

## Research Article

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## Prevalence of Ocular Morbidity and Causes of Visual Impairment among Elders in Geriatric Centres in Dar es Salaam and Tanga

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### ABSTRACT

**Purpose:** To assess the prevalence of ocular morbidity and causes of visual impairment among elders in geriatric centres in Dar es Salaam and Tanga regions in Tanzania.

**Materials and Methods:** A cross-sectional analytical study was conducted among elders in six geriatric centres in Dar es Salaam and Tanga from 1st July to 31st December 2021. Consecutive sampling was used to obtain study participants to be enrolled in the study after obtaining their informed consent, and data were collected using researcher-administered questionnaires. Demographic information, clinical ocular history and assessment of visual acuity, intraocular pressure, refraction, anterior and posterior segment examination were carried out to ascertain various ocular morbidities. The collected data were analysed using SPSS version 23.

**Results:** This study involved 100 participants from six geriatric centres in Dar es Salaam and Tanga. Sixty-four percent were from 3 government geriatric centres, and 36% were from nongovernment geriatric centres. Slightly more than half (59%) of the participants were males. The mean age of the study participants was 75.20 years (SD 9.30 years). The prevalence of ocular morbidity was 100%, and the proportion of visual impairment was 58%. The most common causes of visual impairment were cataract in 32%, glaucoma in 11%, corneal scarring, optic atrophy and endophthalmitis each accounting for 3%. Advanced age was significantly associated with visual impairment, and a history of eye checkups was associated with lower odds of visual impairment.

**Conclusion and Recommendations:** Ocular morbidity among elderly individuals in geriatric Centres in Dar es Salaam and Tanga is high, and most of the participants have significant visual impairment and blindness, which is largely preventable and treatable. Screening for visual loss before entry into geriatric centres and provision of appropriate services will significantly help to reduce the burden of visual impairment among elderly individuals in geriatric centres in Tanzania.

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### Introduction

Ocular morbidity refers to a wide range of clinically significant eye illnesses, independent of the resultant visual loss experienced by the general public. It encompasses both vision-impairing and nonvision-impairing disorders. These disorders are known or considered to be ocular or vision abnormalities, necessitating ongoing monitoring, clinical evaluation, and rehabilitation. The individual or the professionals are both affected by ocular morbidity [1]. Ocular morbidity has been linked to epidemiological characteristics such as age, gender, socioeconomic level, smoking, chewing tobacco, alcohol intake, and exposure to cooking fuel [2]. Ocular morbidity has arisen as a major public health issue in many poor countries, although it receives less attention than HIV/AIDS. Nonetheless, vision impairment and blindness are an enormous concern in terms of human suffering, economic losses, and social burden [3].

At least 2.2 billion individuals worldwide suffer from vision impairment or blindness, with at least 1 billion suffering from vision impairment that might have been avoided or is still unaddressed. Hundreds of millions of people suffer from serious vision impairment and could benefit from rehabilitation, which they now do not receive. The burden of eye diseases and visual impairment is not evenly distributed in low- and middle-income nations; it is generally significantly greater among elderly individuals, women, and persons living in rural and disadvantaged communities [4].

It is believed that there are over 30 million blind and visually impaired people in Europe; one in every 30 Europeans suffers from vision loss, and visually impaired people outnumber blind people four to one. Blindness and visual impairment account for 75% of unemployment among working-age people; women are more vulnerable than males, and sight loss is intimately linked to old age, with over 90% of visually impaired people being over

65 years old [5]. South and Eastern Asia are the most affected regions in the world, with a crude prevalence of vision loss of 18.2% and over 600 million people afflicted. North America is the least affected, with a crude prevalence of vision loss of 5% and approximately 18 million people affected.

Eastern sub-Saharan Africa has a crude prevalence of 8.8% and over 37 million affected individuals, and the common causes of visual loss among adults more than 50 years of age were reported to be refractive errors, cataract, age-related macular degeneration, glaucoma and diabetic retinopathy [6].

Tanzania is the African country with the greatest rate of vision loss; according to 2020 forecasts, the age-standardized vision loss rate for all ages was 25.1% (6). Tanzania has an estimated 1.1 million visually impaired people and 33,000 blind people. With an average household of five members, vision impairment and blindness afflict at least 4.7 million people [7]. Elderly individuals in geriatric centers are considerably more vulnerable than the general population; in addition to the normal issues that elderly individuals encounter in the community, elderly individuals in geriatric centers lack community support, relying on charity for their survival and health care needs.

