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Effect of Ophthalmic Exercise in Reducing Refractive Error among School Going Children in Selected Schools of Maharashtra

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Abstract: ***Aim of the study: The study aims to find the effectiveness of structured teaching Programme (STP) on Knowledge Regardingstroke rehabilitation among staff nurses sevining in tertiary care hospital of Maharashtra. Objectives of study: Primary objective: To assess the effectiveness of STP on knowledge regarding Stroke rehabilitation among staff nurses serving intertiary care hospital of Maharashtra Secondary objectives- 1. To assess the knowledge of Staff nurses regarding stroke rehabilitation among staff nurses serving in tertiary care hospital Maharashtra. 2. To Find out The Effectiveness of STP on knowledge regarding stroke rehabilitation among staff nurses serving intertiary care hospital 3. To Associate between posttest knowledge score on stroke rehabilitation and selected demographic variables of staff nursesserving in tertiary care hospital. Method: A pre-experimental one group pretest posttest design and quantitative approach was carried out on 80staff nurses selected by convenient sampling techniqueto test effectiveness of structured teaching programme. The data was collected by using structured questionnaire consists of 30 items. Results: The presents study evaluates and found that demographic variables, majority 62.5% of them were in the age group of 21-30 years, majorityofstaffnurses75%ofthemwere females, majority 72.5% of the staff nurses were educated upto GNM, majority (46.3%)of the staff nurses had working experience of 0-5 years, majority (17.5) % of the staff nurses had information from mass media. Interpretation and conclusion:The data were analysed by applying descriptive and inferential statistics. The result of the study indicated that after intervention there was an improvement in the knowledge and they gain good knowledge about stroke rehabilitation. Analysis data shows that highly significance difference found between the pre -test and post- test knowledge scores at the level of (P<0.05). The hypothesis is proved and accepted.***

1. Introduction

The visual system consist of the external tissue and structure surrounding the eye the external and internal structure of the eye, the refractive media and the visual pathway. From the retina the visual stimuli travel through the visual pathway to the occipital cortex, where they are perceived as an image.[1] Refractive errors occur when the shape of the eye prevents light from focusing directly on the retina. The length of the eyeball (longer or shorter), changes in the shape of the cornea, or aging of the lens can cause refractive errors.[2]

Refractive error occurs when there is failure of the eye to correctly focus rays of light from an object onto the retinal plane. The resultant image perceived by the individual is blurred, and refractive correction is required to see clearly. Refractive error can be divided into myopia (short or near-sightedness), hyperopia (long or far-sightedness) and astigmatism (irregularly curved cornea.[3] Refractive errors are the one of the most common visual disorders found worldwide in school going children and also it is one of the causes of blindness.[4]

Refractive error is one of the most common causes of visual impairment around the world and the second leading cause of treatable blindness. Childhood visual impairment due to refractive errors is one of the common problems in school children.[7] Childhood visual impairment due to refractive errors is a significant problem among school children and has a considerable impact on public health. Recent data suggest that a large number of people are blind in different parts of the world, due to high refractive errors because they are not using appropriate refractive corrections.[8]

Refractive errors are by far the commonest cause of defective vision in school childrens. This is a health related condition of the eye that causes visual impairment and may lead to blindness if not early detected and corrected. It is a disease that occurs when parallel rays of light entering the non-accommodating eye are not focused on the retina.[9]

2. Need for the study

The Children are the most valuable assets of a country. School age children constitute roughly a quarter of the total population. The children today are going to be adults of future, the more productive group. Almost 1/5th of the population of India consists of school age children. Hence, health care of this group is of paramount importance. Although school health service is considered important among national priorities.[15]

Globally It is estimated that 153 million people over 5 years of age are visually impaired as a result of uncorrected refractive error, of which 8 million are blind. Some12.8 million in the age group 5-15 years are visually impaired from uncorrected or inadequate corrected refractive errors, a global prevalence of 0.96%, with the highest prevalence reported in urban and highly developed urban areas in south-east Asia and in china.[16]

