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ORIGINAL RESEARCH

Exploring Symptom Experience and Management Strategies Among Patients with Corneal Ulcers Based on Symptom Management Theory: A Qualitative Study

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Background: Corneal ulcers, often caused by eye trauma, are the main cause of corneal blindness. Knowledge of their symptom experiences and self-management is limited. The aim of this study was to describe the symptom experience and self-management of patients with corneal ulcers and to provide references for clinical medical staff to understand their impact on quality of life.

Methods: Between July and December 2022, semi-structured interviews were conducted with 20 patients with corneal ulcers who were hospitalised. Colaizzi's analysis was used to organise and analyse the interview data and this study followed the symptom management theory(SMT) model.

Results: The study comprised 10 male and 10 female patients with a mean age of 54.95 ± 8.41 years. Two major themes and six sub-themes were formed through the analysis of textual data: *symptom experience* and the *diversification of symptom management strategies*. *Symptom experience* illustrated the distressing symptoms faced by patients and the subsequent effects on their daily lives, with ocular pain and blurred vision reported by nearly all patients. In an attempt to manage these symptoms, patients demonstrated a *diversification of symptom management strategies*, which were derived from various sources, while also making adaptive changes to their daily lives.

Conclusion: This study revealed patients' experiences and strategies of symptom self-management, which may be a step towards providing a reference for evaluating the quality of life in patients with corneal ulcers.

Keywords: corneal ulcers, symptom experiences, symptom management, qualitative study

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Introduction

Corneal ulcer, a global disease that usually occurs after a corneal trauma, is a defect of the corneal epithelium involving the underlying stroma that causes visual impairment and corneal blindness, usually caused by bacterial, fungal, viral, protozoan and autoimmune infection.[1–3] According to the literature, the incidence of infectious keratitis, a precursor to corneal ulcer, has been estimated at 0.04–8.0 per 1000 people per year, with a higher rate noted in low-and-middle income countries (LMICs).[4] The main causes of corneal ulcers vary depending on the economic level of each country. In developed countries, corneal ulcers are usually associated with contact lens wearing, while in developing countries, they are usually caused by eye injuries.[5,6] Even with appropriate corneal ulcer treatment, some patients may develop serious complications, including corneal scarring or perforation, the development of glaucoma, cataracts and even visual loss.[7] A study conducted two decades ago estimated that over 1.5 million people with corneal ulcers worldwide go blind every year.[8] In China, a nationwide survey found that corneal ulcers are already the leading cause of corneal blindness.[9]

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In recent years, the incidence of corneal ulcers has been on the rise, leading to a great economic burden for patients and society. It is difficult to obtain an exact estimate of the global consequences of corneal ulcers. According to a 2010 report in the United States, about $174,900,000 of medical expenditure included $69,900,000 in keratitis treatment.[10] In recent years, the annual direct healthcare expenditure for patients with corneal ulcers in the US was $35,819,590, according to national estimates calculated by the National Inpatient Sample.[11] In Thailand, the annual direct healthcare expenditure for patients with corneal ulcers was $2,073,517.86, which is considerably lower than in the US.[12] Nevertheless, variations in living costs, medication prices and minimum income levels make direct comparisons of healthcare expenditure between countries unfeasible. Corneal ulcer patients frequently face income loss as a result of hospitalisation and their inability to work. A study indicates that the average number of workdays delayed due to corneal ulcers was 29.8 ± 22.9 days, resulting in an average wage loss of $29.7 ± 1.7.[13] The healthcare costs for these patients significantly surpass the average monthly wages of this demographic. In addition, complications of corneal ulcers, such as corneal perforation and scarring, are the main indications for corneal transplantation, placing an additional financial burden on patients. Parts of the world affected by corneal ulcers are under-resourced and the actual burden of corneal ulcers is likely to be underestimated because of lack of surveillance and under-reporting. Therefore, more attention should be paid to corneal ulcers in the field of ophthalmology.

