

# Patient-Perceived Barriers to Early Help-Seeking, Diagnosis, and Surgical Treatment for Rural Patients with Venous Leg Ulcers: A Qualitative Study

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**Purpose:** This qualitative study aimed to explore the patient-perceived barriers to early help-seeking, diagnosis, and surgical treatment among rural patients with venous leg ulcers.

**Methods:** Semi-structured face-to-face interviews were conducted with 16 rural patients with venous leg ulcers who underwent primary varicose vein surgery for the first time. The data were analyzed inductively and in accordance with reflexive thematic analysis. The generated themes were systematically mapped onto the corresponding intervals of the Model of Pathways to Treatment.

**Results:** We identified 11 barrier themes across the four intervals. During the symptom appraisal interval, barriers were symptom normalization, self-treatment, and avoidant coping with symptoms. When seeking help, patients faced disease misattribution, reliance on familial support and decision-making, and low public awareness of vascular surgery. The diagnosis interval was plagued by misdiagnosis or missed diagnosis and delayed specialist referrals. Finally, pre-surgery barriers included emotional and cognitive resistance to surgery, peer influence bias, and disparities in medical resources distribution.

**Conclusion:** This study identified diverse barriers across four stages of the treatment pathway for venous leg ulcers among rural patients, which were associated with disease-related, patient-related, and healthcare system-related factors. To address these barriers, a multifaceted healthcare system approach is essential, including enhanced public education, the implementation of age-friendly services, the establishment of evidence-based referral criteria, strengthened primary care competencies, and an expanded vascular surgery workforce to serve underserved areas.

**Keywords:** varicose ulcer, help-seeking behavior, primary health care, rural health

## Introduction and Background

Venous leg ulcers (VLUs) are open skin lesions that occur in areas of the legs affected by venous hypertension, accounting for over 70% of all leg ulcers.<sup>1</sup> The prevalence of VLUs is around 1.08%, with an incidence of up to 1.33%.<sup>2</sup> This prevalence rises steadily with age, climbing to significant rates of 3% to 4% among those over 65.<sup>3</sup> In China, the prevalence of chronic venous disease (CVD) in the legs reaches 8.89%, translating to nearly 100 million sufferers nationwide.<sup>1</sup> VLUs are characterized by a repetitive cycle of ulceration, a prolonged healing process, and a high recurrence rate.<sup>4</sup> An Australian longitudinal study revealed that VLUs recur at a rate of 22% just three months after healing, soaring to a staggering 78% within three years.<sup>5</sup> Patients grappling with VLUs persistently confront a multitude of challenges: localized ulcer symptoms, restricted daily activities, complex wound care, social isolation, and significant

financial burdens, all profoundly compromising their quality of life.<sup>6</sup> Moreover, these conditions place an immense burden on the healthcare system, with venous leg ulcers accounting for a staggering 2% of the annual healthcare expenditure in developed countries.<sup>7,8</sup>

Patients with CVD often overlook early symptoms such as lower oedema, varicose veins, and cutaneous hyperpigmentation, typically seeking medical attention only after ulcer development.<sup>7</sup> Venous ulcers are frequently misdiagnosed or overlooked because they bear a striking resemblance to other ulcer types, such as infectious ulcers, diabetic foot ulcers, arterial ulcers, and traumatic ulcers. A Finnish cohort study revealed that two-thirds of chronic wound patients endured diagnostic delays beyond 4 weeks.<sup>9</sup> In managing VLUs, dressings, compression therapy, and anti-infection treatments offer temporary symptom alleviation but fail to address underlying causes. Superficial venous reflux is present in 97% of VLU patients,<sup>10</sup> and surgical or endovenous interventions are exclusively effective ways to treat varicose veins.<sup>11</sup> VLU recurrence rates are twice as high in patients who skip vein surgery.<sup>12</sup> A multicenter randomized trial in the UK showed that performing endovenous ablation within two weeks significantly speeds wound healing, dramatically reduces ulcer recurrence, and boosts cost-effectiveness versus delayed treatment.<sup>11,13,14</sup> Therefore, it is necessary for patients with leg ulcers to be referred to dedicated vascular centers as early as possible for venous reflux treatment.

