to carry out the study was obtained from the Rivers State Ministry of Education. Included in the study were primary school teachers in public and private schools in Port Harcourt who gave informed consent. Teachers in special schools for handicapped children were excluded.

Study Design: A multi-staged sampling technique was used to select the teachers for the study. The schools were used as sampling units from which the teachers were then subsequently selected. Thus, a list of all primary schools in Port Harcourt Local Government Area obtained from the Rivers State Ministry of Education acted as the sample frame.

Stage 1: There were 139 Government approved primary schools in Port Harcourt Local Government Area, which were clustered into the three school districts. Diobu had 67, Township had 53, and Trans-Amadi had 20 schools. Using simple proportions, this translated to a ratio of 6:5:2. Based on this, 13 schools were randomly chosen for the study comprising six schools from Diobu district (three private and three public), five schools from Township (three public and two private) and two schools from Trans-Amadi (one public and one private).

Stage 2: At each selected school, and using a table of random numbers, 10 teachers were randomly recruited from the list of teaching staff provided by the school. The teachers were given self-designed and self-administered pre-test questionnaires which addressed the bio-data of the teachers, their knowledge of vision screening (Snellen's chart), common childhood vision disorders, and ways of observation in the classroom. Eye problems explored included refractive errors like hypermetropia (long-sightedness) and myopia (short-sightedness), corneal opacity (whiteness of cornea), cataract (whiteness of pupils), strabismus (squint), and phthisis bulbi (grossly shrunken abnormal eye). Further clarifications of medical terms used were made as necessary. Ways of observing symptoms of eye disorders in the classroom such as blurring of vision, persistent headaches, tearing, squinting, and poor academic performance were explored. The teachers were also asked what action they would take if they incidentally discovered a class pupil with possible vision disorder, such as: notifying the parents or changing the sitting arrangement of the child to accommodate refractive errors.

After the pre-test, the teachers had a six-hour training on common childhood eye disorders using an adaptation of a manual on "Guidelines for easy and quick assessment of vision" developed as a teaching/training aid for teachers in Cross Rivers State by YOUTHCARE (a Non-Governmental Organization working with Sight Savers International and the Cross Rivers State Government). The manual (unpublished) consists of three modules: Module 1 is introduction and includes a brief description of the eyeball and common vision problems especially among children; Module II discusses the important tips about the eye i.e. 'Dos and Don'ts', as well as composition of the eye team; Module III describes the school vision screening procedures, assessment of visual acuity, procedure for carrying out external eye examination, recording of findings and referral system. In addition, power point presentations with explicit audio-visual images showing the various types of vision anomalies in children mentioned above were shown. The teachers were trained in batches of 45 in a single location for three consecutive days. The sessions were interactive and questions and clarifications were exhaustively addressed. At the end, the same questionnaire (post test) was re-administered to the teachers. Then simple educational materials with illustrations were given to them to take home and study.

Data analysis

The pre and post test data were analyzed using the computer programme EPI INFO version 6 and SPSS 11.0. Comparative analysis of teachers' knowledge was carried out using their pre and post test results, academic qualifications (and whether in the education or non-education disciplines -referred to as "others") and school type (public and private schools). Simple comparisons were carried out using Chi-square test. A level of $P < 0.05$ was considered significant.

Results

All recruited teachers gave consent to the study giving a participation rate of 100%. There were 70 teachers (53.8%) from public schools, and 60 teachers (46.2%) from private schools. One hundred and ten teachers were females (84.6%) and 20 males (15.4%). Ninety-eight teachers (75.4%) had academic qualifications specifically in Education disciplines (such as National Certificate of Education (NCE), Bachelor of Education (B.ED), and Teacher's Training Certificate), while 24.6% of the teachers had qualifications in other disciplines not related to Education. There were more teachers in Education disciplines in public schools – 94.3% (i.e 66 out of 70), compared to 53.3% in private schools (32 out of 60).

Tables I

Result of teachers' pre- and post-test questionnaires

	Pre-Test		*Post-test*		*level of significance*
Questions	*Yes*	*(%)*	*Yes*	*(%)*	*(McNemar Chi square)*
1. Awareness of school entry vision screening.	74	61.7	100	79.4	0.000
2. Knowledge of Snellen's alphabet chart	66	86.8	82	69.5	0.000
3. Knowledge of vision problems in school children.					
—short sightedness (myopia)	104	86.7	104	81.3	0.000
—long sightedness (hypermetropia)	42	35.0	70	54.7	0.565
—cataract	12	10.0	40	31.3	0.000
—corneal opacity	4	3.3	22	17.2	0.000
—Phthisis bulbi	8	6.7	26	20.3	0.000
—squint	28	23.3	50	39.1	0.001
4. Ways vision problems may be noticed in the classroom.					
—inability to see teaching board	90	72.6	94	73.4	0.000
—persistent complaint of headache	20	16.1	46	35.9	0.000
—tearing of eyes	62	50.0	76	59.4	0.268
—poor academic performance	14	11.1	34	26.6	0.000
5. what action may be taken on incidental finding of vision problem in a class pupil.					
—inform child's parent	90	71.4	104	81.3	0.000
—change sitting arrangement	42	30.2	46	26.6	0.000
—do nothing	8	6.3	10	7.8	0.000