Current assessment scales for ophthalmic diseases have primarily focused on conditions such as glaucoma,[14] cataracts[15] and diabetic retinopathy.[16] To date, no specific scale has been validated for evaluating corneal ulcers. Clinicians often rely on vision-related generic instruments, such as the National Eye Institute Visual Function Questionnaire (NEI VFQ), to assess these patients.[17] However, as this tool is designed for broad ophthalmic applications, it lacks specificity for comprehensively evaluating the multidimensional impacts of corneal ulcers on patients' quality of life. Moreover, current assessment tools rely predominantly on quality-of-life scales. Although these scales include some items for symptom evaluation, they are neither comprehensive nor specific to the symptoms experienced by corneal ulcer patients. Therefore, qualitative research is particularly crucial for exploring patients' symptom experiences and symptom management practices in depth.

The 14th Five-Year Plan for the National Eye Health Program (2021–2025) in china emphasises that it is necessary to improve the treatment ability of corneal blindness and to improve the treatment level of eye injuries and other eye diseases. Corneal ulcers are an important cause of corneal blindness. The most common risk factor for corneal ulcers is ocular trauma. Therefore, more attention should be paid to patients with corneal ulcers, and the medical system should establish and improve the patient management model to reduce the blindness rate and disease burden. So far, research on corneal ulcers has mainly focused on the exploration of prevention,[18–20] diagnosis[21] and symptom evaluation.[22–24] A few studies have paid attention to symptom care for patients with corneal ulcers. Understanding patients' experiences and their self-management strategies will help develop personalised interventions to alleviate patients' suffering. Given that symptoms are subjective and multi-dimensional, there are some limitations in evaluating the symptom experience only using scales or questionnaires and some diseases have also explored the experience of symptoms using qualitative studies. Qualitative research provides critical insights into patients' perspectives on disease experiences. For example, McDonald utilised qualitative methodologies to investigate challenges related to glaucoma management and treatment adherence, revealing unmet needs in patient-provider communication.[25]

However, there is little information about symptom experience in qualitative studies of patients with corneal ulcers. A deeper understanding of the symptom experience and symptom management of corneal ulcer patients will help medical staff to have a deeper comprehension of patients' feelings and provide reliable symptom management methods for patients from multiple dimensions.[26] Therefore, the aim of this study was to describe symptom experiences and symptom self-management strategies in patients with corneal ulcers.

Methods

Design

This study employed a descriptive phenomenological approach that emphasises direct observation and description of lived experiences, focusing on the unbiased depiction and analysis of phenomena as they present themselves.[27] The symptom experiences and self-management strategies of patients with corneal ulcers were explored through semi-structured interviews.

Participants and Setting

Purposive sampling was used to recruit participants with corneal ulcers from three hospitals in Chongqing Province, China. Participants who met the following criteria were invited to participate in the study: a) patients diagnosed with corneal ulcers, b) 18 years of age or older and c) willing to share symptom experiences. Exclusion criteria were as follows: a) patients diagnosed with a major psychiatric illness, b) other eye diseases or a history of surgery that affected vision and c) concomitant systemic comorbidities. While scheduling the interviews, the researchers fully informed the participants about the content, purpose and other relevant details of the interviews. The sample size was determined by reaching data saturation, defined as the point where no new information emerged and thematic codes became stabilised through iterative analysis.[28] Initially, 18 participants were interviewed, at which point data saturation was achieved. However, to ensure research quality, the interviews continued up to the 20th participant, at which stage no new information emerged and data collection was terminated.

Ethical Considerations

The study was approved by the hospital's ethics committee (Study ID: KY2021029) and conducted in accordance with the Declaration of Helsinki. All participants signed a written informed consent form that explicitly included permission for the publication of anonymised responses and direct quotes in research publications. Participants were reminded that they could pause the interview at any time if they felt uncomfortable All identifying characteristics of the participants were anonymised in this study, and participants were numbered P1, P2, P3 and so on.

