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Impact of Uncorrected Presbyopia on the Quality of Life in Rural Gwagwalada, Nigeria

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ABSTRACT

Background: Few population based surveys have been done to assess the magnitude of presbyopia in developing countries and even fewer studies have found an impact on vision related quality of life in the developing world. The aim of this study is to determine the Impact of Presbyopia amongadults aged 40 years and above in Rural Gwagwalada, Abuja, Nigeria.

Methodology: The study was an analytical cross sectional study design.Participants underwent distance and near visual acuity testing including refractionto determine if they had presbyopia. A pretested interviewer administered near vision questionnaire was used to determine the self reported difficulty with near vision related tasks in rural Abuja, Nigeria.

Results: Presbyopes were more likely than non-Presbyopes to require help from others due to poor vision, to report having problems with family due to poor vision and to report not being satisfied with general health. (P<0.001). Presbyopes were more likely than nonpresbyopes to report moderate to severe difficulty with near vision tasks. (P < 0.001). Presbyopes reported three times the rates of dependency due to vision compared with non-presbyopes.Female presbyopes compared to males presbyopes were more likely to report having problems with family (30.7% vs. 8.3%, P <0.001).Females were also more likely to report having felt looked down upon (40.0% vs. 17.4%, P <0.001),

Conclusion: This study shows that uncorrected presbyopia substantially impacts on vision related quality of life in Rural Gwagwaladaand efforts should be made towards provision of good quality, affordable and readily accessible spectacles to rural settings in Nigeria.

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INTRODUCTION

Presbyopia which is defined as age related loss of accommodation is the most common physiologic ocular change after the age of forty and causes universal near visual impairment with increasing age[1]. Presbyopia has functional consequences primarily for those who use their near vision for reading and writing. Without optical correction, presbyopia results in an inability to perform the once effortless near tasks at a customary working distance without experiencing visual symptoms. The impact of this process varies from one person to another. Those involved in more frequent or more demanding near vision tasks are likely to have more difficulty.[2]

Few population based surveys have been done to assess the magnitude of presbyopia in developing countries and even fewer studies have found an impact on vision related quality of life in the developing world. This is due to the perception that presbyopia is unimportant in locations were reading is uncommon hence little attention has been paid to presbyopia in the developing world where literacy rates are very low.[3]

This perception lacks an evidence base as only a few

population-based studies have assessed presbyopia in non European

populations and anecdotal evidence suggests a need for good near vision among those in rural areas who may need adequate near vision for near vision related tasks that they carry out in the course of their daily life.[4]

MATERIALS AND METHODS:

This population based analyticalcross sectional study was part of a presbyopia study that was conducted in Gwagwalada area council of Abuja, Nigeria. The study population was made up of 15 villages (clusters)randomly selected from 90 villages in Gwagwalada using information from the census data.[5]Gwagwalada is one of six Area Councils that make up the Federal Capital Territory, Abuja consisting of about 90 towns and villages.[5]

The inhabitants of Gwagwalada are mostly farmers and civil servants. The University Teaching Hospital, Gwagwalada has a fully operational department of Ophthalmology, which provides almost all range of ophthalmic care, serves as a referral center for eye health care for Federal Capital Territory and surrounding states.

Ethical approval was obtained from London School of Hygiene and Tropical Medicine's ethics committee and the Department of Health, Gwagwalada area council. An informed consent was also obtained from each subject prior to testing.

Sampling technique*:* The minimum sample size was calculated to be 561 and this was rounded up to 600 to allow for non – response (Prevalence of presbyopia was taken as 55%,[6] precision of 5%, with a 95% confidence interval and a design effect of 1.5). Cluster sampling technique was used for the study. Out of the 90 villages (clusters) in the study area, fifteen (15) clusters were selected using random sampling technique by picking without replacement. Forty (40) subjects were also randomly selected from each cluster, to make up the minimum sample size of 600. To determine the household to start from, a bottle was spun at the center of each cluster, where the tip of the bottle pointed to after it had stopped rotating became the starting point (household).One subject per household was

selected by moving from one household to another in a clockwise direction, from the starting point, until the required number was recruited.

