ORIGINAL ARTICLE

Compliance of Spectacles among Schools Children in Urban Slums of Pakistan

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ABSTRACT

Aim: This study aimed to investigate compliance with spectacles wear and reasons for non-compliance with spectacle wear among school-aged children in urban areas in Pakistan.

Study design: Cross-sectional quantitative survey.

Duration and Settings of Study: The study was carried out in selected schools where schools screening project were supported by Sight Savers International (SSI), an International non-government organization. Spectacles were dispensed to children with uncorrected refractive errors free of cost. A list of schools, where screening was conducted from June 2014 to May 2015, was obtained from the project database.

Methods: In this study, 117 schools were randomly selected from the database of schools screening project supported by SSl. Out of 2245 potential participants for the study, 1525 children participated. A pre-designed validated questionnaire was used to assess compliance with spectacles and reasons for non-compliance. Descriptive statistics were used to investigate compliance with spectacles. Factors associated with compliance and reasons for non-compliance were evaluated. Chi-square test for independence was applied to assess the significance of differences.

Results: Compliance with spectacles was 56.9 %. Compliance was significantly associated with gender (p=0.000). It was also associated with school type and age but relationship was not statistically significant. Factors associated with non-compliance with spectacles wear include breakage, spectacles loss, poor financial conditions, cosmetic reasons, social stigma and inappropriate corrections.

Conclusions: The compliance of spectacles is low amongst children in urban slums of Pakistan. School screening programs need to devise a robust follow-up mechanism within school screening programs to improve the compliance with spectacles.

Keywords: compliance with spectacles, child eye health, school screening

INTRODUCTION

Uncorrected Refractive Errors (UREs) are the major cause of avoidable blindness and vision impairments[1,2,4] and contribute to one-fifth of the total blindness around the globe.[5] According to World Health Organization (WHO) estimates, over 153 million people are living with uncorrected refractive errors in the world excluding those with presbyopia.[6] WHO therefore promotes elimination of avoidable blindness and vision impairments contributed by refractive errors, and urges to formulate strategies for early diagnosis and management of UREs in school-aged children through school screening programs.[7,8] The prevalence of UREs amongst children varies from country to country. Studies from different countries show that its prevalence is 1% in Tanzania,[9] 8% in Nepal,[10] 15% in Malaysia,[11] 37% in Hong Kong,[12] 50 % in Singapore[13] and 13 % in Bangkok.[14] Results of the survey on the Situational Analysis of Refractive Error Services in Pakistan indicate that prevalence of refractive errors amongst children in Pakistan range between 3.5-4.5 %.[2] This shows that for an estimated population of 200 million, there are over 3 million children suffering from UREs.

Uncorrected refractive errors hamper the child's development, education and career opportunities.[3,15] Effective strategies are therefore required to combat avoidable blindness due to UREs in children such as school screening programs.[3] School screening programs are helpful in the early detection and treatment of refractive errors with spectacles.[3,16] School screening to identify UREs is a cost-effective approach.[9] 20% of blindness resulting from uncorrected refractive errors in children can be prevented with provision of screening services and spectacles during childhood.[17] This requires close collaboration between schools, parents and health professionals.[18]

WHO promotes screening of children at communities and schools and urges to integrate school screening into school health programs,[6] It can only be effective if children use spectacles on a regular basis. The use of spectacles is associated with a number of social factors

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and individual barriers such as individuals' perception of vision problems, peer pressure and concerns about safety of glasses.[15] Peer pressure is also one of the factors contributing to noncompliance.[19,20] Studies show that children do not wear spectacles even when provided free of cost. Another study conducted by Nita Odedra, et al to generate the evidence regarding compliance with spectacles wear in Tanzanian school children revealed that affordability, social factors, beliefs about spectacles, breakage of frames and lost spectacles were main causes of non- compliance with spectacles wear amongst children. Studies also reveal that students consider spectacles useful but still one-half of them do not use them.[21,22]

There are few studies available on the compliance of spectacles wear amongst children. In Chile, one-half of the children are not compliant with spectacles wear,[22] and in Oman 70% of children use spectacles.[18] A study from Pune district in India reports that only 29.5% children had good compliance with spectacles,[23] in Mexico,[19] it is 13.4 % where a study from Rawalpindi District of Pakistan reported the compliance with spectacles as 41%.[24]

The current study is an effort to generate evidence regarding compliance of spectacles wear and associated factors amongst school-aged children in urban slums of Pakistan. Unveiling the reasons for non-compliance with spectacles wear will inform future school screening programs to plan, monitor and take appropriate corrective actions to increase the compliance. The aim of this study was to determine the spectacle compliance rate amongst school going children who are provided with spectacles free of cost under school screening activities and to identify factors associated with non-compliance with spectacles amongst school-aged children.