Early medical consultation, prompt diagnosis, and timely surgery are critical for effective VLU management, directly affecting both healing and recurrence rates. Current qualitative research focuses mainly on VLU daily care and quality of life,<sup>6</sup> yet leaves a critical gap in delayed help-seeking, diagnosis, and treatment, issues more pronounced among rural VLU patients due to limited medical resources and outdated health perceptions. The Model of Pathways to Treatment (MPT)<sup>15</sup> is a theoretical framework that systematically explains how delays occur across the stages of patient presentation, diagnosis, and treatment of illness. It delineates four key intervals (appraisal, help-seeking, diagnosis, and pre-treatment). Each of these intervals is influenced by contributing factors associated with the patient, the healthcare system, and the disease. “Patient factors” encompass the individual’s characteristics and their socio-cultural context. “Healthcare system factors” represent aspects of the health care services that can impact both patient and professional decisions and behavior (eg, access, healthcare policy and delivery). “Disease factors” are the condition’s clinical attributes.<sup>15</sup> Notably, the MPT facilitates an understanding of how these contributing factors interact across the four intervals to form pathway barriers, thereby providing actionable strategies for pathway optimization. Furthermore, the MPT is particularly well-suited for analyzing the treatment pathways of specific diseases, as it enables the systematic identification of both disease-specific characteristics and specialty-specific healthcare system factors. Therefore, this study employed the MPT framework<sup>15</sup> to systematically explore the barriers to early help-seeking, timely diagnosis, and surgical treatment among rural VLU patients in China.

## Method

### Design and Setting

This qualitative study employed reflexive thematic analysis (RTA)<sup>16</sup> to explore rural VLU patients’ experiences regarding symptom appraisal, help-seeking, diagnosis, and receiving surgical treatment. RTA is grounded in a constructivist epistemology, emphasizing co-construction of meaning between researchers and participants to identify the barriers encountered at each stage of the treatment pathway for VLUs. This study was conducted in the department of vascular surgery at a comprehensive tertiary hospital that receives approximately 2.53 million outpatient and emergency visits annually and is located in Yiwu, a county-level city in Zhejiang Province, eastern China. The study participants were rural patients with venous leg ulcers who had recently undergone varicose vein surgery (within 10 days). The study was undertaken and reported in accordance with the standards for reporting qualitative research (SRQR).<sup>17</sup>

### Recruitment and Sampling

Participants were recruited through the vascular surgeons’ referrals from both the outpatient clinic and the inpatient wards of the vascular surgery department at the hospital. To capture diverse perspectives, participants were selected through purposive sampling based on gender, age, educational level, and hometown (ie, within or outside Zhejiang Province). Patients over 18 years with venous leg ulcers, clinician-confirmed superficial venous reflux, and from rural

areas were eligible if they underwent varicose vein surgery for the first time. The presence of deep venous reflux was recorded but was not an exclusion criterion. Patients were excluded if they presented with non-venous leg ulcers (including arterial ischemic ulcers, diabetic foot ulcers, traumatic ulcers, or pressure ulcers), venous ulcers secondary to iliac vein outflow obstruction, or those with severe comorbidities, impaired consciousness, psychiatric disorders, or communication difficulties. The sample size was determined based on the principle of data saturation, whereby interviews were conducted until at least 10 sessions were completed and no new information emerged in three consecutive interviews.<sup>18</sup>

## Data Collection

Semi-structured, in-depth, face-to-face interviews were carried out with patients in the private outpatient room or the wards (either double or triple rooms) between December 2024 and February 2025. Given that some elderly rural patients only spoke local dialects, to ensure communication accuracy and capture their lived experiences, we adopted a research strategy in which a Mandarin-proficient family member designated by the patient provided on-site interpretation. The interviews were conducted during the postoperative period, spanning from 6 hours to 10 days after varicose vein surgery. The interview guide (Figure 1) was carefully crafted, informed by a thorough literature review and insights gained from two pilot interviews. It focused on several key areas, including the detection of initial ulcer symptoms and symptom progression patterns, the self-regulatory behaviors employed, decision-making processes for seeking healthcare in various settings, experiences of the diagnostic process, and perceptions of surgical treatment from the patient's perspective. To identify barriers to early diagnosis and treatment, participants were asked to recall any delays they may have experienced and describe any events or actions that could have caused delays. Notably, when a family member was present during the interviews, the interviewer consistently centered the patient as the primary interlocutor, and strived to preserve the original meaning and subjectivity of the patient's narrative to the greatest extent possible by requiring verbatim translation, observing the patient's nonverbal cues, and directly verifying key descriptions with the patient. The interviews lasted 30–45 minutes, were audio recorded with permission, and were transcribed under a confidentiality agreement.

1. Please describe the first time you noticed the leg ulcer.
  - When did it happen?
  - What were the initial symptoms?
  - How did the wound progress in the following days or weeks?
2. Before seeking professional medical help, what self-management strategies did you try (e.g., self-medication, changing dressings, rest/elevation)?
  - How effective were these measures?
3. What key factors or specific events finally prompted you to visit a healthcare facility?
4. Could you please describe your entire healthcare-seeking process in detail, including all the different levels of medical institutions you visited?
  - How did each clinician explain your condition to you?
  - What treatments were offered by the various clinician you consulted??
  - How well did those treatments work?
5. When and how did you first learn that your diagnosis was “venous leg ulcer”?
6. When did a clinician first mention that surgery might be necessary?
  - What was your immediate reaction and main considerations at that moment?
  - What were the decisive reasons for initially refusing or ultimately accepting the surgical plan?
7. Looking back on the whole experience, what barriers and facilitators did you experience in receiving a timely diagnosis and treatment?