Rigour

Participants were recruited from July 2022 to December 2022. The researcher screened eligible patients from an ophthalmology ward. The interviewer was a master's degree student in nursing and another nurse took the notes, including participants' tone of voice, facial expressions and emotions. During the interview. The interviewers were all female and had completed relevant qualitative research training prior to initiating the study, while also bringing rich clinical experience to the research process. Before the interviews, the study topic was explained to the participants. All interviews were conducted and recorded in a separate quiet room and lasted 30–60 minutes. Data were collected following an interview guide for open-ended questions about the symptom experience and management of corneal ulcers. Two patients were selected for pre-interviews. Based on feedback from the interviewees regarding the interview guide, unclear or difficult-to-understand questions were revised through group discussions and comprehensive consideration before the interview guide was finalised. (Pre-interview results will not be included in the formal data analysis). The specific interview guide is as follows: a) What symptoms do you experience when you are sick? b) How do you deal with these symptoms? c) Where do these treatments come from and how do they work? d) What do you find relieves the symptoms or makes symptoms worse? e) What help do you need from your health care provider in symptom management? The Consolidated Criteria for Reporting Qualitative Research (COREQ)[29] guidelines were used to report the methods (Supplementary Material 1).

Data Analysis

Framework

Symptom management theory (SMT)[30] consists of three main dimensions: symptom experience, symptom management strategies and outcomes. These three core concepts are interrelated and influence each other. The effect of management depends on the symptom management strategy and the patient's symptom experience; at the same time, the outcome also affects the patient's symptom experience and the formulation of the symptom management strategy. Thus, the framework of symptom experience and symptom management strategy in SMT was adopted as the study's conceptual framework.

Data Analysis Steps

The interviews' audio recordings were transcribed verbatim by researchers DL and XL within 24 hours, after which the same two researchers independently coded all data. Any discrepancies in coding the transcripts were referred to experts for advice. In the interview data, nodes were created and encoded, and the themes were refined using NVivo 12.6 software for qualitative data analysis. The interview content was deductively coded using a seven-step analysis by Colaizzi.[31] The specific steps were as follows: (1) All interview content was carefully read to fully understand it. (2) Sentence-by-sentence analysis was conducted to identify significant statements. (3) Recurring ideas were encoded. (4) A theme prototype was developed. (5) Excerpts were made of typical original statements. (6) Similar viewpoints were compared repeatedly, and themes were formulated. (7) The theme structure was returned to the participants to verify authenticity.

Results

Characteristics of the Subjects

The 20 participants had a mean age of 54.95 ± 8.41 years, including 10 males and 10 females. Regarding their education level, 14 subjects had an elementary school education or less and six had a junior high school education. All were married, and none were divorced or widowed. Among them were 7 construction workers, 12 farmers, and 1 self-employed person. The visual acuity of the affected eye was photopic ~ 0.8, numbered P1 to P20. The demographic and clinical characteristics of the participants are detailed in Table 1. The mean interview duration was 40 minutes.

Table 1 General Statistics of the Patients with Corneal Ulcers

Variable	**n**	**%**
Age		
<60 years	15	75%
≥60 years old	5	25%
Gender		
Male	10	50%
Female	10	50%
Occupation		
Construction workers	7	35%
Self-employed	1	5%
Farmer	12	60%
Education level		
Illiteracy	2	10%
Primary School	12	60%
Middle School	6	30%
Damaged eye		
Left	9	45%
Right	11	55%

(*Continued*)

Table 1 (Continued).

Variable	n	%
Cost category		
Medical insurance	7	35%
New Rural Cooperative Insurance	8	40%
Employment Injury Insurance	4	20%
Self pay	1	5%
Visual acuity		
No light perception	1	5%
Light perception	1	5%
Hand movement	11	55%
Count finger	2	10%
≥0.02	5	25%

Research results

The results were divided into two themes based on SMT: patient's symptom experience and diversification of symptom management strategies. The details of the themes are shown in Figure 1.

Patient's Symptom Experience

Ignoring Symptoms

Some patients were ignorant of the symptoms that appeared in the initial stage of the injury. Although symptoms such as eye pain, tearing, foreign body sensation, blurred vision and itchy eyes appeared, some thought these symptoms were normal, underestimated the consequences of corneal injury and did not pay attention to them.