Table II

Comparison of teachers' pre-test result according to School Type

Questions	Public-schools (70 teachers) Yes	(%)	Private-schools 60 teachers) Yes	(%)	Level of significance. X^2	p-value
1. Awareness of school entry vision screening.	38	54.3	36	60	0.43	0.51
2. Knowledge of charts? —Snellen's alphabet	38	54.3	28	46.7	0.75	0.39
3. knowledge of:						
short sightedness (myopia)	54	77.1	50	83.3	0.77	0.38
Long sightedness (hypermetropia)	10	14.3	32	53.3	22.52	0.00
—cataract	6	8.6	6	8.6	0.00	0.96
—corneal opacity	0	0.0	4	6.7	*2.84	0.09
—Phthisis bulbi	2	2.9	6	10.0	*1.75	0.19
—squint	10	14.3	18	30.0	4.72	0.03
4. ways of detecting vision disorders in classroom?						
—inability to see board	46	65.7	44	73.3	0.88	0.35
—persistent complaint of headache	10	14.3	10	16.7	0.14	0.71
—tearing of eyes	28	40.0	34	56.7	3.60	0.66
—poor academic performance	6	8.6	8	13.3	0.76	0.38
5. action taken on incidental finding of vision disorder in pupil?						
—inform child's parent	50	71.4	40	66.7	0.34	0.56
—change sitting arrangement	26	37.1	4	6.7	16.90	0.00
—do nothing	2	2.9	6	8.6	*0.98	0.32

*Yates Corrected Chi²

The responses to the pre and post test questionnaires administered to the teachers are shown in Table I. Prior to training, 61.7 percent of teachers were aware of the school entry vision screening, 86.7 percent of teachers knew myopia as a cause of vision disorders but there was little knowledge of other causes. Twenty teachers (16.1 percent) knew that vision problems may present as persistent complaint of headache, and only 11.1 percent of teachers knew that vision disorders may cause poor academic performance. Post-test, there was a significant improvement in knowledge in most areas such as the awareness of school entry vision screening to 79.4 percent ($p = 0.00$), and knowledge of causes of vision disorders such as cataract which improved from 10.0 to 31.3 percent, ($p = 0.00$), corneal opacity from 3.3 percent to 17.2 percent ($p = 0.00$), and phthisis bulbi from 6.7 percent to 20.3 percent ($p = 0.00$). Also significantly more teachers (26.2 percent) knew that vision disorders could lead to poor academic performance ($p = 0.00$). Table II compares the pre-test result of teachers in private and those in public schools.

Prior to training, there was no significant difference in performance on most questions except in the area of knowledge of hypermetropia where teachers in private schools (53.3 percent) performed better than the 14.3 percent observed for public schools teachers ($p = 0.00$). In contrast, 37.1 percent of public school teachers compared to 6.7 percent of private school teachers will change a child's sitting position to acommodate a suspected vision disorder. This difference was significant ($p = 0.00$).

Table III

Comparison of Teachers' Post Test result to School Type.

Questions	*Public schools (70 teachers)* Yes	(%)	*Private schools (60 teachers)* Yes	(%)	X^2	*Level of significance* p-value
1. Awareness of school entry vision screening.	54	71.4	46	66.7	0.34	0.56
2. knowledge of charts? — Snellen's alphabet	46	65.7	36	60.0	0.45	0.50
3. knowledge of:						
-short sightedness (myopia)	52	74.2	52	86.7	3.10	0.08
Long sightedness (hypermetropia)	22	31.4	48	80.0	30.67	0.00
—cataract	16	22.9	24	40.0	4.46	0.04
—corneal opacity	6	8.6	16	22.9	5.41	0.02
—Phthisis bulbi	6	8.6	20	33.3	11.50	0.00
—squint	20	28.6	30	50.0	6.27	0.01
4. ways vision disorders may be noticed in the classroom?						
—inability to see board	44	62.9	50	83.3	6.76	0.01
—persistent complaint of headache	14	20.0	32	53.3	15.70	0.00
—tearing of eyes	30	42.9	46	76.7	15.21	0.00
—poor academic performance	6	8.6	28	46.7	24.28	0.00
5. Action taken on incidental finding of vision disorders in pupil?						
—inform child's parent	56	80.0	48	80.0	0.00	1.00
—change seats	20	28.5	26	43.3	3.08	0.08
—do nothing	8	11.4	42	70.0	49.74	0.00

