



Age Related Refractive Status in Dhaka South City Corporation

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Abstract

Background: Refractive errors are a common cause of vision problems, and their prevalence increases with age. This study investigated the age-related prevalence and distribution of refractive errors in the Dhaka South City Corporation.

Aim: To investigate and understand the prevalence and patterns of refractive errors among the population residing in Dhaka South City Corporation in relation to age.

Methods: The study was a descriptive type of cross-sectional design to investigate age-related refractive status in Dhaka South City Corporation from January to October 2023. The study population were 101 included residents aged 20 to above 30 who provided informed consent. A purposive sampling technique was used. Comprehensive eye examinations were conducted, and data were analyzed using SPSS 26. The findings will inform vision care programs and policies. Ethical considerations were strictly observed, with privacy and confidentiality measures in place.

Results: This study investigated age-related refractive errors in Dhaka South City Corporation. Half of participants reported visual problems, with styes being the most common. Notably, 49.5% had reading difficulties and 45.5% struggled with vision in sunlight. While 47.5% had normal distance vision, 45.5% had slightly reduced vision and 6.9% had more significant impairment. Among refractive errors, compound power errors were most frequent (36.6%), followed by presbyopia (13.9%). Despite the high prevalence of visual problems, only 45.5% used spectacles, mostly for combined near and distance vision correction. A significant association was observed between visual problems and spectacle use ($p = 0.000$), as well as between styes and reduced distance vision ($p = 0.000$) (Figure 1, 2, Table 1-4).

Conclusion: In young adults of Dhaka South City Corporation, self-reported visual problems and potential uncorrected refractive errors were highly prevalent, particularly among females. Despite this, spectacle use remained low. Further investigations are needed to address this disparity and improve access to vision correction.

Keywords: Visual Health; Age-Related Refractive Errors; Presbyopia; Vision in Sunlight; Normal Distance Vision; Styes

Introduction

In developing countries, the prevalence of refractive errors, though generally lower than in developed countries, affects a significant global population, with an estimated 1 billion individuals requiring vision correction. Myopia is notably high in developed nations, affecting up to 80% of adults [1]. A survey in Dhaka city

revealed a substantial 63.2% prevalence of refractive errors, emphasizing the impact on lower-income communities [2]. Globally, near vision impairment due to uncorrected presbyopia affected approximately 510 million people in 2020, with the highest burden in low-and-middle-income countries (LMICs), rural areas, and among women. The associated annual cost of productivity losses reached

\$25.367 billion, reflecting the economic ramifications [3]. Despite the effectiveness of spectacle correction for both near and distance refractive errors, LMICs, including Bangladesh, report low spectacle coverage, as low as 10%, with gender and rural disparities [3]. Uncorrected presbyopia, affecting over 1 billion individuals, poses a significant burden, especially in LMICs where correction rates may be as low as 10%, underscoring the need for evidence-based programs [7,8]. In Bangladesh, a survey revealed inadequate spectacle coverage, particularly among women and rural populations, highlighting areas for improvement to achieve global vision care goals [9]. The widespread impact of uncorrected presbyopia, predominantly in developing countries, necessitates increased personnel and sustainable, affordable spectacle delivery systems [10].

Results

The majority of participants in this study were young adults, with 46.5% falling precisely at the 30-year-old mark. The remaining participants were distributed between over 30 years old (36.6%) and 20 years old (16.8%) (Figure 1). Interestingly, females made up the majority (55.4%), with males comprising the remaining 44.6% (Figure 2).

A striking finding was the high prevalence of self-reported visual problems amongst participants. Half (50.5%) acknowledged experiencing some form of visual difficulty, with styes taking the top spot as the most common issue, affecting nearly 30% (29.7%). Chalazions followed closely behind at 15.8%, and blepharitis accounted for 5.9%. Notably, nearly half (48.5%) of those with visual problems remained undiagnosed with a specific condition (Table 1).

Further highlighting the potential presence of uncorrected refractive errors, nearly half of the participants (49.5%) reported struggling with reading difficulties. Additionally, 45.5% experienced challenges seeing clearly in sunlight. While 47.5% enjoyed normal distance vision (6/6), a significant portion (45.5%) grappled with slightly reduced vision (6/9-6/18), and a smaller group (6.9%) faced even greater distance vision impairment (>6/18). Diving deeper into the refractive errors present, 63.4% of participants were identified with at least one type, with compound

power errors being the most frequent culprit (36.6%). Presbyopia followed at 13.9%, while spherical and cylindrical errors made up 7.9% and 5.0% of cases, respectively (Table 2).