Inclusion and exclusion criteria

All individuals resident in selected clusters aged 40years and above were eligible to participate. The following exclusion criteria were used (1) Non residence in selected villages. (A regular resident is defined as somebody residing in the study area continuously for the past six months). (2) Individuals with distance visual acuity of less than 6/60 and no improvement noticed with pinhole testing.(3). Inability to test vision although the subject was not blind. (4)Visual Acuity testing precluded by known ocular pathology.

All subjects excluded for visual impairment reasons were examined by the ophthalmologist and referred to the eye centre for medical care.

Definition of presbyopia: A subject was defined as presbyopic, if he or she could not read the N8 optotype at about 40cm with the distance correction in place if required.[7]

Examination and interview procedures: This was conducted by a team made up of an ophthalmologist (Principal investigator), an ophthalmic resident doctor and an enumerator selected at each cluster visited after training. Distance visual acuity was tested in all subjects using Log mar chart at 4 metres in ambient outdoor illumination under a shade. Correct identification of 3 out of 4 characters in a line constituted success at reading that line.

Distance refraction was then done for subjects with visual acuity less than 6/18 after demonstrating improvement of at least one line when tested with a pinhole. The refraction was conducted using a trial lens set with the addition of plus or minus lenses in 0.5 dioptre increments until the subject read 6/6. To reduce testing time due to time constraints in data collection, astigmatism was not corrected for.

Near vision was then tested using a near vision Log mar "E" chart with ambient light. A string was attached to the near vision chart to ensure a

measurement distance of 40cm from the eyes. Visual acuity is measured binocularly and recorded as the smallest line with at least 3 of the 4 optotypes read correctly. The distance correction was put in place for those that require it before near vision testing was done. Spherical plus lenses are added in increments of 0.5 dioptre until the subject is able to read N8 or no further improvement occurs. Subjects that presented with a vision of 6/6 are assumed emmetropic and tested for near vision as described. Subjects needing presbyopic glasses were provided free of charge while patients with reduced visual acuity not improved by refraction and those needing distance correction were referred appropriately. All refractions were done by the ophthalmologist.

The ophthalmologist in the team conducted the interviews to determine the degree of self-rated difficulty with near tasks. The questionnaire was adapted from the questionnaire used in the Nigeria blindness survey and the Tanzanian near vision impairment project.[4]

Level of difficulty was classified as None, Little and moderate/severe for each of the near vision activity assessed. The level of difficulty for reading was classified as none if the subject read without straining the eyes or moving the book further away from the eyes, little if he/she strained the eyes or required bright illumination to read or moved the book further away from the eyes and moderate to severe if he/she was unable to read despite straining or moving the book away from the eyes.

For sorting out grains, level of difficulty was classified as none if the subject was able to sort out grains without straining the eyes, little difficulty if the subject strained and moderate to severe difficulty if the subject could not sort out grains at all.

For threading needles, level of difficulty was classified as none if the subject was able to thread a needle without eye strain, little difficulty if the subject strained the eyes or required bright illumination and moderate to severe if the subject was unable to thread a needle at all.

For cutting of finger/toe nails, the level of difficulty was classified as none if the subject easily trimmed his nails without fear of injuries and did not strain the eyes, little difficulty if the subject strained the eyes and occasionally injured his/her fingers/toes and moderate /severe if the subject was unable to trim the nails for fear of injury.

For recognition of objects, the level of difficulty was classified as none if the subject easily recognized objects without straining his/her eyes, little difficulty if the subject strained the eyes and moderate to severe if the subject was unable to recognize objects at all.

