



## RESEARCH ARTICLE



## Prevalence and associated factors of vision impairment in Kandahar

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## ARTICLE INFO

## ABSTRACT

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**Background:** This study aims to assess the prevalence, primary causes, and associated factors of visual impairment (VI) among individuals aged 40 years and older at Mirwais Hospital in Kandahar Province, Afghanistan.

**Methods:** The data for this population-based cross-sectional study were collected from 2022 to 2023. The calculated sample size was 301, allocated to urban and rural strata using the probability proportional to size method. Visual impairment (VI) encompasses two components: low vision and blindness. Low vision is defined as visual acuity less than 6/18, while blindness is defined as visual acuity less than 3/60, as measured by the Snellen chart.

**Results:** The study included 301 patients, comprising 145 (48.2%) women and 156 (51.8%) men. The age distribution was as follows: 67 (22.1%) participants were aged 40–50 years, 111 (36.8%) were aged 51–60 years, and 127 (42.1%) were above 60 years. Visual impairment was observed in 159 cases (52.8%) in urban areas and 142 cases (47.2%) in rural areas. The leading causes of visual impairment were cataracts in 144 (47.8%) patients, refractive errors in 68 (22.6%), glaucoma in 37 (12.3%), macular degeneration in 28 (9.3%), and diabetic retinopathy in 24 (8.0%).

**Conclusion:** The prevalence of visual impairment increases notably after the age of 50, particularly among patients with cataracts, followed by those with refractive errors and glaucoma. In conclusion, this research highlights a higher prevalence of visual impairment in patients with cataracts, refractive errors, and glaucoma.



## Introduction

Visual impairment is a term used by experts to describe any form of vision loss, ranging from complete blindness to partial vision loss. While some individuals are entirely blind, others experience partial blindness (4).

Visual impairment encompasses two primary conditions: low vision and blindness. Low vision refers to visual acuity less than 6/18, while blindness is defined as visual acuity less than 3/60, assessed separately for each eye using the Snellen chart (2). Understanding the various causes of low vision and

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blindness is crucial, as some conditions are treatable while others may result in permanent blindness. Early intervention is essential for managing visual impairment and mitigating associated challenges (5).

This condition is more prevalent among individuals over 50 years of age, indicating that its incidence increases with advancing age (4).

The causes of visual impairment (VI) vary across countries. In the United States, the leading causes of blindness include age-related macular degeneration, cataracts, diabetic retinopathy, and glaucoma, whereas cataracts are the most prevalent cause in many other countries (7). Globally, 300–400 million people suffer from VI due to diverse causes, with approximately 50 million experiencing complete blindness. Presbyopia, which affects 826 million individuals worldwide, is a significant contributor to vision loss (8).

Globally, the seven leading causes of blindness are macular degeneration, glaucoma, cataracts, diabetic retinopathy, retinitis pigmentosa, amblyopia, and strabismus (1).

Impaired vision ranges from poor vision to blindness in individuals whose vision cannot be corrected by ordinary glasses, contact lenses, medication, or surgery. People with visual impairment (VI) often have difficulty performing routine activities (3).

Global data reveals that approximately 2.2 billion people have nearsightedness or farsightedness, with one million experiencing treatable visual impairment (VI) (6). Thirty-six percent of VI cases are attributed to refractive errors, and 17 percent to cataracts. While vision loss can occur at any age, it is most prevalent among individuals over 50 years old (7).

In 2020, nearly 2.2 billion people worldwide were reported to have near or distance vision impairment, with almost half of these cases attributed to avoidable causes such as unaddressed refractive errors, cataracts, glaucoma, and diabetic retinopathy (2). Individuals with diabetes are particularly susceptible to these conditions due to the added risk of visual impairment from diabetic retinopathy, as well as an

increased likelihood of developing cataracts, glaucoma, and other ocular disorders (6).

Poor visual perception is commonly defined as blindness, which can be classified and measured using various scales to determine the extent of vision loss. Total blindness refers to the complete absence of visual perception and is clinically recorded as "no light perception" (2). The term blindness is often used to describe severe visual impairment, even when some residual vision remains. Individuals with only light perception can distinguish light from dark and identify the general direction of a light source but lack detailed vision (5).

According to statistics, 285 million people worldwide were visually impaired in 2012, with 246 million cases of low vision and 39 million cases of total blindness. The majority of these cases were in developing countries and predominantly affected individuals over the age of 50. Of these, 15 million cases were attributed to corneal blindness, one of the most common causes of blindness globally, with approximately 30,000 new cases reported annually (1).

