

Magnitude and pattern of presbyopia among patients seen on outreach with Lions SightFirst Eye Hospital, Loresho- Nairobi

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ABSTRACT

Objectives: To determine the magnitude and pattern of presbyopia in patients aged 35 years and above on outreach with Lions SightFirst Eye Hospital and its association with increasing age, literacy level and sex distribution; Also to determine spectacle coverage and reasons for not wearing presbyopic spectacles.

Design: Cross sectional outreach based study.

Setting: Outreach centres visited by Lions SightFirst Eye Hospital.

Subjects: Four hundred and forty two patients aged thirty-five years old and above from 13 outreach centres.

Results: Three hundred and eighty eight (87.8%) patients had presbyopia. Fifteen point four per cent had pre-existing refractive errors. Males required higher power of presbyopic correction for age matched individuals ($p=0.001$) and lower literacy was associated with more severe presbyopia ($p=0.004$). Forty four point two per cent aged 35 to 39 years had presbyopia. Females experienced earlier onset of presbyopia ($p=0.008$). Spectacle coverage was 33%. Males had higher uptake of spectacles ($p=0.01$). Forty four per cent were unaware their presbyopia could be corrected, 39% did not see the need for correction while 7% cited cost as a hindering factor for correction. Outreach centres were the most popular place for obtaining presbyopic spectacles (46.9%).

Conclusion: High prevalence of presbyopia in patients attending these rural outreach centres majority of who are uncorrected. This is mainly due to unawareness of presbyopic correction.

Recommendation: Awareness in the community and among health workers presence of presbyopia as early as mid- thirties and its easy correction with spectacles which should be made easily and cheaply available locally.

INTRODUCTION

Presbyopia (literally, old eye) is the most common ocular affliction in the world. It comes about due to the progressive decline in the accommodative amplitude hence effectively pushing away the near point towards the far point. The rate of decline occurs with very little inter-individual variability even in different populations and is considered a reliable biomarker for human age¹.

Early presbyopia is characterized by patient complaining of requiring more light to read or being able to read better in the morning hours compared to night, difficulty reading fine print and their eyes taking too long to focus on near point. This is accompanied by asthenopia because of straining to accommodate the whole day. The onset of presbyopia is approximately between 40 and 45 years of age however there is some inter-individual and geographic variations².

The global prevalence of presbyopia is unknown but it is estimated hundreds of millions suffer near vision impairment due to uncorrected presbyopia³. Variables associated with either earlier onset or increased severity of presbyopia is increasing age, female sex, higher educational background and residence in town⁴. Among the elderly (>55 years),

uncorrected refractive errors, including presbyopia, is associated with poorer quality of life, more depressive symptoms⁵ and unnecessary dependency on other family members or society³.

Spectacles are the simplest and most inexpensive way to correct refractive errors including presbyopia⁶. Those with refractive error [myopia, hypermetropia or astigmatism] in addition to presbyopia will need bifocals or trifocals the design of which will depend on the nature of his/her work. Surgical methods are also used but not as popular as spectacles.

The methods used include the use of multi-focal IOLs, laser surgery of the cornea and 'surgical reversal of presbyopia'⁷.

MATERIALS AND METHODS

Lions SightFirst Eye Hospital conducts outreach eye camps every week to various remote areas outside Nairobi.

A cross-sectional outreach study was conducted among patients aged 35 years and above who attended the camps between 19th February 2009 and 23rd March 2009. Those with unclear ocular media, prior intraocular surgery or BCVA of >6/60 were excluded. Systematic sampling was

to identify those to be examined in chronological order in each camp until the desired sample size was attained. A total of 442 patients were examined. Verbal consent was obtained from each patient while ethical approval was granted by Kenyatta National Hospital Ethical Committee. A questionnaire was used to capture all demographic data and assessment findings. Visual

Acuity was assessed using an illiterate E chart at 6 metres in a well lit room, each eye being examined separately. Subjective refraction was carried out on all those with a visual acuity of less than 6/9. Thereafter an illiterate E near chart held at 33 centimetres was used to assess and correct for near vision if it was less than N8.