Elders have a 50% chance of having eye illnesses compared to the general population, despite having a higher prevalence of other health-related conditions [1-8]. Visually impairing ocular morbidity has a detrimental impact on the health of the elderly because it affects practically all aspects of life, increasing the risk of falls, depression, incapacity to socialize, and a lower quality of life. In Tanzania, data from the Ministry of Health, Community Development Gender Elderly and children show that there are 17 government-owned geriatric centres with a total of 510 inhabitants and 14 privately owned geriatric centres with a total of 383 inhabitants as of [1-26]. These centres are the home for elderly people aged 60 years and above, unmarried people with no dependent children and vulnerable elderly people who cannot be safely supported within the community as assessed by the community development officers. Initially, the establishment of some of these centres cater to leprosy patients, and for this purpose, they also equipped them with dispensaries at the geriatric centre so that they receive all the services as seen at Nunge and Msufini. After the reduction of leprosy victims, these centres were regarded as geriatric centres. Others were established by missionaries and faith-based organizations to help vulnerable elders and aged ones with no support to sustain their lives.

The health services are mainly from the support of nongovernmental organizations or from the government, but the support is not adequate to meet the basic service demands of these elders. Since geriatric centres accommodate elders more than 60 years of age and vulnerable ones who are unable to be safely supported within the communities, most of them have eye problems.

This makes eye problems highly prevalent in this group of elders. A study performed in South Africa showed a high prevalence of visual impairment and blindness among elders in geriatric centres and recommended refractive correction and surgical cataract intervention to reduce the burden of visual impairment and blindness.

To provide eye care assessments that could potentially reduce their eye care needs and the higher prevalence of reversible causes of visual impairment and blindness, it is necessary to better understand the prevalence of ocular morbidity and causes

of visual impairment among elders in geriatric centers. The goal of this study was to determine how common ocular morbidities are and what the causes are among Tanzanian elders who live in geriatric centers in two different regions.

## Materials and Methods

### Study Design

This was a cross-sectional analytical study that was conducted for a period of 6 months among elders in six geriatric centres in Dar es Salaam and Tanga from July to December 2021.

### Study Setting

The study was conducted among elders in geriatric centers in Tanga and Dar es Salaam, and data were collected from each geriatric center from the two regions.

### Study Population

Were all elders (>60 years) who were residing in geriatric centres in Dar es Salaam and Tanga during the study period.

### Sampling and Sample Size

Dar es Salaam and Tanga were conveniently selected, and all the centres available in these two regions were included in the study. A consecutive sampling technique was used to obtain the study participants, and a total of 100 elders were recruited into the study.

### Data Collection Tools

A structured questionnaire was used to collect information on social demographic data, ocular history, medical history, and clinical findings. A pen torch was used for pupillary examination, a head mount binocular indirect ophthalmoscope with a 20-diopter lens was used for fundus examination, an I care tonometer (Ic-200 Finland) was used for measuring intraocular pressure, and a binocular portable slit lamp was used for anterior segment examination.

### Data Collection Procedures

Data were collected by the researcher with the assistance of an optometrist. We were introduced to the elders by the geriatric centre in-charges or any assigned staff whom we were together in the whole process of data collection at a specific geriatric centre. Elders were informed about the study, informed consent was signed, and for those who were unable to read or see, the researcher explained the consent process to them. Those who were willing to participate were assisted in signing the consent, and then they were consecutively recruited into the study. A structured questionnaire was used to collect data on social demographic information, ocular history, medical history and ocular examination findings. This was done at the geriatric centres dispensary (for those centres with a working dispensary within the premises in this case Nunge and Msufini) or in an arranged dining hall where elders were called one after the other in this case Msimbazi, Mburahati, Kasosora and Mwazange. For those elders who were not able to attend where data collections were being carried out, they were visited in their respective rooms, and similar procedures were followed.

The assessment included Visual Acuity (VA) measurement of Intraocular Pressure (IOP) and refraction of the eligible elders to assess their refractive status. Visual acuity was assessed in all elders using Snellen charts for both literate and illiterate elders to establish the severity of visual impairment caused by ocular morbidities and recording was as per WHO categories of visual impairment of year 2019 mild visual impairment [ $<6/12-6/18$ ], moderate visual impairment [ $6/18-6/60$ ], severe visual impairment [ $<6/60-3/60$ ] and blind [ $<3/60$ ]. The procedure involved asking

the patients to occlude one eye and use the other eye to identify the Snellen chart letters in the charts for literate patients or the orientation of tumbling E in the chart for illiterate patients with the chart located 6 meters away. Similarly, the intraocular pressure was measured in all elders using an I care tonometer.