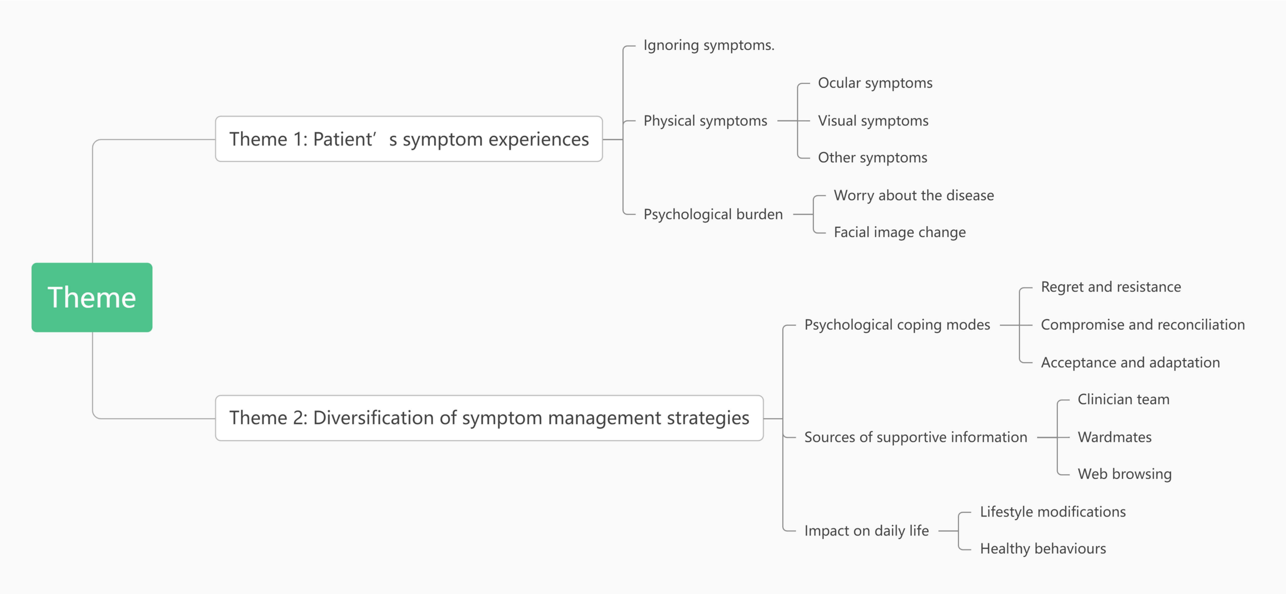

Figure 1 The theme of symptom experiences and symptom management strategies.

> A tree branch hit my eye when I was doing farmwork, and my eye bled a little when I was injured. I thought it was like a skincut, which would be fine after a few days, and I continued working. (P2)

> My eyes were splashed with cement at the construction site, and then I went to the pharmacy to buy eye drops. I can't remember the specific name. It's too far to go to a large hospital, and I am not familiar with medical treatment processes. I treated myself by using some medicine, hoping it would get better. (P6)

In addition, during the busy farming season, patients ignored the symptoms of discomfort because they needed to harvest their crops.

> It's been almost 2 months since I was injured, and when my family was threshing rice, I went to the local hospital and bought eye ointment. Although my eyes still hurt after rubbing in the medicine, I thought it would be better to bear it for a while. (P4)

Physical Symptoms

Ocular Symptoms

The variety, severity and distress of ocular symptoms in patients with corneal ulcers are diverse. The cornea is the most densely innervated structure in the human body, and ocular pain is the most commonly mentioned effect in patients with corneal ulcers.

> It was hard to fall asleep at night, but the pain started again at two or three o'clock. Half of my head was in pain, which made my eyes twitch. (P10)

> I had not only eye pains but also head pains. It hurt so much that I wanted to take my eyeballs out. (P4)

Some Diagnosis and Treatment Activities Were Also Painful

> Every time I come in for eye drops, the pain is worse. Also, some patients have photophobia and tearing. (P12)

> My eyes don't feel well. As soon as I open my eyes and see light, my eyes start watering. (P15)

Some patients also experience eye swelling, discharge and so on.

