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A interventional study: Bates exercise on myopia

V Beautily[1] and Lavanya[2]

[1-2] Department of Child Health Nursing, Saveetha College of Nursing, SIMATS, Chennai, Tamil Nadu, India

Abstract

Aim: The present study aims to determine the effectiveness of bates exercise on myopia.

Methods and Materials: A one group pretest and posttest design was used for the present study. A total 60 samples were collected using non probability sampling technique and children with myopia were used as samples. The demographic data and visual acuity using snellen chart was collected from the samples, followed by that the pretest was conducted by using snellen chart. After a period of intervention with bates exercise. Post test was done by using same snellen chart to assess the level of visual acuity after the period of intervention.

Results: the results the study revealed that there is an significant improvement in post test level of visual acuity at the level of $p<0.001$ after the intervention among the children.

Conclusion: Thus, the present study proves that, the bates exercise are used as the effective remedies for the children with myopia, it is easily adaptable with no side effects.

Keywords: Myopia, snellen chart

Introduction

Vision is important for day to day work, any fluctuation in vision may attribute to stress in educational aspect or in working aspect. Myopia is the major human eye disorder with prevalence, 33% of population, mostly adults are more susceptible [1]. National health and nutrition examination survey detected that annual cost for correcting distance vision impairment due to error in the refractive index, were approximately US$ 3.9 and US $ 7.2 billion [2]. Myopia is increasing day to day without any attribution, despite they were commonly affected in developing countries. The burden of myopia is mass backbone for many co-morbidies. The adult with HM are more vulnerable to develop pathogenic myopia [3]. The prevalence of myopia is high is school students. The syllabus and curriculum are the major cause for developing stress among school students, which ends up with visual impairment. About 89.4% had myopia out of 1271 student [4]. Myopia prevalence remains higher in asia compared to europe. A study enhances that 73% of students have developed myopia with cycloplegic measurement [5]. A review on the epidemiology, home confinement have worsened the burden of myopia through. New face of education through prolonged video based teaching [6]. Numerous students have shown increased prevalence of myopia throughout the worldwide, India is a major country with highest magnitude of myopia in school going children. About 75% of prevalence of myopia in 5_15 age group children [7]. Despite myopia is professional diagnosis, about 82% of the students have undergone the word myopia through mass media, were 20% of study participants had positive attitude towards glass use [8]. The effect of exercise over myopia has significant effect, though yoga and other eye warming eye exercise, bates exercise plays a significant effect in visual acuity, when it done for 4 weeks [9].

The purpose of the study 1.To assess the level of visual acuity among children with myopia 2. To assess the effectiveness of bates exercise on level of visual acuity among children with myopia. 3. To find out the association between post test level of visual acuity with leucorrhea their selected demographic variables.

Material and Methods

After obtaining and ethical clearance from the institutional ethical committee of saveetha institute of medical and technical science and formal permission letter obtained from the school head, present study was conducted. For the present study quantitative approach, one group pretest and post test research design was adopted. The data were collected using a non probability sampling technique from 60 school children with myopia. The inclusion criteria for the study, participants should be school children, who are available during the study period and who are cooperative and who understand both Tamil and English. Exclusion criteria for the study are, samples who under treatment for myopia. The purpose of the study was explained by the investigator to each of the study participants and a written informed consent was obtained from them. The demographic and visual acuity was collected from the samples and pre test was done and after 4 weeks intervention with bates exercise for 30 minutes. The post test were done using same tool. The data were analyzed by

biostatistics. The sample characteristics were described using frequency and percentage, paired t-test was used to assess the effectiveness bates exercise. Chi- square was used to associate the post test level visual acuity among their selected demographic variables.

Results and discussion
Demographic data
The analysis revealed that most of the school children with myopia, 22(44%) were aged 9 years, 28(56%) were male, 21(42%) were studying 4th standard, 13(26%) had no hobbies, 24(48%) were interested in indoor games, 29(58%) had no family history of wearing glass, 28(56%) were wearing glass for less than 1 year, 40(80%) had no knowledge of optical power, 35(70%) had no history of headache when reading / doing home work, 40(80%) had no history of eye infection, 31(62%) used to read 1 – 5 books or magazines in a week, 45(90%) used tube light for reading and writing, 32(64%) used to watch television for 1 – 3 hours, 27(54%) were watching television at a distance of 1 – 5 feet and 20(40%) were using computer for less than 1 hour.
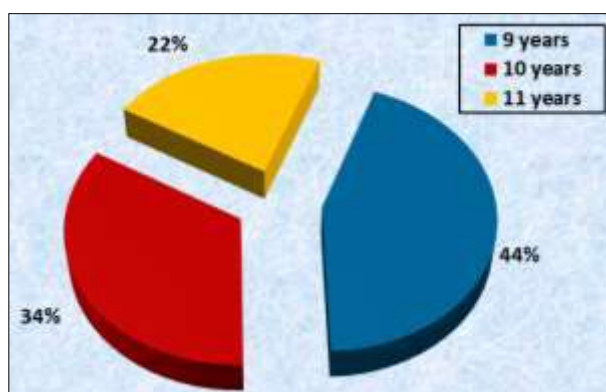