RESULTS

A total of 442 patients participated in the study from thirteen different outreach camp sites (Figure 1).

Figure 1: Distribution of participants by area of residence (n=442)

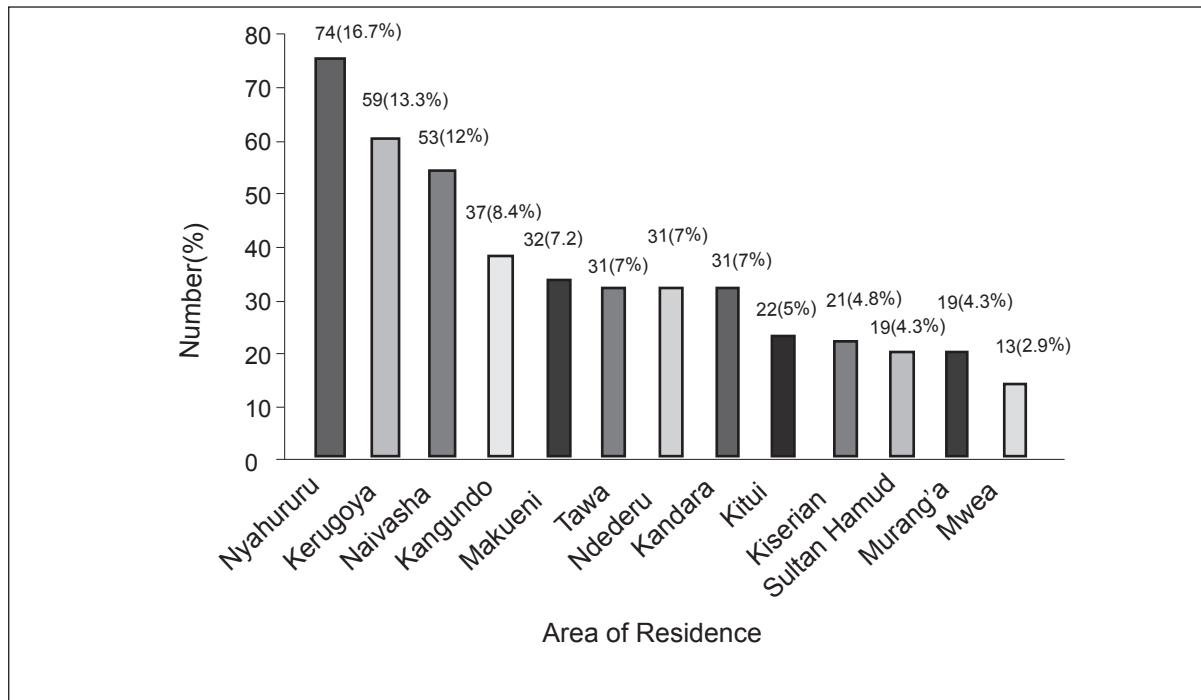
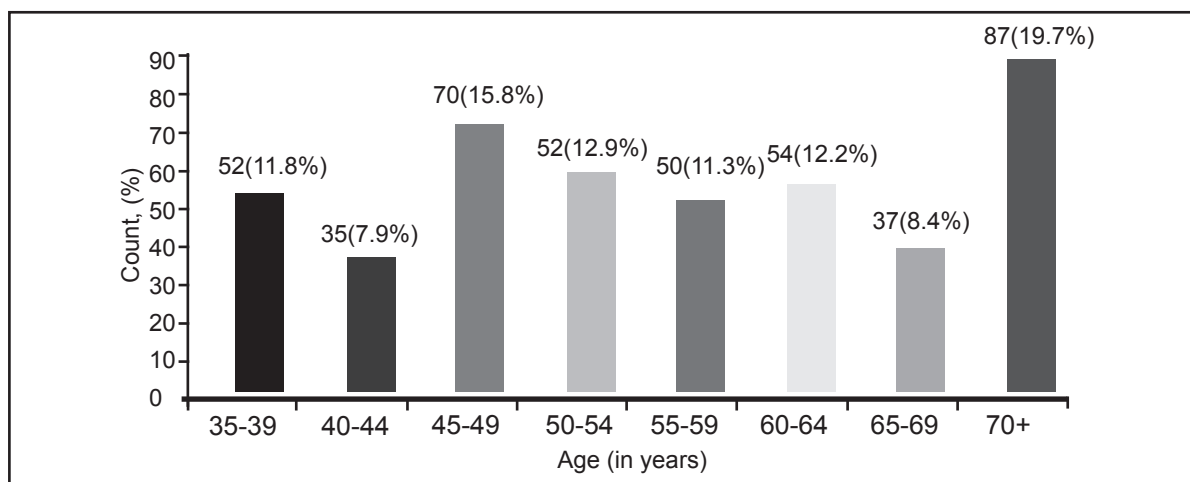


