

Prevalence of Presbyopia and Spectacle uptake among adults in Amuwo-Odofin Local Government Area in Lagos State

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Abstract

Introduction: This study seeks to determine the prevalence of presbyopia and spectacle uptake among adults in Amuwo-Odofin LGA in Lagos State.

Objectives: The objectives of this study were to determine the prevalence of presbyopia and spectacle uptake, identify social and cultural factors that hinders presbyopes from spectacle uptake and to ascertain the level of awareness program regarding the use of reading glasses amongst presbyopes in Amuwo-Odofin LGA, Lagos State.

Method: A cross-sectional descriptive survey involving 441 adults within the ages of 35-60 years was carried out in Amuwo-Odofin LGA. A modified cluster sampling technique involving 3 stages was used for the study. Informed consent was obtained from participants before screening commenced. A self-administered, structured questionnaire that was given out to consenting participants at the survey

ground was used to gather data.

Results: The prevalence of presbyopia and spectacle uptake in this study was 46% (n= 204) and 40% (n= 177), respectively. The participants' mean (SD) age is 47.1 (± 9.4) years. More than three-quarters of respondents perceived spectacle uptake as a sign of old age. Majority (88.0%) were not aware of any eye-related program in the area. There is significant association ($p < 0.05$) between spectacle uptake and prevalence of presbyopia ($p < 0.001$) in Amuwo-Odofin LGA, Lagos State.

Conclusion: This study found a low prevalence of presbyopia and spectacle uptake. About one-third of the respondents considered cost as the main barrier to the spectacle uptake. The study found a high level of the respondents not being aware of any eye program.

Keywords: Prevalence, Presbyopia, Spectacle uptake

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Introduction

Presbyopia is regarded as a typical part of the aging process¹. The condition occurs primarily because of physiological changes in the crystalline lens and surrounding ocular structures. With increasing age, the crystalline lens becomes less elastic and more sclerotic, while the ciliary muscle and lens capsule gradually lose their efficiency in altering the lens shape required for accommodation. These structural and functional changes reduce the amplitude of accommodation, resulting in difficulty performing near visual tasks such as reading and sewing. Although presbyopia is considered a natural part of aging, it remains a significant public health concern due to its impact on productivity and quality of life².

Some studies have shown that presbyopia develops earlier in people who live around the equator^{3,4}. Further studies showed that the important variable could be ambient temperature rather than latitude. Thus, the higher the ambient temperature, the earlier the onset of presbyopia^{3,4}. Presbyopia sets in much earlier in Nigerians, usually at the age of 38 years⁴, and that increased visual activity is a major contributing factor⁵. The hallmark of presbyopia symptoms is blurred vision of the eye and inability to see clear details at the near working distance⁶. Diagnosis is by refraction¹. Presbyopia is typically corrected by wearing spectacle. A spectacle is an optical appliance consisting of a pair of ophthalmic lenses mounted in a frame or rimless mount, resting on the nose and held in place by sides extending towards or over the ear, used to correct errors of refraction or to protect the eyes⁷. Several factors that determine the willingness to wear spectacles include: the cost of spectacle, occupation, age, lack of awareness, level

of education, and cosmetic appearance of the spectacles^{8,9}.

Presbyopia poses a public health challenge; this is because it affects older people's ability to maintain their economic independence¹⁰. Individuals with presbyopia often experience difficulty in viewing near prints and objects which is very important for economic activity. Lack of awareness will further complicate and increase more health burden on their quality of life. Assessing the level at which presbyopes confidently wear reading glasses for near vision task will significantly give an insight on how well an awareness program have been conducted in the area. Hence, the importance of this research.

The global prevalence of presbyopia was estimated to be 1.09 billion¹¹. Despite this, most uncorrected presbyopes are not bothered about their vision despite being economically disadvantaged. If left uncorrected or under-corrected, presbyopia could result in potential productivity losses¹⁰. For example, research conducted in India showed that presbyopic factory workers were less productive than their co-workers¹². After correction with glasses, their productivity improved greatly, which made the investment in the use of corrective spectacles very beneficial. Moreover, as more transactions are done in writing, adults with poor reading vision will definitely be at an economic disadvantage. Additionally, uncorrected presbyopia can hamper development. The World Health Organization (WHO) has placed increasing emphasis on adult literacy to improve attainment of developmental goals, but people require good near vision to benefit from programs to improve literacy.