Patients with a VA of 6/18 or worse were subjected to pinhole examination. Refraction to eligible elders was performed by an optometrist in a room that met the minimum requirements for refraction in the elder’s compounds, and the best corrected visual acuity was considered in the better eye.

The anterior segment examination was performed by a binocular portable slit lamp, and posterior segment examination was performed by a head mount indirect ophthalmoscope using a 20D lens. The causes of vision 6/18 or worse were enumerated from the case history and examination findings.

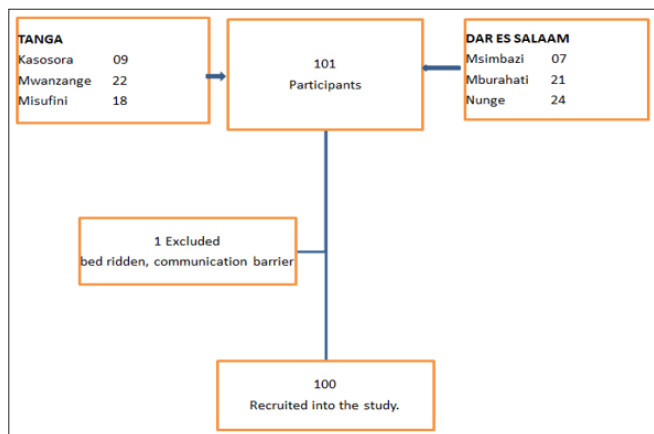
**Data Analysis**

Data were analysed with the help of Statistical Package for the Social Sciences (SPSS) version 23. SPSS was used to generate frequency distribution tables for social demographic characteristics. The prevalence of ocular morbidities was calculated as a proportion of elders with ocular morbidities. This study had two outcome variables, the primary and secondary outcome variables. The proportion of visual impairment was calculated as a secondary outcome; the numerator was the elders with visual impairment, and the denominator was the elders with ocular morbidity.

The cause of visual impairment was ocular morbidity with an associated visual acuity of less than 6/18 as per the WHO classification of visual impairment. The degrees of differences between variables were assessed by using the chi-square test, and the associations of different factors with visual impairment were assessed with binary logistic regression. A P value < 0.05 was considered statistically significant.

**Ethical Issues**

Ethical clearance to conduct the study was obtained from the Senate Research and Publication Committee of MUHAS. Permission to conduct the study was obtained from the Permanent Secretary, Ministry of Health Community Development Gender Elderly and Children central community development department. Participants were informed comprehensively about the purposes and benefits of the study, and those who consented were recruited into the study.



**Figure 1:** Flow Chart Illustrating the Recruitment Process of the Study Participants

In this study, a total of 100 participants were recruited. Males made up 59% of the elders, with a male to female ratio of 1.4:1. The mean age was 75.2-/+9.3 years, with >80 years being the most common age group. More than a quarter of the elderly (36%) had never had their eyes examined (Table 1).

**Table 1: Characteristics of the Study Participants N=100**

Characteristic	Frequency	
	No	%
<b>Age group in years</b>		
60-69	32	32
70-79	33	33
>80	35	35
Mean (SD) 75.2+/- 9.3		
<b>Gender</b>		
Male	59	59
Female	41	41
<b>Type of geriatric centre</b>		
Government	60	60
Non –Government	40	40
<b>Prior occupation</b>		
Peasants	65	65
Professionals	24	24
Small business	11	11
<b>History of eye checkup</b>		
Yes	64	64
	36	36

**Table 2: Distribution of Visual Acuity in the Better Eye N=100**

Characteristic	Frequency	
	No	%
<b>Presenting visual acuity</b>		
6/6-6/18	27	27
<6/18-6/60	21	21
<6/60-3/60	2	2
<3/60-NPL	50	50
<b>BCVA in a better eye</b>		
6/6-6/18	42	42
<6/18-6/60	6	6
<6/60-3/60	2	2
<3/60-NPL	50	50

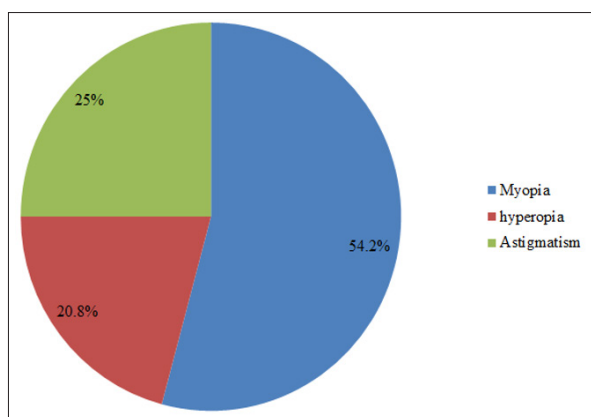
The presenting normal VA (6/6-6/18) before correction was 27%, which increased to 42%. The proportion of visual impairment in this study before correction was 73%, and after correction, it was 58%.