> I feel like my left eye is sticky all the time now. I can't open my eyes, and I don't know if I can get well (sigh). (P9)

All the interviewees reported pain: 11 patients stated that the pain affected their sleep or caused sleep disturbance, eight mentioned that the eye pain caused radiating pain, such as headaches or toothaches, three subjects had a single eye swelling, and only three cases had mild pain that could be easily controlled by painkillers.

Visual Symptoms

The cornea is an important refractive medium, and a series of vision-related symptoms, such as blurred vision, diplopia and decreased contrast sensitivity, are caused by corneal lesions.[32] All interviewees experienced how vision loss and visual impairment affected their daily lives:

> Not being able to see clearly affects my life. In the past, I had been able to cut and cook my own food at home and take a bath by myself, but now I can't do it. I'm afraid of hurting myself. (P10)

Blurred vision also affects a patient's social life or work:

> Two days after the eye injury, my eyes saw double, and I couldn't work at that time. (P12)

It also affected the patients' hobbies:

> I used to like reading novels, but now the words on my phone are blurred and I can't read novels now. (P6)

Other Symptoms

Following the onset of the disease, two respondents reported experiencing digestive system abnormalities, four had decreased appetite or general fatigue and 15 patients experienced sleep disturbances:

> I only eat one or two meals a day now, sometimes only one bun a day. I have no appetite, don't feel hungry and haven't relieved my bowels for several days. (P5)
>
> I don't want to eat when my eyes hurt, and now, when I walk, my feet are a little weak because I have little strength, and I just want to lie down and be comfortable (P4)

Psychological Burden

Worry About the Disease

Most of the patients showed negative emotions, such as fear, worry, anxiety and depression.

> I am worried that my condition is getting worse and I will have to enucleate my eyeball. That makes me feel like I have a disability. I just want my eyes to get better. (P5)
>
> I still can't see clearly with this eye, and I don't know if I will be able to see clearly afterwards. I can't work and make money. Every night, I can't sleep thinking of these things. (P16)

Facial Image Change

Patients with corneal ulcers may experience congestion of the corneal rim and conjunctival blood vessels, redness and swelling, large amounts of secretions, greyish-white plaques or lamellar lesions of the cornea and other ocular manifestations that affect the patient's appearance, thus causing a sense of shame and resulting in low self-esteem.[33]

> If I really removed my eye, I would feel that I was not a whole and healthy person. (P5)
>
> Look at my eyes. They are red and there is a white blur on my black eye. I feel that people will look at my eyes when I am inside the elevator; it makes me embarrassed. (P16)

Diversification of Symptom Management Strategies

Psychological Coping Modes

Regret and Resistance

People with the disease often express regret, feeling that they should not have done the event that caused the disease or should not have bought medication by themselves.

> (Sigh) If I had known, I wouldn't have cut grass (to feed the pigs), although I didn't do much, and I ended up in the hospital. (P6)
>
> I should have come to the hospital earlier. I didn't know it was so serious at that time, and I thought it would be better to buy some medicine at the pharmacy and and apply it myself. (P11)

In the process of disease management, nurses frequently give patients eye drops, and a small number of patients have shown resistance to treatment.

> My eyes are painful all the time. Every time I take eye drops, I feel more pain. After that, it alleviates gradually, and I feel like you are going to do the next eye drops again. Sometimes, I really don't want to take eye drops. (P17)

In addition, patients feel that others have become overconcerned with their patient identity and exhibit inner resistance to special care and care from others.

> I think my condition is fine. My other eye is completely fine, but my family has been worried about me, afraid I will hit something or fall, which really annoys me. I don't want them to follow me all the time. (P2)

> I'm playing with my phone and my family always reminds me to protect my eyes. (P15)

Compromise and Reconciliation

Because the effects of the disease are not easy to avoid, patients are forced to compromise and accept the status quo:

> I still hope my disease recovery will get better and better, and I don't want to pick my eyeballs. I just have to accept this disease and deal with it positively. (P9)

> Before I got sick, I would go to the square to dance with my friends in the evening. Now, I dare not walk outside at night and only listen to the radio at home. (P19)

Some patients were also hospitalised because of the recurrence of the disease.