The World Health Organization (WHO) has identified various causes of blindness, including diseases such as cataracts, diabetes, and glaucoma, as well as genetic defects, childhood blindness, and eye injuries resulting from accidents. Early symptoms of blindness include cloudy vision, difficulty recognizing shapes, seeing only shadows, poor night vision, and tunnel vision. Blindness can also develop during infancy. Preventive measures, such as regular eye examinations, are critical for early detection and management of eye diseases. For conditions like glaucoma, timely treatment with medication can help prevent blindness. In cases of vision impairment, interventions such as eyeglasses, surgery, or medication may restore vision. For partial blindness that cannot be corrected, adaptive guidance can assist individuals in functioning with limited vision (6, 7).

Globally, the leading causes of visual impairment and blindness include refractive errors, cataracts, diabetic retinopathy, glaucoma, and age-related macular degeneration. Specifically, cataracts contribute to low vision or blindness in 94 million people worldwide,

while macular degeneration affects 8 million, glaucoma affects 7.7 million, and diabetic retinopathy impacts 3.9 million (6).

In 2018, a study was conducted in Jalalabad city and four districts of Nangarhar province, Afghanistan, focusing on individuals aged 50 and above. The study involved 1,281 participants and aimed to identify the prevalence of visual impairment (VI), its primary causes, and associated risk factors. Patients with vision less than 3/60 were categorized as blind, while those with vision less than 6/18 were classified as having low vision. The study found that 22.6% of participants had VI, with 13.9% experiencing low vision and 8.7% classified as blind. The leading cause of VI was cataracts, accounting for 52% of cases, followed by refractive errors at 26.9% and glaucoma at 8.6%. Refractive errors were the primary cause of low vision (42%), followed by cataracts, glaucoma, age-related macular degeneration, and diabetic retinopathy. Notably, 72% of blindness due to cataracts was attributed to posterior capsular opacity, with other causes including glaucoma, refractive errors, and age-related macular degeneration. In terms of gender, the prevalence was slightly higher among males (53.2%) compared to females (46.8%). Age distribution revealed that 26.3% of cases occurred in individuals aged 50–54 years, another 26.3% in those aged 55–59 years, 23.9% in those aged 60–64 years, and 23.5% in individuals aged 65 years and older. Regarding residence, urban participants accounted for 40.6% of cases, while rural participants represented 59.4% (9).

In 2022, a cross-sectional study was conducted in Ethiopia involving 655 patients aged 40 years or older. Of these, 271 were female (41.37%), and 384 were male (58.63%). The age distribution was as follows: 15.42% were aged 40–49 years, 30.69% were aged 50–59 years, 42.14% were aged 60–69 years, and 11.76% were aged 70 years and older (10).

In 2017, a study conducted in Pakistan included 16,507 patients aged 30 years or older. The study revealed that cataracts were the most common cause of blindness, accounting for 51.5% of cases, followed by corneal opacity (11.8%), non-correctable glaucoma (8.6%), glaucoma (7.1%), and posterior capsular opacity (3.6%). Refractive errors were responsible for

43% of vision loss cases, while cataracts accounted for 42% (11).

In 2022, a study conducted in India found that 25% of the population experienced visual impairment (VI), with prevalence increasing with age, particularly among individuals over 45 years. Low near vision accounted for 76.3% of VI cases in the study. Additionally, economic disadvantage was associated with a higher incidence of the condition (16).

Another cross-sectional study in India focused on individuals over 50 years old, revealing a 1.99% prevalence of blindness and 26.68% prevalence of low vision. Causes of blindness included cataracts (66.2%), corneal opacity (8.2%), complications of cataract surgery (7.2%), posterior segment diseases (5.9%) and glaucoma (5.5%) (13).

A cross-sectional study conducted in Sri Lanka in 2017 involved 602 patients aged 40 years or older to investigate the prevalence and risk factors associated with visual impairment (VI). The study found that VI affected males and females almost equally, with an incidence of 49.6% in males and 50.4% in females. Regarding age, the prevalence of low vision increased significantly with age, affecting 36.7% of patients aged 40–59 years and 63.3% of those aged 60 years and older. The study reported that 21.3% of patients had VI, with 19.6% experiencing low vision and 1.7% classified as blind. Treatment success rates for VI were recorded at 11%, with 8.3% achieving vision correction and 1.7% achieving correction for blindness (14).

In India, a study on individuals aged 40 years and older assessed the prevalence of visual impairment (VI) and blindness across different age groups, genders, and rural versus urban residences. The study found a nearly equal prevalence among men and women. By age group, the prevalence was 20.4% for ages 40–49 years, 30.8% for ages 50–59 years, 30.9% for ages 60–69 years, and 17.9% for ages 70 years and older. Urban areas showed a higher prevalence of VI compared to rural areas, accounting for 62.3% and 37.7%, respectively (12).