According to research study reports on the prevalence of refractive error in children below 15 years of age, the overall prevalence of refractive error per 100 children was 8.0 and in schools it was 10.8 and the population based prevalence of myopia, hyperopia and astigmatism was 5.3%, 4.0% and 5.4%, respectively. In India, varied prevalence rate of myopia and hyperopia have been reported in children. These studies have confirmed that many children are in need of spectacle correlation and in rural India. Around 86% of

children presented without correlation for refractive error. There are 365 million children age less than 15 years of age (29% of the population national health profile 2015, published by government of India) therefore providing vision screening for all children is an essential task. School best vision screening services are consider cost effective in detecting correctable causes of decrease vision.[10] School screening is performed in various ways, including simple visual acuity assessment by school teachers or paramedical professionals, and by using computers to assess vision. In developing countries, schoolteachers have been most commonly used for vision screening of schoolchildren. In recent years, vision screening has also included preschool children. However, current understanding of the natural history of refractive error and amblyopia is incomplete, thus limiting the prophylactic potential of early screening of preschool-age children.[17]

3. Review of Literature

The visual system consist of the external tissue and structure surrounding the eye the external and internal structure of the eye, the refractive media and the visual pathway. From the retina the visual stimuli travel through the visual pathway to the occipital cortex, where they are perceived as an image.[1]

Refractive error, also known as refraction error, is a problem with focusing light accurately onto the retina due to the shape of the eye. The most common types of refractive error are near-sightedness, far-sightedness, astigmatism, and presbyopia. Near-sightedness results in faraway objects being blurry, far-sightedness and presbyopia result in close objects being blurry, astigmatism causes objects to appear stretched out or blurry. Other symptoms may include double vision, headaches, and eye strain.[18]

Refractive error was the main cause of visual impairment in children aged between 7 and 15 years in rural India.[35]

Refractive errors are the fourth commonest cause of blindness in the developing world. In the developed countries, screening for eye diseases including refractive errors in school going children is done.[36]

The most usual convergent the commonest cause is hypermytropia, which cause over accommodation and therefore over convergence. In contrast to this, myopia can predispose to the tendency to divergence because the eyes are already in in focus to near vision without the aid of accommodation, convergence is not stimulated and divergence may result.[3]

Eye exercises method first introduced by William H. Bates in the early 1900's. Bates was an ophthalmologist. This method was known as Bates Method. In his theory, Eye exercises can reduce eye's movement disorder, accommodation dysfunction, amblyopia, learning disabilities, dyslexia, asthenopia, myopia, motion sickness, sports performance, stereopsis, visual field defects, increase visual acuity and general health. Myopia can be prevented and treated effectively without any complication by practicing the extra ocular muscles. Eye exercises also improve cognitive function and neural activity by increasing the mechanical plasticity in short-term at superior calculus, frontal and parietal part of the brain. Those parts of the brain have a role in visual attention, preparatory motor signaling from vasomotor system and working memory coulometer circuits.[42]
[7]

Assumption:
1) Staff School going children may reducing the refractive error
2) Administering the ophthalmic exercise may reducing the refractive error

Delimitations:
The study was limited to
- Effect of ophthalmic exercise with regards to refractive error
- 40 school going children in selected schools of Maharashtra

Hypothesis:
- H1:There is a significant difference between pretest and post-test reading of snellen chart in reducing refractive error among school going children after ophthalmic exercises.
- H2:There is a significant association between post-test readings of snellen chart with selected demographic variable among school going children

4. Methodology

Research approach: An experimental research approach was used for the study

Research design: Quantitative, pre-experimental one group pretest posttest design

Variables under study: Dependent Variable**:** -refractive error Independent Variable: - ophthalmic exercise**.**

Accessible population: The accessible population for the present study was the school going children with refractive error.

Sample and sampling technique
Sample: school going children with refractive error. Were the samples for present study.
Sample size: Sample's size was 40 calculated based on sample size determination formula

Sampling technique: Purposive sampling techniquewas used to select theschool going children with refractive error. As per the tentative schedule of data collection, the investigator has selected the school going children conveniently on first come first basis after informed consent.

Inclusion criteria-
- The children studying in 1st to 10th standard who have refractive
- School going children who will give consent to participate in the study
- School going children available at the time of data

collection

Exclusion criteria-

- School going children with low vision < 20/70 and other vision problem or disease condition like cataract, conjunctivitis and congenital eye defect
- Who have already practicing eye related exercises

Tool preparation:
Tool used for the research study was Standardized Snellen chart Protocol of Ophthalmic exercises The tool was prepared after extensive review of literature search, consultation with experts, and based on the past experience of the investigator.

