

## ASSESSING THE FACTORS GOVERNING THE NON-COMPLIANCE TOWARDS SPECTACLE-WEARING IN INDIAN CHILDREN WITH REFRACTIVE ERRORS: A CROSS-SECTIONAL STUDY

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### **ABSTRACT**

**Background:** Most effective and well-accepted treatment modality for correction of visual impairment associated with refractive error is wearing spectacles. Visual impairment also affects the social, professional, and developmental aspects of the affected subjects.

**Aim:** The present cross-section clinical study was conducted to assess the factors governing the non-compliance towards spectacle-wearing in Indian children of less than six years of age having refractive errors.

**Methods:** In 102 child subjects with the age group of less than 6 years, having refractive errors, and were prescribed wearing spectacles for correction of refractive errors. Non-compliance was considered when parents gave the history of not wearing spectacles by child subjects for a minimum of 6 hours every day. Demographic characteristics and other parameters assessed were the financial issue, peer pressure, broken glasses, lost glasses, glass intolerance, squint, hypermetropia, myopia, anisometropia, and/or astigmatism. The collected data were subjected to statistical evaluation.

**Results:** Financial constrain was seen in 37.25% (n=38) subjects as the reason for not wearing spectacles. Peer pressure/teasing was seen as a reason for not wearing spectacles in 22.54% (n=23) of study subjects. Glass breakage was the reason in 31.37% (n=32) child subjects for not wearing spectacles. In 88.23% (n=90) subjects spectacle loss was the reason for not wearing spectacles. Most compliant subjects were within the age group of 4-6 years with 47.91% (n=23) subjects, whereas, most non-compliant subjects were in the age group of 2-4 years with 40.74% (n=22) study subjects. Maximum subjects from the compliant and non-compliant group were higher than the primary education group with 77.08% (n=37) and 53.70% (n=29) subjects respectively. Astigmatism was seen in 37.5% (n=18) and 59.25%

(n=32) subjects respectively, and anisometropia in 16.66% (n=8) and 48.14% (n=26) subjects respectively from compliance and non-compliance group.

**Conclusion:** The present study concludes that non-compliance was most commonly seen in child subjects within the age group of 2-4 years, in mothers with primary or less education, having squint, and children with anisometropia.

**Keywords:** Eyeglasses, Non-Compliance, Refractive Error, Spectacles Wearing, Spectacle Acceptance

## INTRODUCTION

One of the most common etiologic factors associated with visual impairment, especially preventable visual impairment in children is the not-corrected refractive error (RE). Visual impairment can progress to amblyopia when not treated. The most effective and well-accepted treatment modality for correction of visual impairment associated with refractive error is wearing spectacles. Visual impairment also affects the social, professional, and developmental aspects of the affected subjects. Compliance towards spectacle-wearing in children is comparatively difficult than adults owing to not understanding the importance of spectacle wearing.<sup>1</sup>

One of the significant causes of morbidity associated with visual impairment is the uncorrected refractive error. It is estimated that approximately 7-30% of blindness in children can be corrected and avoided. Also, approximately 13 million children with visual impairment have an uncorrected refractive error as underlying etiology.<sup>2</sup> Uncorrected refractive error and visual impairment also pose a very high burden on the health care system every year. Refractive error includes anisometropia, astigmatism, hyperopia, amblyogenic hyperopia, and myopia. These errors require appropriate management as early as possible.<sup>3</sup> Wearing spectacles along with being the most effective treatment modality for correcting refractive error is also an economic treatment modality aiming to improve eye, vision, function, and productivity in child subjects. Also, spectacles are inexpensive, non-invasive, and simple. However, the efficacy and success of spectacle-wearing are largely governed by the compliance of the wearers.<sup>4</sup>

Various literature studies have assessed the factors governing the compliance towards spectacles wearing in children. It was seen that compliance is only seen in one-third of subjects. Low compliance rates were seen even in old children and in subjects where free spectacles were given. Factors responsible were self-esteem, safety concerns, peer pressure, perception of subjects and parents, forgetfulness, loss, breakage, and/or poor follow-up. Efforts are hence needed to improve compliance in children.<sup>5</sup>

However, the studies assessing the non-compliance of children in wearing spectacles are limited in literature, especially in children of lesser age than six years. Hence, the present study was conducted to assess the factors governing the non-compliance towards spectacle-wearing in Indian children of less than six years of age having refractive errors.