In the United States, a 2022 study focused on individuals over 50 years old and demonstrated an

increasing incidence of visual impairment (VI) with advancing age. The study highlighted age-related declines in both near and distant vision. Individuals with lower education levels or economic disadvantages exhibited higher rates of VI and blindness, with the incidence reported as 42.5% in males and 57.5% in females (15).

## Materials and Methods

This was a hospital-based descriptive cross-sectional study conducted at Mirwais Regional Hospital in Kandahar from February 2022 to February 2023. A total of 301 patients with visual impairment (low vision or blindness) were included in the study. The study population consisted of males and females aged 40 years or older residing in Kandahar. Patients living in other provinces or those younger than 40 years were excluded.

A structured questionnaire, developed from a literature review, was used to collect the data. Visual acuity was assessed using Snellen's chart. A well-lit area with good daylight was selected for the test. The Snellen's chart was positioned at eye level in a location with adequate natural light. The participant sat six meters away from the chart, with each eye tested separately. One eye was covered with a hand while the visual acuity of the other eye was assessed, starting with the largest letter and proceeding to the smallest. The participant was asked to identify each letter on the line being presented and communicate it to the data collector. The process continued with progressively smaller letters until the participant could no longer read them. The smallest line that the participant could read successfully was recorded. If the participant was unable to read the topmost line at six meters, the distance was reduced to three meters, and their ability to read was reassessed. Visual acuity was tested for each eye separately. Two medical undergraduates were trained to administer the questionnaire and perform visual acuity tests using Snellen's chart and a pinhole test.

The visual acuity of the better-seeing eye refers to the eye with the better visual acuity. The WHO definition of visual impairment was used, based on presenting vision. Using the Snellen's chart, a visual acuity of 6/6 to 6/18 in the better eye was considered normal vision.

A visual acuity of less than 6/18 in the better eye was classified as visual impairment, which was further divided into two groups. Low vision was defined as a visual acuity ranging from 6/18 to 3/60 in the better eye, and blindness was defined as a visual acuity of less than 3/60 in the better eye. Best corrected visual acuity refers to the visual acuity in the better eye achieved after testing with a pinhole.

All patients who met the age and vision criteria were included as cases in this study.

### **Ethical consideration , patients privacy and confidentiality:**

Ethical approval was obtained from the Research Committee of Kandahar University. After providing all relevant information about the study, written informed consent was obtained from all participants. Contact information of the respondents was not collected for this study. The data collected was used solely for this study and will not be used for any commercial or non-commercial purposes. Participants had the right to withdraw from the study at any time without any consequences.

## Results

It was found that out of 301 cases of visual impairment (VI), 156 (51.8%) were male. Among them, 103 (34.3%) had low vision, and 53 (17.5%) were blind. Additionally, 145 (48.2%) were female, of whom 98 (32.7%) had low vision, and 47 (15.5%) were blind, as depicted in the figure below:

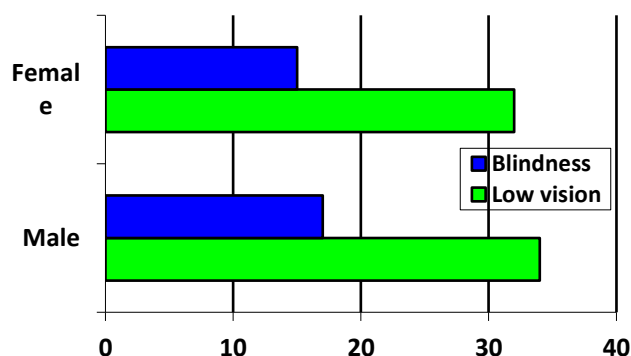


Figure 1. Prevalence of low vision and blindness in male and female patients

From the figure provided, it is evident that both males and females in this study are equally affected by visual impairment (VI), but the incidence of low vision is

higher than that of blindness. This is further explained in the following table:

Table 1. Shows prevalence of low vision and blindness in male and female

SEX	NUMBER OF PATAINTS	LOW VISION WITH PERCETAGE	BLINDNESS WITH PERCENTAGE
MALE	156(51,8%)	103(34,3%)	53(17,5%)
FEMALE	145(48,2%)	98(32,7%)	47(15,5%)

Regarding age, visual impairment predominantly occurs at age fifty, with further increases in prevalence beyond fifty years, as illustrated in the following figure.

