Original Article

Non-compliance for wearing spectacles: Prevalence and determinants in school-going children in South India

Neelam Pawar, Meenakshi Ravindran, Ramakrishnan Renagappa, Thulsiraj Ravilla, Ramalakshmi Raman, Mohammed Sithiq Uduman

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Purpose: To study the prevalence and determinants of compliance with spectacle wear among school-age children in South India who were given spectacles free of charge under a school vision screening program. **Methods:** A cross-sectional, descriptive study was performed. The participants were recruited from the school from Tirunelveli and Tuticorin districts of Tamil Nadu, where a school vision screening camp was conducted between January 2012 and October 2012. The school screening was performed under ***"Lavelle Pediatric Eye Care Project"***. Of the 129,720 children examined of 249 schools, 4253 of children had refractive error and 3333 were prescribed and dispensed spectacles. A total of 683 children were interviewed, who were not wearing glasses on follow-up. **Results:** About 20% of the participants (683/3333) were not wearing their spectacles at examination. The most common reasons given for non-wear were lost (44.9%) or broken (35.3%) spectacles. There was no gender preference on compliance to spectacles. **Conclusion:** Compliance with spectacle wear is less even when spectacles are provided free of cost, particularly in children among the age group of 5–15 years. Because factors such as type of school, area (urban or rural), parent's income, occupation, and their education were not significantly affecting the compliance of spectacle wear, proper encouragement and counseling of the parents and the child become extremely important.

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Refractive errors account for major causes of impaired vision in most school-going and community-based population studies. Refractive errors have significant economic and educational impact, including poor academic performance and reduced social participation.[1-9] The World Health Organization (WHO) estimated that there are 19 million children with vision impairment globally, and 12 million of those have uncorrected refractive error which need to be addressed.[1,10] The prevalence of refractive error varies and depends on ethnicity, geographic location, gender, age, educational level, outdoor activities, behavioral patterns, and parental education.[1-3,10,11]

Vision impairment related to refractive error has a significant effect on quality of life regarding children's physical, emotional, and social functioning. Various developed and developing countries have implemented programs to address the problem of uncorrected refractive error through school-based vision testing and spectacle distribution programs. The majority of children have uncomplicated refractive error (RE) which can be promptly and cost-effectively corrected at timely intervention with spectacles.[3–5]

Most of the studies on compliance of spectacle wear observed that only one-third or less of children with visual impairment because of refractive error are wearing corrective spectacles.[1-8,10,11] The reasons reported of non-compliance for wearing glasses vary in various studies with different geographic locations.[10,5-9,12-16] The most reported reasons for not wearing glasses include lost or broken eyeglasses, concern about appearance or teasing by friends, worry that the eyeglasses will make the eyes worse, eyeglasses forget at home, or use only for special occasions. Other reasons include parental pressure, model of the glass, free cost glasses, and strong belief on other modalities of refractive error treatment.[4-9,12-15]

Few Indian studies are published on compliance of spectacle wear in school children.[1,5] The purposes of this study were to find out the actual rate of spectacle compliance and to assess the principal determinants of spectacle wear and reasons for non-wear in South Indian schools when glasses were given free of cost.

Methods

The participants were recruited from the school from Tirunelveli and Tuticorin districts of Tamil Nadu, India, where a school vision screening camp was conducted between January 2012 and October 2012. The Lavelle project (2010–2013) aimed to screen 5 lakh children in Tirunelveli, Tuticorin, and Kanyakumari districts in Tamil Nadu, South India. The basic aim was to provide comprehensive eye care to those in need,

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to improve awareness about pediatric eye problems, and to develop a strong referral system at the grass root level among the community and medical professionals. This study was a part of Lavelle project. Of the 129,720 children examined of 249 schools in both urban and rural areas, 4253 of children had refractive error and 3333 were prescribed and dispensed spectacles free of cost.