**Figure 1** Interview guide.

## Data Analysis

All interviews were transcribed verbatim by K.H. and uploaded to NVivo 15 software for data management. Inductive thematic analysis commenced soon after the start of data collection. The data analysis followed RTA's six-phase process:<sup>19</sup> (1) data familiarization and writing familiarization notes; (2) systematic data coding; (3) generating initial themes from coded and collated data; (4) developing and reviewing themes; (5) refining, defining and naming themes; and (6) writing the report. Initially, two authors (Y.Y. and K.H.) immersed themselves in the data by repeatedly reading the transcripts to gain a nuanced understanding of each participant's experience. They then collaboratively developed the initial codes through an iterative process of discussion. These codes were further grouped into meaning units, which were critically reviewed and refined through full-team discussion. The preliminary themes were collaboratively refined and then deductively mapped onto the Model of Pathways to Treatment.<sup>15</sup> In our study, the "appraisal interval" is the time from first noticing a leg ulcer to perceiving a need to discuss it with a clinician; the "help-seeking interval" is the period from this recognition to the first clinical visit; the "diagnosis interval" extends from the first visit to the patient's awareness of a confirmed "venous leg ulcer" diagnosis; and the "pre-treatment interval" is the time from diagnosis awareness to receiving surgical treatment.

## Rigor and Reflexivity

A female researcher (K.H.) with a Master's degree in Nursing and no prior relationship to participants conducted all interviews. The researcher completed reflective journals after each interview, exploring interviewer perceptions, assumptions, and subjectivities to enhance reflexive value. The research team also included: Y.Y., a clinical nurse with extensive experience in vascular surgery nursing; J.W. and C.D., both vascular surgery specialists; and H.Z., a nursing administrator with broad expertise in geriatric and psychological care. Regular team meetings were held to discuss all parts of the research.

## Ethical Considerations

This research has been approved by the Medicine Human Research Ethics Committee of The Fourth Affiliated Hospital, Zhejiang University School of Medicine on November 25, 2024 (approval number: K2024209). Before the study commenced, the purpose and significance of the study were explained to the participants. Written informed consent was obtained from each participant, which included authorization for audio recording the interviews, transcribing the recordings, anonymizing all data, and publishing anonymized responses/direct quotes. To guarantee anonymity and confidentiality, all collected data were de-identified, with digital codes (eg, P1) replacing all personal identifiers. The original audio recordings and transcripts were encrypted and stored on a secure server, with access restricted to the research team members. All procedures complied with the Declaration of Helsinki.

## Findings

The characteristics of 16 rural patients with VLUs in the interview were displayed in [Table 1](#). Among them, 11 patients were over 60 years old, and 6 were from outside Zhejiang Province. Regarding the four intervals: 7 patients had a symptom appraisal interval over 2 weeks, 7 had a help-seeking interval over 1 week, 7 experienced a diagnosis interval over 4 weeks, and 6 had a pre-treatment interval over 12 weeks. Eleven themes were mapped onto the four MPT intervals and categorized by the three types of contributing factors ([Table 2](#)). "Symptom normalization" and "Misattribution of disease" were classified as disease factors, as they primarily stem from the inherent pathological characteristics of the condition. Themes associated with individual coping behaviors ("Self-treatment", "Avoidant coping with symptoms"), personal perceptions ("Emotional and cognitive resistance to surgery"), and sociocultural influences ("Reliance on family support and decision-making", "Peer influence bias") were grouped as patient factors. Finally, themes mainly attributed to clinical capability limitations ("Misdiagnosis or missed diagnosis", "Delayed specialty referrals") or systemic inadequacies ("Low public awareness of vascular surgery", "Disparities in medical resource distribution") were categorized as healthcare system factors.

**Table 1** Characteristics of the Participants (n=16)

| Characteristics            | N  |
|----------------------------|----|
| Sex                        |    |
| Male                       | 12 |
| Female                     | 4  |
| Age group (years)          |    |
| <50                        | 2  |
| 50–59                      | 3  |
| 60–69                      | 6  |
| 70–79                      | 4  |
| 80–89                      | 1  |
| Marital status             |    |
| Married                    | 14 |
| Widowed                    | 2  |
| Live with adult children   |    |
| Yes                        | 7  |
| No                         | 7  |
| Children who are minors    | 2  |
| Educational level          |    |
| Primary school             | 7  |
| Junior high school         | 8  |
| Senior high school         | 1  |
| Hometown                   |    |
| Zhejiang province          | 10 |
| Other provinces            | 6  |
| Symptom appraisal interval |    |
| ≤2 weeks                   | 9  |
| >2 weeks                   | 7  |
| Help-seeking interval      |    |
| ≤1 week                    | 9  |
| >1 week                    | 7  |
| Diagnosis interval         |    |
| ≤4 weeks                   | 9  |
| >4 weeks                   | 7  |