METHODS

A cross-sectional quantitative survey was conducted to assess compliance with spectacles wear and its associated factors amongst school-aged children in urban slums of Pakistan. The study was carried out in selected schools where school screening project was supported by Sightsavers International (SSI) and spectacles were dispensed to children with uncorrected refractive errors free of cost. A list of all the schools where screening was conducted from June 2014 to May 2015 was obtained from the project database. A formal Memorandum of Understanding (MOU) with the education department was signed before start of the interventions in schools. Respective authorities (District Education Officers, Assistant Education Officers and Head Teachers) were taken on board before conducting selected visits for data collection.

One hundred and seventeen (117) schools from the SSI supported project area were randomly selected. Total of 60,673 children in selected schools were screened for uncorrected refractive errors from June 2014 to May 2015. All 2245 children identified with uncorrected refractive errors and who were dispensed spectacles free of cost were included in the study. However, 68% (1525) children (1086, 71.2% girls and 439, 28.8% boys) finally participated in the study. Remaining 720 children have either promoted/shifted to other schools or were not present when their respective schools were visited. The students were visited on unannounced dates to assess compliance after 12-15 months of dispensing and those not wearing glasses were investigated for reasons.

A pre-designed questionnaire was applied to collect data for the study. The questionnaire was validated and moderated by experts including community ophthalmologists and optometrists. Adjustments were also made to the questionnaire as per experts' suggestions. Data collection teams included optometrists, refractionists and ophthalmic technicians; who were employed and trained before data collection and entry. School's heads were informed about visits to their respective schools.

Quantitative data was entered into Statistical Package for Social Sciences (SPSS) version 20.0. Compliance with spectacles wearing was obtained using frequencies. Factors associated with compliance and reasons for non-compliance were evaluated using cross tabs /contingency tables. Chi-square test was used to assess the significance of the associations. Degree of association was described using odds ratio and its confidence limits with a level of significance set at 5%.

RESULTS

Total of 1525 students provided with spectacles participated in the study. Of them, 64.7% were residing in Punjab, 79 % were from government schools and 64% were girls. The reason for having more government schools and more girls is that the screening program supported by Sightsavers has mainly worked in government schools with a focus on more girls' schools. In the sample group, mothers of 59% and fathers of 73% of students were literate. Ages of the students who participated in the study ranged from 5-18 with an average age of 12.2 years. 20.65 % of the children were within the age group of 5-10 years whereas 79.35% were 11-18 years old (Table 01).

Table 01: Demographics

		Frequency	Percentage
Province	Sindh	539	35.30
	Punjab	986	64.70
School Type	Government Schools	1205	79.00
	Private Schools	320	11.80
Gender	Boys	539	35.30
	Girls	986	64.70
Age Group	5-10 years	315	20.65
	11-18 years	1210	79.35
Parents Education	Literate Fathers	1125	73.80
	Literate Mothers	903	59.20

Total 868 (56.9 %) children were found using spectacles when school visits were conducted. The rate of compliance with spectacles in urban slums of Pakistan was 56.9 % (95% CI) after 12-15 months of dispensing (Table 20). The compliance with spectacles was measured based on the children present at school on the day, the visit was conducted. The demographic factors associated with compliance with spectacles are given in Table 03.