> I have been in the hospital before, and when I get home, I often forget to put in my eye drops, and then it comes back, and I'm back in the hospital. Now I do as you (medical staff) say and dare not stop taking medicine. (P15)

Acceptance and Adaptation

With the patient's acceptance of the status quo and continuous self-regulation, patients can positively face the disease and are optimistic about its impact:

> Even though I have these symptoms now and may face the consequences of worsening symptoms, my inability to see clearly does not affect my life as much as my advanced age. Besides, my family members are kind to me; they help me do some things. (P3)

> I can't see clearly now. My family does not need me to make money, and I don't have anything special to do, so I do not care whether I can see clearly. (P11)

In addition, some patients were happy to share their experiences and cultivate self-worth.

> I see the person in the bed next to me who is depressed every day, and I tell him that I was in the same situation as him before and encourage him that he will slowly get better if he keeps a positive mindset. (P17)

Sources of Supportive Information

Clinician Team

Patients can obtain reliable disease-related knowledge through healthcare professionals, who also provide emotional support to patients through interactive communication.

> I think the best symptom management is to go to the hospital; you can't believe the words of nonprofessionals. I think you all talk about things carefully and patiently, and you all speak softly and comfortingly. (P15)

Although professional suggestions are viewed as trustworthy, some patients do not have the means to contact their doctors after discharge when they have symptoms again and their information needs cannot be met.

> I felt better after I came home from the hospital, and no one reminded me to put eye drops in on time; as a result, I often forgot the eye drops. I felt a little uncomfortable with my eyes at home, and I felt it was a hassle to come to the hospital, so I dragged it out (sigh), and now I'm hospitalised again. (P19)

Wardmates

Wardmates can provide emotional support, and experienced wardmates are also an important source of knowledge for patients. It is more convenient to contact wardmates than to contact professional information providers. Sometimes, information from wardmates will put patients' minds at ease because they have the same experiences.

> The patients in the same ward as me are all patients with corneal ulcers, and we chat very day. If there was anything uncomfortable, I would tell the doctors and nurses, but they sometimes said it was okay. This made me feel that the doctors

> and nurses had not experienced it and I was still nervous. I would talk with my wardmate and when he said he had experienced it too, I would feel more at ease. (P18)

On the other hand, some patients mentioned that the exchange of information between patients may also be the wrong way to exchange information.

> The one in the bed next to me told me to bear the pain and that I would be addicted to painkillers if I took too many. I am also afraid that I will keep taking them afterwards and become addicted, and it will take a long time to get out of the hospital. (P12)

Web Browsing

Faced with the distress of disease symptoms, patients can obtain disease-related information through a variety of channels on their phones, such as WeChat public websites, Zhihu, Weibo and other free social platforms. These information platforms are usually the most commonly used when they are injured or have problems.

> After I told my children about the injury, they told me that it was quite serious after checking it on their cell phones (Baidu), and they brought me to the hospital. (P12)

However, with the wealth of resources available through the internet, some patients reported that they felt anxious about what they read:

> I just read on the internet that I needed to have my eyeball removed due to my situation; it scared me at the time until I went to hospital and asked the doctor. (P14)

Impact on Daily Life

Lifestyle Modifications

Patients can make adaptive adjustments to their living arrangements or habits to cope with symptoms and reduce adverse effects. Such lifestyle adjustments are individualised and involve all aspects of life. Some patients with corneal ulcers have reduced vision and can rely more on other senses such as hearing, touch and smell in daily life.

> I used to like to read e-books. Now my eyes get swollen and painful when I read. But now I can listen to some songs or the radio, which feels good too. (P14)

Some have changed their busy lifestyles:

> I used to do things quickly; now, I have to slow down and gradually become patient. (P7)

They also do activities in well-lit conditions:

> I try to go out in the daytime when the light is good so that I can see more clearly. (P6)

Healthy Behaviours

Healthy behaviours are influenced by behavioural decision-making, and behavioural choices are made by individuals who consider the benefits and harm of their actions and thus make decisions about whether to adopt a behaviour. Through the health education provided by medical staff, almost all patients described their own health behaviours, for example:

> Before the corneal ulcer, I used to rub my eyes with my hands when they felt itchy or teary, but now I know there are bacteria on my hands, so I don't dare to do it. (P6)

> I used to eat food with heavy oil and spice, which I pay attention to avoiding now. I choose to eat a lot lighter and hope to get well soon. (P18)

Discussion

In this study, patients with corneal ulcers reported eye pain and visual impairment as their primary symptoms, and their self-management practices varied. Integrating domains of "symptom experience" and "management strategies" in SMT will help provide a comprehensive understanding of the symptom experience of patients and how they manage these symptoms to determine what they need to relieve their symptoms and alleviate negative psychological experiences to improve their quality of life.