## MATERIALS AND METHODS

The present cross-section clinical study was conducted to assess the factors governing the non-compliance towards spectacle-wearing in Indian children of less than six years of age

having refractive errors. The study was carried out at Department of Ophthalmology, Rajarshi Dasrath autonomous state medical college, Ayodhya, Uttar Pradesh after obtaining clearance from the concerned Ethical committee. The study population was comprised of the subjects visiting the Department of Ophthalmology of the Institute.

The study included a total of 102 child subjects from both genders with the age group of fewer than 6 years, having refractive error, and was prescribed wearing spectacles for correction of refractive errors. The study was carried out for 2.5 years i. e. from May 2019 to December 2021. The inclusion criteria were subjects less than 6 years of age, having vision impairment due to refractive errors, prescribed spectacles, and parents of the children gave consent to participate in the study. The exclusion criteria were, subjects having refractive errors with any ocular pathology and subjects who were not willing to participate in the study. For data collection, a questionnaire was used. The reliability of the questionnaire was assessed by the previous studies. Necessary alterations/ revisions in the questionnaire were made after consulting with the experts. After explaining the study design, informed consent was taken from the parents of the subjects both in verbal and written form. The data collection was done by interviewing the parents of the study subjects. No monetary benefits were offered and the identity of participants was kept confidential.

Non-compliance was considered when parents gave the history of not wearing spectacles by child subjects for a minimum of 6 hours every day. Demographic characteristics recorded were parents' education, address, gender, and age. Other parameters assessed were the financial issue, peer pressure, broken glasses, lost glasses, glass intolerance, squint, hypermetropia, myopia, anisometropia, and/or astigmatism.

The collected data were subjected to the statistical evaluation using SPSS software version 21 (Chicago, IL, USA) and one-way ANOVA and t-test for results formulation. The data were expressed in percentage and number, and mean and standard deviation. The level of significance was kept at  $p < 0.05$ .

## RESULTS

The present cross-section clinical study was conducted to assess the factors governing the non-compliance towards spectacle-wearing in Indian children of less than six years of age having refractive errors. The study included a total of 102 child subjects from both genders with the age group of fewer than 6 years, having refractive errors, and was prescribed wearing spectacles for correction of refractive errors. Demographic characteristics of the study subjects are listed in Table 1. There were 51.96% (n=53) males and 48.03% (n=49) females in the present study. There were 26.47% (n=27), 39.21% (n=40), and 34.31% (n=35) subjects from less than 2 years, 2-4 years, and 4-6 years age group. There were 65.68% (n=67) subjects residing in the urban area and 34.31% (n=35) subjects residing in the rural area. For mothers' education, there were 7.84% (n=8), 27.45% (n=28), and 64.70% (n=66) mothers that were illiterate, primary, and higher than primary education.

On assessing the reason behind the non-compliance in the children for not wearing spectacles, the study results are summarized in Table 2. It was seen that financial constrain was seen in 37.25% (n=38) subjects as the reason for not wearing spectacles. Peer pressure/teasing was seen as a reason for not wearing spectacles in 22.54% (n=23) of study

subjects. Glass breakage was the reason in 31.37% (n=32) child subjects for not wearing spectacles. In 88.23% (n=90) subjects spectacle loss was the reason for not wearing spectacles. Spectacle intolerance was seen as the reason for not wearing spectacles in 57.84% (n=59) of child subjects (Table 2).