Development of tool:
The research instrument consists of two parts:

Part A-Demographic data:seeking information about demographic variables of school going children such as; age in years, gender, monthly family income, area of living etc.

Part B- It is related standardized Snellen chart. And protocol of ophthalmic exercises. The data on refractive error was recorded in three point rating scale. The refractive error was measured in terms of poor vision = > 20/70, average vision = 20/25 to 20/50 and normal vision = 20/20.

Scoring: The refractive error was measured in term of visual acuity score the score. The score were given like poor vision = 1, average vision = 2 and normal vision = 3.

Protocol of Ophthalmic exercises: It is a procedure in written forms that describe the performance steps of ophthalmic exercise in reducing refractive error for a period of 10minutes.

Validation of the tool: The description of snellen chart was validated by the panel of experts. Minor modification were made as per their recommendation

Reliability: As per recommendation of panel of expert guide, the snellen chart was not put under the reliability test as it is the standardized tool

Feasibility of the study: The investigator conducted a Pilot study.

Pilot study: The pilot study was conducted from 14/10/2019 to 14/11/2019 after the permission from concern authority. Around 4 school going children were included from selected school of Maharashtra state who fill the criteria for sample selection. The investigator made approach to the sample in person and explained the purpose as well as objectives of study. After that consent was obtained to participate in the study. Visual acuity of school going children was assessed by using Snellen chart before intervention and ophthalmic exercises were practice in school going children. After intervention on 14th November 2019 again post intervention visual acuity assessment was done of same school going children. The collected data was coded, tabulated and analyzed by using descriptive and inferential statistic.

The findings of pilot study have shown the feasibility of major study in terms of time, money, samples and data collection procedure. However, the pilot study helped the investigator to visualize some of the practical problems like non-cooperation in terms of time from one of the participants. Hence, adequate measures will be undertaken to make the main study more feasible.

5. Data Collection Procedure

Legal permission
The investigator has obtained formal permission from chairperson BORS, Institutional ethical committee and from principal of selected school Maharashtra to conduct research study.

Informed consent
The informed consent was obtained from each school going children or their willingness to participate in the study. They were assured anonymity of participation in the study. Further, the investigator has explained the purpose and how the study is beneficial to them.

Data collection procedure
After obtaining permission from concerned authorities, the investigator has fixed the date and time for data collection in consultation with school going children. The data was collected for four weeks in the month of December and January from school going children studying at the selected school. The totals of 40 samples were selected for the study using purposive sampling technique. Initial rapport was established. Explanation for the purpose of study was done. Inform consent was taken.

Pre-test: was conducted by using Snellen Chart and demographic data sheet to identify school children with Refractive Error. After an eye test, 150 children were identified as Refractive Error, out of which 40 were included purposively based on sampling criteria. Further, the same pretest data was used to assess the effect of ophthalmic exercise with the posttest data on Refractive Error.

Intervention: The protocol of ophthalmic exercise was explained to the children. The ophthalmic exercise was demonstrated to the children on the same day. The exercises were shown to the children in each of the session of schedule. The children were instructed to practice this exercises every day on a given time. The investigator observed practices of each children regularly in given time. The average tome taken for doing this exercise was 5 minutes.

Post test: The post test was conducted using same tool used for pretest. After 1 month of intervention. The visual acuity was again checked by the investigator and mark in scoring system. After the data gathering process the researcher thanked all the study samples as well as the authorities for their cooperation.

Plan for data analysis: - The data collected was planned to analyze by using both descriptive and inferential statistics based on objectives and hypothesis of the study. The

descriptive statistics includes; mean median, mode, mean percentage and standard deviation. The inferential statistics includes; t test and ANOVA.

The collected date were planned to analyze under following heading –

1) Distribution of school going children according to their demographic variables
2) Assessment of vision among school going children with refractive error before intervention
3) Assessment of vision among school going children with refractive error after intervention
4) Effectiveness of ophthalmic exercise in reducing refractive error among school going children
5) Association of level of vision among school going children with their demographic variables.