Studies[34,35] have shown that ocular trauma is a major risk factor for corneal ulcers, especially in areas where agricultural or manual labour is performed, which is consistent with the findings of this study. One of the main reasons for treatment delay is patient ignorance, including insufficient knowledge and understanding of disease-related risks and harm.[36] We found that patients' perceptions of symptoms were biased, probably due to their low awareness of seeking medical care. They simply believed that the disease would heal on its own if they waited it out and there was no need to see a doctor. In addition, the adverse physical effects of the disease were ignored because they were busy with agricultural work or other things at the time of injury, or because they thought the procedures for seeking medical care were tedious or transportation was inconvenient, causing the disease to become more serious until seeking medical help. Patients perceived difficulties in accessing medical care and inadequate support systems during the course of the illness.[37] Some patients were afraid to come for treatment at the hospital on their own due to a lack of family accompaniment. Moreover, patients may have delayed seeking medical attention due to financial factors. Hence, during the early stages of injury, failure to seek professional medical assistance or reliance on self-treatment through medications purchased from pharmacies may have led to worsening of the condition, ultimately resulting in corneal ulcer formation. Early diagnosis and timely management of corneal ulcer patients in the early stages of corneal injury can effectively improve the prognosis of the disease.[38] Therefore, health education targeting people engaged in agricultural work and physical activities is needed to enhance their awareness of prevention and medical consultation and to and to raise awareness of the occurrence of common symptoms and seeking timely medical treatment.

Participants reported that the main symptoms experienced were ocular pain and visual impairment, and the findings were generally consistent with Farahani et al's study.[3] This is because the human cornea is the most innervated tissue, with approximately 7000 nerve terminals per square millimetre and one of the largest pain generators in the body.[39,40] It has sensitive autonomic and sensory nerves, and when a corneal ulcer occurs, the cornea is stimulated by inflammatory factors, and the patient experiences severe eye pain.[41] The cornea is the most anterior transparent part of the eye and provides most of the refractive power for the eye; therefore, when it is damaged or ulcers develop, it can affect the patient's vision. Currently, medication and surgery are the primary treatments for patients with corneal ulcers, but these measures cannot completely relieve the pain, so nonpharmacologic therapies are needed to assist in their treatment. Nonpharmacologic treatments for corneal neuropathic pain include wearing bandage-type corneal contact lenses, acupuncture, transcranial magnetic stimulation and an omega-3 rich diet. However, all of these nonpharmacologic treatments come from the evidence-based literature on noncorneal neuropathic pain and need to be validated in randomised trials.[39] In addition to the primary symptoms, some patients also had ocular discharge, ocular redness and photophobia. Therefore, while monitoring patients' main symptoms, attention should also be paid to patients' other symptoms to comprehensively assess the characteristics of the symptoms of patients with corneal ulcers and to develop a patient-appropriate intervention plan to promote their visual recovery and improve their quality of life.

On the other hand, most patients often worry about disease progression due to a lack of knowledge of the disease, and they may have negative psychological experiences about changes in their ocular appearance. Studies have shown that[42,43] negative experiences can seriously affect treatment compliance and disease management, thus aggravating the disease and creating a vicious cycle. Therefore, medical and nursing staff should help patients establish mature psychological defence mechanisms and adopt positive coping methods. First, health education should be strengthened to improve patients' correct knowledge of the disease and to avoid unnecessary fear and anxiety. Second, encouraging patients to express their inner feelings and using positive hints to remind them of the positive outcomes of treatment and self-management to improve the patient's confidence. At the same time, personalised nursing interventions can be implemented in conjunction with the patient's actual situation. Healthcare workers can pay more attention to the patient's psychological problems while symptoms worsen, to timely detect and alleviate bad emotions and improve psychological status.