The duration of these visual issues was also explored. Over half of the participants (57.4%) reported experiencing them for at least 6 months, with the prevalence evenly split between those suffering for 6 months to a year and those struggling for longer than a year. Interestingly, despite the high visual problem prevalence, only 45.5% of participants utilized spectacles for correction. Among spectacle wearers, the majority (68.3%) had been relying on them for over a year. The most common type of prescription was a combination of near and distance vision correction (36.6%), followed by near vision only (13.9%), distance vision spherical correction (6.9%), and distance vision cylindrical correction (5.9%) (Table 3).

Finally, a statistically significant association was identified between the presence of visual problems and the use of spectacles (p -value = 0.000). Individuals with visual difficulties were significantly more likely to wear glasses (72.5%) compared to those without visual problems (18%). Further analysis also revealed a significant association between the type of visual problem and distance vision (p -value = 0.000). Interestingly, participants with styes were more likely to have reduced distance vision compared to those with other types of visual problems or no problems at all. However, it is important to note that this specific analysis relied on small sample sizes in some categories, potentially impacting the p -value reliability (Table 4).

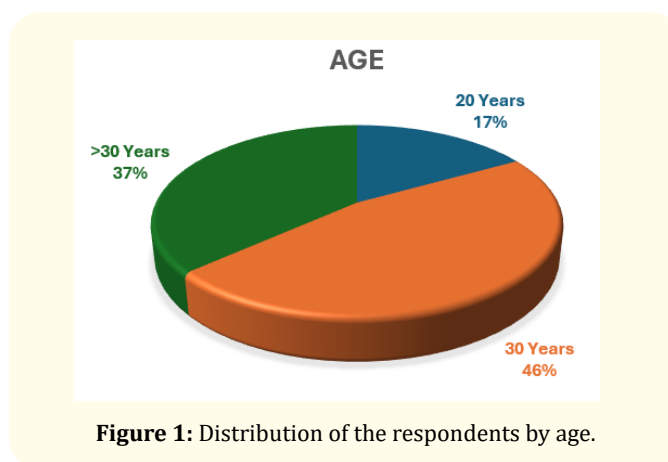


Figure 1: Distribution of the respondents by age.

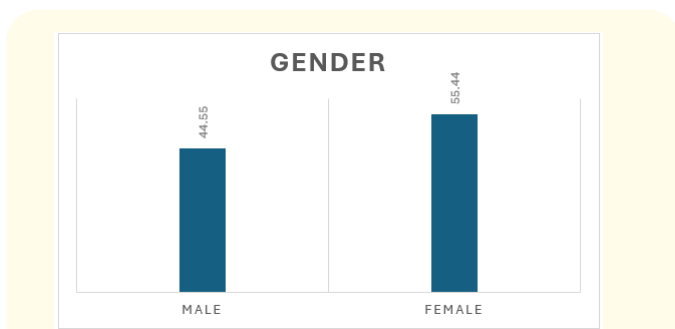


Figure 2: Distribution of the respondents by gender in Percent.

Table 1: Distribution of the respondents by visual problem and type of visual problem.

Visual problem	Frequency	Percent
Yes	51	50.5
No	50	49.5
Type of visual problem		
Stye	30	29.7
Chalazion	16	15.8
Blepharitis	6	5.9
No problem	49	48.5
Total	101	100

Table 2: Distribution of the respondents by reading difficulties, difficulty in Sunlight, distance vision and type of refractive error.

Type of Difficulties	Yes/No	Frequency	Percentage
Reading difficulties	Yes	50	49.5
	No	51	50.5
Difficulty in Sunlight	Yes	46	45.5
	No	55	54.5
Distance vision	6/6	48	47.5
	6/9-6/18	46	45.5
	>6/18	7	6.9
Type of refractive error	spherical myopic or hyperopic	8	7.9
	cylindrical power myopic or hyperopic	5	5.0
	Presbyopia	14	13.9
	compound power	37	36.6
Total		64	63.4

Table 3: Distribution of the respondents by duration of sufferings, use of spectacles, duration of using spectacles, and power using of spectacles.

Duration of sufferings	Frequency	Percent
6 months	29	28.7
> 1 year	29	28.7
Total	58	57.4
Use spectacles		
Yes	46	45.5
No	55	54.5
Total	101	100.0
Duration of using spectacles		
<12 months	32	31.7
>12 months	69	68.3
Total	101	100.0
Power for spectacles		
Distance vision spherical plus or minus power	7	6.9
Distance vision cylindrical plus or minus power	6	5.9
Near vision plus power	14	13.9
Near vision with distance vision spherical or cylindrical plus or minus	37	36.6
Total	64	63.4

Table 4: Association between visual problem and use spectacles and Association between type of visual problem and distance vision of the respondents (n = 101).