Figure 2: Distribution of participants by age (n=442)



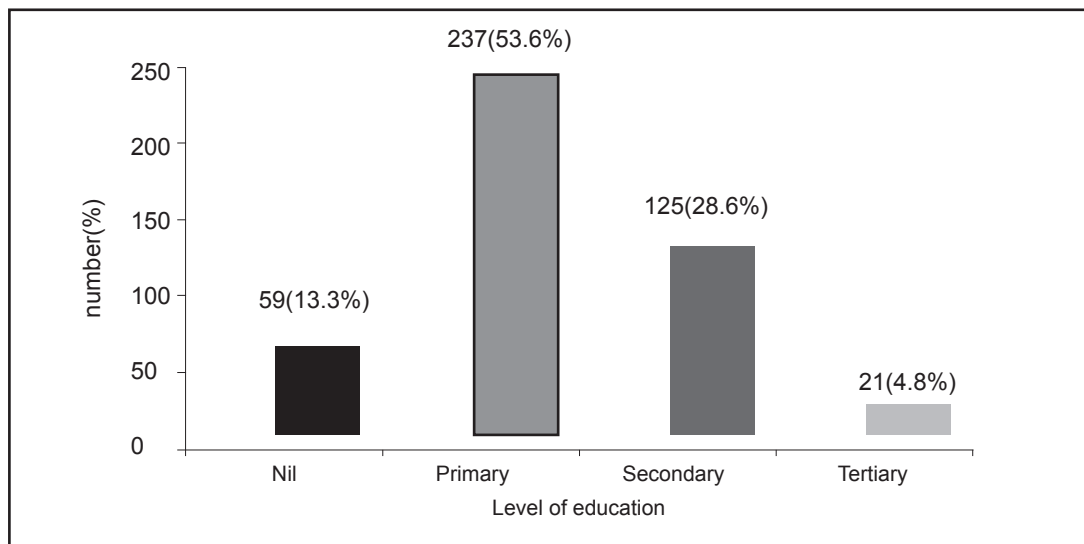
The age range for the participants was from 35 to 85 years.

Table 1: Distribution of participants by age and sex (n=442)

| Sex | No. (%) | Mean age (years) |
|---------------|-----------|------------------|
| Male | 177 (40) | 59.8 |
| Female | 265 (60) | 53.1 |
| Total/average | 442 (100) | 55.8 |

The mean age of males 59.8 years was significantly higher than the mean age of females 53.1 years ($p < 0.001$). The mode, median and age range for both male and female were equal (Table 1).

Figure 3: Distribution by education status (n=442)