Table 02: Compliance with Spectacles

Compliance with Spectacles	Frequency	Percentage
Using Spectacles	868	56.9
Not using Spectacles	657	43.1
Total	1525	100.0

Table 03: Association of Compliance with Demographics

		Outcome of Spectacles		Total	P - value
		Compliance	No-compliance		
Gender	Boy	217 (49.4%)	222 (50.6%)	439	0.000
	Girl	651 (59.9%)	435 (40.1%)	1086	
Type of School	Government	703 (58.3%)	502 (41.7%)	1205	0.092
	Private	92 (51.1%)	88 (48.9%)	180	
	Community Schools	73 (52.1%)	67(47.9 %)	140	
Province	Sindh	322 (59.7%)	217 (40.3%)	539	0.056
	Punjab	546 (55.4%)	440 (44.6%)	986	
Mothers Education	Illiterate	365 (58.7%)	257 (41.3%)	622	0.135
	Literate	503 (55.7%)	400 (44.3%)	903	
Fathers Education	Illiterate	236 (59.0%)	164 (41.0%)	400	0.179
	Literate	632 (56.2%)	493 (43.8%)	1125	
Age group	5-10 years	165 (52.4%)	150 (47.6%)	315	0.39
	11-18 years	703 (58.1%)	507 (41.9%)	1210	

Compliance was significantly associated with gender (P= 0.000). In the sample group, girls showed good compliance (59.9%) as compared to boys (49.4%). Compliance with spectacles wear was not significantly associated with area of residence (P=0.056), mother's qualification (P= 0.135) and father's qualification (P= 0.179). Children in government schools showed good compliance (58.3 %) in comparison with private schools (51.7 %) but the association is not statistically significant (P=0.092). In the same way, children aged between 11-18 years showed slightly more compliance than children aged between 5-10 years but relationship is not statistically significant (P= 0.39).

Table 04: Reasons for non-compliance

	Frequency	Percentage
Cosmetic Reasons (Size, color and shape of frames)	82	12.5
Social Stigma (Shyness, fellows teasing, dis-likeness)	53	8.1
In-appropriate Correction (no improvement, feel headache)	66	10.0
Spectacles Broken	202	30.7
Spectacles Lost	48	7.3
Non-affordability	198	30.1
Parents Disapprove	8	1.2
Total	657	100.0

Major causes of non-compliance of spectacles (Table 04) include: spectacles broken (30.7 %), non-affordability (30.1 %) and cosmetic reasons such as; frame size, color and shape (12.5 %). 8.1 % of students reported that they dislike wearing spectacles due to shyness and a fear of being bullied. Small group of children (10%) in non-compliance group reported that they feel headache or have noticed no improvement in their vision while wearing spectacles. A very small number of children (1.2 %) reported that their parents do not allow for wearing spectacles.

Table 05: Willingness to Pay for Spectacles

Second Pair of Spectacles	Frequency	Percentage
Yes	133	15.30
No	735	84.70
Total	868	100

The study also explored the parents' willingness to pay for second pair of spectacles if first pair was lost or broken. Slightly less than one-sixth (15.5 %) of students were provided with second pair by their parents.

DISCUSSION

This study was designed to measure the compliance of spectacles wear among school-aged children who were provided free of cost spectacles under a school screening project supported by Sightsavers International. In addition, the study also examined the factors associated with non-compliance. The results of the study can greatly help in understanding and mitigating major causes of non-compliance with spectacles among children leading to strengthening the uptake of spectacles wear.

Results of the study indicates that the compliance rate of spectacles wear among children in urban slums is 56.9 % after 12-15 months of provision of free of cost spectacles. Results of different compliance studies around the world show huge variation in the compliance rates. For example, it is 13.4 % in Mexico[19] ,29.5 % in India,[23] and 70 % in Oman.[18] A study conducted in Pakistan to assess the compliance with spectacles among children has reported 41% compliance in the district Rawalpindi.[24] However, the results of the current study are in agreement with the 58% compliance rate reported from Chile[22] and 57.8 % in South India,[25] where the follow up period was one year and three months respectively. This variation may attribute to the fact that different studies have

investigated compliance rate at different lengths after provision of spectacles.

Girls in urban slums of Pakistan showed good compliance compared to boys. These results are in agreement with the reports from previous studies in Mexico,[19] Oman,[18] India,[23] Pakistan,[24] China,[26] South India[25] and Chile.[22] However, this may be due to that fact that boys are more exposed to outdoor games and activities than girls. Research studies indicate that girls are cosmetically more conscious and avoid wearing spectacles.[18] However, current study shows different results. It needs further investigation, particularly in rural areas.

