

A descriptive study on compliance of spectacle-wear in children of primary schools at Qassim Province, Saudi Arabia

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Abstract

Background: Uncorrected Refractive errors are the most common cause of avoidable visual impairment in children worldwide. Importance of school screening of refractive errors are one of the most important initiatives outlined in WHO Vision 2020 targets for control of avoidable visual impairment in children. But the benefit depends on the compliance of the spectacle wear by children.

Purpose: To study the prevalence and determinants of compliance of spectacle wear among children and to investigate the reasons of non compliance associated with the spectacle wear in primary school children.

Materials and Methods: This was a cross-sectional descriptive study of 631 students who had been prescribed spectacles for constant wear during school screening programme done by our Department of Optometry, College of Applied Medical Sciences, Qassim University during 2010-2011. After six months, experienced Optometrists conducted a follow-up visit where these students were assessed about spectacle compliance. Information on age, gender, type of refractive error, reasons for non compliance were collected and analyzed.

Results: The non-compliance rate of spectacle wear in primary school children is 66.80%. A significantly higher proportion of boys 244(69.13%) were not wearing their spectacles compared to girls 178 (64.03%) ($P<0.05$). Non-compliance was not related to age of the students ($P>0.05$), but older and myopic children were slightly more non-compliant. The main reasons for non-compliance in primary school boys and girls for using spectacles were disapproving spectacle wear by parents, not like to wear spectacles, broken spectacles and many children feel spectacles are not needed or causes head ache.

Conclusions:

Comprehensive eye care for primary school children with refractive error is practised in Qassim Province, but limited information is available on the magnitude of the compliance for spectacle wear and their reasons. School children were not compliant because of many issues that could and should be addressed. This information is crucial for establishing a program and will strengthen its efforts for a better eye care in primary school children with refractive errors.

Key words: Spectacle Compliance, Primary School children, Qassim, Saudi Arabia.

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Introduction

The World Health Organisation recommends monitoring the outcome of school screening programs, using appropriate indicators for it and conducting operational research on these programs to achieve the goal of eliminating avoidable visual disability due to refractive error. One of the main priorities of The World Health Organization's "Vision 2020: The Right to Sight" initiative is the correction of refractive error in developed and developing countries. As many as 13 million worldwide, have uncorrected refractive error, numerous programs have attempted to address the problem of uncorrected refractive error through school-based vision testing and spectacle distribution programs. Unfortunately, most programs have found that at follow up, the majority of children provided spectacles at no charge were not wearing them or non compliant on wearing refractive correction^(5, 7, 13-15, 21) Reasons for non-compliance vary by study and population, most common reasons were lost or broken eyeglasses, concern about appearance or teasing, worry that the eyeglasses will make the eyes worse, eyeglasses kept at home or used only for special occasions^(1-7, 16, 21).

Visual impairment is one of the most common causes of daily life impairment and can be corrected by spectacles that can give a better life^(18, 20). It is an established truth that the correction of refractive error and when our patients are following the guidelines the results are better. However, school children don't like wearing spectacles for various reasons or are found to be non-compliant. The dictionary (The Oxford Concise Dictionary) meaning of compliance refers to "Obedience to a request or command", in respect to our study, we used to prescribe for spectacles but it is useful only at time when child patients are wearing them. Refractive errors are commonly found as the causative agent for visual impairment in the most surveyed population and this impairment is easily treatable⁽¹⁻⁷⁾. Previous studies shows prevalence of refractive error differs with geographic location, age, gender, education level, and amount of near work⁽¹⁻⁷⁾. Moderate hyperopia can be overcome by accommodation and many school aged children are most commonly found with myopic errors, these conditions have significance in economic, educational effectiveness including

poor academic performance, reduced school performance, and social activity⁽⁵⁾.

Studies from Mexico, U.K., China, U.S.A, India, Oman, South Africa and Brazil⁽¹⁻⁷⁾ showed that compliance is only 50-60 %. This means that, the entire process of refraction and dispensing has gone waste to a large extent and the child will not benefit from the refractive correction. So it is very necessary to find-out what the causes of non-compliance are.