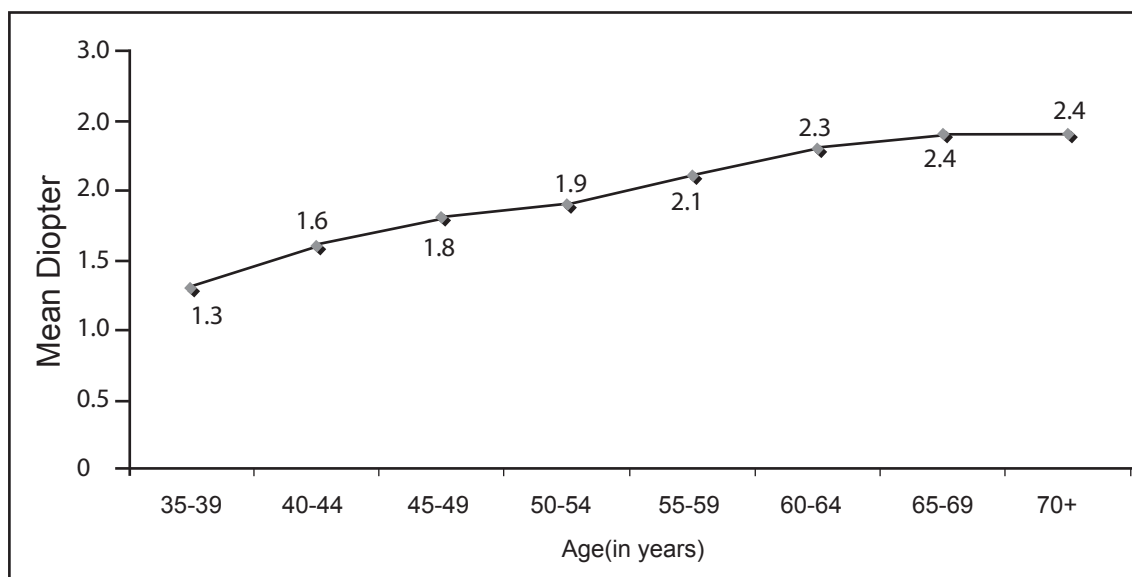
There was no significant difference in education levels between males and females OR=1.21 (95%CI =0.79-1.85); $p=0.349$ (Figure 3).

Table 2: Association of presbyopia by sex (n=442)

| Sex | Patients seen | Presbyopic patients (%) | OR | P= | Mean correction(D) | P= |
|--------|---------------|-------------------------|-----------------------|-------|--------------------|-------|
| Male | 177 | 151(38.9) | 0.69(95%CI 0.37-1.26) | 0.195 | +2.18 | 0.001 |
| Female | 265 | 237(61.1) | | | +1.97 | |
| Total | 442 | 388(100.0) | | | +2.05 | |

Three hundred and eighty eight out of 442 (87.8%) patients were found to have presbyopia. There was no significant difference in frequency of presbyopia by sex (p -value = 0.195), but males required a significantly higher near correction compared to women $p=0.001$ (Table 2).

Figure 4: Mean correction by age group (n = 388)



There is an almost linear progression in the required near correction by age. It commences at an average of 1.3D in the 35 to 39 year age group and plateaus at 2.4D at 65 years and above (Figure 4).

Table 3: Early presbyopia (age 35-39 years): Association by sex (n=52)

| Sex | No presbyopia No. (%) | With presbyopia No. (%) | OR (95% CI) | P= |
|--------|--------------------------|----------------------------|------------------|-------|
| Male | 12 (23.1) | 2 (3.8) | 0.13 (0.02-0.78) | 0.008 |
| Female | 17 (32.7) | 21 (40.4) | | |
| Total | 29 (55.8) | 23 (44.2) | 52 (100) | |

Significantly more females than males presented with presbyopia in this age group (p=0.008) (Table 3).

Table 4: Association of presbyopia correction by education level (n=388)

| Education level | Mean presbyopic correction in Diopters(D) | P-value |
|---------------------------|---|---------|
| Secondary & Above (n=120) | +1.91 (0.57) | 0.004 |
| Primary & Below (n=268) | +2.11 (0.63) | |

Those who have attained secondary education and above were associated with a lower mean presbyopia correction (p=0.004) (Table 4).

Table 5: Association of spectacle coverage by sex in presbyopic patients (n=388)

| Sex | Correction No. (%) | No correction No. (%) | OR (95%CI) | P= |
|--------|-----------------------|--------------------------|------------------|--------|
| Male | 61 (15.7) | 90 (23.2) | 1.72 (1.09-2.71) | P=0.01 |
| Female | 67 (17.3) | 170 (43.8) | | |
| Total | 128 (33.0) | 260 (67.0) | 388 (100.0) | |

Only 45 patients brought with them their spectacles to be examined. Of these, nine had incorrect power of spectacle correction. Males were more likely to have spectacle correction p-value= 0.01 (Table 5).