Fig 1: Percentage distribution of age of the school children

Section A: To assess the level of visual acuity among children with myopia
The analysis shows that in the right eye, 14(28%) had visual acuity of 6/18, 10(20%) had visual acuity of 6/24 and 6/12 in each level respectively, 7(14%) had visual acuity of 6/36,

5(10%) had visual acuity of 6/9 and 4(8%) had visual acuity of 6/6. It shows that in the left eye, 13(26%) had visual acuity of 6/24, 12(24%) had visual acuity of 6/12, 6/11 had visual acuity of 6/18, 6(12%) had visual acuity of 6/36 and 4(8%) had visual acuity of 6/9 and 6/6 in each level respectively.

The findings shows that in the right eye, 29(58%) had low level of myopia, 17(34%) had high level of myopia and 4(8%) were normal. It further shows that in the left eye, 27(54%) had low level of myopia, 19(38%) had high level of myopia and 5(10%) were normal.

The findings of the analysis depicted that in the right eye, 14(28%) had visual acuity of 6/18, 10(20%) had visual acuity of 6/24 and 6/12 in each level respectively, 7(14%) had visual acuity of 6/36, 5(10%) had visual acuity of 6/9 and 4(8%) had visual acuity of 6/6. It also shows that in the left eye, 13(26%) had visual acuity of 6/24, 12(24%) had visual acuity of 6/12, 6/11 had visual acuity of 6/18, 6(12%) had visual acuity of 6/36 and 4(8%) had visual acuity of 6/9 and 6/6 in each level respectively.

The analysis shows that in the right eye, 30(60%) had low level of myopia, 15(34%) were normal and 5(10%) had high level of myopia. It also shows that in the left eye, 32(64%) had low level of myopia, 14(28%) were normal and 4(8%) had high level of myopia.

Section B: Evaluate the effectiveness of bates exercise on level of visual acuity among children with myopia
The findings shows that the pretest mean score of visual acuity in the right eye was 4.16 with standard deviation 1.45 and the post test mean score of visual acuity was 5.42 with standard deviation 1.36. The calculated paired 't' test value of t=12.833 was found to be statistically significant at $p<0.001$ level. The table 6 also depicts that the pretest mean score of visual acuity in the left eye was 4.14 with standard deviation 1.43 and the post test mean score of visual acuity was 5.50 with standard deviation 1.27. The calculated paired 't' test value of t = 13.880 was found to be statistically significant at $p<0.001$ level.

This clearly infers that bates exercise on level of visual acuity administered to school children was found to be effective in improving the level of visual acuity in both the eyes among school children in the post test.

Table 2: Frequency and percentage distribution of pretest level of visual acuity among school children with myopia N = 50

Visual Acuity	Right		Left	
	No.	%	No.	%
6/60	0	0	0	0
6/36	7	14.0	6	12.0
6/24	10	20.0	13	26.0
6/18	14	28.0	11	22.0
6/12	10	20.0	12	24.0
6/9	5	10.0	4	8.0
6/6	4	8.0	4	8.0

Hence the research hypothesis H_1 that stated earlier "There is a significant difference between the pretest and post test level of visual acuity among school children with myopia" was accepted.
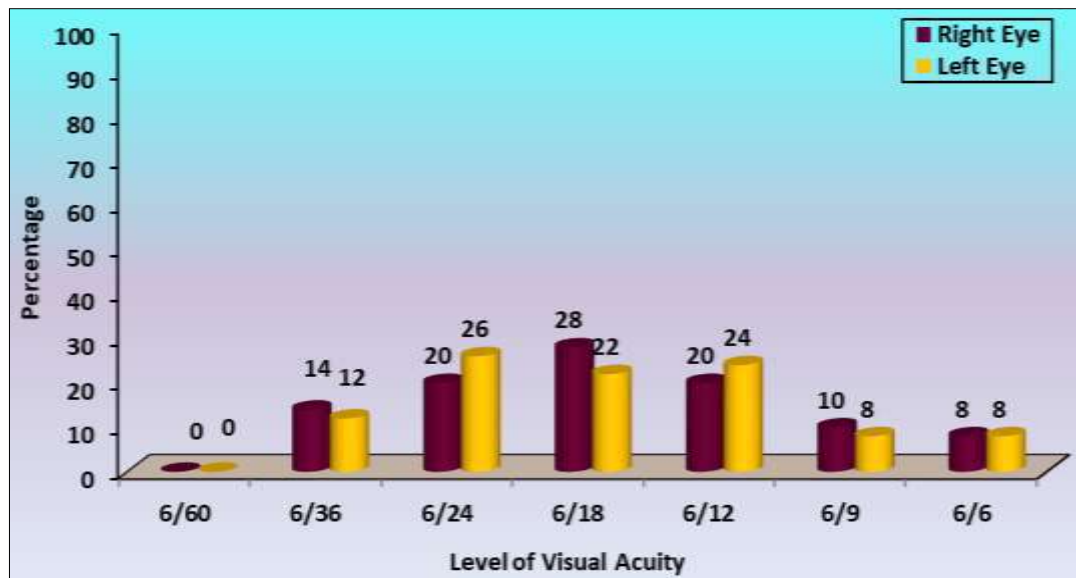
Fig 2: Percentage distribution of pretest level of visual acuity among school children with myopia