Visual Problem	Use Spectacles		Total	p-value
	Yes	No		
Yes	37	14	51	
No	9	41	50	.000*
Total	46	55	101	
* Significant, p-value is .05 at 95% CI.				
Type of visual problem	Distance vision			
	6/6	6/9-6/18	>6/18	
Stye	3	19	4	.000*
Chalazion	4	10	2	
Blepharitis	0	5	1	
6 cells (50.0%) have expected count less than 5. * Significant, p-value is .05 at 95% CI.				

Table 5: Association between visual problem and use spectacles and Association between type of visual problem and distance vision of the respondents (n = 101).

Visual Problem	Use Spectacles		Total	p-value
	Yes	No		
Yes	37	14	51	
No	9	41	50	.000*
Total	46	55	101	
* Significant, p-value is .05 at 95% CI.				
Type of visual problem	Distance vision			p-value
	6/6	6/9-6/18	>6/18	
Stye	3	19	4	.000*
Chalazion	4	10	2	
Blepharitis	0	5	1	

6 cells (50.0%) have expected count less than 5. * Significant, p-value is .05 at 95% CI.

Discussion

Our study provides valuable insights into the prevalence and patterns of age-related refractive errors in Dhaka South City Corporation, Bangladesh. Notably, a high prevalence of self-reported visual problems (50.5%) was observed, with styes being the most common issue. Nearly half of participants (49.5%) reported reading difficulties and 45.5% faced challenges seeing clearly in sunlight, further highlighting the potential for uncorrected refractive errors. Importantly, 63.4% of participants were diagnosed with at least one type of refractive error, with compound power errors being the most frequent (36.6%). Presbyopia also held a significant presence at 13.9%, followed by spherical and cylindrical errors.

These findings align with previous research in both Bangladeshi and international contexts [1,10,16]. The high prevalence of refractive errors, particularly myopia and presbyopia, is concerning given the potential impact on individual well-being and economic productivity [7,8]. Notably, only 45.5% of participants utilized spectacles for correction, even among those with self-reported visual problems. This underutilization of corrective eyewear could be attributed to various factors, including lack of awareness, affordability, or accessibility of eye care services [9].

A statistically significant association was identified between the presence of visual problems and the use of spectacles, echoing previous reports [18]. Interestingly, participants with styes were more likely to have reduced distance vision, suggesting a potential link between certain eye conditions and refractive errors. How-

ever, the small sample size in some analysis categories warrants further investigation to confirm this association.

Our study findings emphasize the need for comprehensive vision care programs and policies tailored to address age-related refractive errors in this urban population. Expanding access to affordable eye examinations, raising awareness about corrective eyewear, and exploring innovative solutions for underserved communities are crucial steps towards improving vision health and overall well-being [5,21]. Further research exploring the specific risk factors contributing to age-related refractive errors in Dhaka South City Corporation, such as occupational or environmental factors, is also warranted for effective intervention strategies.

In conclusion, this study highlights the high prevalence of age-related refractive errors in Dhaka South City Corporation, Bangladesh. Addressing this issue through accessible and affordable eye care, awareness campaigns, and targeted interventions can significantly improve individuals' quality of life and contribute to better overall public health outcomes.

Limitations of the Study

This study has certain limitations that warrant consideration. First and foremost, the cross-sectional design of the study hinders the establishment of cause-and-effect relationships among the observed factors. Furthermore, the study's focus exclusively on the Dhaka South City Corporation in Bangladesh imposes constraints on the generalizability of its findings to other regions or countries. These aspects underscore the necessity for additional research endeavors aimed at addressing these limitations comprehensively, thereby enabling a more thorough understanding of the causes and potential solutions for prevalent visual issues on a broader scale.

Recommendations

Implementing measures to improve access to affordable and comprehensive eye care services is essential.

Launching targeted awareness campaigns about the importance of regular eye examinations and the benefits of corrective eyewear can help address the underutilization of spectacles observed in the study.

Integrating eye care services into existing primary health care systems can facilitate early detection and management of refractive errors.

Investing in the training and capacity building of eye care professionals, including optometrists and ophthalmic technicians, is

vital for strengthening the eye care infrastructure in Dhaka South City Corporation.

Authors' Contributions

The idea for the study, statistical analyses, and manuscript draft were generated by Nargish Akhtar Banu and Dr. Mst. Nadira Parvin. Feedback on the statistical analyses and the draft manuscript was reviewed by all authors. The concluding manuscript was read and approved by all contributors.

Conclusion

This study sheds light on the high prevalence of age-related refractive errors in Dhaka South City Corporation, Bangladesh, emphasizing the urgent need for comprehensive vision care interventions. With a significant portion of the population experiencing visual difficulties, particularly among females, and a notable underutilization of corrective eyewear, targeted efforts to improve access to affordable eye care services and raise awareness about the benefits of spectacles are imperative. Integrating eye care into primary health systems, investing in professional training, and further research into risk factors are essential steps towards addressing this public health challenge and enhancing overall well-being.

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