The findings of this study on the prevalence of presbyopia would provide essential epidemiological evidence to guide health policy and planning within the study area. By quantifying the burden of uncorrected presbyopia, the research will highlight a largely neglected cause of visual impairment that significantly affects daily functioning, productivity, and quality of life, particularly among the economically active population.

Presbyopia cuts across different social strata, both the rich and the poor, and impacts negatively on near vision-related tasks both in formal workplaces or among artisans such as tailors¹³. A simple pair of corrective spectacle lenses will correct presbyopia, yet there still exists a high prevalence, especially in developing countries¹⁴.

Currently, there are no approved therapies that can reverse the normal ageing process that causes presbyopia; instead, current management focuses on either using optical correction with medical devices (e.g., spectacles, contact lenses) or by way of surgical intervention (e.g., corneal refractive procedures and intraocular lens (IOL) replacement)¹⁵.

In southern India, the same definition for presbyopia was used¹², they found a prevalence of 55 percent in people aged 30 years and older. According to the study, the prevalence of presbyopia worsened with increasing age. Female gender, rural residence (as opposed to urban residence), myopia, and hyperopia were associated with presbyopia. A third of subjects with presbyopia were using spectacles.

A population-based study of presbyopia in Gwagwalada, Nigeria, found that among adults 40 years and older found a prevalence of 53.4%¹⁶. Female gender and

increasing age were associated with presbyopia, and presbyopia was more severe in females¹⁶. Population and clinic-based studies among other African populations reported a prevalence of presbyopia between 48% and 65%¹⁷⁻¹⁹. In other parts of the world, prevalence values range from 55.3% (South India)¹², to 68.2% in Finland²⁰.

Materials and Method

A pre-survey visit was made to the leaders of the community to familiarize them with the need for the study. The study was explained to participants and permission sought before commencing the study. A close-ended, self-administered, structured questionnaire was issued to the participants to fill out. The study made use of a cross-sectional descriptive design. The study population were adults within the age range of 35-60 years residing in Amuwo-Odofin Local Government Area, Lagos State. The required sample size was determined using the formula used for calculating the adequate sample size in cross-sectional study design,

$$n = (Z)^2 p (1-q)/(d)^2$$

Where n = Sample size, Z = confidence level usually converted to Z score, p = approximate proportion of the event in the population (standard deviation), and d = confidence interval (margin of error). A sample size calculation²¹. Assuming the maximum variability, which is equal to 50% (p=0.5) and taking a 95% confidence level with a 5% margin of error, the calculation for the required sample size will be as follows:

$$Z = 95\% \text{ CI } (1.96), P = 50\%, 0.5, q = 1-p, 1-0.5 = 0.5, d = 5\%, 0.05$$

$$n = ((1.96)^2 \times 0.50 (1-0.50)) / (0.05)^2$$

$n = 3.84 \times 0.50 (0.50) / 0.0025$; $n = 384$

Sample size = 384

15% non-respondent rate = 57²², Therefore, 441 subjects participated in the study.

A modified cluster sampling technique was used. It involved 3 stages. In the first stage, the names of the 14 wards in Amuwo-Odofin LGA were written on a piece of paper rolled up, and one name was removed randomly until 5 wards in Amuwo-Odofin LGA were selected out of the 14 wards. In the second stage, 10 streets were chosen randomly from each of the 5 wards selected. At the chosen street on the day of the survey, the first house was screened, then next 2 houses were skipped. For every house screened, 2 houses were skipped to screen the next. In the third stage, the households with eligible consenting individuals were thereafter screened until the entire streets were completed. This was done for each ward selected until a total number of 441 consenting eligible participants were gotten.