In a study conducted in Saudi Arabia⁽²²⁾, more than 60% of the subjects aged 15-45 were aware about the importance of wearing spectacles which shows that the spectacle compliance in adults will be better compared to school children.

The purpose of this study is to find out prevalence and determinants of compliance of spectacle wear among primary school students, and to investigate and compare the reasons of non compliance associated with the spectacle wear in primary school boys and girl students.

Subjects and Methods

The eye health care program by Optometry Department of College of Applied Medical Sciences, Qassim University provides refractive services to the students of primary grades in Qassim province on annual basis since 2009. A team of Ophthalmologists and Optometrists of Optometry Department visit schools and follow the guidelines for prescribing spectacles as recommended by WHO. Students with defective vision detected during screening are subjected to retinoscopy and subjective refraction testing using trial lenses. In case of students having hypermetropia, the refraction is performed under cycloplegia. A child with myopia of more than -0.50 Dioptre (D) or hypermetropia of more than +1.00D are prescribed spectacles. Children with strabismus or amblyopia were referred to our eye clinics in Optometry Department of Qassim University for further evaluation and management. Based on the outcomes, strategies to improve the compliance could be recommended. This was a cross sectional questionnaire based multicentre descriptive study. The primary school students of Qassim Province who were prescribed the spectacles during school year 2010-2011 were the study population.

Follow-up visits to the schools to assess whether children were wearing their glasses and to determine reasons for noncompliance, were conducted 6 months after the students received the prescription for glasses. A team of Optometrists were the investigators. To minimise dropout, the school health staff was informed in advance regarding the dates and purpose of the follow up visit. The students' age, gender, school level, type of refractive error, causes of non-compliance were noted on the pro forma.

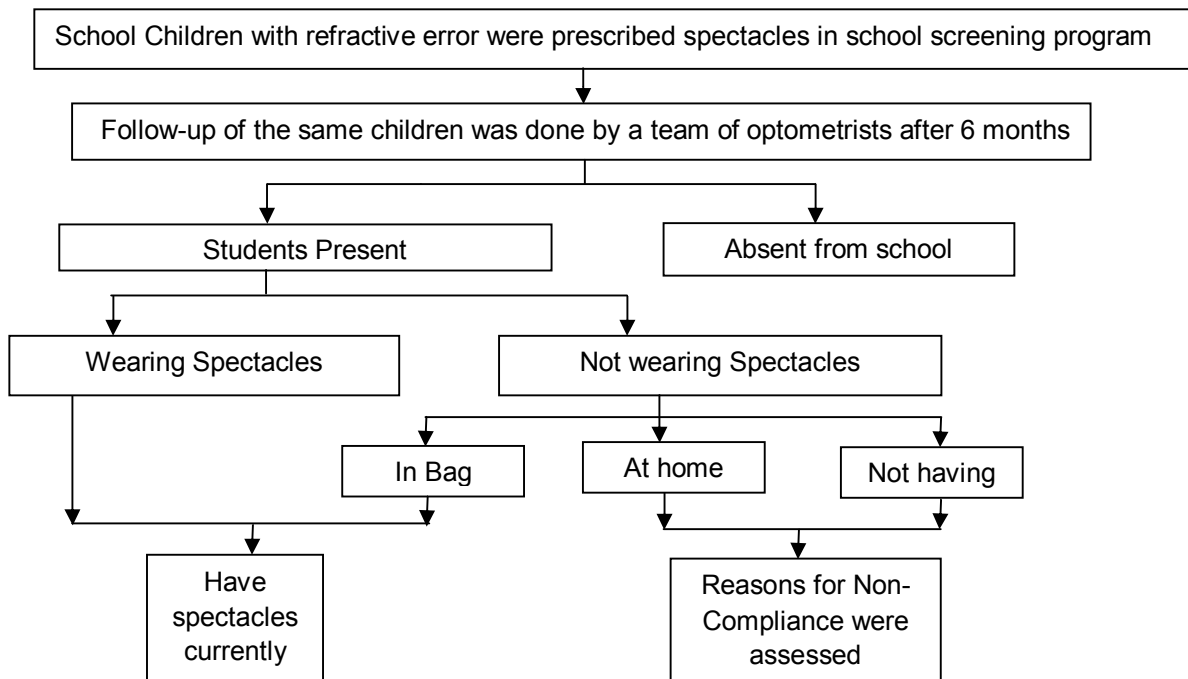
Within the sampling frame of the study, 846 primary school students from 20 Schools of Qassim Province with refractive errors were identified from the vision screening program conducted at least 6 months before this study. This study was carried out from January to October 2012. 631 students were recruited in the study with refractive errors, where 353 (56%) boys and 278 (44%) girls. Figure 1 represents the flowchart which shows the recruitment of school children and how the compliance and non-compliance of spectacle wear were assessed for this study.