6. Results

Organization of the data: The collected data is tabulated, analyzed, organized and presented under the following sections:

Section I:

Table No 1.1: -Distribution of school going children according to their demographic variables, *n=40*

Demographic Variables	No. of school going children	Percentage (%)
Age(yrs)		
6-8 years	7	17.5%
9-11 years	13	32.5%
12-14 years	14	35.0%
≥15 years	6	15.0%
Gender		
Male	16	40.0%
Female	24	60.0%
Monthly family income (Rs)		
5001-10000 Rs	5	12.5%
10001-15000 Rs	9	22.5%
15001-20000 Rs	12	30.0%
>20000 Rs	14	35.0%
Area of living		
Urban	33	82.5%
Rural	7	17.5%

Section-II: Assessment of vision among school going children with refractive error before intervention

Table 1.2: Percentage distribution of school going children with refractive error according to the level of Vision before intervention, n=*40*

S. No	Level of Vision	Number of school going children (Frequency)	Level of vision
1	Poor (>20/70)	5	12.5%
2	Average (20/25 to 20/50)	35	87.5%
3	Normal (20/20)	-	-
Overall		40	

Table 1.3: Mean and standard deviation of level of vision before intervention, n=40

S. No	Level of Vision	Frequency	Mean Level of Vision	SD
1	Poor (>20/70)	5	76	13.42
2	Average (20/25 to 20/50)	35	33	9.17
3	Normal (20/20)	-	-	-
	Overall	40	38.37	17.08

Section III: Assessment of vision among school going children with refractive error after intervention

Table 1.4: Percentage distribution of school going children with refractive error according to the level of Vision after intervention, *n=40*

Sr. No	Level of Vision	Pre-test	Post test	Difference in Percentage of school going children
1	Poor (>20/70)	12.5%	12.5%	0%
2	Average (20/25 to 20/50)	87.5%	37.5%	-50%
3	Normal (20/20)	-	50%	+50%

Table 1.5: Mean and standard deviation of vision of level among school going children with refractive error after intervention, *n=40*

Sr. No	Level of Vision	Pre-test		Post-test	
		Mean	Standard Deviation	Mean	Standard Deviation
1	Poor (>20/70)	20/76	13.41	20/76	13.41
2	Average (20/25 to 20/50)	20/33	9.17	20/26.86	10.44
3	Normal (20/20)	-	-	20/20	0

Table 1.6: Overall Effectiveness of ophthalmic exercise in reducing refractive error among school going children *n=40*

Overall	Mean	Standard deviation	Mean difference	t value	P value
Pre test	38.38	17.08	5.38	8.89	0.0001 S, p<0.05
Post test	33	19.61			

With Student's paired' test applied at 5% level of significance, 't' value was found to be 8.89 whereas the corresponding p value was 0.0001which highly significant. Hence, it is interpreted that the ophthalmic exercises among school going children was effective in reducing refractive error and the Research Hypothesis H_1 is accepted.

Section V: H2: there is a significant Association between association between levels of vision among school going children and their demographic variables, *n*=80

Variables		No. of Children	Mean posttest knowledge score	F-value	p-value
Age (years)	6-8 years	15	31.42± 17.72	0.63	0.5952 NS,p>0.05
	9-11 years	05	30.76±18.01		
	12-14 years	15	38.57± 24.45		
	≥15 years	5	26.66± 11.69		

Gender					
	Male	10	34.37± 23.58	0.128	0.7222 NS, p>0.05
	Female	30	32.08± 16.93		
Monthly family income					
	5001-10000 Rs	20	38± 21.67	0.6413	0.5935 NS, p>0.05
	10001-15000 Rs	5	31.11± 15.36		
	15001-20000 Rs	10	27.5± 16.02		
	>20000 Rs	5	37.14± 24.23		
Area of Living					
	Urban	15	33.33± 20.22	0.0532	0.8188 NS, p>0.05
	Rural	25	31.42± 17.72		

Testing Of Hypothesis:

H_1:: there is a significant Association between **association between levels of vision among school going children and their** demographic variables. In the present study, a significant difference (t=17.37; p=0.001 at 0.05level of significance) between pre-test and post-test Ophthalmic exercise administered for the period of 1 month. A post test was conducted by using same standardized snellen chart which used for pretest. The post-test vision scores on Ophthalmic exercise has shown highly significant difference in "t" value (t=8.89, p<0.05) among school going children with refractive error attending selected school of Maharashtra state