In Table III, the post test results of the teachers based on School Type were compared. There was an overall improvement in knowledge in both groups especially among the private school teachers (80 percent) who still had significantly better knowledge than public school teachers (31.4 percent) in causes of vision disorders like hypermetropia ($p=0.00$), corneal opacity where 22.9 percent of private school teachers gained knowledge compared to 8.6 percent of public school teachers ($p=0.02$); phthsis bulbi, 33.3 percent of private school teachers compared to 8.6 percent of public school teachers ($p=0.00$); and squint, 50.0 percent of private school teachers compared to 28.6 percent of public school teachers ($p=0.01$). More private school teachers had improved knowledge on ways vision disorders may be noticed in the classroom; such as persistent headache -53.3 percent of private school teachers compared to 20.0 percent of public school teacher ($p = 0.00$), tearing of eyes – 76.7 percent of private school teachers compared to 42.9 percent of public school teachers ($p = 0.00$), and poor academic performance – 46.7 percent private school teachers compared to 8.6 percent of public school teachers ($p = 0.00$). There was no significant difference between public and private school teachers on action they will take on incidental finding of a child with a vision disorder, as 80 percent of both private and public school teachers affirmed that they would inform an affected child's parent.

The teachers' pre-test results according to their academic qualification were compared in Table IV. There was no significant difference in performance

Table IV

Comparison of teachers' pre-test result according to academic qualification.

Questions	Education Discipline (98 teachers) (B.ed. N.C.E, T.TC) Yes	(%)	Other Disciplines (32 teachers) Yes	(%)	Level of significance X^2	p- value
1. Awareness of school entry vision screening.	56	57.1	18	56.3	0.01	0.93
2. knowledge of charts: — Snellen's alphabet	52	53.1	14	43.8	0.84	0.36
3. - knowledge of: short sightedness (myopia)	78	79.6	26	81.3	0.04	0.84
—long sightedness (hypermetropia)	24	24.5	18	56.3	11.13	0.00
—cataract	6	6.1	6	18.8	3.21	0.07
—corneal opacity	0	0.0	4	12.5	-	
—Phthisis bulbi	6	6.1	2	6.25	0.16	0.69
—squint	20	20.4	8	25.0	0.30	0.58
4. ways vision problem may be noticed in class?						
—inability to see board	64	65.3	26	81.3	2.88	0.09
—persistent complaint of headache	12	12.4	8	25.0	2.11	0.14
—tearing of eyes	42	42.9	20	32.2	1.35	0.24
—poor academic performance	6	6.1	8	25.0	7.09	0.01
5. Action taken on incidental finding of vision disorder in a pupil?						
—inform child's parent	70	71.4	20	62.5	0.90	0.34
—change sitting arrangement	28	28.6	14	43.8	2.54	0.11
—do nothing	6	6.1	2	6.25	0.16	0.69

between teachers with Education discipline (B.Ed, N.C.E, Teachers Training Certificate), and those in other disciplines in most of the questions, except in the questions relating to knowledge of vision disorders like myopia and corneal opacity, where teachers in other discipline (56.3 percent, and 12.5 percent respectively) performed significantly better than those in Education disciplines (24.5 percent, 6.1 percent and 0.0 percent respectively). ($p = 0.00$). In the same comparison post-test in Table V, there was a general improvement in knowledge amongst the two groups of teachers in all areas. However a significant proportion of teachers in other disciplines (43.8 percent) had acquired knowledge of other vision disorders like phthisis bulbi ($p = 0.00$) and squint (68.8 percent) ($p = 0.00$). Twenty-eight teachers (87.5 percent) with other disciplines compared to 67.3 percent of teachers in Education discipline knew of ways to detect vision disorders in the classroom such as inability to see the board ($p = 0.03$), and persistent complaint of headache (62.5 percent other discipline as against 28.3 percent of teachers in Education discipline ($p = 0.00$). However, more teachers in Education discipline (20.4 percent)

Table V

Comparison of teachers' Post-test result according to academic qualification.