Poor compliance rates were lower in older children (41.9% in 11-18 years) as compared to younger children (47.6% in 5-10 years). This is may be because the older children better understand the importance of vision and are able to relate consequences of not wearing spectacles. Studies from Mexico, [19] Pakistan[24] and India[23] have reported similar results whereas in China[3] older children are less compliant with spectacles. However, this contradicts the results from Chile where older children are more likely to be less compliant.[22] Older children may also be able to relate it to better school performance. Younger children might be more prone to breakage and loss of spectacles. It needs further in-depth investigation and analysis.

Children enrolled in government schools have good compliance (58.3 %) as compared to those enrolled in private schools (51.7 %). There are no such studies comparing compliance with spectacles in government and private schools. This might be due to the reason that children from more needy and poor families are enrolled in government schools so they value a pair of spectacles more. On the other hand, children in private schools might be more fashion conscious. In addition, something given free may have less value for the parents and children in private schools. However, it needs further in-depth investigation and analysis to explore the reason for this difference.

Surprisingly, children with illiterate or less educated parents were more compliant with spectacles. A Mexican study also reports broken/lost spectacles as a major cause of non-compliance.[19] 48 children (7.3 %) reported that their spectacles were broken. Whereas, slightly less than one-third reported that they are non-compliant because they cannot afford buying spectacles. Children who reported that their spectacles are broken or lost might also have the affordability issue as they could not buy second pair of spectacles. Affordability might be the largest reason for being non-compliant. The current study has not investigated at that depth. This is contradictory with the results from previous studies in India,[23] Pakistan[24] and Oman.[18] This may be because illiterate parents are more concerned regarding spectacles provided free of cost, as they cannot afford them on their own. Further investigation and in-depth analysis is required to explore it to know the factors contributing to this fact.

The most common reasons reported by children for not wearing spectacles are broken spectacles, loss of spectacles, and cosmetic reasons such as size, color and shape of frames. The social stigma attached to wearing spectacles such as peer pressure, dislikeness and shyness due to being prominent. Presumably, no choices were given to children while dispensing spectacles due to program design. These results are in accordance with the results from previous studies in Mexico.[19] Evidence also shows that children are concerned about their cosmetics and do not like wearing spectacles due to it.[27] One reason for the high breakage and loss rate could be that the quality of frames provided was not good or children could not take care of spectacles. One-tenth of the non-compliance children reported that they feel headache when they wear spectacles or have not experienced any improvement with the use of spectacles. This could be because corrections provided were not appropriate. However, it needs further in-depth investigation. Studies indicate that peer pressure and teasing by fellows was major cause of non-compliance in Pakistan[24] and Oman,[18] Mexico[19] and United

Kingdom.[20] However, very small number of children reported similar issues in the our study.

In addition to broken and lost spectacles, slightly less than one-third of children in non-compliance group have reported that they cannot afford the cost of spectacles. Presumably, the children with broken and lost spectacles might also have an affordability issue. In such cases, poverty or affordability could be a major cause of non-compliance. There is no evidence to support this. However, it suggests further investigation and in-depth analysis.

Evidence exists that parents' disapproval of spectacles use by their children in Saudi Arabia[28] and Tanzania[21] is one of the major cause of non-compliance. However, in the our study, few children (1.2 %) have reported that their parents do not allow to use of spectacles. This result matches the one from Pune District in India.[23]

Finally, slightly less than one-seventh of children among the group using spectacles have received second pair of spectacles supported by their parents after losing first pair. This indicates the willingness of parents to pay for spectacles if they are aware that their children have refractive errors. However, how much they would be willing to pay needs further investigation. A study conducted in China[26] confirms that four-fifth of the children were willing to pay for the spectacles at the mean price of UDS 15. Nevertheless, it may not be true for Pakistan due to socio-economic differences. To improve the compliance with spectacles wear among children, services providers needs to address these factors along with counseling of teachers, parents and children. Forums like Parent Teachers' Associations (PTAs), School Management Committees and School Councils can play an important role in raising awareness among parents regarding the usage of spectacles. School screening programs need to devise a robust follow-up mechanism within school screening programs to improve the compliance with spectacles wear.

CONCLUSIONS

Compliance with spectacles is low amongst children in urban slums of Pakistan. Certain factors restrict children from using spectacles regularly. These factors include quality of frames, social stigma attached the use of spectacles, financial limitations and inappropriate correction provided.

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