

## Vision-Related Quality of Life in Patients with Keratoconus at Zagazig University Hospitals

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### Abstract

The most prevalent corneal ectatic condition is keratoconus (KC). It is characterized by a thin, cone-shaped cornea that causes myopia, uneven astigmatism, and visual impairment. The goal of this study was to evaluate vision-related quality of life in keratoconus patients at Zagazig University Hospitals. In this study, a descriptive design was adopted. The research was carried out in the Zagazig University Hospitals' Ophthalmology outpatient clinics. A self-administered questionnaire based on the National Eye Institute Visual Functioning Questionnaire – 25 (VFQ-25) was used to measure the visual functioning of 54 male and female patients. The findings revealed that 42.6 percent of the sample were between the ages of 31 and 40, that almost three-fifths of the research sample (59.3%) were male and employed, that 63 percent were married, and that 83.3 percent were nonsmokers. The findings also demonstrated that patients with Keratoconus score had highly statistically significant variations in age, educational level, employment, smoking, and total visual quality of life ( $P < 0.001$ ). The study concluded that Keratoconus has a negative effect on the majority of patients' vision-related quality of life. It was suggested that all nurses be trained on effective intervention for patients with keratoconus in order to improve their eyesight standard of living.

**Keywords:** Vision-Related standard of living, Keratoconus, Patients.

### Introduction

Keratoconus is a progressive corneal ectasia characterized by corneal thinning and weakness, resulting in uneven astigmatism, refractive myopia, and reduced vision due to corneal scarring and a cone-like appearance (Zhao et al., 2019). Atopic illness or allergy affects a large percentage of keratoconic individuals, who touch their eyes often as a result. (Bral & Termote, 2017).

The conical shape of the cornea is caused by non-inflammatory thinning of the corneal stroma, which typically encompasses the central 2/3 of the cornea, with the temporal inferior paracentral zone being more commonly involved, resulting in a corneal protrusion, which leads to myopic shift and high irregular astigmatism. Depending on the degree and position of the protrusion, this uneven astigmatism causes mild to severe distortion and visual impairment (Omer, 2018).

Keratoconus pathogenesis may be influenced by both environmental and genetic factors. Eye rubbing, atopy, UV exposure, and geography are just a few examples of environmental influences. A significant number of genes have been found in a very short period of time. The discovery of the exact molecular mechanism behind KC pathogenesis will help to

expand our understanding of the disease and aid in the development of viable treatments (Gordon-Shaag et al., 2015).

Curvature-based topography (also known as Placido-based topography, i.e. videokeratography) is a traditional method for diagnosing keratoconus, while elevation-based topography is a newer method that has gained attention recently. Other techniques were used to analyze keratoconus cornea include corneal biomechanics and wave front sensing (Shi, 2016).

High myopia, uneven astigmatism, and corneal scarring cause serious vision loss in the later stages of the condition. The condition can lead to corneal transplantation in 12–20 percent of instances (Mohammadpour et al., 2018).

Treatment options are usually determined by the severity and progression of the condition. In people with minor types of the condition, spectacles and contact lenses may give acceptable visual acuity; but, in severe situations, transplant treatments will be the greatest choice for visual rehabilitation. Collagen cross-linking may be the most convenient alternative for individuals if the problem looks to be progressing (Hodge et al., 2015).

In situations with progressive keratoconus, the degree of vision severely deteriorates and continues to reduce over time, resulting in a worsened quality of life (QoL). The National Eye Institute Visual Functioning Questionnaire 25 is a questionnaire that measures vision-related quality of life and the impact of poor eyesight on everyday activities. The overall vision, mental health, social position, peripheral, and color vision subscales of this 25-item examination are used to estimate quality of life (Penbe et al., 2018).

Preoperatively, the nurse informs the patient about the operation procedure and discusses his options, as well as inspecting the eyes for symptoms of infection. Antibiotic therapy, changing eye patches, measuring intraocular pressure to avoid it rising, assessing pain and administering moderate analgesics, and increasing patient comfort and spatial orientation are all part of postoperative care (Pagkratis et al., 2016).

### Significance of the study

Keratoconus prevalence varies by region, with estimates ranging from 1/500 to 1/2000 instances globally (Najmi et al., 2019). Adult vision-related quality of life has long-term consequences, including profession, survival, and social integration. Keratoconus patients' visual symptoms vary greatly depending on the stage of the disease and can range from minor to severe vision impairment, with a major impact on health-related quality of life. Panthier et al. (Panthier et al., 2020). As a result, the purpose of this study was to determine how individuals with keratoconus felt about their quality of life.