The coping model refers to the cognitive and behavioural ways in which individuals handle frustration and pressure. The results of this study show that patients adopt two coping styles in the face of the disease and its effects: negative coping and positive coping. Negative coping manifests as patients having resistance due to disease symptoms and excessive care or compromise because the disease is difficult to cure and vision is not easily recovered. Positive coping is manifested in the patient's ability to accept the disease through positive attitude adjustment, support from relatives and friends and active communication with patients or medical staff. The study found that coping negatively with the disease can increase the severity of anxiety and depression, while positive coping can improve the self-management of the disease.[43,44] The higher the level of mental resilience of patients, the more they are able to cope with the disease positively. Therefore, medical staff should carry out targeted interventions to improve patients' psychological resilience and to promote their active response to the disease.

The symptoms of the disease often influence daily activities, and patients may change their habits, such as relying on other senses to make judgements, moving cautiously and slowly, going out less at night and moving around in well-lit environments and adjusting their diet to eat foods that are easily accessible and easy to cook. Family members often help visually impaired patients carry out daily activities and social interactions to improve their adaptability, actively encourage patients to participate in social activities, listen to the encouragement of patients who have recovered well and reduce the anxiety and sadness of patients who are visually impaired. Patients can obtain and understand the methods of symptom management through multiple channels, especially internet resources. Almost all patients mentioned that they or their family members had enquired about disease-related knowledge through the internet, and the reliability of the enquiry results was related to the education level of the enquirer. The impact of information shared empirically by patients or friends has two sides. Currently, accessing personalised information through healthcare professionals is still the most reliable way, but most patients need to come to a healthcare facility to access it, and accessibility is not easy. Because traditional access to symptom management methods through healthcare professionals is singular, patient accessibility is low and does not help caregivers provide patients with a comprehensive, continuous pathway to symptom management in a timely manner. In recent years, with the development of information technology, mobile healthcare has unique advantages and has gradually been applied in the field of symptom management.[45] Therefore, with the development of the economy and the widespread adoption of the internet,[46,47] modern mobile technology should be combined with traditional medical care in future research based on patient portrait information. This can build dynamic monitoring of chronic eye disease symptom management and provide timely and accurate evidence-based intervention information to ultimately improve patients' health status. However, there are still some drawbacks to mobile applications, such as insufficient adaptability for special patient groups (low vision, elderly, low literacy etc.), passive health education, low patient motivation and the development and promotion costs of the technology. The active role of nursing staff in patient symptom management and dynamic monitoring is expected to be effective in overcoming the drawbacks and problems in the development of modern healthcare and in providing better quality care to patients by combining nursing and mobile healthcare.

Limitations

First, the participants were recruited only from a certain region in southwest China, which may limit generalisability to other socioeconomic or cultural groups. Further studies should be conducted on patients recruited from different areas and careers to expand the generalisability of the findings to other socioeconomic or cultural groups. Second, given the chronic nature of corneal ulcers and the progression of symptoms over time, a future longitudinal study will be conducted to delineate symptom progression trajectories and their accompanying strategic adaptations. Third, as with all qualitative research, the results are dependent on the researchers' interpretations; although this bias is unlikely to be fully removed, senior qualitative researchers carried out the analysis to reduce the bias.

Conclusion

During the disease course, patients with corneal ulcers experience a series of symptoms, including physical symptoms, ocular symptoms and other manifestations. They adopt various attitudes and symptom management strategies to cope with these symptoms, acquiring such strategies through multiple channels—among which healthcare professionals serve as the most reliable source of information. This study highlights that healthcare providers should closely monitor the physical symptoms of corneal ulcer patients while paying attention to their psychological changes during the illness. Targeted interventions should be implemented to alleviate adverse physical and mental experiences, thereby promoting overall comfort and well-being.

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics Statement

This study was approved by Ethics Committee of the First affiliated Hospital of Army Medical University, PLA ((A) KY2021029)

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflicts of interest in this work.

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