(Continued)

**Table 1** (Continued).

| Characteristics        | N  |
|------------------------|----|
| Pre-treatment interval |    |
| ≤12 weeks              | 10 |
| >12 weeks              | 6  |

**Table 2** Summary of Identified Themes and Codes

| Interval      | Contributing Factors | Themes                                           | Codes                                                                                                                                                                                                                             |
|---------------|----------------------|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Appraisal     | Disease              | 1.Symptom normalization                          | <ul style="list-style-type: none"> <li>• Plausible external attribution</li> <li>• Failure to adjust lifestyle due to neglect</li> </ul>                                                                                          |
|               | Patient              | 2.Self-treatment                                 | <ul style="list-style-type: none"> <li>• Self-management based on prior wound care experience</li> <li>• Attempts at folk remedies</li> </ul>                                                                                     |
|               |                      | 3. Avoidant coping with symptoms                 | <ul style="list-style-type: none"> <li>• Enduring Symptoms</li> <li>• Denial of symptom severity</li> </ul>                                                                                                                       |
| Help-seeking  | Patient              | 4.Reliance on family support and decision-making | <ul style="list-style-type: none"> <li>• Reliance on family in the decision to seek care</li> <li>• Functional dependence on family during healthcare visits</li> <li>• Time constraints from family caregiving burden</li> </ul> |
|               | Disease              | 5.Misattribution of disease                      | <ul style="list-style-type: none"> <li>• Misidentification as a dermatological condition</li> <li>• Misidentification as an orthopedic condition</li> </ul>                                                                       |
|               | Healthcare           | 6.Low public awareness of vascular surgery       | <ul style="list-style-type: none"> <li>• Unfamiliarity with the clinical scope of vascular surgery practice</li> <li>• Confusion between similar-named specialties</li> </ul>                                                     |
| Diagnostic    | Healthcare           | 7.Misdiagnosis or missed diagnosis               | <ul style="list-style-type: none"> <li>• Misdiagnosis or missed diagnosis by primary care physicians</li> <li>• Misdiagnosis or missed diagnosis by non-vascular surgery specialists</li> </ul>                                   |
|               |                      | 8.Delayed specialty referrals                    | <ul style="list-style-type: none"> <li>• Symptom-only treatment</li> <li>• Failure to recognize the need for referral</li> </ul>                                                                                                  |
| Pre-treatment | Patient              | 9. Emotional and cognitive resistance to surgery | <ul style="list-style-type: none"> <li>• Emotional aversion to surgery</li> <li>• Outdated surgery conceptions</li> </ul>                                                                                                         |
|               |                      | 10.Peer influence bias                           | <ul style="list-style-type: none"> <li>• Preferential trust in peer narratives over medical advice</li> <li>• Surgical decision hesitation/refusal driven by peer influence</li> </ul>                                            |
|               | Healthcare           | 11.Disparities in medical resource distribution  | <ul style="list-style-type: none"> <li>• East-central-west regional medical resource disparity</li> <li>• Urban-rural medical resource disparity</li> </ul>                                                                       |

## Appraisal Interval

### Symptom Normalization

When the initial skin breakage on the foot was minor and had a plausible explanation, individuals might perceive this slight impairment of skin integrity as a normal occurrence rather than a pathological sign. As a result, such cases were often dismissed as insignificant, with the assumption that they would heal naturally over time.

I thought the skin was broken because it was bitten by mosquitoes, and I scratched it with my own hands. (P7, Female, 60–69 years)

At first, this was just a small knock while working that turned red—I didn't think much of it. (P5, Male, < 50 years)

When the skin breach was not taken seriously, people also failed to pay attention to their lifestyle, leading to the deterioration of the wound.

Back when the skin was red, I didn't watch my diet—I kept drinking and eating spicy food. That caused inflammation, and then it just wouldn't heal. (P5, Male, < 50 years)

At first, it was just a small scar, and I didn't think much of it. When I took a shower and rubbed it with a towel, the scar came off, and then it got infected. Eventually, it grew larger and larger. (P10, Male, 50–59 years)

## Self-Treatment

The patients realized that the delayed wound healing was problematic, but they still considered it a minor issue with no serious consequences. They believed they could manage the healing process based on their previous experiences with wounds or skin problems and continued to feel that seeking medical assistance was unnecessary.

I considered seeing a doctor earlier, but I just grabbed some ointment from the pharmacy and figured it would resolve the issue. (P11, Male, 60–69 years)

My husband skinned his knee while riding a motorcycle. He just wiped it with iodine, and it healed after the scab fell off. He said he thought my condition would be the same. (P8, Female, 60–69 years)

Some patients attempted folk remedies for the ulcer, but found it ineffective.