### Aim of this study:

The goal of this study was to evaluate vision-related quality of life in keratoconus patients at Zagazig University Hospitals.

### Research Question

What impact does keratoconus have on patients' vision-related standard of living?

### Subjects and Methods

#### Research design:

- A comprehensive research approach was used with a group of Keratoconus patients.

- Describing research is used to describe the facts and features of a certain population or area of interest in a consistent and exact manner (Dulock, 1993).

#### Setting:

This research was carried out at the ophthalmology outpatient clinic on the second floor of Zagazig University Hospitals' outpatient clinics.

#### Sample

The Outpatient Clinic of Ophthalmology at Zagazig University Hospital gathered a convenience sample of 54 individuals with Keratoconus diagnoses.

- Sample size =  $[(Z1-\alpha/2)2.P(1-P)]/d2$ , sample size =  $[(1.96)2.(0.862).(1-0.862)]/(0.092)2 = 53.9$ .
- The sample size required for the investigation is 54, according to the calculation.
- Data Collection Instruments To achieve the study's goal, two data gathering technologies were used:

**Patient Assessment Sheet (Tool D):** It was created by scholars using current national and international literatures, and it is divided into two sections:

**Part 1:** Demographic information about the patient:

Age, sex, marital status, educational level, employment, smoking, income level, and domicile are among the (8) elements used to analyze demographic patient data.

**Part 2:** Examining the medical history of the patient: It has five items: which eye is affected, whether or not you're using a visual aid, your visual acuity, your family's history of sickness, and whether or not you're rubbing your eyes.

The National Eye Institute's Visual Functioning Questionnaire is a useful tool (II).

**Mangione et al. (2001)** created it to measure the vision-related quality of life of keratoconus patients. It is made up of 25 pieces and is separated into three sections:

**Part 1** contained four things, part 2 contained twelve, and part 3 contained nine.

### Scoring system

The National Eye Institute Visual Functioning Questionnaire included 25 items, separated into three parts: part 1), general health and vision, which had four things; part 2), difficulty with activities, which had 12 items; and part 3), reactions to visual difficulties, which had nine items. The total score is the sum of the 25 items' scores. There are no right or wrong answers. The response that appears to be the most descriptive of you.

### Methods of data collection

This study was conducted in the following manner:

#### Content validity

A team of five professionals from the disciplines of medicine and medical-surgical nursing reviewed and evaluated the tools, and changes were made based on their recommendations.

#### The dependability of the tools

The reliability test was conducted using Cronbach's Alpha, and the instruments proved to be trustworthy, particularly the National Eye Institute Visual Functioning Questionnaire Scale ( $r=0.84$ ).

#### Pilot study

A pilot sample of 10% (5) of patients was provided prior to the commencement of the main trial to assess the feasibility and usability of the study tool. Those who participated in the pilot study were excluded from the main investigation. Modifications were made to the study tools as needed in order for them to be used.

#### Fieldwork

The definite fieldwork started from March 2021 to November 2021. A formal letter was obtained upon a letter for acceptance issued from the Faculty of Nursing to the directors of Outpatient Clinics of Ophthalmology in Zagazig University Hospitals to approve conduction of this study. The researchers highlighted strongly that the information collected would be used for scientific research only, and confidentiality will be assured. The participants filled in the questionnaire. From the beginning of March 2021 to the end of November 2021, data was gathered for nine months. The trial was conducted for all available patients in the morning and afternoon shifts until 1.30 p.m. At the initial interview, the researchers introduced

themselves to begin communication, explained the nature and purpose of the study to patients who agreed to participate, and filled out the questionnaire tools (2) to assess the patients' demographic data, medical history of disease, and visual questioning questionnaire. The questionnaire took between 20 and 30 minutes to complete.

#### Administrative and ethical considerations

The Dean of the Faculty of Nursing sent an official letter to the Head of the Outpatient Clinic of Ophthalmology at Zagazig University Hospitals, requesting permission to conduct the study. Every patient who accepted to participate in the trial gave verbal consent to the researchers. Study participants were told that they had the right to refuse to participate in the study and/or withdraw without giving a reason.