Figure 5: Reasons given for not wearing spectacles in patients with presbyopia (n=260)

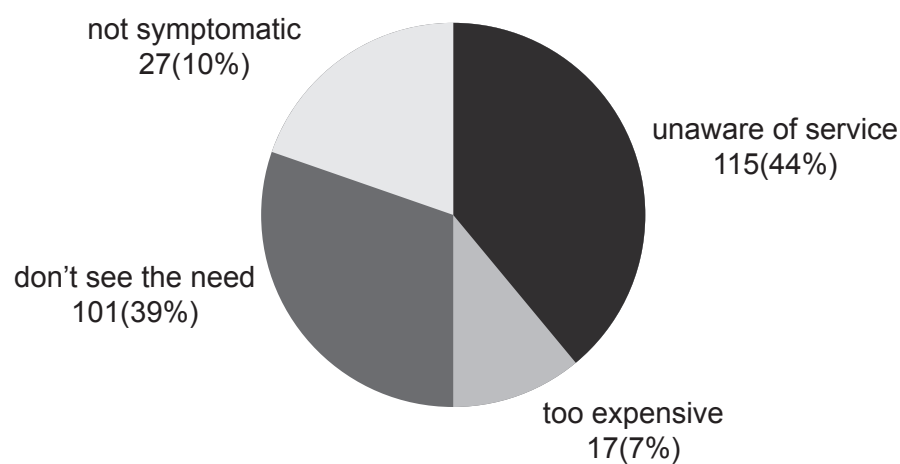
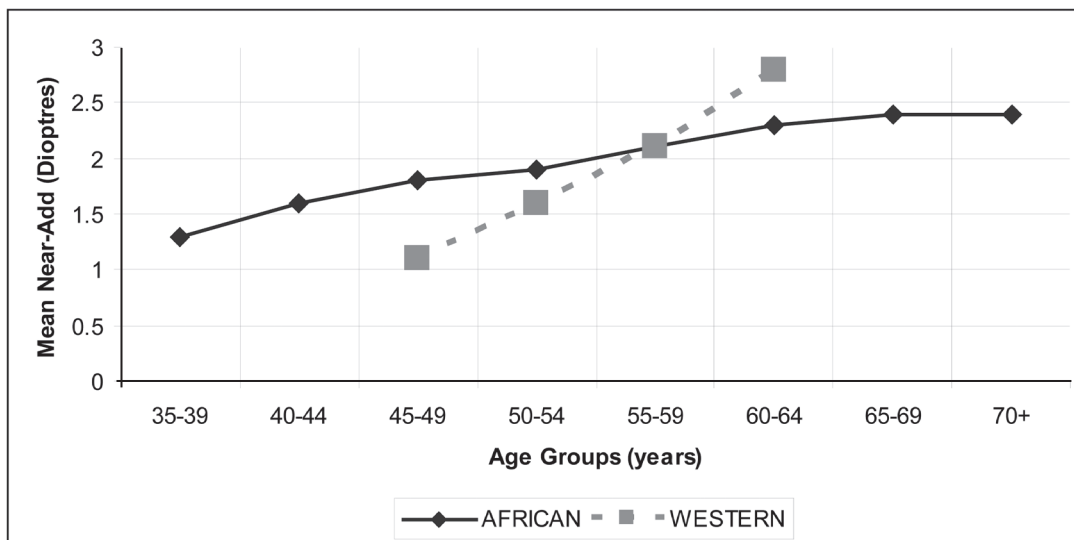


Figure 6: Presbyopia correction: Proposed normogram for Kenyan African Population

(Western values adapted from Principles and Practice of Ophthalmology)¹².