The principal investigator performed anterior and posterior segment examinations with the pen torch and an ophthalmoscope, respectively. Manual refraction was also done for both distance and near at 6m and 40cm respectively²³. Participants who had eye pathologies were referred to the nearest hospital. The ophthalmic nurse carried out visual acuity testing with a Snellen's chart and also administered the questionnaires to the eligible participants. Presbyopia was determined when a respondent was unable to read N8 character at 40cm with best correction at distance²⁴.

Inclusion Criteria

All individuals aged 35 years and not more than 60 years who are resident in the study

area and willing were enumerated to participate in the study.

Exclusion Criteria

All individuals with corrected visual acuity (VA) worse than 6/60, severe eye pathology that impaired vision such as cataract, advanced glaucoma, corneal opacity, etc., and individuals who cannot read or write were excluded from the study. All individuals who met the inclusion criteria and were not willing to participate in the study were also excluded from the study.

Method of Data Analysis

Data from the study was analyzed using the Statistical Package for Social Sciences (SPSS, 25.0). The independent variables are access to eye care services, occupation, level of education, cost of spectacles, visual acuity, gender, and awareness. These variables are considered potential determinants that may influence the outcomes of interest. The dependent variables are the condition presbyopia and spectacle uptake. Presbyopia refers to the outcome of interest in terms of its prevalence among the study population, while spectacle uptake represents the utilization of corrective measures among those diagnosed with presbyopia. Descriptive statistics was used to describe each variable assessed. The total number of participants who have presbyopia divided by the total number of participants who availed themselves for the research multiplied by 100 gives the prevalence rate for presbyopia in the area. A chi-square test was also used to determine the relationship between the prevalence of presbyopia and other categorical variables. Statistical calculations were done at a significance of $p < 0.05$.

Ethical Approval

Ethical approval number NNRHL/HREC/0007/10/2023 was obtained from the Health Research Ethics Committee (HREC), Nigerian Navy Reference Hospital, Ojo, Navy Town. Permission was also sought from the community leaders. Informed consent was obtained from each participant. The study was conducted in accordance with the Declaration of Helsinki (1964).

Results

A total of 441 respondents participated in the study, comprising 39.7% ($n=175$) males and 60.3% ($n = 266$) females. The mean age of selected participants was 47.1 (± 9.4) years. Most of the respondents were within the age range of 35-40 years (57.8%). The majority (75.5%) of the participants had tertiary education. The prevalence of presbyopia and spectacle uptake in this study was 46% ($n= 204$) and 40% ($n= 177$), respectively. Proportionally, more of the females (54.1%) had presbyopia compared to the males. The most common symptoms noticed by participants with uncorrected presbyopia were headache (47.7%), eye tearing (25.8%), and blurred vision (19.7%). The majority (88.0%) of the respondents were not aware of any eye-related program in the area however, the majority still believe that spectacles can improve their vision, accuracy, and productivity. The majority of the respondents were ashamed of wearing reading spectacles. Most of the respondents (34.4%) had a barrier in getting reading glasses because they were expensive. There is a significant association ($p<0.05$) between spectacle uptake and prevalence of presbyopia ($p=0.001$) in Amuwo-Odofin local government area of Lagos State. There is a statistically significant association between the age of respondents and spectacle uptake

($p=0.000$). There is a statistically significant association between years of residence and spectacle uptake ($p=0.027$). There is a statistically significant association between occupation and spectacle uptake ($p=0.000$). There is no statistically significant association between sex and spectacle uptake ($p=0.151$). There is no statistically significant association between educational qualification and spectacle uptake ($p=0.136$).

Discussion.

The prevalence of presbyopia and spectacle uptake in this study was (46%, 95% CI, 41–51%) and (40%, 95% CI, 35–45%), respectively. The observed prevalence of presbyopia is slightly lower than the 53.4% reported in a population-based study conducted in urban Gwagwalada, Nigeria¹⁶. However, it is also lower than the 55% prevalence reported among individuals aged 30 years and above¹⁰. This variation may be attributed to the relatively younger population in Amuwo-Odofin, which formed the study area, as presbyopia is strongly age-related.