Compliance to spectacle usage was recorded in a binary format. Compliance rate was reported as percentages. Factors associated with compliance were analyzed initially using Chi-square test, and those found to be significant were included in a multiple logistic regression.

The optometry staff listed all students who had been advised spectacles and noted whether each student was wearing spectacles in the class or not. If a student had spectacles but was not wearing it, the student was considered as "non-compliant". Children not wearing glasses were asked whether they had the eyeglasses with them and to identify 1 of 10 different reasons for noncompliance, which had been identified from other researches⁽¹⁻⁷⁾ as the most common reasons for spectacle noncompliance in school children.

The data was analyzed using Microsoft Excel and crude percentage proportions were calculated. Ethical committee approval of College of Applied Medical sciences, Qassim University and verbal consent of the school authorities was obtained on behalf of the children, to undertake this study. The students who were not wearing spectacles at the time of this study were again counselled and the school authorities were informed to discuss this issue with the parents of non-compliant children so that the spectacles could be used by the students. The study noted the compliance rate on the basis of single visit in individual schools. The compliance of spectacle wear in relation to time can be accessed through later follow up observations, which was not done in the present study. Therefore, the reported compliance rate may not give the real picture of spectacle wear in primary school children.

Figure 1: A flowchart showing the recruitment of children in study



Results and Analysis

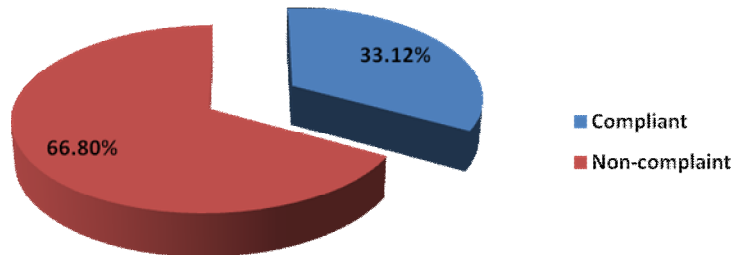
631 students from twenty primary schools of Qassim Province were recruited in the study from a sample size of 846 students found to

have refractive error and were advised constant wear of spectacles in earlier vision screening program.

Table 1. Gender wise distribution of Primary School Children recruited for spectacle compliance study

Gender	Number	Percentage (%)
Boys	353	56
Girls	278	44
Total	631	100

Figure 2: Percentage of Compliance and Non-Compliance of spectacle wear among primary school children.



The gender distribution of primary school children who were recruited for this study was shown in (Table 1). At the time of the visit to the schools for this study we found 209 primary school children (33.12%) were compliant to wearing spectacles and non compliance were seen in 422 school children (66.80%) (Figure 2). In general, spectacle wear compliance was found to be low in primary school children.

Table 2. Association of Demographic factors and Non Compliance of Spectacle wear

	Non Compliant No. (%)	Compliant No. (%)	Total No. (%)	P Value
Gender				
Boys	244 (69.13)	109 (30.87)	353(56)	0.032*
Girls	178 (64.03)	100(35.97)	278(44)	
Age				
7-9 yrs	102(58.62)	72(41.38)	174(27.57)	0.052
10-13 yrs	329 (72)	128(28)	457(72.43)	

* P value<0.05; Chi-square test.