I used mugwort leaves to steam this area. I heard about this method from a fellow countryman. Aren't mugwort leaves used for disinfection? I steamed for a few days, but then I stopped because I felt it was useless. It really didn't work at all. (P6, Male, 50–59 years)

I put some herbal medicine on the wound. The elders in my village said these herbs help with healing. (P16, Male, 70–79 years)

## Avoidant Coping with Symptoms

Avoidant coping with symptoms was evident among some VLU patients, as many frequently suffered from severe pain which they tended to endure, and one participant (P1) even refused to acknowledge the severity of their condition while hoping it would resolve naturally.

Every time my leg ached and swelled, I rubbed on cream. When the pain became really severe, I took painkillers, but it just kept getting worse. (P9, Male, < 50 years)

During that time, my leg was cramped every day, and it was really painful. I did not go to see a doctor, and I did not tell my son or my husband either. The pain was just pain, cramps were just cramps—I let them take their natural course, believing it would get better eventually. (P1, Female, 70–79 years)

## Help-Seeking Interval

### Reliance on Family Support and Decision-Making

Venous ulcer patients are predominantly older adults. Within traditional Chinese familial structures, adult children typically hold primary responsibility for their elderly parents' healthcare decisions and provide essential logistical support such as transportation and hospital accompaniment. However, some elderly patients consciously postpone seeking their support out of a protective desire to avoid burdening their children.

I can't drive. I always need my husband or daughter to take me, so of course I needed them to accompany me. (P8, Female, 60–69 years)

The hospital is so complicated. If I came alone, I wouldn't know where to go, right? With my daughter-in-law accompanying me, the young people could find their way around anywhere. (P4, Female, 60–69 years)



I never mentioned this condition to my son before. I would endure it alone as long as tolerable. But this time, the pain became so severe that I finally had to tell him. He urged me to see a doctor, warning, ‘This isn’t good— it’s dangerous.’ That’s why I went to the hospital. (P2, Male, 80–89 years)

Moreover, the time constraints imposed by family caregiving burdens significantly delayed healthcare-seeking among female patients, especially when they lacked alternative support for domestic duties.

For years, I cared for my bedridden mother over 90. Last year added nightly newborn care for my daughter’s baby. I haven’t had a moment of peace in all these years. Just look at how old I’ve become (frown). My mother passed away a few days ago. I thought I definitely needed to go to the hospital when I was free. I really couldn’t put it off any longer. It was just that I hadn’t had the time, and that’s why it had been postponed until then. (P8, Female, 60–69 years)

### Misattribution of Disease

VLUs predominantly occur around the ankle region, and the surrounding skin often presents with pigmentation, eczema, dermatitis, skin induration, or atrophy.<sup>20</sup> As a result, patients often mistakenly attributed these symptoms to infections, trauma, or skin diseases rather than associating them with venous disease. Therefore, they tended to visit dermatology or orthopedic departments for consultation.

I thought it was a skin condition, so I went to a dermatology specialist hospital where there’s an expert who treats leg ulcers. (P8, Female, 60–69 years)

Initially, I didn’t think about varicose veins at that time. I knew I had varicose veins, but I didn’t realize they could affect this area. At that time, my left ankle was severely swollen and ulcerated, so I just focused on that area and went to see an orthopedist. (P6, Male, 50–59 years)

### Low Public Awareness of Vascular Surgery

In China, vascular surgery emerged as an independent discipline only in the late 20th century. The national sample survey showed <30% of secondary/tertiary hospitals have independent vascular surgery departments.<sup>21</sup> The majority of hospitals incorporate the diagnosis and treatment of vascular diseases into the general surgery or cardiovascular surgery departments. This systemic context directly contributes to low levels of public awareness regarding vascular surgery among rural patients, leading to their unfamiliarity with the scope of vascular surgery practice. On the other hand, the semantically overlapping terminology in the Chinese nomenclature for vascular surgery, cardiovascular surgery, and cardiology often triggers confusion among patients. Consequently, when patients suspected their ulcers may be venous in origin, they often experienced difficulty identifying the appropriate clinical department for consultation.

My daughter-in-law thought varicose veins might cause this condition, so she directly made an appointment with the general surgery department. Later, the general surgery doctor suggested that we should consult the vascular surgery department instead. (P4, Female, 60–69 years)

The emergency doctor told us that we should go to the vascular department for this problem. My son checked the department list and found that only the cardiovascular department had the word “vascular” in it, so he made an appointment with an expert in the cardiovascular department. Later, the doctor there said that we had made a mistake and should have gone to the vascular surgery department. Anyway, it took us several days to figure out the registration. We felt we had never heard of the vascular surgery department and knew nothing about it. (P15, Male, 50–59 years)

## Diagnosis Interval

### Misdiagnosis or Missed Diagnosis

Primary care physicians and non-vascular-surgery specialists have limited experience in the diagnosis and treatment of venous vascular diseases. Sometimes, they failed to associate leg ulcers with venous diseases and misdiagnosed VLUs as other similar types, such as diabetic ulcers or infectious ulcers.