Visual acuity (VA) was measured using an abbreviated Snellen's chart at 6 m, with daylight illumination. VA was measured with and without available correction and with a pinhole. Although the optometrist was allowed to use his or her clinical judgment in determining the spectacle prescription, it was verified by a pediatric ophthalmologist. The general guidelines for prescribing spectacles were as follows: prescribe full correction for myopia > 0.75 D, astigmatism 1.00 DC, and anisometropia 1 D, and prescribe spectacles for hyperopia 2.50 D. The children with high myopia and those not willing for cycloplegic refraction, strabismus, and high astigmatism were referred to the base hospital. All students with myopia of more than − 5.0 D were also referred to the ophthalmologist for retinal evaluation. A child with strabismus or amblyopia was also referred to the ophthalmologist for further care.

Schools for the follow-up study (sub-urban/urban and rural) were chosen at random from a complete list of several hundred schools screened between January 2012 and October 2012 in Tirunelveli and Tuticorin districts by using a lottery method. Follow-up visits to the schools to assess whether children were wearing their glasses and to determine reasons for non-compliance were conducted between 3 and 6 months after the students received their eyeglass.

The coordinator/field worker interviewed on a single day all the students indicated in program records who have received spectacles at each chosen school without any announcement of date. The questionnaire proforma was selected after studying the literature on compliance in many areas. Any eligible child who was not wearing spectacles during assessment was classified as non-compliant. Children not wearing glasses were asked whether they had the eyeglasses with them and to identify different reasons for non-compliance. Children not currently wearing their spectacles were given a questionnaire, and the field coordinator filled the questionnaire after interview.

Demographic information including age; gender; and urban, sub-urban, or rural residence was recorded for each child from program records. The determinants of spectacle wear including age, gender, urban versus rural residence, refractive error, and time since dispensing of the spectacles were analyzed.

Statistical analysis

The statistical analysis was performed using STATA version 14.0 (StataCorp, USA). The demographic profiles of the school children were presented using frequency (n) and percentage (%). Uni-variate and multi-variable logistic regressions were used to examine the associations between non-compliance of wearing spectacles and the potential factors (i.e., age, gender, school type, place, parent education, and income). *P* values less than 0.05 were considered as statistically significant.

Results

The demographic details and family background characteristics have been described in Table 1. A total of 683 children with glasses previously provided at the school were examined at the period of 3–6 months follow-up. Among those, most of the schools (77.8%) were government-aided. All participants between 5 and 17 years of age were included, with the majority from the age group of 11–15 years (78.3%) and 50.0% of them being male children. All the 683 children were not wearing spectacles at the time of examination. After providing the questionnaire, 506 (74%) children reported that they were wearing spectacles at home and sometimes in school and 177 (26%) never used spectacles at all [Fig. 1]. Thus, 506 children were categorized as wearers of spectacles and 177 were labeled as non-wearers.

The reasons given by children for not wearing their spectacles are described in Table 2. The most common reasons given for not wearing spectacles were headache and watering on wearing spectacles (20.3%) or broken spectacles (14.7%) and peer pressure (14.7%). The number of hours of wearing spectacles among the spectacle-wearing children is shown in Fig. 2.

A significantly higher proportion of children in the age group of 11–15 years (85.9%) were non-compliant to spectacles wearing as compared to the other age groups (p-value = 0.015). The non-compliance rate was also found to be significantly high in the children whose parent's education (36.7%) was higher secondary and above (p-value = 0.035). The study further tried to analyze the rationale for non-compliance using the logistic regression analysis.