In the present study, it was seen that there were 48 subjects that were compliant and 54 subjects were non-compliant in the present study. There were 50% males and females (n=24) that were compliant, whereas, 51.85% (n=28) males and 48.14% (n=26) females among non-compliant study subjects. Most compliant subjects were within the age group of 4-6 years with 47.91% (n=23) subjects, whereas, most non-compliant subjects were in age group of 2-4 years with 40.74% (n=22) study subjects. Majority of subjects were residing in urban area with 70.83% (n=34) subjects from compliant group and 59.25% (n=32) subjects from non-compliant group. Maximum subjects from compliant and non-compliant group were from higher than primary education group with 77.08% (n=37) and 53.70% (n=29) subjects respectively. There were 31.48% (n=17), 40.74% (n=22), 57.40% (n=31), 24.07% (n=13), and 81.48% (n=44) subjects from non-compliant group having financial constrain, peer pressure/teasing, glass breakage, spectacle loss, and spectacle intolerance respectively. Squint was seen in 47.91% (n=23) and 25.92% (n=14) subjects from compliant and non-compliant group respectively. Myopia was seen in 41.66% (n=20) and 44.44% (n=24) study subjects from compliant and non-compliant group respectively, hypermetropia in 50% (n=24) and 42.59% (n=23) subjects respectively. Astigmatism was seen in 37.5% (n=18) and 59.25% (n=32) subjects respectively, and anisometropia in 16.66% (n=8) and 48.14% (n=26) subjects respectively from compliance and non-compliance group (Table 3).

## DISCUSSION

The present cross-section clinical study was conducted to assess the factors governing the non-compliance towards spectacle-wearing in Indian children of less than six years of age having refractive errors. The study included a total of 102 child subjects from both genders with the age group of fewer than 6 years, having refractive error, and was prescribed wearing spectacles for correction of refractive errors. There were 51.96% (n=53) males and 48.03% (n=49) females in the present study. There were 26.47% (n=27), 39.21% (n=40), and 34.31% (n=35) subjects from less than 2 years, 2-4 years, and 4-6 years age group. There were 65.68% (n=67) subjects residing in the urban area and 34.31% (n=35) subjects residing in the rural area. For mothers' education, there were 7.84% (n=8), 27.45% (n=28), and 64.70% (n=66) mothers that were illiterate, primary, and higher than primary education. These demographics were comparable with the studies of Mehnaz S et al<sup>6</sup> in 2020 and Sharma P and Gaur N<sup>7</sup> in 2018 where authors assessed subjects with comparable demographics.

The present study also assessed the reason behind the non-compliance in the children for not wearing spectacles, the study results showed that financial constrain was seen in 37.25% (n=38) subjects as the reason for not wearing spectacles. Peer pressure/teasing was seen as a reason for not wearing spectacles in 22.54% (n=23) of study subjects. Glass breakage was the reason in 31.37% (n=32) child subjects for not wearing spectacles. In 88.23% (n=90) subjects spectacle loss was the reason for not wearing spectacles. Spectacle intolerance was seen as the reason for not wearing spectacles in 57.84% (n=59) child subjects. These results were

consistent with the results of the studies by Bhatt NK et al<sup>8</sup> in 2017 and Gogate P et al<sup>9</sup> in 2013 where similar reasons were found to be associated with the non-compliance in spectacle wearers for not wearing them.

The results of the present study also showed that 48 subjects were compliant and 54 subjects were non-compliant in the present study. There were 50% males and females (n=24) that were compliant, whereas, 51.85% (n=28) males and 48.14% (n=26) females among non-compliant study subjects. Most compliant subjects were within the age group of 4-6 years with 47.91% (n=23) subjects, whereas, most non-compliant subjects were in the age group of 2-4 years with 40.74% (n=22) study subjects. The majority of subjects were residing in an urban area with 70.83% (n=34) subjects from the compliant group and 59.25% (n=32) subjects from the non-compliant group. Maximum subjects from the compliant and non-compliant group were higher than the primary education group with 77.08% (n=37) and 53.70% (n=29) subjects respectively. There were 31.48% (n=17), 40.74% (n=22), 57.40% (n=31), 24.07% (n=13), and 81.48% (n=44) subjects from non-compliant group having financial constrain, peer pressure/teasing, glass breakage, spectacle loss, and spectacle intolerance respectively. Squint was seen in 47.91% (n=23) and 25.92% (n=14) subjects from compliant and non-compliant group respectively. Myopia was seen in 41.66% (n=20) and 44.44% (n=24) study subjects from compliant and non-compliant group respectively, hypermetropia in 50% (n=24) and 42.59% (n=23) subjects respectively. Astigmatism was seen in 37.5% (n=18) and 59.25% (n=32) subjects respectively, and anisometropia in 16.66% (n=8) and 48.14% (n=26) subjects respectively from compliance and non-compliance group. These results were in agreement with the results of Bhandari G et al in 2016 and Bruce A et al in 2018 where similar factors were seen to be associated with non-compliance of spectacle-wearing in child subjects with visual impairment associated with refractive errors.