#### Statistical Design

Using Microsoft Excel software, data from the prior tools and outcome measures were coded, input, and evaluated. For analysis, the data was imported into the Statistical Package for the Social Sciences (SPSS) version 20.0. Numbers and percentages are used to express qualitative data. The Chi-square test was used to look for differences and connections between qualitative variables (X<sup>2</sup>). The t-test was used to determine the difference between quantitative independent groups, and Pearson's correlation was used to determine correlation.

#### Results

**Table (1):** reveals that 42.6% of studied patients aged from 31 – < 41 years, with a mean age of 34.5 ±8.0, 59.3% was male, 63% of them were married and 46.3% got university degree. The majority of the patients (83.3%) were non smokers. The highest percentage of respondents (75.9%) was living in rural area and 72.2% of them had insufficient income.

**Table (2):** indicates that 83.3% of the studied patients had keratoconus in both eyes, the majority of them (88.9%) were rubbing their eyes, and 53.7% of them had low visual acuity in the right eye and 51.9% didn't have family history of the disease.

**Table (3):** shows that, 42.6% of studied patients told that using their eyesight, both eyes are fair at the present time. Moreover 44.4% of them are worried some of the time about their

eye sight, and 53.7% of them had moderate pain in and around their eyes.

**Table (4a):** 42.6 percent of the research participants reported considerable trouble reading standard type in newspapers, while 63 percent had significant difficulty reading street signs or business names, and 40.7 percent of respondents had ceased attending to movies, plays, or sporting events for various reasons.

**Table (4b):** According to the findings, 46.3 percent of the research participants had great trouble going down steps, stairs, or curbs in poor light or at night, and 44.4 percent had extreme difficulty detecting items off to the side when walking.

**Table (5a):** According to the findings, 38.9% of research participants said their eyesight limited them most of the time when working or doing other tasks, and 33.3 percent of them reported pain or discomfort in or around their eyes at least some of the time.

**Table (5b):** According to the findings, 40.7 percent of the study sample said they were

frustrated a lot of the time because of their eyesight, 46.3 percent said they needed a lot of help from others because of their eyesight, and 42.6 percent said they were worried about doing things that would embarrass themselves or others because of their eyesight.

**Table (6):** There were highly statistically significant relationships between demographic parameters of keratoconus patients and overall health, trouble with activities, and visual impairments, as shown in.

**Table (7):** There were highly statistically significant relationships between the medical history of keratoconus patients and overall health, trouble with activities, and visual impairments, according to the study.

**Table (8)** shows that age, educational level, employment, smoking habits, income level, and total visual quality of life of keratoconus patients have highly statistically significant relationships ( $P < 0.001$ ).

**Table 1:** Shows the frequency distribution of demographic characteristics of keratoconus patients (n=54).

Items	No	%
<b>Age</b>		
20 – < 31	20	37.0
31 – < 41	23	42.6
41 – 50	11	20.4
Mean $\pm$ SD	34.5 $\pm$ 8.0	
<b>Sex</b>		
Male	32	59.3
Female	22	40.7
<b>Marital status</b>		
Single	20	37.0
Married	34	63.0
<b>Educational level</b>		
Secondary degree	20	37.0
Institute	9	16.7
University degree	25	46.3
<b>Occupation</b>		
Unemployed	23	42.6
Employed	31	57.4
<b>Smoking habit</b>		
Yes	9	16.7
No	45	83.3
<b>Income level</b>		
Sufficient	15	27.8
Insufficient	39	72.2
<b>Residence</b>		
Urban	13	24.1
Rural	41	75.9

**Table 2:** Medical History of Keratoconus Patients (n=54): Frequency Distribution

Items	No	%
<b>Which eye is involved?</b>		
Right	9	16.7
Both	45	83.3
<b>Are you using visual aid?</b>		
Glasses	27	50.0
Rigid contact lens	7	13.0
None	20	37.0
<b>Visual acuity</b>		
Right eye	29	53.7
Left eye	25	46.3
<b>Family's disease history</b>		
Yes	26	48.1
No	28	51.9
<b>Eye rubbing</b>		
Yes	48	88.9
No	6	11.1