Data analysis

Statistical analysis using SPSS 16.0 and Stata 10 statistical software (StataCorp, Texas, USA) was done. Each subject was interviewed in the following areas: (1) Self rated satisfaction with near vision; (2) Satisfaction with general health; (3) Requiring help from others in carrying out near tasks; (4) Reporting problems with family due to vision; (5) Reporting having felt looked down upon; (6) Reporting difficulty with near vision related tasks; comparison was made between presbyopes and non-presbyopes in all of these areas. Chi – square tests was used to determine association where p - value of less than 0.05 was considered significant.

RESULTS

The number of subjects with complete interview and examination data was four hundred and sixty one (461). The mean age of the participants was 52.5 years with a median of 50 years and age range of 40 – 85years) Three hundred and thirty six participants had little or no education (73%) while two hundred and eighty eight (62.5%) were men. Two hundred and seventy one (58.8%) of the participants were manual workers. (Table I). Presbyopes reported three times the rate of

Table I : Distribution of sample by study participation.

	Males N=288(%)	Females N=173(%)	P Value
Age Group			
40 – 49	144 (50)	74 (42.8)	
50 – 59	82 (28.5)	43 (24.9)	**0.075**
60 – 69	34 (11.8)	33 (19)	
70+	28 (9.7)	23 (13.3)	
Educat ional level			
None/primary	196 (68.1)	140 (80.9)	**0.003**
Secondary+	92 (31.9)	33 (19.1)	
Occupation			
Unemployed/wife/retired	25 (8.7)	113 (65.3)	
Manual	221 (76.7)	50 (28.9)	**P < 0.001**
Skilled	42 (14.6)	10 (5.8)	

N – Number of subjects.

Table II:Proportion of subjects requiring help from others due to poor near vision.

	Presbyopes N =246 (%)	Non-presbyopes N =215 (%)	P value
Require help	116 (47.2)	32 (14.9)	
No help required	130 (52.8)	183 (85.1)	**P <0.001**

N=Number of subjects

Table III:Comparison of difficulty with Near - Vision tasks between presbyopes and nonpresbyopes

Level of difficulty	None N (%)	Little N (%)	Moderate/Severe N (%)	P Value
Reading				
Presbyopes(142)	2(1.4)	4(2.8)	136(95.8)	**P < 0.001**
Non Presbyopes(129)	42(32.6)	12(9.3)	75(58.1)	
Sorting out grains				
Presbyopes (86)	10(11.6)	27(31.4)	49(57.0)	
Non Presbyopes (47)	25(53.2)	13(27.7)	9(19.1)	**P < 0.001**
Threading neddle				
Presbyopes(221)	6(2.7)	10(4.5)	205(92.8)	**P < 0.001**
Non Presbyopes(164)	51(31.1)	27(16.5)	86(52.4)	
Cutting Nails				
Presbyopes(238)	126(52.9)	70(29.4)	42(17.7)	**P <0.001**
Non Presbyopes(213)	182(85.5)	22(10.3)	9(4.2)	
Recognizing Objects				
Presbyopes (246)	26(10.6)	34(13.8)	186(75.6)	**P <0.001**
Non Presbyope (215)	112(52.1)	39(18.1)	64(29.8)	

N = Number of subject

dependency due to vision compared with nonpresbyopes Table II)

For each near vision related activity, a significant proportion of presbyopes reported difficulty with the lowest being difficulty in dressing children where 0.6% of males and 1.3% of females reported difficulty.

In the comparison of difficulty with near-vision tasks between presbyopes and non-presbyopes, Presbyopes were significantly more likely than non-presbyopes to report having moderate to severe difficulty with reading, threading needle, sorting out grains, cutting finger/toe nails and recognizing small objects. (Table III).