*I visited the community hospital nearby. They prescribed several medications, including ointments and wash solutions. However, the treatment was ineffective. The doctors at that small hospital never mentioned varicose veins or provided a specific diagnosis. They just prescribed medication, applied bandages, and administered anti-inflammatory infusions. (P4, Female, 60–69 years)*

I visited a local clinic and had a blood test, which showed my glucose level was 7.1, while the normal range is up to 6.1. The doctor suggested my wound might be related to high blood sugar, but I'm skeptical—I've never felt any diabetic symptoms. (P6, Male, 50–59 years)

## Delayed Specialty Referrals

Some patients received non-specialist treatment for more than 12 weeks. Non-vascular-surgery specialists might not have been clear about how to follow guidelines for diagnosing and treating VLU, nor did they realize the necessity of referring patients to specialists. They had merely treated superficial skin, infection, and skeletal manifestations, neglecting the underlying venous pathology, which could have accelerated the progression of ulcers.

Three years ago, I went to see an orthopedic surgeon and had a skin graft surgery. But after the operation, the wound kept breaking open again - the skin graft didn't take properly. (P13, Male, 60–69 years)

The renowned dermatologist, available only monthly, prescribed topical ointment with a predicted 3-month healing timeline. I went to see the specialist every month to get the prescribed ointment. However, after three months, the ulcer had actually worsened - the wound grew larger with a yellowish layer forming over the flesh, and the condition continued deteriorating. (P8, Female, 60–69 years)

I visited an elderly orthopedist at the hospital. He called it an "old rotten leg", saying it would heal slowly and that I needed to be patient. He prescribed medication and referred me to the Wound Care Clinic for dressing changes several times. But after half a year waiting at home, the ulcer still hadn't healed. (P6, Male, 50–59 years)

## Pre-Treatment Interval

### Emotional and Cognitive Resistance to Surgery

When doctors mentioned that surgical treatment is necessary, patients tended to show instinctive resistance, hoping to avoid it if possible.

I was really timid and had a low tolerance for pain. I was afraid of the pain during the surgery, so I didn't want to undergo the operation. (P1, Female, 70–79 years)

As long as I can still walk, that is enough. Surgery is so uncomfortable, and it is never a good thing, is it? (P3, Male, 70–79 years)

Some patients held misconceptions about varicose vein surgery, perceiving it as a "major procedure" requiring extended perioperative care, prompting them to delay treatment until they had sufficient leave time. However, in modern medicine, most varicose vein surgeries have entered the minimally invasive era. Patients can ambulate immediately after surgery and undergo same-day discharge.<sup>22</sup>

I waited until the holiday season for the surgery, when I could properly rest during recovery. (P7, Female, 60–69 years)

But it just so happened that my year-end work was all wrapped up half a month ago. Since I had the time for surgery, there would be enough time for me to rest and recover after the operation. (P12, Male, 60–69 years)

## Peer Influence Bias

Some patients have relatives or friends that also have varicose veins. When deciding whether to undergo surgery, these patients tend to trust opinions from such familiar-patient peers more than their doctors' recommendations. However, these experiences shared by fellow patients may be influenced by individual differences and carry the risk of generalization.

Some of my cousins also have varicose veins. They underwent surgery, but the condition returned after a few years. They told me, “Surgery can’t cure it permanently—it will come back”. So, I hesitated. (P13, Male, 60–69 years)

A distant relative of mine had the same illness as I did. When the doctor said he needed surgery, he refused because he was afraid that he wouldn’t be able to walk afterwards. That’s exactly what scared me, too, and I dared not have the surgery. (P9, Male, < 50 years)

### Disparities in Medical Resource Distribution

Significant disparities in the adoption of minimally invasive varicose vein surgery in China manifest along two critical axes: East-central-west regional medical resource disparity and urban-rural medical resource disparity. The procedure is predominantly concentrated in tertiary hospitals located in China’s economically developed eastern region, while its implementation has yet to be widely established in the central and western regions and in rural areas of the eastern provinces.<sup>22</sup> Thus, patients with VLUs in central-western and rural areas faced surgical treatment delays.