**Table (3):** Frequency Distribution of General Health and Vision of the Patients with Keratoconus (n=54)

Items	No	%
<b>1. In general, would you say your overall health is</b>		
Very Good	4	7.4
Good	11	20.4
Fair	21	38.9
Poor	18	33.3
<b>2. At the present time, would you say your eyesight using both eyes are:</b>		
Excellent	7	13.0
Good	11	20.4
Fair	23	42.6
Poor	9	16.7
Very poor	4	7.4
<b>3. How much of the time do you worry about your eyesight?</b>		
Some of the time	24	44.4
Most of the time	18	33.3
All of the time	12	22.2
<b>4. How much pain or discomfort have you had in and around your eyes?</b>		
None	7	13.0
Mild	4	7.4
Moderate	29	53.7
Severe	9	16.7
Very severe	5	9.3

**Table (4 a):** Frequency Distribution of Difficulty with Activities among Patients with Keratoconus (n=54)

Items	No difficulty at all		A little difficulty		Moderate difficulty		Extreme difficulty		Stopped doing this because of your eyesight		Stopped doing this for other reasons or not interested in doing this	
	No	%	No	%	No	%	No	%	No	%	No	%
How tough is it for you to read regular print in newspapers?	7	13.0	5	9.3	23	42.6	12	22.2	7	13.0	0	0.0
How difficult is it for you to undertake job or pastimes that need you to be able to see well up close?	4	7.4	16	29.6	13	24.1	14	25.9	7	13.0	0	0.0
How difficult do you find it to understand street signs or business names?	4	7.4	7	13.0	4	7.4	34	63.0	5	9.3	0	0.0
How difficult is it for you to observe how people react to what you say because of your vision?	11	20.4	10	18.5	16	29.6	14	25.9	3	5.6	0	0.0
How difficult is it for you to visit people in their homes, at parties, or in restaurants because of your vision?	9	16.7	9	16.7	11	20.4	14	25.9	7	13.0	4	7.4
How tough is it for you to attend to movies, plays, or sporting events because of your vision?	4	7.4	0	0.0	9	16.7	9	16.7	10	18.5	22	40.7

**Table (4b):** Frequency Distribution of difficulty with activities among the patients with keratoconus (n=54)

Items	No difficulty at all		A little difficulty		Moderate difficulty		Extreme difficulty		Stopped doing this because of your eyesight	
	No	%	No	%	No	%	No	%	No	%
How difficult is it for you to find something on a crowded shelf because of your vision?	5	9.3	9	16.7	21	38.9	19	35.2	0	0.0
How difficult is it for you to descend down steps, stairs, or curbs in weak light or at night because of your eyesight?	0	0.0	9	16.7	15	27.8	25	46.3	5	9.3
How difficult is it for you to notice objects off to the side while you're walking because of your eyesight?	5	9.3	0	0.0	18	33.3	24	44.4	7	13.0
How tough is it for you to pick out and coordinate your own clothes because of your vision?	14	25.9	18	33.3	12	22.2	10	18.5	0	0.0

**Table (5a):** Frequency Distribution of Responses to Vision Problems Among the Patients with Keratoconus (n=54).

Items	All of the time		Most of the time		Some of the time		A little of the time		None of the time	
	No	%	No	%	No	%	No	%	No	%
Do you accomplish less than you would like because of your vision?	14	25.9	16	29.6	11	20.4	9	16.7	4	7.4
Is your eyesight limiting the amount of time you can work or conduct other activities?	14	25.9	21	38.9	11	20.4	0	0.0	8	14.8
How much does pain or discomfort in or around your eyes, such as burning, itching, or hurting, prevent you from performing the things you want to do?	11	20.4	11	20.4	18	33.3	7	13.0	7	13.0

**Table (5b):** Frequency Distribution of Responses to Vision Problems Among the Patients with Keratoconus (n=54).

Items	Definitely True		Mostly True		Not sure		Mostly False		Definitely False	
	No	%	No	%	No	%	No	%	No	%
Because of my vision, I spend the most of my time at home.	14	25.9	21	38.9	9	16.7	0	0.0	10	18.5
Because of my poor vision, I am frequently annoyed.	19	35.2	22	40.7	7	13.0	6	11.1	0	0.0
I have to rely too much on what other people tell me because of my vision.	11	20.4	19	35.2	9	16.7	11	20.4	4	7.4
Because of my vision, I require a great deal of assistance from others.	9	16.7	25	46.3	11	20.4	0	0.0	9	16.7
Because of my vision, I am concerned about doing things that would disgrace myself or others.	15	27.8	23	42.6	11	20.4	0	0.0	5	9.3

**Table (6):** Association Between Demographic Characteristics of the Patients with General health, Difficulty with Activities, Vision Problems.