## CONCLUSION

Within its limitations, the present study concludes that the non-compliance was most commonly seen in child subjects within the age group of 2-4 years, in mothers with primary or less education, having squint, and children with anisometropia. Hence, the mother's education should be considered as a vital factor in educating subjects for detecting and treating visual impairment associated with refractive error. However, the present study had a few limitations including small sample size, cross-section nature, and geographical area biases. Hence, more longitudinal studies with a larger sample size and longer monitoring period will help reach a definitive conclusion.

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## TABLES

Characteristics	Parameters	%	N
<b>Gender</b>	Males	51.96	53
	Females	48.03	49
<b>Age group (years)</b>	Less than 2	26.47	27
	2-4	39.21	40
	4-6	34.31	35
<b>Residence</b>	Urban	65.68	67
	Rural	34.31	35
<b>Education (Mother's)</b>	Illiterate	7.84	8
	Up to primary	27.45	28
	Higher than primary	64.70	66

**Table 1: Demographic characteristics of the study subjects**

Reasons for non-compliance	Findings	%	N
<b>Financial constraints</b>	Present	37.25	38
	Absent	62.74	64
<b>Peer pressure/Teasing</b>	Present	22.54	23
	Absent	77.45	79

<b>Glass Breakage</b>	Present	31.37	32
	Absent	68.62	70
<b>Spectacle loss</b>	Present	88.23	90
	Absent	11.76	12
<b>Spectacle Intolerance</b>	Present	57.84	59
	Absent	42.15	43

Table 2: Reasons non-compliance towards spectacle-wearing in the study subjects

Factors	Parameters	Compliant (n=48) % (n)	Non-compliant (n=54) % (n)
<b>Gender</b>	Males	50 (24)	51.85 (28)
	Females	50 (24)	48.14 (26)
<b>Age group (years)</b>	Less than 2	12.5 (6)	37.03 (20)
	2-4	39.58 (19)	40.74 (22)
	4-6	47.91 (23)	22.22 (12)
<b>Residence</b>	Urban	70.83 (34)	59.25 (32)
	Rural	29.16 (14)	40.74 (22)
<b>Education (Mother's)</b>	Illiterate	2.08 (1)	11.11 (6)
	Up to primary	20.83 (10)	35.18 (19)
	Higher than primary	77.08 (37)	53.70 (29)
<b>Financial constraints</b>	Present	0	31.48 (17)
	Absent	100 (48)	68.51 (37)
<b>Peer pressure/Teasing</b>	Present	0	40.74 (22)
	Absent	100 (48)	59.25 (32)
<b>Glass Breakage</b>	Present	0	57.40 (31)
	Absent	100 (48)	42.59 (23)
<b>Spectacle loss</b>	Present	0	24.07 (13)
	Absent	100 (48)	75.92 (41)
<b>Spectacle Intolerance</b>	Present	0	81.48 (44)
	Absent	100 (48)	18.51 (10)
<b>Manifest squint</b>	Present	47.91 (23)	25.92 (14)
	Absent	52.08 (25)	74.07 (40)
<b>Myopia</b>	Present	41.66 (20)	44.44 (24)
	Absent	58.33 (28)	55.55 (30)
<b>Hypermetropia</b>	Present	50 (24)	42.59 (23)
	Absent	50 (24)	57.40 (31)
<b>Astigmatism</b>	Present	37.5 (18)	59.25 (32)
	Absent	62.5 (30)	40.74 (22)
<b>Anisometropia</b>	Present	16.66 (8)	51.85 (28)
	Absent	83.33 (40)	48.14 (26)

Table 3: Factors governing the non-compliance towards spectacle-wearing in the study subjects