Age and gender were found to be significantly associated with presbyopia ($p=0.001$). Increasing age was positively correlated with the condition, which is consistent with its physiological progression. Female gender was also significantly associated with presbyopia, with females exhibiting more severe forms than males. This finding aligns with studies by Muhammad and Jamda¹⁶ and Duarte et al.²⁵. A possible explanation for this observation may be the relatively shorter tear break-up time in females, which could exacerbate visual discomfort and accelerate symptom manifestation. The study population had more females than males, with a male-to-female ratio of 1:1.52. This disparity may be explained by

rural–urban migration patterns, where males often relocate in search of better economic opportunities, leaving a higher proportion of females in the study area²⁶.

In terms of educational status, the majority of respondents had attained tertiary

education, including Bachelor's, Master's, and Doctoral degrees. Only a minority had secondary or primary education. This indicates a relatively well-educated population, which likely enhanced comprehension of the survey questions and improved the reliability of responses.

Table 1: Association between Sociodemographic Factors and Prevalence of Presbyopia.

Sociodemo- graphic factors	Presbyopia		X ²	P-value
	Yes	No		
Age				
35-40	94(36.9)	161 (63.1)	37.463	0.001
41-45	18 (38.3)	29 (61.7)		
46-50	51 (75.0)	17 (25.0)		
51-55	9 (69.2)	4 (30.8)		
56-60	32 (55.2)	26 (44.8)		
Sex				
Female	144 (54.1)	122 (45.9)	16.730	0.001
Male	60 (34.3)	115 (65.7)		
Educational qualification				
Primary	0 (0.0)	9 (100.0)	12.190	0.032
Secondary	50 (50.5)	49 (49.5)		
BSc	96 (47.3)	107 (52.7)		
Masters	41 (50.6)	40 (49.4)		
Phd	8 (40.0)	12 (60.0)		
None	9 (31.0)	20 (69.0)		
Years of residence				
1 -5 years	56 (44.8)	69 (55.2)	0.715	0.949
6-10 years	51 (45.5)	61(54.5)		
11-15 years	25 (50.0)	25 (50.0)		
16-20 years	29 (50.0)	29 (50.0)		
> 21 years	43 (46.7)	49 (53.3)		
Occupation				
Farming	9 (36.0)	16 (64.0)	7.248	0.123
Business	109 (48.9)	114 (51.1)		
Civil Servant	40 (54.8)	33 (45.2)		
Retiree	13 (43.3)	17 (56.7)		
Others (Fishing)	33 (36.7)	57 (63.3)		

Regarding symptoms, headache (47.7%) was reported as the most common complaint among respondents, particularly among uncorrected presbyopes. This finding differs from that of the American Optometric Association⁶, which identifies blurred near vision as the hallmark

symptom of presbyopia. The discrepancy may be due to participants' limited ability to recognize or describe blurred vision, whereas headache is a more easily identifiable and commonly understood symptom.

Table 2: Clinical presentation of uncorrected Presbyopia

Variable	Frequency (n=441)	Percentage
<i>How often do you engage in near visual task in a day?</i>		
1-3 hours	146	33.1
4-6 hours	174	39.5
7-9 hours	45	10.2
10-12 hours	51	11.6
13 hours and above	25	5.7
<i>Wear Reading Spectacle</i>		
Yes	177	40.1
No	264	59.9
<i>If, yes for how long? (n=177)</i>		
1-5 years	88	49.7
6-10 years	40	22.6
11-15 years	15	8.5
16-20 years	12	6.8
21 years and above	22	12.4
<i>If no, do you experience any form of these symptoms? (n=264)</i>		
Headache	126	47.7
Eye Tearing	68	25.8
Blur Vision	52	19.7
Diplopia	8	3.0
Others	10	3.8

Awareness of eye care programs was notably low, with just over four-fifth of respondents unaware of any such initiatives. Among those who were aware, the majority cited government-sponsored programs as their primary source of information, while only a small proportion reported media sources such as television or radio. This suggests limited dissemination of eye health information

and highlights the need for broader awareness campaigns by government agencies, non-governmental organisations, and other stakeholders.