Demographic factors associated with non-compliance are described in [Table 2]. A significantly higher proportion of boys 244(69.13%) were not wearing their spectacles

compared to girls 178 (64.03%) $P = 0.032$. Non-compliance was not significantly related to age of the students ($P = 0.052$), but older children were slightly more non-compliant.

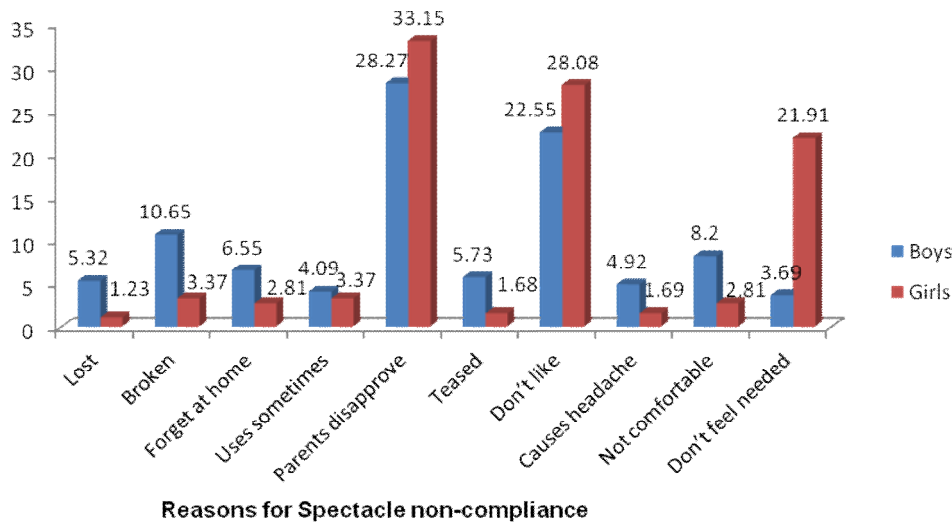
Table 3. Proportion of self-reported reasons for non-compliance with spectacle wear among Boys and Girls.

CAUSES OF NON-COMPLIANCE	BOYS No. (%)	GIRLS No. (%)
1. LOST THE SPECTACLES	13(5.32)	2(1.23)
2. BROKEN THE SPECTACLES	26(10.65)	6(3.37)
3. FORGOT SPECTACLE AT HOME	16(6.55)	5(2.81)
4. USES SPECTACLES SOMETIMES	10(4.09)	6(3.37)
5. PARENTS DISAPPROVE	69 (28.27)	59 (33.15)
6. TEASED ABOUT SPECTACLE	14(5.73)	3(1.68)
7. DON'T LIKE SPECTACLE	55(22.55)	50(28.08)
8. SPECTACLES CAUSE HEADACHE	12(4.92)	3(1.69)
9. NOT COMFORTABLE	20(8.20)	5(2.81)
10. DON'T FEEL SPECTACLES ARE NEEDED	9(3.69)	39(21.91)

After analysing the reasons (Table 3) for causes of non-compliance in 244 (69.13%) boys and 178 (64.03%) girls, we found disapproval by parents for wearing spectacles were reported by 28.27% boys and 33.15% girls. Did not like to wear spectacle was the reason found in 22.55% boys and 28.08% girls. Broken spectacles were reason for 10.65% in boys and 3.37% girls. Some students felt that spectacles are not needed or useful to them like 21.91% girls and 3.37% boys. Students reported they were not comfortable wearing spectacles which are

8.20% in boys and 2.81% in girls. Some students forgot spectacle at home which was reported by 6.55% boys and 2.81% girls. Many students lost their spectacle like in 5.32% boys and 1.23% girls. Some students were teased in their class by peers for wearing glasses as reported by 5.73% in boys and 1.68% in girls. Spectacle wear caused head ache in some students which is 4.92% in boys and in 1.69% girls. Some students' think that they can see without wearing spectacles so they don't feel wearing them as in 3.69% boys and 21.91 % girls.

Figure 3. Comparison of percentage of each cause of non compliance in primary school boys and girls.