Items	General health score	difficulty with activities score	Mean $\pm$ SD	vision problems score	Mean $\pm$ SD
	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	
<b>Age</b>					
20 – < 31	9.9 $\pm$ 2.1	12.7 $\pm$ 4.6	8.4 $\pm$ 2.3	4.1 $\pm$ 1.4	6.6 $\pm$ 1.8
31 – <41	14.4 $\pm$ 1.2	23.0 $\pm$ 2.3	13.5 $\pm$ 1.4	8.0 $\pm$ 1.4	12.0 $\pm$ 1.7
41 – 50	18.8 $\pm$ 1.0	28.9 $\pm$ 1.7	17.0 $\pm$ 1.1	13.5 $\pm$ 1.7	20.9 $\pm$ 2.5
ANOVA test	F=119.968, P<0.001	F=99.925, P<0.001	F=95.945, P<0.001	F=151.461, P<0.001	F=198.641, P<0.001**
<b>Sex</b>					
Male	11.3 $\pm$ 2.5	15.8 $\pm$ 5.5	9.9 $\pm$ 2.7	5.2 $\pm$ 1.8	8.2 $\pm$ 2.6
Female	17.0 $\pm$ 2.2	27.0 $\pm$ 2.4	15.9 $\pm$ 1.4	11.3 $\pm$ 2.6	17.0 $\pm$ 4.4
t-test	t=8.683, P<0.001	t=9.058, P<0.001	t=9.383, P<0.001	t=10.250, P<0.001	t=9.279, P<0.001**

Items	General health score	difficulty with activities score	Mean $\pm$ SD	vision problems score	Mean $\pm$ SD
	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD	
<b>Marital status</b>					
Single	9.9 $\pm$ 2.1	12.7 $\pm$ 4.6	8.4 $\pm$ 2.3	4.1 $\pm$ 1.4	6.6 $\pm$ 1.8
Married	15.8 $\pm$ 2.4	24.9 $\pm$ 3.5	14.6 $\pm$ 2.1	9.8 $\pm$ 3.0	14.9 $\pm$ 4.7
t-test	t=9.212, P<0.001	t=11.030, P<0.001	t=10.222, P<0.001	t=8.160, P<0.001	t=7.547, P<0.001**
<b>Educational level</b>					
Secondary degree	9.9 $\pm$ 2.1	12.7 $\pm$ 4.6	8.4 $\pm$ 2.3	4.1 $\pm$ 1.4	6.6 $\pm$ 1.8
Institute	13.6 $\pm$ 0.5	20.7 $\pm$ 0.7	12.2 $\pm$ 1.0	6.8 $\pm$ 0.4	10.7 $\pm$ 1.3
University degree	16.6 $\pm$ 2.3	26.4 $\pm$ 2.8	15.5 $\pm$ 1.6	10.9 $\pm$ 2.7	16.4 $\pm$ 4.5
ANOVA test	F=61.953, P<0.001	F=91.563, P<0.001	F=83.240, P<0.001	F=63.031, P<0.001	F=48.088, P<0.001**
<b>Occupation</b>					
Unemployed	10.3 $\pm$ 2.2	13.6 $\pm$ 5.0	8.7 $\pm$ 2.3	4.3 $\pm$ 1.5	7.2 $\pm$ 2.3
Employed	16.1 $\pm$ 2.3	25.4 $\pm$ 3.3	15.0 $\pm$ 1.8	10.1 $\pm$ 2.9	15.2 $\pm$ 4.7
t-test	t=9.244, P<0.001	t=10.458, P<0.001	t=11.100, P<0.001	t=8.765, P<0.001	t=7.532, P<0.001**
<b>Smoking habit</b>					
Yes	8.0 $\pm$ 1.2	8.4 $\pm$ 2.4	6.3 $\pm$ 1.6	3.0 $\pm$ 0.0	5.0 $\pm$ 0.0
No	14.8 $\pm$ 2.9	22.8 $\pm$ 5.1	13.5 $\pm$ 2.7	8.6 $\pm$ 3.4	13.2 $\pm$ 5.1
t-test	t=6.933, P<0.001	t=8.275, P<0.001	t=7.631, P<0.001	t=4.922, P<0.001	t=4.766, P<0.001**
<b>Income level</b>					
Sufficient	9.1 $\pm$ 1.7	10.7 $\pm$ 3.6	7.5 $\pm$ 2.0	3.4 $\pm$ 0.8	5.7 $\pm$ 1.0
Insufficient	15.4 $\pm$ 2.5	24.1 $\pm$ 4.0	14.2 $\pm$ 2.3	9.3 $\pm$ 3.0	14.1 $\pm$ 4.8
t-test	t=8.959, P<0.001	t=11.386, P<0.001	t=9.831, P<0.001	t=7.371, P<0.001	t=6.727, P<0.001**
<b>Residence</b>					
Urban	8.8 $\pm$ 1.6	9.9 $\pm$ 3.1	7.2 $\pm$ 1.8	3.2 $\pm$ 0.4	5.5 $\pm$ 0.8
Rural	15.2 $\pm$ 2.6	23.7 $\pm$ 4.2	14.0 $\pm$ 2.4	9.1 $\pm$ 3.1	13.8 $\pm$ 4.9
t-test	t=8.262, P<0.001	t=10.796, P<0.001	t=9.291, P<0.001	t=6.807, P<0.001	t=6.121, P<0.001**