Despite low awareness levels, most respondents believed that spectacles could improve their vision. This finding is consistent with studies by Naidoo and Ravilla¹⁶ and Patel and West¹⁷, which

emphasize the effectiveness of corrective lenses in managing presbyopia. Similarly, Duarte et al.²⁶ reported that 58% of participants required near-vision spectacles for daily tasks to enhance productivity. The

slightly lower percentage observed in their study may be due to the inclusion of younger individual (aged 30 years and above), among whom presbyopia may not yet be fully established.

Table 3: Awareness Program Regarding Presbyopia

Variable	Frequency (n=441)	Percentage
<i>Are you aware of any eye related program done by the government in the last one year in Amuwo - Odojin?</i>		
Yes	53	12.0
No	388	88.0
<i>If yes, how did you get to know about the program</i>		
Through seminar	8	15.1
Social media	17	32.1
Tv/radio	4	7.5
Govt sponsored outreaches	20	37.7
Others (Newspaper publication)	4	7.5
<i>Believe that spectacle can improve your vision</i>		
Yes	353	80.0
No	88	20.0
<i>Is there any eye care service within your area?</i>		
Yes	297	67.3
No	144	32.7
<i>If yes, what is the distance of the eye care center to your area (n=297)</i>		
Near (< 5km)	164	55.2
Far (5km-10km)	124	41.8
Very far (> 10km)	9	3.0

Cost was identified as a major barrier to spectacle uptake, with a significant proportion of respondents perceiving spectacles as expensive. This aligns with findings by Thulasiraj et al.⁸, who also reported cost as a key limiting factor. Additionally, there was a statistically significant association between presbyopia and spectacle uptake ($p < 0.001$), indicating that individuals with the condition are more

likely to require corrective measures, although uptake remains suboptimal.

Sociocultural factors also played a significant role in limiting spectacle uptake. More than three-quarters of respondents expressed embarrassment about wearing spectacles, largely due to the perception that spectacles signify old age. Such beliefs contribute to low utilization despite recognized benefits.

Overall, the study revealed a relatively low prevalence of presbyopia and spectacle uptake in Amuwo-Odofin. A substantial proportion of respondents who did not use spectacles experienced symptoms, particularly headaches. Low awareness of eye care programs, high cost of spectacles, and sociocultural stigmatization were identified as key barriers to uptake. Addressing these factors through targeted health education, subsidized eye care services, and community-based interventions is essential to improve visual health outcomes.

Public health implication

The findings of this study demonstrate important public health implications for visual health and quality of life. Although the prevalence of presbyopia and spectacle uptake are relatively low, the persistence of uncorrected cases reflects a notable burden of avoidable visual impairment with potential effects on productivity and daily functioning. The low spectacle uptake relative to need suggests gaps in awareness, accessibility and utilisation of eye care services, influenced by factors such as limited knowledge, cost constraints and sociocultural beliefs, including stigma associated with spectacle use. The greater impact observed among females further emphasizes the need for gender-sensitive approaches to improve equitable access to care. Strengthening health education, improving affordability and implementing culturally appropriate interventions, alongside integrating presbyopia screening into primary health care and expanding community-based outreach, are critical to enhancing early detection and service uptake. These findings also underscore the need for supportive policies, including the incorporation of refractive services into

national health insurance schemes, to improve overall eye health outcomes.

Limitation of the study

This study has several limitations. Its cross-sectional design limits causal inference between associated factors and presbyopia or spectacle uptake. Spectacle uptake was self-reported without objective verification, which may have introduced misclassification despite structured questionnaires and standardized procedures. The study covered only a small number of communities within Amuwo-Odofin LGA, Lagos State and not all uncorrected presbyopes were included; although a modified cluster sampling technique was applied, selection bias cannot be entirely excluded. Nonetheless, the findings provide valuable insights into the burden of presbyopia and patterns of spectacle uptake. Future research should employ longitudinal designs and objective verification of spectacle use to improve accuracy and generalizability.

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