COMPLIANCE AND ACCEPTANCE OF CYLINDRICAL REDUCTION SPECTACLES IN NEW AND OLD GLASSES USERS

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ABSTRACT

PURPOSE: *To explain the compliance and acceptance of cylindrical reduction spectacles in new and old glasses users.*

METHODS: *A comparative cross-sectional study was performed in refraction clinic at Mayo Hospital Lahore to determine the compliance and acceptance of cylindrical reduction spectacles in new and old glasses users. The sample comprised of 34 Patients, females 23 (67.6%) and males 11 (32.35%) between 15 to 30 years of age. Astigmatism was classified into mild (up to 1.50D), moderate (1.50-3.00D) and severe (>3.00D). Each patient was singly observed after using cylindrical reduction spectacles for two weeks to find out its acceptance on the basis of asthenopic symptoms.*

RESULTS: *The acceptance and non-acceptance of cylindrical reduction spectacles were 44.11% and 55.88% respectively. The compliance of spectacles among acceptance was 61.11% and 38.89% among non-acceptance. The compliance of spectacles in the patients already using glasses was 65% and 35% in the patients wearing glasses for the first time. The acceptance in the patients already using glasses was 73% and 27% in the patients wearing glasses for the first time while non-acceptance in the patients already using glasses was 32% and 68% in the patients wearing glasses for the first time. The acceptance of spectacles in males was 53.33% and46.66% in females. Mild asthenopic symptoms at near distance were 81.35% while at far distance were 64.66%. These asthenopic symptoms were more in females, teenage and patients using glasses for the first time. p-value <0.05 was considered as significant.*

CONCLUSION: *Compliance and acceptance of cylindrical reduction spectacles was significantly higher in old glasses users as compared to the patients using glasses for the first time and was closely associated with gender, age and history of spectacles.*

KEY WORDS: *Astigmatism, Asthenopic symptoms, Compliance, Cylindrical reduction*

INTRODUCTION

Visual acuity is the sharpness or clarity of one's eyesight represented in minutes of arc which is subtended at the nodal point of eye at given distance. Refractive error (RE) has been one of the most notorious eye disorders among children and adolescents and one of the menacing public health concerns around the globe.[1] Most of the uncorrected refractive errors are asymptomatic.[2] Screening is highly recommended for early detection, diagnosis and prompt treatments. There is a dire need to educate parents regarding visual screening to prevent adverse effects of uncorrected refractive error.[3]

There are three most common types of refractive error include myopia, hyperopia and astigmatism.[4] Myopia is a refractive error caused by excessive axial elongation due to which image of distant object is formed in front of retian.[5] Hyperopia is a condition of the eye in which image of distant object is formed behind the retina.[6]

Astigmatism is a condition in which parallel light rays focus at distinct focal points perpendicular to each other, resulting in impaired vision at near and far distances.[7] Astigmatism is caused by corneal asymmetry which results in blurred vision and lowers a patient's

quality of life.[8] Astigmatism is divided into three types: regular, irregular, and oblique. In regular astigmatism, both flat and steep meridian of cornea are perpendicular (90°) to one another. Regular astigmatism is further classified as with the rule, against the rule and oblique astigmatism.[9,10] With the rule astigmatism is a condition in which vertical meridian of cornea is more curved or steeper than horizontal meridian of cornea (cylindrical axis 180±15°).[11] In against the rule astigmatism, horizontal meridian of cornea is more curved or steeper than vertical meridian of cornea (cylindrical axis 90±15°).[12] In irregular astigmatism, both flat and steep meridian of cornea are not perpendicular (90°) to each other. Oblique astigmatism is a condition in which incident ray obliquely strikes the surface of cornea and lens[13] (cylindrical axis from 16° to 74° and 106° to 164°).[14]

Cylindrical lenses are used to treat astigmatism,[15] but patient experience intolerance and acceptance challenges with them. An alternative method known as cylindrical reduction is employed to solve this problem. This method is used to reduce intolerance, promote acceptance of cylindrical lenses, and lessen the aberrational effect of high cylindrical lenses. Cylindrical reduction has following steps: First decide how much cylindrical reduction is required for given prescription and then take half of the selected amount of cylinder and add it to spherical part of prescription.

New Sphere = Sphere +(Selected Cylinder ÷ 2)

Remaining Cylinder = Old Cylinder – Reduced Cylinder

Cylindrical Axis = Same

So,

New Prescription = New Sphere/Remaining cylinder @ Cylindrical Axis

The goal of this study is to examine patient acceptance of cylindrical reduction spectacles using the cylindrical reduction technique. To assess the asthenopic symptoms such as headache, vertigo, nausea, eyestrain, weariness of eyes, eye soreness, diplopia, anxiety, blurring, and gait are used as acceptance criteria.[16-18]

MATERIALS AND METHODS

A comparative cross-sectional study was performed in refraction clinic at Mayo Hospital Lahore to determine the compliance and acceptance of cylindrical reduction spectacles in new and old glasses users. Total 34 patients were examined and data was collected for3 months after the approval of synopsis. The sampling technique used in this study was non-probability convenience sampling. A self-made questionnaire was designed and each patient was singly observed after using cylindrical reduction spectacles for two weeks to find out its acceptance on the basis of asthenopic symptoms. Cooperative patients of both genderwith age between 15 to 30 years having visual acuity 6/60 to 6/12 were included but the patients having any ocular pathology were excluded. Equipment used were auto refractor, pen torch, trial box, occluder and visual acuity charts for distance (Log Mar chart) and near (Light house near vision chart). Data was entered and analyzed by SPSS-25.