In the uni-variate regression analysis, the proportion of non-wearers was significantly higher in the age group of 11–15 years (28.4%) as compared to the younger age group (OR = 2.34; 95% CI – 1.2 to 4.7) and also associated with higher education of the parents (OR = 1.47; 95% CI – 1.03 to 2.1) compared with lower education. Those who were not able to see better with the prescribed glasses were 9.5 times more likely to be non-wearers (OR = 9.53; 95% CI – 5.2 to 17.5). Non-compliance with spectacles was also associated among the children who felt that glasses were not needed (OR = 4.62;

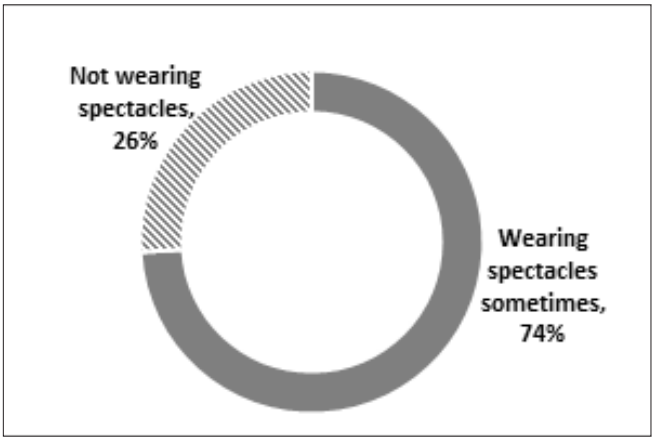

Figure 1: Showing the number of students wearing spectacles sometimes

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Table 1: Demographic characteristics, parent's education and income, and type of school of children who were not wearing glasses on follow-up

Variables	Frequency, *n*	Percentage
Number of children	683	
Age		
5-10	69	10.1
10-15	535	78.3
>15	79	11.6
Gender		
Male	341	49.9
Female	342	50.1
School type		
Government	25	3.7
Government-aided	506	74.1
Private	152	22.2
Father's education		
Illiterate	98	14.4
Primary	202	29.6
High school	215	31.5
Higher secondary	105	15.4
Graduate	57	8.4
Post-Graduate	6	0.9
Mother's education		
Illiterate	124	18.2
Primary	243	35.6
High school	192	28.1
Higher secondary	86	12.6
Graduate	32	4.7
Post-Graduate	6	0.9
Parent education		
>=Higher secondary	208	30.5
<Higher secondary	475	69.5
Father's occupation		
Self-employed	139	20.4
Government employee	60	8.8
Private employee	178	26.1
Laborer	306	44.8
Mother's occupation		
Self employed	31	4.5
Government employee	17	2.5
Private employee	62	9.1
House wife	374	54.8
Laborer	199	29.1
Area		
Urban	499	73.1
Rural	184	26.9
Income (in INR)		
<10,000	512	75.0
10,000-25,000	120	17.5
>25,000	51	7.5

95% CI – 2.8 to 7.6), parents were not willing to see their child wearing glasses (OR = 6.83; 95% CI – 4.6 to 10.1), and none of their family members were wearing glasses (OR = 2.19; 95% CI – 1.5 to 3.2). The non-compliance rate of spectacle wear did not differ significantly by gender, school type, family income, occupation, and residence locality.

Also, adjusted multi-variable logistic regression analysis was performed. The *P* value which is below 0.2 from the uni-variate model was included in the multi-variable model,

Table 2: Reasons for not wearing glasses

Reasons for not wearing glasses	*n*	%
Headache/Watering	36	20.3
Glass broken	26	14.7
Friends teasing	26	14.7
Lost	21	11.9
Forgot glasses at home	19	10.7
Parents do not like to wear spectacles	19	10.7
Spectacle frame is not good	12	6.8
My eyes are OK	6	3.4
I do not like to wear spectacles	5	2.8
Vision does not improve	3	1.7
Wearing in house only	2	1.1
Fear to use spectacles	2	1.1