I haven’t heard of where to have this varicose vein surgery. Smaller hospitals won’t perform this kind of surgery. (P6, Male, 50–59 years)

I’ve been seeking treatment in Shaanxi for 20 years. Doctors at the major hospitals in Xi’an said they dare not perform surgery, claiming that if they did, my leg would lose strength. (P9, Male, < 50 years)

## Discussion

This study is the first comprehensive qualitative investigation in China to explore the experiences of rural patients with VLUs across four intervals of the MPT: symptom appraisal, help-seeking, diagnosis, and receipt of surgical treatment. The barriers encountered by patients during these four intervals were categorized into three dimensions: disease-related, patient-related, and healthcare system-related factors. Specifically, disease-related factors were found to predominantly affect the appraisal and help-seeking intervals. Patient-related factors exerted influence across all intervals except diagnosis. Healthcare system-related factors played a significant role in all intervals other than appraisal.

### Disease Factors

Disease factors include “Symptom normalization” and “Misattribution of disease”. Due to the non-specific nature of symptoms associated with leg wounds, patients in the early stages often misinterpret them as minor injuries or mistakenly attribute them to trauma, infection, or dermatological issues. Consequently, these wounds receive insufficient attention until they fail to heal over time. However, if a patient has a history of varicose veins, the appearance of a leg wound should immediately raise concern, as it may develop into a chronic venous leg ulcer that is difficult to heal.<sup>23</sup> The typical location of venous leg ulcers around the ankle, combined with characteristic skin changes, further reinforces their misattribution to dermatological or orthopedic problems.<sup>20</sup> Consequently, patients often first seek care from dermatology or orthopedics rather than vascular surgery. These patterns clearly demonstrate a profound knowledge deficit among rural VLU patients, which in turn prolongs both the symptom appraisal and the help-seeking interval.

### Patient Factors

Patient factors comprised themes related to individual coping behaviors (“Self-treatment”, “Avoidant coping with symptoms”), personal perceptions (“Emotional and cognitive resistance to surgery”), and sociocultural influences (“Reliance on family support and decision-making”, “Peer influence bias”). Patients’ own health literacy, age, and coping styles significantly influence their healthcare-seeking behaviors. A retrospective survey in Finland found that the median time from wound detection to first contact with the medical team was only 2 days.<sup>9</sup> In contrast, more than one-third of patients in this study did not consider seeking medical help until two weeks after wound detection. This discrepancy may be attributed to the lower health literacy among rural patients, who seek professional help only when symptoms become intolerable or self-treatment fails.<sup>24</sup> Meanwhile, some patients adopted avoidant coping strategies, such as denying painful symptoms and avoiding surgery, which may serve as a mechanism to manage their fears.<sup>25</sup>

Furthermore, VLUs commonly affect elderly patients, making family support vital during medical visits and treatment. Family support includes acquiring disease knowledge, accompanying patients to appointments, assisting with treatment decisions, and providing home care when needed. However, for the many empty-nest elderly in rural areas, their adult children are often unable to fulfill this obligation because they live too far away or are busy with work.<sup>26</sup> If the hospital's voluntary accompanying service is improved, it can facilitate the elderly's access to medical care.<sup>27</sup>

In addition, patients' medical behaviors are shaped by sociocultural influences. According to Fei Xiaotong's theory of the "differential mode of association", Chinese social structure is organized concentrically: kin constitute the innermost circle, followed by friends and neighbors, with strangers at the periphery. Trust and obligation decrease with social distance.<sup>28</sup> This structure directly shapes rural patients' behavior. For instance, elderly patients often first consult their own adult children or spouse before seeking care. Similarly, when considering surgery, patients frequently place greater trust in the opinions of friends or relatives who have experienced similar conditions than in recommendations from physicians, who are perceived as part of the distant "outsider" circles. Thus, personal networks often serve as primary references in medical decision-making. This reliance, however, can easily lead to bias when non-professional opinions are prioritized over clinical advice.

## Healthcare System Factors

Healthcare system factors included themes primarily attributed to clinical capability limitations ("Misdiagnosis or missed diagnosis", "Delayed specialty referrals") or systemic inadequacies ("Low public awareness of vascular surgery", "Disparities in medical resource distribution"). Delayed diagnosis is frequently observed in rural patients with VLUs. Insufficient diagnostic and therapeutic experience in VLUs among primary care providers or non-vascular-surgery specialists easily leads to misdiagnoses, missed diagnoses, and delayed referrals to specialty centers. An Australian interview-based study among general practitioners (GPs) revealed that vascular function assessment is not routinely integrated into primary healthcare settings.<sup>29</sup> GPs demonstrated low confidence in diagnosing VLUs and typically initiated patient referral only after wounds had failed to heal for several months.<sup>30</sup> In this study, some patients showed no improvement or even experienced ulcer deterioration after three months of non-specialist treatment, yet failed to receive timely referral to venous specialty centers. According to the Australian and New Zealand Clinical Practice Guideline (2011),<sup>31</sup> ulcers not reduced in size by 25% in four weeks or failing to heal in 12 weeks should be considered for specialist referral. Separately, the UK's National Institute for Health and Care Excellence (NICE) guideline (2013)<sup>23</sup> recommends referral to a vascular service if a venous leg ulcer shows no signs of healing within just two weeks. However, studies have found that GPs often do not adhere closely to these guideline recommendations in practice.<sup>30,32</sup> Notably, current venous ulcer management guidelines in China, the United States, and Europe lack clear timelines for referring patients to specialized venous centers.<sup>1,20,33</sup> This ambiguity has left many primary care physicians and non-vascular specialists uncertain about when to initiate referrals for venous ulcer patients. Therefore, guidelines should be refined with specific, practical referral criteria, and GPs and non-specialist clinicians need to be supported to learn and apply them consistently, thereby facilitating better adherence and improving patient outcomes.