Parent's disapproval was found to be the major cause of non-compliance in 33.3% girls and 8.27% boys. Not like to wear spectacle was found to be the second largest reason in 28.08% girls and 22.55% boys. And finally 21.91% girls don't feel spectacles are needed for them and 10.65% of boys were non wearers due to broken spectacle (Figure 3).

Table 4. The rate of Myopic error in Compliant Boys and Girls

	Total	No. of Myopes	% of Myopes
Boys	109	64	58.7
Girls	100	67	67

Based on the available data of refractive errors from the compliant children we found that the maximum children wearing glasses during the

time of follow up visit were myopes. Cylindrical powers were adjusted to spherical equivalents from the worse eye for analysis. Out of 109

compliant boys 64 (58.7%) were myopes and out of 100 compliant girls 67 (67%) were found to be myopes.

Discussion

The relatively small proportion of children (33.12%) identified as compliant with spectacle wear in the present study, which is similar with other studies by Holguin et al⁽¹⁾ who found 30% spectacle compliance of school children in Mexico, Congdon et al⁽²¹⁾ who found 37.7% spectacle compliance in China, Khandekar et al⁽¹⁶⁾ found 19 % compliance and Gogate et al⁽⁷⁾ found 29.5% non-compliance in school children in India. Only Khandekar et al⁽³⁾ in 2002 found more than 50% or half the participants wearing their spectacles at the time of follow up.

Studies from Oman⁽³⁾, South Africa⁽⁵⁾ and India⁽⁷⁾ found girls are more compliant in wearing spectacles than boys like our study where compliance is 31% in boys and 36% in girls.

Messer et al⁽²⁾ found that even after provision of two free spectacles breakage or loss was the reason for not wearing spectacles by the 80% of American participants. Ethan et al⁽¹³⁾ and Yabumoto et al⁽¹⁴⁾ from Brazil found that scratched lenses, breakage and lost spectacles were main reason for not wearing spectacles, whereas in our study we found the reasons for not wearing spectacles were parents disapproval, don't like spectacles, and breakage.

Studies from America⁽²⁾, India⁽⁷⁾ and Tanzania⁽¹⁵⁾ showed that parents disapproval as one of the main reason of non compliance like our study parents disapproval to be one of the main reasons of non compliance in 29% boys and 33% girls.

Various studies^(1, 4, 16) have been reported the use of spectacle sometimes or part time wear among their participants like in our study as one of the reasons of non compliance. Holguin et al⁽¹⁾ also reported about forgetting spectacles at home (16%) as one of the reasons of non compliance like our study we found this reason in 6.55% boys and 2.81% girls.

Concern over appearance or being teased in the class was found to be the reason for non compliance in approximately 6% in boys and 2% in girls. A similar reason for non-

compliance with spectacle wear was reported in other studies^(1, 2, 15, 17).

Children prescribed spectacles in clinic setting may be more likely to wear their spectacle than children recruited in school vision screening.. The main reasons are the parent is present with the child at the time of screening and evaluation, and the optometrists who are in the clinics are able to explain and demonstrate the need of child wearing spectacles to their parents⁽²⁾. The compliance may be low because of the unexpected visit and students who were actually wearing spectacles at the time of visit were noted as compliant. We had to believe the primary school students when they told us the reasons of non compliance.

Based on the outcome of this study, measures to strengthen the willingness of children for refractive correction should be done effectively by educating the students, parents and recommending schools to conduct follow up visit after school screening program.

Conclusion

Although comprehensive eye care for primary school children with refractive error is practised in Qassim province, only limited information is available on the magnitude of the compliance for spectacle wear and their reasons. School children were not compliant because their parents disapproved, teased about, did not like, caused head ache, did not think it's needed, were not comfortable in their spectacles, broken spectacles etc - all societal issues that could and should be addressed. This information is crucial for establishing a program to strengthen its efforts for eye care for primary school children with refractive errors. Therefore, an eye health care programme should be established that allow a system of follow up of students with refractive error to evaluate their compliance of spectacle wear. The school health management with the concerned eye care units associated with the school should ensure that students who have been advised spectacles are counselled for better compliance and the needy should be referred to qualified eye care practitioners.

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