DISCUSSION

A total of 442 patients were eligible to participate in the study after visiting 13 different towns (Table 1). Two hundred and sixty five (60%) of the patients examined were female while 177 (40%) were male. This was contrary to what was expected. Women generally have a worse health seeking behaviour than men mainly because they are economically disadvantaged more so in rural areas. This finding therefore, could be explained by the fact that most services rendered at the eye camp are free. The elimination of cost reduces the barriers to access the eye services by women and thereby increase their turnout. Their ages ranged from 35 to 85 years for both males and females (Figure 2). The mean age for males was 59.8 years and for females was 53.1 years. Males were significantly older than females $p < 0.001$ (Table 1). Males being older could be because the younger ones are the bread winners of the family and fewer were able to attend the camps.

Evidence of presbyopia was found in 388 (87.8%) of the patients examined (Table 2). This was higher than what Patel *et al*² found in the same age group (61.7%) and closer to what Sherwin *et al*¹⁰ found (85.4%) in an older age group.

This high prevalence could be explained by the fact that the study was done in a camp setting where subjects were patients who were seeking an eye service of one kind or another therefore the probability of capturing those with presbyopia was higher. The prevalence of presbyopia was found to be higher among females (89.4%) than in males (85.3%). This was not found to be statistically significant $p = 0.195$ (Table 2). This was similar to findings in the studies by Nirmalan *et al*⁴, Patel *et al*⁷ and Duarte *et al*⁸.

However the mean correction for males (+2.18D) was higher compared to females (+1.97D) and this was statistically significant $p = 0.001$ (Table 2). This could be explained by the fact that males were significantly older than females. The median and mode presbyopia correction was equal for both sexes, +2.00D. The average age of presbyopic males was 62.3 years while that of females was 54.2 years. There was an increase in the degree of presbyopia with increasing age in an almost linear pattern which levelled off at 65 years (Figures 5,6).

This was different from that found by Patel *et al*² whose study showed it plateaus earlier at 50 years. Those below the age of 40 years represented 52 (11.8%) of the total patients examined. Presbyopia was found to be more prevalent in females compared to males in this category ($p = 0.008$). This correlated with studies done by Duarte *et al*⁸ and Pointer *et al*¹². This could be due to a better health seeking behaviour among females in this age group or purely be an indication that there was an earlier onset of presbyopia in females. Presbyopia with increasing age in almost a linear pattern which levelled off at 65 years of age (Figure 6).

There was no significant difference in education levels between males and females $p = 0.349$. Those who had less education were associated with significantly more severe presbyopia $p = 0.004$ (Table 4). This was contrary to the finding in the study done by Patel *et al*² who found higher education was associated with more severe presbyopia. This could be due to incorrect interpretation of clarity of near chart patterns when excessive power was used and the near chart symbols appeared darker or bigger in the non-educated group of patients. Of the patients found to have presbyopia, 67% did not have spectacle correction

(Table 5). This was similar to that found by Nirmalan *et al*⁴ who found unmet presbyopia correction of 70%. Males were more likely to have spectacle correction than females; ($p= 0.01$). This could be because the male participants in the study were significantly older and more economically endowed so as to acquire the spectacles when prescribed. Various reasons were given by participants as to why they stayed without correction. The most common response was not being aware that their condition could be corrected (44%) and not seeing the need to have spectacle correction (39%) (Figure 5). Twenty per cent of patients were found to have incorrect presbyopia correction; however this was based on the few patients, (35%) who came with their spectacles. This incorrect power could be due to lack of renewal of the prescription as the presbyopia progresses.

CONCLUSION

There was 87.8% prevalence of presbyopia in patients attending outreach camps in the age group 35 years and above. Females experienced an earlier onset of presbyopia while severity was associated with increasing age and lower education status. Spectacle coverage was found to be 33% while 20% of these had incorrect spectacle power.

RECOMMENDATIONS

There is need to create awareness in the community about presbyopia which can easily be corrected by spectacles. Health workers need to actively examine and correct for presbyopia in patients in their mid 30's and older while policy makers should include detection and management of presbyopia services in the national eye care plan with the provision of good, durable and affordable reading glasses. Population based studies need to be conducted in the African setting to develop our own protocol of presbyopia correction because the age adjusted presbyopic correction differs from that in western countries.

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