**Table (7):** Association Between the medical history of the patients with general health, difficulty with activities, vision problems

	General health score Mean $\pm$ SD	difficulty with activities score Mean $\pm$ SD	Mean $\pm$ SD	vision problems score Mean $\pm$ SD	Mean $\pm$ SD
<b>Which eye is involved?</b>					
Right	8.0 $\pm$ 1.2	8.4 $\pm$ 2.4	6.3 $\pm$ 1.6	3.0 $\pm$ 0.0	5.0 $\pm$ 0.0
Both	14.8 $\pm$ 2.9	22.8 $\pm$ 5.1	13.5 $\pm$ 2.7	8.6 $\pm$ 3.4	13.2 $\pm$ 5.1
t-test	t=6.933, P<0.001	t=8.275, P<0.001	t=7.631, P<0.001	t=4.922, P<0.001	t=4.766, P<0.001**
<b>Using visual aid</b>					
Glasses	10.8 $\pm$ 2.4	14.7 $\pm$ 5.3	9.3 $\pm$ 2.6	4.7 $\pm$ 1.7	7.7 $\pm$ 2.5
Rigid contact lens	14.0 $\pm$ 0.1	22.1 $\pm$ 1.1	13.3 $\pm$ 0.5	7.6 $\pm$ 0.5	11.1 $\pm$ 1.1
None	17.3 $\pm$ 2.1	27.4 $\pm$ 2.2	16.1 $\pm$ 1.4	11.7 $\pm$ 2.5	17.6 $\pm$ 4.3
ANOVA test	F=54.102, P<0.001	F=58.006, P<0.001	F=63.711, P<0.001	F=73.064, P<0.001	F=54.432, P<0.001**
<b>Visual acuity</b>					
Right eye	11.0 $\pm$ 2.4	15.1 $\pm$ 5.4	9.6 $\pm$ 2.7	4.9 $\pm$ 1.7	7.9 $\pm$ 2.5
Left eye	16.6 $\pm$ 2.3	26.4 $\pm$ 2.8	15.5 $\pm$ 1.6	10.9 $\pm$ 2.7	16.4 $\pm$ 4.5
t-test	t=8.687, P<0.001	t=9.503, P<0.001	t=9.663, P<0.001	t=9.817, P<0.001	t=8.667, P<0.001**
<b>+ve Family History</b>					
Yes	10.7 $\pm$ 2.3	14.5 $\pm$ 5.2	9.2 $\pm$ 2.5	4.7 $\pm$ 1.6	7.6 $\pm$ 2.5
No	16.4 $\pm$ 2.3	25.9 $\pm$ 3.1	15.3 $\pm$ 1.7	10.5 $\pm$ 2.8	15.7 $\pm$ 4.7
t-test	t=8.964, P<0.001	t=9.779, P<0.001	t=10.325, P<0.001	t=9.115, P<0.001	t=7.722, P<0.001**