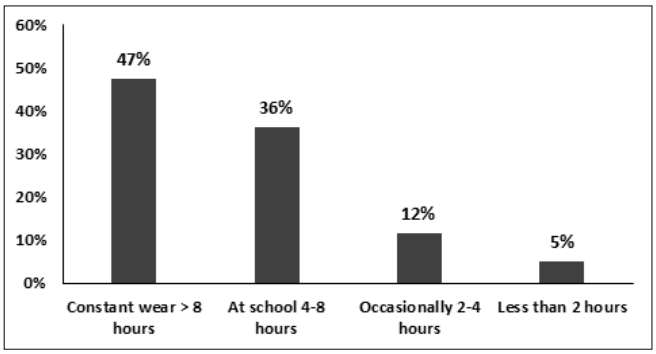

Figure 2: Graph explains the time period in hours of wearing spectacles among the wearers

and it was found that odds of children who felt that glasses were not needed (OR = 6.01; 95%CI – 2.8 to 12.8), parents were not willing to see their child wearing glasses (OR = 5.41; 95% CI – 3.5 to 8.4), and no family members wearing glasses (OR = 2.17; 95% CI – 1.4 to 3.5) were significantly associated with non-compliance [Table 3].

The refractive details of 641 children were taken for statistical analysis; for the rest of 47 children, the spherical equivalent was available in one eye only, so they were excluded for the calculative purpose. Table 4a shows that the type of refractive error was not significantly associated with compliance of spectacles (P-value = 0.113). Table 4b shows that lesser spherical equivalent was significantly associated with non-compliance (P-value = 0.034).

Discussion

In the literature, various studies have described variable compliance of glasses given under school screening worldwide.[1-8,10,11] Morjaria *et al*.[2] reported that in a randomized clinical trial, the main reason students gave for non-wear was teasing or bullying by peers (48.9%).[14] Girls reported parental pressure as a reason for non-compliance more frequently than boys. Compliance was higher in Botswana than in previous African studies; however, improvement in this area would increase the effectiveness of the program. Girls were more likely to be more compliant than boys [adjusted odds ratio (AOR) = 2.32, 95% confidence interval (CI) 1.03 to 5.27]. Children at

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Table 3: Factors associated with non-compliance

Variables	Wearing spectacles		OR (95% CI)	
	Non-wearers	Wearers	Unadjusted	Adjusted
School type				
Private	47 (30.9)	105 (69.1)	1.00	1.00
Government/Government-aided	130 (24.5)	401 (75.5)	0.7 (0.5-1.1)	0.7 (0.4-1.1)
Age				
5-10	10 (14.5)	59 (85.5)	1.00	1.00
11-15	152 (28.4)	383 (71.6)	2.3 (1.2-4.7)*	2.2 (0.9-4.9)
>15	15 (19.0)	64 (81.0)	1.4 (0.6-3.3)	1.3 (0.5-3.8)
Gender				
Female	83 (24.3)	259 (75.7)	1.00	-
Male	94 (27.6	247 (72.4)	1.2 (0.8-1.7)	
Parent education				
<Higher secondary	112 (23.6)	363 (76.4)	1.00	1.00
≥Higher secondary	65 (31.2)	143 (68.8)	1.5 (1.03-2.1)*	1.5 (0.9-2.4)
Place				
Urban	125 (25.0)	374 (75.0)	1.00	-
Rural	52 (28.3)	132 (71.7)	1.2 (0.8-1.7)	
Income (INR)				
≥10,000	38 (22.2)	133 (77.8)	1.00	-
<10,000	139 (27.2)	373 (72.9)	1.3 (0.9 to2.0)	
Do you think you can see better with your glasses?				
Yes	135 (21.6)	490 (78.4)	1.00	1.00
No	42 (72.4)	16 (27.6)	9.5 (5.2-17.5)*	6.0 (2.8-12.8)*
Was it difficult to adapt to the new spectacles?				
No	137 (25.4)	403 (74.6)	1.00	-
Yes	40 (28.0)	103 (72.0)	1.1 (0.8-1.7)	
Do you get headache or eyestrain after wearing glass?				
No	120 (27.5)	316 (72.5)	1.00	-
Yes	57 (23.1)	190 (76.9)	0.8 (0.6 to1.1)	
Do you feel glasses are needed?				
Yes	136 (22.3)	475 (77.7)	1.00	1.00
No	41 (56.9)	31 (43.1)	4.6 (2.8 to7.6)*	0.9 (0.5-1.9)
Whether parents are allowing/willing to wear glasses?				
Yes	89 (16.8)	442 (83.2)	1.00	1.00
No	88 (57.9)	64 (42.1)	6.8 (4.6-10.1)*	5.4 (3.5-8.4)*
Whether anyone in your family is wearing glasses?				
Yes	43 (17.1)	209 (82.9)	1.00	1.00
No	134 (31.1)	297 (68.9)	2.2 (1.5-3.2)*	2.2 (1.4-3.5)*