RESULTS

The acceptance and non-acceptance of cylindrical reduction spectacles were 44.11% and 55.88% respectively. The compliance of spectacles in the patients already using glasses was 65% and 35% in the patients wearing glasses for the first time (Table 1). The compliance of spectacles among acceptance was 61.11% and 38.89% among non-acceptance (Table 2).The acceptance in the patients already using glasses was 73% and 27% in the patients wearing glasses for the first time while non-acceptance in the patients already using glasses was 32% and 68% in the patients wearing glasses for the first time (Table 3). The acceptance of spectacles was more in males 53.33% as compared to females 46.66%. Mild asthenopic symptoms at near distance were 81.35% while at far distance were 64.66%. These asthenopic symptoms were more in females, teenage and the patients using glasses for the first time.

Table 1: Compliance among new and old glasses users.

		Compliance		Total	p - value
		Good	Poor		
Glasses user	Yes	7	10	17	0.037
	No	13	4	17	
Total		20	14	34	

Table 2: Compliance among acceptance and non-acceptance.

		Compliance		Total	p - value
		Good	Poor		
Acceptance	Yes	11	4	15	0.034
	No	7	12	19	
Total		18	16	34	

Table 3: Acceptance among new and old glasses users.

		Acceptance		Total	p - value
		Yes	No		
Glasses user	New	4	13	17	0.016
	Old	11	6	17	
Total		15	19	34	

DISCUSSION

There are three most common types of refractive error include myopia, hyperopia and astigmatism. The goal of this study is to examine patient acceptance of cylindrical reduction spectacles using the cylindrical reduction technique. Asthenopic symptoms such as headache, vertigo, nausea, eyestrain, eye pain, anxiety, blurring, difficulty in focusing and difficulty in walking was used as acceptance criteria. If the patient experience 20% of the listed asthenopic symptoms, then it is considered as acceptance of cylindrical reduction spectacles.

A study conducted to find out the relationship of asthenopic symptoms with different types of refractive error which revealed that asthenopic symptoms were higher in the patients wearing glasses for the first time.[17] This study matched with the results of our study that asthenopic was higher in the patients using glasses for the first time as compared to patients already using glasses. In other words, acceptance of cylindrical reduction spectacles was higher 73% in the patient already wearing glasses as compared to patients wearing glasses for the first time 27% while the non-acceptance was higher 68% in the patients wearing glasses for the first time as compared to the patients already using glasses 32%.

A study conducted in school aged children to find out the factors which are linked with adherence of spectacle wear showed that the compliance was higher in the patients already using glasses as compared to the patients wearing glasses for the first time.[19] This study supported our result that the compliance among patients wearing for the first time was lower 41.17% as compared to old glasses users 64.70%. The reason behind poor compliance was that the patients were facing asthenopic symptoms like headache and eye strain. Reason of poor compliance in the patients wearing glasses for the first time was that they were satisfied with their presenting vision. Another reason was that wearing glasses will not improve their vision, glasses cause headache, use occasionally and make their eyes weaker. which is linked to the study conducted in 2006 in china to predict spectacle compliance and its interrelated factors among children.[20]

A study conducted in school children to predict asthenopic symptoms showed that most of the asthenopic symptoms are interrelated with near vision mainly during reading and writing.[21] This study was in accordance with results of our study that asthenopic symptoms at near distance were higher 81.35%than asthenopic symptoms at far distance 64.66%. Most common asthenopic symptoms at near distance were eye strain 27.11%, difficulty in focusing 18.64%, headache 15.25% and eye fatigue 13.55%. A study performed which suggested that stimulation of far point decreased the asthenopic symptoms.[22] This study supported the results of our study that asthenopic symptoms at far distancewere 64.66% which was lower than asthenopic symptoms at near distance 81.35%. Most common asthenopic symptoms at far distance were difficulty in focusing 22.55%, eye strain 20.30%, blurred vision 18.04%, headache 15.03% and eye fatigue 10.52%.

A study directed to find out prevalence of asthenopic symptoms among university students which showed that asthenopic symptoms were higher in females than males. This study supported our results that asthenopic symptoms were higher in females than males.[23] In other words,non-acceptance of spectacles was more (84.21%) in females than males 15.78%. Our results agreed with this study and reported a comparatively more complaining of asthenopic symptoms in females. Contrary to our results, another study conducted that suggested that there was no notable association between asthenopic symptoms and gender.[24]

A study conducted which showed that asthenopic symptoms were higher in students between 12 to 18 years of age.[25] This study was in accordance with our study which revealed that asthenopic symptoms were higher in teen age patients between 15 to 20 years of age. In other words, acceptance of spectacles was less in the patients between 15 to 20 years of age and more in the patients between 21 to 30 years of age. Our results showed that asthenopic symptoms were more in that patients due to which acceptance of spectacles was low.

CONCLUSION

Compliance and acceptance of cylindrical reduction spectacles was significantly higher in old glasses users as compared to new glasses users. Compliance and acceptance of cylindrical reduction spectacles was less in females, teenage and the patients using glasses for the first time. This study revealed that compliance and acceptance of cylindrical reduction spectacles was closely related to gender, age and history of spectacles.

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