Vascular surgery is the surgical specialty concerned with the diagnosis, comprehensive management, and operative or interventional treatment of disorders of the arterial, venous, and lymphatic systems, excluding vessels of the brain and the heart.<sup>34</sup> As an emerging discipline in China, it remains underdeveloped in hospitals at the county level and below.<sup>21</sup> Public awareness is also low; patients are often unaware that conditions such as venous ulcers fall within the scope of vascular surgery. Furthermore, knowledge about minimally invasive treatments for varicose veins is limited among rural populations, leading to skepticism or reluctance toward these procedures. Consequently, there is an urgent need to strengthen public health education for chronic venous diseases. The content should not only cover the pathogenesis, clinical manifestations, and disease prognosis but also include the scope of the vascular surgery department as a specialized field and scientific explanations of surgical treatment options. In terms of delivery, regular rural medical missions and health lectures are more effective promotional tools for rural patients.<sup>35</sup> Furthermore, expanding the vascular surgery workforce both in number and expertise is crucial to improving resource distribution to underserved areas and ensuring timely care for rural VLU patients.

## Strengths and Limitations of the Work

This study is the first to systematically apply the MPT to VLUs, which are a chronic wound condition with distinct care-seeking patterns, generating disease-specific pathway insights. By focusing specifically on rural populations, it further reveals the unique interplay of disease, patient, and healthcare system-level barriers within rural healthcare ecosystems. The sample, which included patients from Zhejiang and other provinces (including central and western China), was designed to enhance socioeconomic heterogeneity. Finally, interviews were conducted within 10 days following patient's first varicose vein surgery to optimize the recall of initial symptoms, diagnostic processes, and surgical decision-making.

There are several limitations. First, owing to Mandarin communication barriers among some patients, family-member interpretation may have introduced “translation bias”, whereby relatives could have inadvertently altered patients' narratives by simplifying, reinterpreting, or supplementing them with their own experiences. Second, the generalizability of findings may be limited as participants were clinician-referred and interviewed exclusively post-surgery. Third, this sampling approach also introduces potential survivorship bias, as barriers faced by undiagnosed or non-surgical patients were not captured.

## Conclusion and Implication

This study identified patient-perceived treatment pathway barriers for rural patients with VLUs. Delays in symptom appraisal and help-seeking interval were due to poor disease knowledge and inappropriate help-seeking attitudes. Diagnostic delays mainly arose from insufficient VLU diagnosis and treatment experience among primary care physicians and non-vascular-surgery clinicians. Delays in accepting surgery resulted from patients' subjective perceptions of surgical outcomes and side effects, as well as objective medical resource shortages. Our findings offer valuable insights and highlight potential directions for improving care in similar rural settings. First, enhancing public education on venous diseases in rural areas should be prioritized as a key strategy for improving early awareness. Second, healthcare institutions could consider developing more age-friendly services. Furthermore, at the local or institutional level, there may be benefit in refining clinical pathways to include clearer referral criteria and supporting primary care and non-specialist clinicians through targeted training. Finally, increasing the number of vascular surgeons and enhancing their expertise in underserved areas remains a critical long-term challenge for addressing resource disparities. Future research employing longitudinal qualitative designs across multiple centers, with broader patient sampling (including non-surgical patients), is needed to validate these barriers in real time and assess the transferability of the proposed recommendations.

## Data Sharing Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

## Ethics Approval and Informed Consent

This research has been approved by the Medicine Human Research Ethics Committee of The Fourth Affiliated Hospital, Zhejiang University School of Medicine on November 25, 2024 (approval number: K2024209). Before the study commenced, the purpose and significance of the study were explained to the participants. Written informed consent was obtained from each participant, which included authorization for audio recording the interviews, transcribing the recordings, anonymizing all data, and publishing anonymized responses/direct quotes.

## Acknowledgments

The authors gratefully acknowledge that the patients shared their experiences.

## 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.

## Funding

The authors received no funding for this work.

## Disclosure

The authors declare that they have no competing interests in this work.

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