Table 4a: Comparison of refractive error with non-compliance

Refractive error	Spectacle non-wearers	Spectacle wearers	Total	*P*
Simple Myopia	147 (27.6)	385 (72.4)	532 (83.0)	0.113
High Myopia	1 (25.0)	3 (75.0)	4 (0.6)	
Compound Myopic Astigmatism	19 (18.1)	86 (81.9)	105 (16.4)	

Fisher's exact test

primary and junior secondary schools were more likely to be complaint than senior secondary school children. Nine studies found that there was no significant difference in compliance by sex, and none of the studies reported lower spectacle wear among girls.[3,4,9,12,13,17-20] However, few studies reported barriers to spectacle wear for boys and girls but more frequently for girls. One study reported that spectacles were more acceptable by girls and less acceptable for boys. In India, three studies documented girls as facing additional social and psychological barriers to spectacle wear.[1,4,13]

There is fair evidence in some studies where younger children are more compliant with spectacle wear than teenagers. The reason is disliking of frames and personal appearance. However, adherence with increasing age is not consistent. The studies from Chile, Saudi Arabia, the United States, and Mexico reported breakage, loss, and forgot spectacles to be the main reasons for low adherence.[18] Dhirar *et al*.[18] in a meta-analysis of 23 cross-sectional studies on compliance to spectacles found that the overall compliance with spectacle use was 40.14%, varying from 9.84% to 78.57%.

Table 4b: Comparison of spherical equivalent with non-compliance

Spherical equivalent	Spectacle non-wearers	Spectacle wearers	Total	*P*
0 to >-2.0	136 (28.6)	339 (71.4)	475 (74.1)	0.034
-2.0 to >-5.0	30 (18.6)	131 (81.4)	161 (25.1)	
≤-5.0	1 (20.0)	4 (80.0)	5 (0.8)	
	167	474	641	-

Fisher's exact test

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The main reasons for non-compliance reported in all studies were broken/lost spectacles, forgetfulness, and parental disapproval. Many studies suggested that greater severity of uncorrected refractive error and uncorrected VA is associated with higher adherence to spectacle wear. The majority of studies documented girls to be more likely to be compliant with spectacle wear than boys, whereas our study showed no gender difference.

Messer *et al*. and Castanon *et al*. reported that compliance with spectacle wear is low, even when spectacles are provided free of charge.[3,21] Messer *et al*. found that even when providing two glasses free of cost, particularly among older children, breakage or loss was the reason for not wearing spectacles by 80% of American school-going children, whereas Castanon *et al*. found that older children and children in urban–sub-urban areas were significantly not wearing glasses because of appearance of the glasses or teasing by friends, which is comparable to our study.[3,21] The young children are likely to obey the instructions of parents and teachers. Any negative comments make them less compliant to glasses. Lower compliance with increasing age was significant in three observational studies with similar age groups: in Mexico [OR 1.19 (95% CI 1.05–1.33) per year decrease in age (range 5–18)] and in Chile [OR 0.83 (95% CI 0.76–0.92) per year increase in age (range 4–19)]. Younger and older children may have different motivations, perspectives, and social issues for wearing their spectacles, which can affect compliance.