Presbyopes were more likely than non presbyopes, to report not being satisfied with near vision and general health. Presbyopes were also more likely to report having problems with family, having felt looked down upon and requiring help due to vision compared with non-presbyopes. Female presbyopes compared to males presbyopes were more likely to report having problems with family (30.7% vs. 8.3%, P <0.001).Females were also more likely to report having felt looked down upon (40.0% vs. 17.4%, P <0.001), However there was no significant difference between male and female

Table IV: Near vision and health domains between presbyopes and non-presbyopes and between males and females

	Presbyopes				Non-presbyopes				P-value
	Males		Females		Males		Females		
	N 132	%	N 114	%	N 156	%	N 59	%	
Not satisfied with near vision	131	99.2	113	99.1	85	54.5	29	49.2	**P <0.001**
Not satisfied with general health	19	14.4	29	25.4	6	3.8	6	10.2	**P <0.001**
Reporting problems with family	11	8.3	35	30.7	10	6.4	4	6.8	**P < 0.001**
Reporting having felt looked down upon	23	17.4	46	40.4	10	6.4	11	18.6	**P < 0.001**
Reporting requiring help due to vision	49	37.1	67	58.8	20	12.8	12	20.3	**P < 0.001**

N = Number of subjects,

presbyopes reporting not being satisfied with near vision (99.2% vs. 99.1%, P =0.917) (Table IV).

DISCUSSION

This survey provides population-based data on the impact of uncorrected presbyopia on the quality of life in a random sample of individuals aged 40 years and older in Nigeria. The results showed that subjects with presbyopia had reduced quality of life because activities of daily living could not be accomplished easily without glasses. Presbyopes were more likely than non-presbyopes to report difficulty with performing near vision related tasks with females being more dissatisfied.

The negative impact of uncorrected presbyopia on quality of life has also been demonstrated from the results of a few studies in developing countries, (Illesh et al[4], Nirmalan et al,[6] Laviers[8]). Several European-based studies, McDonnell et al,[9] Laitinen et al,[10] Luo et al[11] have found an association between presbyopia and reduced quality of life but cannot be compared with the findings of this study because most questionnaires used in developed countries do not include relevant information necessary to address quality of life in rural settings in developing countries.

This study found that 95.8% of presbyopes reported moderate to severe difficulty with reading while 75.6% reported moderate to severe difficulty with recognizing small objects consistent with findings in the Andhra Pradesh eye disease study were 76.3% of subjects stated that they had moderate to severe difficulty in recognizing small objects[6]. Presbyopes reported three times the rates of dependency due to vision compared with non-presbyopes similar to the findings of the Tanzanian study were presbyopes reported almost twice the rates of dependency due to vision[4] and overall presbyopes reported moderate to severe difficulty with near vision tasks such as reading, threading needle, recognizing small objects than non presbyopes and females presbyopes were more likely than males to report being unsatisfied similar to the findings of the Tanzanian study on the impact of presbyopia on quality of life[4]. Presbyopes were more likely to feel looked down upon, have family issues and require help due to poor near vision consistent with reports that vision specific distress is very common among near vision impaired adults.[12]

In view of the significant burden of difficulty with activities of daily living and social impairment associated with uncorrected presbyopia in this rural setting and other settings,[4,6,8,13] and the fact that 78% of presbyopic subjects in this cohort had no spectacle correction, [14] there is a need for a robust program to ameliorate this problem.The nature of these programs will depend on the barriers to the use of near vision spectacles, our sister study discovered that the major barriers in this rural setting were cost (51.8%) and not a priority (19.7%).[14] Available evidence shows that there is lack of treatment or under treatment of presbyopia even with reading glasses that is assumed to be the easiest treatment intervention[3,6,8,15]

The provision of low cost, high quality reading spectacles that are accessible through community based approach including the development of an efficient outreach program that incorporates provision of refractive services to cater for the needs of the poor who cannot access eye care services will help in ameliorating this problem.[14]

The fact the interviewers relied on self-report from subjects is a potential source of bias, the fact that participants were aware that they may receive free near vision spectacles might have influenced their responses to the questionnaire. The use of N8 to define presbyopia (WHO guideline) did not allow us to estimate the prevalence of milder degrees of near vision disability. Despite these limitations, this population based survey provides information on the negative impact of uncorrected presbyopia on quality of life in Rural Abuja, Nigeria and has further emphasized the need for provision of low cost, good quality spectacles to rural communities because presbyopia is common in such locations and substantially impacts on the activities of daily living.

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