**Table 3: Distribution and Causes of Ocular Morbidity N =163**

Causes of ocular morbidity	Frequency	
	No	%
Cataract	44	27.2
Presbyopia	30	18.5
Refractive errors	24	14.7
Glaucoma	15	9.5
Pseudophakia	12	7.4
Pterygium	5	3.1
Corneal scar	3	1.9
Optic atrophy	3	1.9
Physis bulbi	3	1.9
Dry eye syndrome	3	1.9
Allergic conjunctivitis	3	1.9
Ptosis	2	1.2
Aphakia	2	1.2
Blepharitis	2	1.2
Age related macular degeneration	2	1.2
Endophthalmitis	2	1.2
Uveitis	1	0.6
Diabetic retinopathy	1	0.6
Branch retinal vein occlusion	1	0.6
Trachomatous trichiasis	1	0.6
Bullous keratopathy	1	0.6
Conjunctival concretions	1	0.6
CMV retinitis	1	0.6
Ocular hypertension	1	0.6

Cataract (27.2%), presbyopia (18.5%), uncorrected refractive errors (14.7%), and glaucoma (9.5%) were the most common causes of ocular morbidity among elderly individuals in geriatric centers. Ocular morbidity was present in every elderly individual.

Myopia was the most common refractive error, accounting for more than half of the study participants, followed by astigmatism and hyperopia.



**Figure 2: Distribution of Refractive Errors N=58**

**Table 4: Causes of Visual Impairment by Visual Acuity Category N=58**

Causes of visual impairment	Visual acuity distribution		
	<6/18-6/60	<6/60-3/60	<3/60-NPL
Cataract		3	29
Glaucoma	1	1	9
Corneal scar			3
Optic atrophy			3
Physis bulbi			3
Endophthalmitis			2
Uveitis			1
*BRVO		1	
**CMV-Retinitis			1
Pseudophakik bulous keratopathy			1

\*BRVO-branch Retinal Vein Occlusion

\*\*CMV-Cytomegalomegalovirus.

Cataract was the most common cause of vision impairment (32%), followed by glaucoma (11%). The majority of the elderly people with visual impairment had a visual acuity less than 3/60

**Table 5: Association Between Demographic and Clinical Characteristics and Visual Impairment N=58**

Variables	Univariate logistic regression Analysis			Multivariate logistic regression analysis		
	CoR	95% CI	p value	AoR	95% CI	P Value
<b>Age groups</b>						
60-69	4.7	1.4-15.0	0.023	6.1	1.8-21.0	0.019
70-79	1.9	0.6- 7.0		2.3	0.6-8.3	
>80						
<b>Sex</b>						
Male	1.3	0.5-3.2	0.377	0.6	0.2-1.7	0.33
Female						
<b>Type of geriatric centre</b>						
Government	0.6	0.2-1.7	0.247	1.6	0.5-5.1	0.395
Non government						
<b>Prior occupation</b>						
Peasants	0.9	0.2-3.7	0.377	0.5	0.1-2.4	0.479
Professionals	0.4	0.8-2.2				
Small business						
<b>History of eye check up</b>						
Yes	0.3	0.1-0.9	0.024	0.32	1.1-8.8	0.027
No						

Among the factors associated with visual impairment, advanced age was associated with higher odds of visual impairment. A history of regular check-ups was also associated with lower odds of developing visual impairment, and this was also statistically significant. Staying in nongovernment geriatric centres was associated with visual impairment, but this was not statistically significant. Additionally, male gender and being a farmer were associated with visual impairment.

### Discussion

Enrolment in geriatric centers differs between countries. The World Health Organization considers old age to be 60 years and above and the United States of America considers old age to be 65 years and above [8-11]. Tanzania uses the WHO definition of elders in which elders are defined from the age of 60 years. Elders

above 60 years and vulnerable are enrolled in geriatric centres. The mean age of the study participants in this study was 75.20 years (SD 9.3), which is consistent with a study that was performed in Hyderabad, India, by [3].