The two Tanzanian studies described the socio-economic status and cultural factors affecting compliance.[11] In India, three studies identified girls as facing additional social, gender, and psychological barriers to spectacle wear, whereas our study reported no gender difference.[2,13,15] These included concerns about appearance, their marriage prospects, and facing negative comments for wearing spectacles. All these factors led to peer pressure discouraging them to wear glasses.

However, a few studies found no significant difference in the level of spectacle wear between different age groups.[3,17-23] Only a few studies have investigated the type of RE (i.e., myopia, hyperopia, or astigmatism) that affects spectacle wear.[18] Various authors reported better compliance with higher refractive errors, especially with myopia.[18] The majority of studies in developing and under-developed countries had children who were provided free spectacles, and so factors associated with cost and accessibility were not addressed.

The studies from Nigeria, India, and minority groups in USA reported cost to be a concern among most parents in two studies, in Nepal and India, which reported lower levels of spectacle wear with lower levels of parental education.[18] The provision of free-of-cost spectacles may not be appropriate for every country setting, and this should be determined before implementing a program. There is substantial evidence that socio-cultural attitudes also influence compliance and there is a need to assess the socio-demographic factors which affect compliance with spectacle wear in a wider range of settings.

In our study, the rate of spectacle wear is even comparable than those reported in the literature. However, there have been a few systematic studies of the adverse psychosocial effects of wearing glasses, although both peers and teachers are reported to attribute more negative characteristics to children with glasses, especially those who are female.

The results of our study may not be applicable to other demographic settings. Another major limitation was that the questionnaire was not pre-tested and validated, which could influence responses by children and thus results. The cost effectiveness of this study could not be exactly determined as it was a part of ***Lavelle Pediatric Eye Care Project***, which was for a period of 3 years for a pediatric age of 15 years.

Conclusion

Our study showed that compliance with spectacle wear is less even when spectacles are provided free of cost, particularly in children in the age group of 5–15 years. Because factors such as type of school, area (urban or rural), parent's income, occupation, and their education were not significantly affecting the compliance of spectacles wear, proper encouragement and counseling of the parents and the child become extremely important. With advent of many screening programs for refractive errors, strategies are needed to improve compliance in order to achieve the real success of such programs.

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Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Gogate P, Mukhopadhyaya D, Mahadik A, Naduvilath TJ, Sane S, Shinde A, *et al*. Spectacle compliance amongst rural secondary school children in Pune district, India. Indian J Ophthalmol 2013;61:8-12.
2. Morjaria P, Evans J, Murali K, Gilbert C. Spectacle wear among children in a school-based program for ready-made vs custom-made spectacles in India: A randomized clinical trial. JAMA Ophthalmol 2017;135:527-33.
3. Castanon Holguin AM, Congdon N, Patel N, Ratcliffe A, Esteso P, Toledo Flores S, *et al*. Factors associated with spectacle-wear compliance in school-aged Mexican children. Invest Ophthalmol and Vis Sci 2006;47:925–8.
4. Khandekar R, Mohammed AJ, Al Raisi A. Compliance of spectacle

wear and its determinants among schoolchildren of Dhakhiliya region of Oman: A descriptive study. J Sci Res Med Sci 2002;4:39-43.