These findings are consistent with the following study done by Jyophy K. Abraham (2014) conducted a study to evaluate the effect of bates exercise on visual acuity among children with myopia at selected schools, Coimbatore. The study was conducted in CMS Primary School, PSG primary School, Rasakondalar and Shri Vijaya Vidhyalaya School at Coimbatore. Out of 372 children, 43 children were selected using purposive sampling technique. Visual acuity of these children were assessed using Snellen chart. Among 43, parents of 42 children were willing to participate in the study. Bates exercise was demonstrated to these children and the intervention was continued. The duration of each session was 30 minutes and 2 sessions per day was given for 4 weeks. The level of visual acuity was reassessed using Snellen chart after 4 weeks. The obtained date were analyzed using paired 't' test. Results showed that, in the right eye the mean score of visual acuity before Bates exercise was 4.35 with a standard deviation of 1.51. The mean score of visual acuity after Bates exercise was 5.40 with a standard deviation of 1.35. The calculated t value is 6.418 which is significant at 0.001 level. In the left eye the mean score of visual acuity before Bates exercise was 4.67 with a standard deviation of 1.33. The mean score of visual acuity after Bates exercise was 5.43 with a standard deviation of 1.53. The calculated 't' value is 4.858 which is significant at 0.001 level. This shows a significant difference in visual acuity among children with myopia before and after implementation of Bates exercise. Hence it is concluded that Bates exercises is an effective intervention to improve the visual acuity of children with myopia [10].

Section C: To associate the post test level of visual acuity among school children with myopia with their selected demographic variables
The analysis revealed that the demographic variables age and gender had shown statistically significant association with post test level of visual acuity (right eye) among school children at $p<0.05$ level and the other demographic variables had not shown statistically significant association with post test level of visual acuity (right eye) among school children.

The analysis revealed that the knowledge of optical power had shown statistically significant association with post test level of visual acuity (left eye) among school children at $p<0.05$ level and the other demographic variables had not shown statistically significant association with post test level of visual acuity (left eye) among school children.

The present study is supported by dorothy s. p. fan, *et al.*, (2004) conducted a cross-sectional survey was initially conducted. A longitudinal follow-up study was then conducted 12 months later. A total of 7560 children of mean age 9.33 (95% confidence interval [ci] = 9.11–9.45; range, 5–16) participated in the study. Mean spherical equivalent refraction (ser) was -0.33 d (sd=11.56; range, -13.13 to -14.25 d). Myopia (ser $\leq$ -0.50 d) was the most common refractive error and was found in 36.71% ± 2.87% (sd) of children. Prevalence of myopia correlated positively with older age. children aged 11 years were almost 15 times more likely to have myopia than were children younger than 7 years (odds ratio [or] = 14.81; 95% ci = 14.17–15.48). incidence of myopia was 144.1 ± 2.31 (sd) per 1000 primary school children per annum. increasing age was correlated with increased incidence of myopia, with highest risk in children ages 11 years (or = 2.27; 95% ci = 2.11–2.44). the average annual change in SER for children with myopia (SER $\leq$ -0.50 D) was -0.63 D (SD = 3.44) compared with -0.29 D (SD = 2.96) for those who were not myopic at the beginning of the study ($P < 0.001$). The results show that the prevalence and progression of myopia in Hong Kong children was much higher than those previously reported in Western countries. The longterm socioeconomic impact of these findings warrants further studies [11].

Conclusion
From the results of the present study, it was concluded that bates exercise has significant effect on myopia. Thus this intervention can be used has effective remedies,which is effective and easily adoptable.

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