Hence, conclude that the Ophthalmic exercise is effective among school going children with refractive error

7. Summary

The study was undertaken to assess the effect of ophthalmic exercise in reducing refractive error among school going children in selected schools of Maharashtra drawn purposively using inclusion and exclusion criteria.
The following hypothesis were made by the investigator-

- H1: There is a significant difference between the pre-test and post-test vision scores on ophthalmic exercise in reducing refractive error
- H2: There is significant association between post-test readings of snellen chart with selected demographic variable The study was conducted in 1 selected school urban areas of Maharashtra state.40student with refractive error were the samples for present study. Standardized snellen chart were used to collect the data School going children with refractive error .

Accordingly, collected data were analysed using descriptive and inferential statistics. The data collected was organized, tabulated and analysed using descriptive statistics such as; percentage, mean, and standard deviation and the inferential statistics such as;

One-way ANOVA and paired 't' test to test the hypothesis with SPSS software. There was a significant difference between mean pre test and post test vision level among school going children with refractive error (t=5.38, p<0.05). Hence, Hypothesis H1: There is significant difference between pretest and post-test findings before and after the administration of ophthalmic exercise There was a no significant association between posttest finding of vision level to reducing refractive error with age in year, gender, monthly income and area of living .hence Hypothesis H_1, H_2, H_3, H_4 were rejected

8. Conclusion

The school going children were selected as a sample who met the sampli criteria as per standardized snellen chart. However for the purpose of study the school going children with poor vision >20/70 were excluded. Ophthalmic exercise administered for the period of 1 month. A post test was conducted by using same standardized snellen chart which used for pretest. The post-test vision scores on Ophthalmic exercise has shown highly significant difference in "t" value (t=8.89, p<0.05) among school going children with refractive error attending selected school of Maharashtra state. Hence, conclude that the Ophthalmic exercise is effective among school going children with refractive error

Nursing Implications

The investigator has drawn the following implication from the study which vital concern to the field of Nursing service, Nursing education, Nursing Administration and Nursing research

Nursing Services

- The ophthalmic exercise can be used by the staff nurses now and then in regular health care services
- The ophthalmic exercise can significantly used among the client in refractive error
- Nurses working in the hospitals can benefit from such researcher, as it will provide more insight regarding the ophthalmic exercise in reducing refractive error

Nursing Education

- The findings of the study can be incorporated with the existing nursing education curriculum and must include imparting reducing refractive error among school going children
- The nursing teachers can use the result of the study as an informative illustration for the students.
- Educate the student about ophthalmic exercise
- The study emphasizes significance of short term in service education programmes for school going children ophthalmic exercise and its important
- The role of nurse teachers implementing traditional method of ophthalmic exercise in the education setting involve all aspect of teaching

Nursing administration

- The nursing administrator, the nurse should motivate her staff to participate new trends in nursing field. Learning to communicate, develop new traditional method and their practice the new trends in the nursing field.
- The nursing administrator should convey the traditional way of demonstrate the ophthalmic exercise
- The nurse administrator should plan and organize continuing education programme for all school going children in schools to motivate them in conducting teaching programmes on ophthalmic exercise
- She should organize sufficient manpower; money and material for disseminating health information.

Nursing research

- The finding can be used for publication to dissemination effectiveness of ophthalmic exercise in reducing refractive error
- The study will serve as a valuable reference material for the future investigator of a nurse consumer
- These all researcher are showing that how we can discover the new tradition method and use it as a effective way to upgrade our professional knowledge

9. Limitation

Following were the limitations of the study, it includes: -

- The study was limited only poor & Average vison level.
- The study was limited to urban area only.
- The study was limited to private selected school of Maharashtra state only.
- The study was limited to school going children only
- The Sample size was limited to only 40 school going children.
- Data collection period was limited for 1 month.

10. Recommendations

- It is suggested that study may be done using large population.
- The same study can be conducted by control group
- The same study can be conducted for all ages.
- A survey study can be done to assess the effect of ophthalmic exercise on reducing refractive error among school going children.
- A comparative study can be undertaken to find out the difference in vision among patients attending urban and rural hospitals
- A study to find the effect of different ophthalmic exercise in reducing refractive error of school going children can be conducted.

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