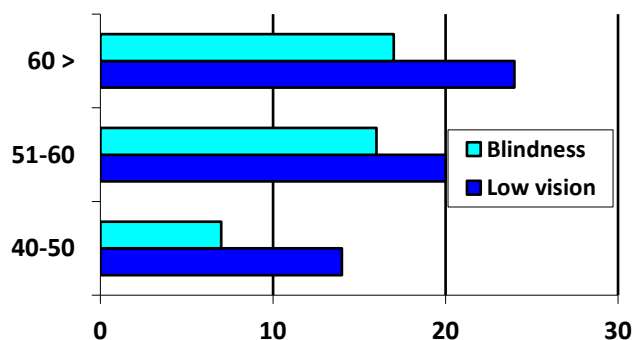


Figure 2. Prevalence of low vision and blindness in different ages

In this study, the number of patients aged 40-50 is 67 (22.1%), of whom 44 patients (14.5%) have low vision and 23 patients (7.6%) are blind. The number of patients aged 51-60 is 111 (36.8%), with 62 patients (20.7%) having low vision and 48 patients (16.1%) being blind. The number of patients older than 60 is 127 (42.1%), of whom 75 patients (24.9%) have low vision and 52 patients (17.2%) are blind. For a clearer presentation, please refer to the following table:

Table 2. Shows prevalence of low vision and blindness in different ages

Age on year	Number of patients with percentage	Low vision with percentage	Blindness with percentage
40-50	67(22.1%)	44(14.5%)	23(7.6%)
51-60	111(36.8%)	62(20.7%)	49(16.1%)
60>	127(42.1%)	75(24.9%)	52(17.2%)

The cases of low vision and blindness are almost equal in urban and rural areas, with low vision cases being more prevalent than blindness. In this study, 159 (52.8%) cases were from urban areas, of which 101 cases (33.4%) had low vision and 58 cases (19.4%) were blind. Additionally, 142 (47.1%) cases were from rural areas, including 94 cases (31.2%) with low vision and 48 cases (15.9%) with blindness. This is clearly shown in the following figure.

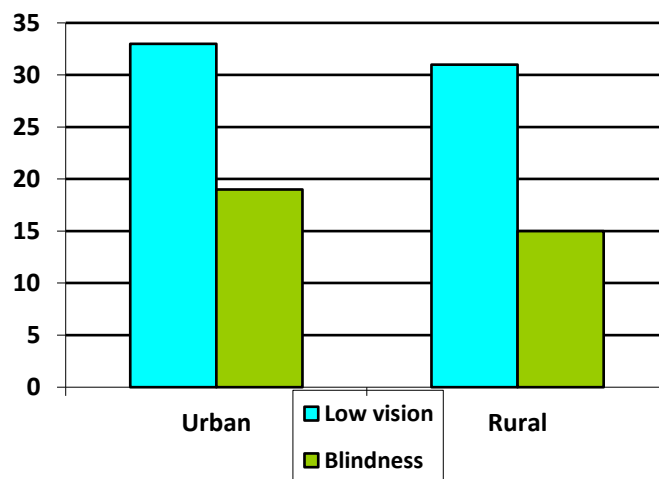


Figure 3. Prevalence of low vision and blindness among urban and rural area

The incidence of low vision is higher than that of blindness. Additionally, the disease shows nearly equal prevalence among urban and rural populations. In this study, we found that 144 (47.7%) patients had cataracts, 68 (22.5%) had refractive errors, 37 (12.4%) had glaucoma, 28 (9.3%) had macular degeneration, and 24 (8.1%) had diabetic retinopathy.

Table 3. Shows prevalence of causes of low vision and blindness

Causes of VI	Number of patients with percentage	Low vision with percentage	Blindness with percentage
Cataract	144(47.7%)	88(29.4%)	55(18.3%)
Refractive error	68(22.5%)	36(12%)	32(10.5%)
Glaucoma	37(12.4%)	22(7.3%)	15(5.1%)
Age-related macular-degeneration	28(9.3%)	16(5.2%)	13(4.2%)
Diabetic retinopathy	24(8.1%)	12(4.1%)	12(4%)

### Discussion

The results of this study shows that the prevalence of visual impairment (VI) increases in Kandahar province after the age of 50. VI encompasses two types: low vision and blindness. This study also revealed that cataracts are the primary cause of VI, followed by refractive error, glaucoma, age-related macular degeneration, and diabetic retinopathy, which play a minor role in its occurrence.