5. Li L, Song Y, Liu X, Lu B, Choi K, Lam DS, *et al*. Spectacle acceptance among secondary school students in rural China: The Xichang Pediatric Refractive Error Study (X-PRES): Report 5. Invest Ophthalmol Vis Sci 2008;49:2895-902.
6. Zeng Y, Keay L, He M, Mai J, Munoz B, Brady C, *et al*. A randomized, clinical trial evaluating ready-made and custom spectacles delivered via a school-based screening program in China. Ophthalmology 2009;116:1839-45.
7. Gajiwala UR, Patel RU, Sudhan A, Sil A, Jain E, Jhala L, *et al*. Compliance of spectacle wear among school children. Indian J Ophthalmol 2021;69:1376-80.
8. Nirmalan PK, John RK, Gothwal VK, Baskaran S, Vijayalakshmi P, Rahmathullah L. Kariapatti pediatric eye evaluation project. The impact of visual impairment on functional vision of children in rural South India: The Kariapatti Pediatric Eye Evaluation Project. Invest Ophthalmol Vis Sci. 2004;45:3442-5.
9. von-Bischhoffshausen FB, Muñoz B, Riquelme A, Ormeño MJ, Silva JC. Spectacle-wear compliance in school children in Concepción Chile. Ophthalmic Epidemiol 2014;21:362-9.
10. Keay L, Zeng Y, Munoz B, He M, Friedman DS. Predictors of early acceptance of free spectacles provided to junior high school students in China. Arch Ophthalmol 2010;128:1328-34.
11. Odedra N, Wedner SH, Shigongo ZS, Nyalali K, Gilbert C. Barriers to spectacle use in Tanzanian secondary school students. Ophthalmic Epidemiol 2008;15:410–7.
12. Aldebasi YH. A descriptive study on compliance of spectacle-wear in children of primary schools at Qassim Province, Saudi Arabia. Int J Health Sci (Qassim) 2013;7:291-9.
13. Pavithra MB, Hamsa L, Madhukumar S. Factors associated with spectacle-wear compliance among school children of 7-15 years in South India. Int J Med Public Health 2014;4:146-50.
14. Morjaria P, Evans J, Gilbert C. Predictors of spectacle wear and reasons for nonwear in students randomized to ready-made or custom-made spectacles: Results of secondary objectives from a randomized noninferiority trial. JAMA Ophthalmol 2019;137:408-14.
15. Ramasamy D, Joseph S, Valaguru V, Mitta VP, Ravilla TD, Cotch MF. Cluster randomized trial to compare spectacle delivery systems at outreach eye camps in South India. Ophthalmic Epidemiol 2013;20:308-14.
16. Khandekar RB, Gogri UP, Al Harby S. The impact of spectacle wear compliance on the visual function related quality of life of Omani students: A historical cohort study. Oman J Ophthalmol 2013;6:199-202.
17. Morjaria P, McCormick I, Gilbert C. Compliance and predictors of spectacle wear in schoolchildren and reasons for non-wear: A review of the literature. Ophthalmic Epidemiol 2019;26:367-77.
18. Dhirar N, Dudeja S, Duggal M, Gupta PC, Jaiswal N, Singh M, *et al*. Compliance to spectacle use in children with refractive errors- A systematic review and meta-analysis. BMC Ophthalmol 2020;20:71.
19. Guan H, Wang H, Du K, Zhao J, Boswell M, Shi Y, *et al*. The effect of providing free eyeglasses on children's mental health outcomes in China: A cluster-randomized controlled trial. Int J Environ Res Public Health 2018;15:2749.
20. Bhatt NK, Rathi M, Dhull CS, Sachdeva S, Phogat J. Spectacle compliance amongst school children of Rohtak, Haryana, India. Int J Community Med Public Health 2017;4:734-7.
21. Messer DH, Mitchell GL, Twelker JD, Crescioni M, CLEERE Study Group. Spectacle wear in children given spectacles through a school-based program. Optom Vis Sci 2012;89:19-26.
22. Guan H, Wang H, Du K, Zhao J, Boswell M, Shi Y, *et al*. The effect of providing free eyeglasses on children's mental health outcomes in China: A cluster-randomized controlled trial. Int J Environ Res Public Health 2018;15:2749.
23. Morjaria P, Murali K, Evans J, Gilbert C. Spectacle wearing in children randomised to ready-made or custom spectacles, and potential cost savings to programmes: Study protocol for a randomised controlled trial. Trials 2016;17:36.

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