Questions	*Education Discipline (98 teachers)* Yes	(%)	*Other Disciplines (32 teachers)* Yes	(%)	*Level of significance* X^2	*p-value*
1. Awareness of school entry vision screening.	74	75.5	26	81.3	0.45	0.50
2. knowledge of charts: — Snellen's alphabet	60	61.2	22	68.8	0.59	0.44
3. Knowledge of:						
-short sightedness (myopia)	74	75.5	30	93.4	5.02	0.03
Long sightedness(hypermetropia)	44	44.9	26	81.3	12.83	0.00
—cataract	28	28.6	12	37.5	0.90	0.34
—corneal opacity	14	14.3	8	25.0	1.97	0.16
—Phthisis bulbi	12	12.2	14	43.8	16.61	0.00
—squint	28	28.6	22	68.8	16.45	0.00
4. ways vision problems may be noticed in the class						
—inability to see board	66	67.3	28	87.5	4.89	0.03
—persistent complaint of Headache	26	28.3	20	62.5	11.92	0.00
—tearing of eyes	54	55.1	22	68.8	1.85	0.17
—poor academic Performance	20	20.4	2	6.26	3.44	0.06
5. Action taken on incidental finding of vision disorder in pupil?						
—inform child's parent	78	79.6	26	81.3	0.04	0.84
—change sitting Arrangement	32	32.7	14	43.8	1.30	0.25
—do nothing	8	8.2	2	6.25	0.00	0.98

compared to 6.26 percent of those in other disciplines knew that vision disorders can cause poor academic performance, but this difference was not statistically significant ($p = 0.06$)

Discussion

This study revealed that the knowledge of eye disorders and vision screening among primary school teachers in Port Harcourt was low prior to receiving 6-hour training. Specifically, only 61.7% of teachers were aware of school entry vision screening for pupils, and 11.1% agreed that vision problems may cause poor academic performance. This finding is important because teachers' training curriculum ought to include health education which should address common health problems that may affect a child. By such training, a teacher should be able to notice pupils with vision problems that may affect their education and bring this to the attention of their parents for early treatment. That the teachers had poor knowledge of vision disorders in children may suggest an inadequacy in content and/or time allocated to Health Education or a lack of emphasis on health issues in their training curriculum. The school health program (SHP) aims to maintain the health of the school population so as to optimize their educational experience, by providing preventive health services like vision and hearing screening services amongst others.[10,11] In places where it is practiced, it has been found to be a cost effective

way of delivering preventive health services.[15] Although the SHP exist in Nigeria as in most developing nations, implementation is at best minimal in most schools; possibly contributing to the poor performance of the teachers before the training.

After training, there was significant improvement in awareness of school entry vision screening, Snellen's chart and knowledge of common childhood vision disorders like hypermetropia, phthisis bulbi and strabismus. Significantly, more teachers realized that vision disorders could lead to poor academic performance and had learnt of ways to detect visual difficulties in their pupils in the classroom. This is comparable to findings by Krumholtz,[13] in New York, USA, who observed that there was a statistically significant increase in the ability of teachers to correctly identify vision problems from 29% prior to receiving a 40 minutes in-service lecture on vision problems, to 68% after the lecture.[13] Similarly, Seethal and Karim[14] evaluated a teacher vision awareness program in South Africa, and showed that teachers trained on detection of vision problems significantly identified more preschool children with vision problem by observation alone, than those who had no training.[14]

Though there was a general increase in knowledge among the teachers after training, bi-variate analysis of knowledge in relation to school type, showed that more private school teachers performed better than public school teacher in most questions pre and post test. This is surprising because more than ninety percent of public school teachers had academic qualification specifically in Education disciplines and as such would have been expected to have extensive knowledge on school health education and SHP which addresses vision and other screening services for school children; as part of their training. This lends further evidence to possible inadequacy in the Health Education aspects of training curriculum. On the other hand, it is plausible that the private school teachers may have had academic qualifications in other Biological or Health Sciences related courses (which were not explored in this study), and as such displayed better overall knowledge of the subject matter pre and post test.

The same pattern of performance was observed when comparisons were made based on academic qualifications pre and post test; with teachers who had qualifications in Other Disciplines scoring better than those with qualifications in Education in most questions; also lending credence to the speculation of inadequate Health Education curricula for trainee teachers in content and/or time allotted. A lack of continuing education for teachers in form of short training workshops or re-fresher courses in health education or other aspects of their profession may also have been contributory.

Conclusion

We conclude that primary school teachers in Port Harcourt had poor knowledge of childhood vision disorders and ways of detecting them in the classroom prior to participating in a six-hour training workshop. With training, there was significant improvement in their knowledge. Therefore, regular courses/training workshops in relevant aspects of health education for teachers as a means of continuing education for the updating of knowledge and acquisition of relevant skills, is recommended. Also, review and/or incorporation of eye health education and vision screening as an integral part of the SHP in the curriculum of trainee teachers is recommended to heighten their awareness and ability to detect visual difficulties in their class pupils, so as to alert caregivers for prompt intervention and remedy.

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