The study indicated that 51.8% of VI cases were male, among whom 43.3% had low vision and 17.5% were blind, while 48.2% were female, with 32.7% having low vision and 15.5% being blind. A study in Nangarhar province showed a male prevalence rate of 53.2% and a female prevalence rate of 46.8% for this disease, indicating nearly similar figures between Kandahar and Nangarhar provinces (9). Comparatively, a study in Sri Lanka reported a male prevalence rate of 49.6% and a female rate of 50.4%, suggesting no significant difference (14). In India, a study on VI indicated that the male prevalence rate was 55.5% and the female rate was 44.5%, with a slightly higher prevalence observed among males. This could be attributed to differences in patient visits and disease prevalence between Afghanistan and India (12).

A study in Ethiopia showed a male prevalence rate of 58.63% and a female prevalence rate of 41.37% for this disease, indicating nearly similar figures between

Kandahar province and Ethiopia (10). Furthermore, comparing our findings with research from the United States, where the male prevalence rate was 42.5% and the female rate was 57.5%, reveals a notable difference. This disparity may reflect varying disease prevalence between Afghanistan and the United States (15).

From an age perspective, analyzing the research data reveals that the incidence of this disease begins after the age of 40, with an increase in incidence observed after 50 years of age: 22.1% for 40-50 years, 36.8% for 51-60 years, and 42.1% for those above 60 years. Comparing with research conducted in Nangarhar province, which showed 26.3% for 50-54 years, 26.3% for 55-59 years, 23.9% for 60-64 years, and 23.5% for those 65 years and older, there is slight variation. The incidence of the disease decreases in the age group above 60 in Nangarhar, whereas in our study it increases. This discrepancy could be due to factors such as not all patients visiting doctors or some patients facing economic challenges (9). In comparison with a study from Ethiopia, where the percentages were 15.42% for 40-49 years, 30.69% for 50-59 years, 42.14% for 60-69 years, and 11.76% for those over 70 years, our data shows a decrease, possibly due to higher mortality in older age groups (10). Similarly, research from India reports 20.4% for 40-49 years, 30.8% for 50-59 years, 30.9% for 60-69 years, and 17.9% for those 70 years and older, aligning closely with our findings, which may suggest similar disease pathology in both countries (12).

In terms of place of residence, this study found an urban percentage of 52.8% and a rural percentage of 47.1%. A study conducted in India in 2024 reported an urban percentage of 62.3% and a rural percentage of 37.7%. The difference in these figures could be attributed to differing health profiles between India and Afghanistan or potential variations in patient participation rates (12). Research in Nangarhar province showed an urban percentage of 40.6% and a rural percentage of 59.4%, indicating a different distribution due to variations in the study populations (9).

In this study, the main causes of visual impairment (VI) were cataracts (47.7%), refractive errors (22.5%),

glaucoma (12.4%), age-related macular degeneration (9.3%), and diabetic retinopathy (8.1%). Similarly, research in Nangarhar province identified cataracts as the primary cause of VI (52.8%), followed by refractive errors (26.9%) and glaucoma (8.6%). These similarities suggest that both studies, conducted within the same country, likely yielded comparable results (9).

In Pakistan, the main cause of VI is also cataracts (51.5%), with glaucoma accounting for 7.1%. These results are similar to those found in the study conducted in Kandahar (11). A study in India showed that cataracts are the primary cause of VI (66.2%), with glaucoma accounting for 5.5%. These findings show some similarities, possibly due to similar pathology of the disease in both countries (13).

### Conclusion

The prevalence of visual impairment (VI) is notably higher among individuals with cataracts, particularly those over 50 years of age. Cataracts, along with refractive errors, glaucoma, age-related macular degeneration, and diabetic retinopathy, are significant contributors to the development of this condition. Further research in other provinces could provide additional insights and help reduce the prevalence of this disease.

At the conclusion of this review, I propose the following recommendations to colleagues, fellow citizens, and officials:

- Given that cataracts are a leading cause of VI, especially among older individuals, regular visits to an eye doctor for information and guidance are crucial.
- Addressing refractive errors, another major cause of VI, requires consultation with an eye specialist for the appropriate prescription of glasses or lenses. Regular eye pressure checks are essential for managing glaucoma, and individuals with diabetes should prioritize effective diabetes management.
- Emphasize overall hygiene, particularly eye hygiene.
- Use media platforms, such as radio, television, Facebook, and WhatsApp, to disseminate health information about VI.

- Ensure comprehensive diagnostic and treatment facilities for VI at Mirwais Hospital, Kandahar Noor Hospital, and private clinics in Kandahar.

### Declaration of interest

The authors declare no competing interest.

### Author contribution

All of the authors contributed equally.

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### Data sharing statement

Data supporting the findings and conclusions are available upon request from corresponding author.

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