**Table (8):** Association Between the Demographic Characteristics and Total Visual Quality of Life Score (n=54).

Items	Mean	Student T-test		ANOVA Test	
	Mean $\pm$ SD	t	P	F	P
<b>Age</b>					
20 – < 31	43.7 $\pm$ 6.3				
31 – <41	37.9 $\pm$ 1.9				
41 – 50	34.5 $\pm$ 2.2			20.779	<0.001**
<b>Sex</b>					
Male	39.5 $\pm$ 6.5				
Female	36.9 $\pm$ 2.8	1.798	0.077		
<b>Marital status</b>					
Single	40.7 $\pm$ 6.3				
Married	38.7 $\pm$ 2.7	1.641	0.106		
<b>Educational level</b>					
Secondary degree	35.6 $\pm$ 2.7				
Institute	35.9 $\pm$ 2.6				
University degree	43.7 $\pm$ 6.3			19.299	<0.001**
<b>Occupation</b>					
Unemployed	35.5 $\pm$ 2.6				
Employed	43.0 $\pm$ 6.1	5.534	<0.001**		
<b>Smoking habit</b>					
Yes	36.5 $\pm$ 2.9				
No	49.3 $\pm$ 5.0			7.404	<0.001**
<b>Income level</b>					
Sufficient	45.8 $\pm$ 5.9				
Insufficient	35.9 $\pm$ 2.6	8.721	<0.001**		
<b>Residence</b>					
Urban	42.5 $\pm$ 5.7				
Rural	40.2 $\pm$ 2.6	1.883	0.065		

## Discussion

Keratoconus is an asymmetric corneal condition marked by steepening and deformity, apical thinning, and central corneal scarring that progresses over time. Keratoconus can decrease eyesight by steepening the cornea and increasing corneal parameter abnormalities after commencement. Keratoconus has a long-term influence on vision-related quality of life (Pinto et al., 2021). The goal of this study was to evaluate keratoconus patients' vision-related quality of life.

In terms of the age of the patients in the current study, the findings revealed that more than two-fifths of the respondents were between the ages of 31 and 41, with a mean age of 34.5 8.0. This finding is consistent with that of Al-Qahtani et al., (2021), who found that the most prevalent mean age for keratoconus patients at interview is 32.05 7.18 years.

As well, according to gender of the patients in the present study, findings showed that, almost three fifths of them were males. This is in accordance with that of Magalhaes et al., (2020), who stated that 62% of patients with keratoconus were males.

In connection with residence, 75.9% of the study patients are living in rural areas, this result was congruent with that of Yang et al.,(2021). In a recent study, they discovered that patients living in rural areas had a higher risk of keratoconus than those living in urban areas ( $P = 0.039$ ).

Considering the prevalence of smoking, the bulk of the research participants were nonsmokers. This is consistent with the findings of Spoerl et al., (2008), who found that the incidence of keratoconus in smokers is much lower than in the non-smoking group.

As regards visual acuity, more than half of this study participants had visual acuity in the right eye, this result is in accordance with that of another recent study carried out by Liduma et al., (2020). This previous research revealed that The decrease in visual acuity and contrast sensitivity are observed in all stages in keratoconus subjects with and without corrected visual acuity.

In terms of family history of illness, the current study found that about half of keratoconus patients had a family history of disease, and a large majority of them were employed. This study finding was in congruent with those of Alqudah et al., (2021), which found that only 23.5% of the study sample had family history of keratoconus and the majority of them were unemployed

With regard to eye rubbing, the ongoing study result revealed that majority of patients having keratoconus rubbed their eyes. This finding was consistent with that of Saro et al., (2017), who found that a strong relationship of frequent eye rubbing to development of keratoconus.

According to the findings of the ongoing study, the majority of patients had extreme difficulty noticing objects off to the side while walking, going down steps, stairs, or curbs in dim light or at night, and reading street signs or store names. Kurna et al., (2014) confirmed these findings, showing that the keratoconus group scored worse on all subscales of the National Eye Institute Visual Function Questionnaire-25. General vision, ocular discomfort, near vision, vision-specific mental health, vision-specific role challenges, and peripheral vision all showed a significant difference ( $P 0.05$ ). Except for general health and ocular discomfort, binocular entrance visual acuity of less than 20/40 was connected to worse VR-QoL ratings on all dimensions. Lower scores on the mental health, role difficulty, driving, dependency, and ocular pain scales were linked to steep keratometric readings  $>52$  D.

## Conclusion

According to the findings of this study, Keratoconus has a negative impact on the majority of patients' vision-related quality of life. Furthermore, there were statistically significant links between keratoconus patients' demographic features and overall health, trouble with activities, and visual impairments.

## Recommendations

The following recommendations were made based on the findings of the continuing study: Nursing staff should give patients with

continuous health education programs at outpatient ophthalmology clinics to improve their quality of life.

A larger scale replication of the study in additional Egyptian clinics to allow for generalization of findings and a better understanding of the impact of Keratoconus on patients' lives.

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