The majority of the study participants (59%) were males. This is inconsistent with the data from the Ministry of Health Community Development Gender Elderly and Children, where the recorded number of males in geriatric centres is high [26]. This finding is different from the findings of other studies performed on ocular morbidity among elderly individuals in geriatric centers, where the percentages of males were below 40%. The observed differences can be due to social cultural issues in the family, such as the death of a female partner, which results in family disintegration and lack of social support [1, 3, 4, 5]. Additionally, in Tanga, most males

were immigrants working in sisal plantations. These were likely to reside in the area of their work and far away from their close relatives, and in old age, it was not possible for them to return to their original homes.

The prevalence of ocular morbidity among elderly individuals in geriatric centres in Tanga and Dar es salaam was 100%. This finding is similar to what was reported in Nepal by [1]. This signifies that there is a need for eye care services in these geriatric centres because eye diseases are age related and increasing age increases the risk of having ocular morbidity.

The proportion of visual impairment among elders in geriatric centres in Tanga and Dar es salaam was 58% using best corrected visual acuity. This finding is higher than what was reported by Dev MK et al in Nepal and Marmamula et al in India[1-6]. The differences can be explained by the fact that, in our study, elders were recruited into geriatric centres without eye check-ups, and there was no protector for regular eye review by eye care professionals. A study by Hanne JE et al in Denmark supported the need for eye exams before entering geriatric centres [20]. Additionally, in our geriatric centres, elders are enrolled based on their visual impairment status, which could also explain the differences.

However, the results are lower than those published by Mashige KP et al in Durban, South Africa [6]. The differences can be explained by the fact that our study utilized Best Corrected Visual Acuity (BCVA), which reduces the number of elderly people with vision impairment. Eye exams performed before admission to geriatric centres have been shown to aid in the early detection of geriatric vision-related issues, with detection rates of 13.8% for cataracts and 6.6% for other eye problems. Before entering a geriatric center, it is critical that all elderly people get their eyes checked [15]. In Tanzanian geriatric centers, refractive error is a common cause of vision impairment among elderly individuals.

The findings of this study showed that 50% of the elders were blind, which is higher than what was reported by and the difference can probably be explained by selection bias. In this study, the criteria for entry into geriatric centres was vulnerability due to visual impairment, and no prior screening was done. It is likely that those who were recruited into the geriatric centres were already blind [8].

Cataracts accounted for 32% of visual impairment in geriatric centers, while glaucoma accounted for 11%. This is consistent with what has been found in many studies in the literature [1,3-6,8,12,19,22,24]. Cataracts are still a common cause of visual impairment among the elderly in geriatric centers. Cataract surgery at geriatric centres or a nearby eye unit in the respective region where eye care services are offered will help to alleviate the burden of visual impairment.

Moreover, myopia was the most common refractive error encountered among elderly individuals in geriatric centers (54.2%). This finding is consistent with other studies, and the high prevalence of myopia could be explained by the high proportion of cataracts, with cataract nuclear sclerosis resulting in myopic shift, which favors myopia as the most common refractive error in this age group.

With refractive correction, there was a 15% reduction in visual impairment. Refractive errors have rendered a large percentage of elderly people visually impaired. The prevalence of visual

impairment is significantly reduced when refractive errors are corrected. This finding is similar to what was reported by Thibault L et al, which indicated that 13.5 percent of elderly people regained normal vision once refractive errors were corrected. To prevent uncorrected refractive errors for distance vision among elders in geriatric centers, regular eye examination and dispensing spectacles are required [22].

### Limitations and Mitigation of the Study

The small number of geriatric centres studied could limit the generalizability of the study findings but given similar entrance criteria and that all residents are elderly, the interclass variation is very small and hence can be representative of all geriatric centres in the country.

### Conclusion

The prevalence of ocular morbidity in geriatric centers is extremely high. More than half of the elders (58%) had visual impairment. Cataracts continue to be a leading cause of ocular morbidity and visual impairment, and advanced age was found to be a major predictor of visual impairment. Further research is needed to explore the barriers to eye care services in geriatric centres [27].

### Recommendations

Primary eye care training for geriatric staff to identify visual impairment and blindness for early referral to eye care facilities. Refraction and provision of spectacles is required to avoid needless uncorrected refractive errors for distant vision among elders in geriatric centres. Ophthalmological assessment should be performed for all elders before enrollment in geriatric centers and appropriate treatment offered to eligible elders at geriatric centers or at the nearby eye unit in the respective region where eye services are offered.

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