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Dynamic Trajectories of Psychological Resilience and Psychological Profiles Among Patients With Uremia and Pulmonary Tuberculosis: A Qualitative Study Based on Kumpfer's Resilience Framework

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Table 1 and 3 are available in the Supplementary Files section.

Dynamic Trajectories of Psychological Resilience and Psychological Profiles Among Patients With Uremia and Pulmonary Tuberculosis: A Qualitative Study Based on Kumpfer's Resilience Framework

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Abstract

Background Patients with uremia complicated by pulmonary tuberculosis (PTB) experience substantial physical and psychological burdens; however, their psychological resilience experiences remain poorly understood.This study aimed to explore the dynamic development of psychological resilience and psychological patterns among these patients to inform targeted psychological interventions.

Methods A qualitative descriptive study using semi-structured interviews was conducted.Purposive sampling was used to recruit patients who met the inclusion and exclusion criteria from the hemodialysis unit of a hospital in Hunan Province, China.Directed content analysis was performed using Kumpfer's Resilience Framework as the initial coding framework.

Results Sixteen patients were interviewed. Five themes and 10 subthemes were identified: stress and risk factors; environmental protective factors; internal factors; coping and interaction processes; and resilience outcomes.Perceived risk of PTB transmission emerged as an additional core category beyond the original framework.Four psychological resilience patterns were identified based on family support, economic security, perceived transmission risk, and family responsibility: altruistic-approach type,cognitive-acceptance type,resource-depletion type,Guilt-avoidance type.

Conclusions Psychological resilience among patients with uremia and PTB followed a chain-like dynamic developmental pathway shaped by cognitive schemas, family support, and differences across treatment milestones. The four identified psychological profiles may inform precision psychological interventions tailored to distinct nursing targets.

【Keywords】 Uremia; Pulmonary Tuberculosis; Psychological Resilience; Psychological Profiles; Qualitative Study

Introduction

Uremia represents the terminal stage of chronic kidney disease (CKD)[1]. As the global burden of CKD increases, so does the number of patients with uremia [2]. These patients depend on renal replacement therapy, such as maintenance hemodialysis (MHD), to sustain life [3]. Toxin accumulation, long-term dialysis, and immune dysfunction also substantially increase their susceptibility to pulmonary tuberculosis (PTB) [4]. The reported incidence of PTB among patients with CKD is 6.9–52.5 times that of the general population and is higher still among patients with uremia [5]. The coexistence of these conditions complicates treatment and markedly reduces patients' quality of life [6].

Psychological resilience is the capacity to maintain adaptive functioning in the face of adversity and is associated with more favorable psychosocial outcomes among patients with chronic illness [7]. Long-term dialysis and the potential transmissibility of PTB impose a dual burden of physical suffering and psychological distress. Previous studies have reported generally low levels of resilience among patients receiving MHD and those with PTB [8-11]. However, research has largely examined resilience in each condition separately. Consequently, nurses lack a comprehensive understanding of how patients with these comorbid conditions experience and develop resilience, which may limit the provision of individualized psychological support.Kumpfer's Resilience Framework conceptualizes resilience as the outcome of dynamic interactions between risk and protective factors [12] (Figure 1 [13]). It therefore provides a theoretical basis for examining psychological adaptation in

patients with comorbid conditions. However, its applicability to patients experiencing both infectious and noncommunicable diseases remains insufficiently explored.Guided by this framework, the present qualitative study explores how patients experience and develop psychological resilience while managing the combined challenges of uremia and PTB, including PTB-related stigma. It also examines patterns of resilience development and psychological experiences to inform individualized psychological nursing interventions.

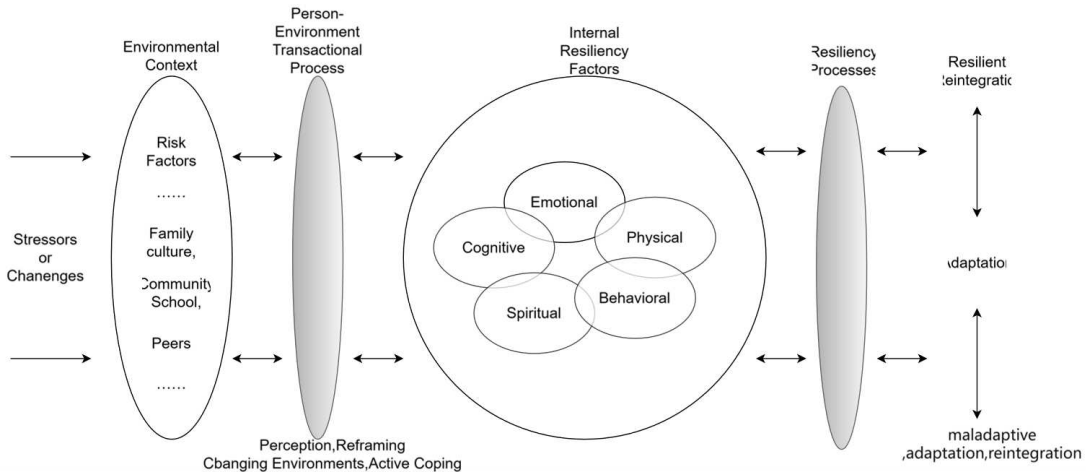


Figure 1 Kumpfer's resilience framework

Participants and Methods

Participants

Purposive sampling was used to recruit patients with uremia and pulmonary tuberculosis (PTB) who received maintenance hemodialysis (MHD) at a tertiary hospital in Hunan Province, China, between April and June 2026. In accordance with the maximum variation principle, patients were selected to represent a range of sexes, ages, dialysis vintages, and durations of PTB. **Inclusion criteria were:** (1) a clinical diagnosis of end-stage renal disease and receipt of MHD for ≥3 months; (2) a current

or previous diagnosis of active PTB, with positive or negative etiological test results (the latter diagnosed through comprehensive clinical assessment in accordance with the Diagnostic Procedure for Etiologically Negative Pulmonary Tuberculosis [T/CHATA 008—2020] [14]), whether diagnosed before or after the initiation of dialysis, and receipt of anti-tuberculosis treatment either previously or at the time of recruitment; (3) age ≥18 years, clear consciousness, basic reading comprehension and verbal communication abilities, and the ability to complete an interview independently; and (4) an understanding of the study and voluntary participation with written informed consent. **Exclusion criteria were:** (1) severe cognitive impairment, psychiatric illness, or impaired consciousness; (2) critical illness, inability to communicate adequately, or a life expectancy of <3 months; (3) participation in a qualitative study or psychological intervention program within the preceding six months; and (4) unwillingness to cooperate, withdrawal during the study, or incomplete data. Recruitment continued until information saturation was reached and a further one or two interviews yielded no new information. Sixteen patients were ultimately included and assigned identifiers N1–N16. Their demographic and clinical characteristics are presented in Table 1.

Methods

Development of the Interview Guide

An initial interview guide was developed through a literature review and research team discussions. Before the main interviews, pre-interviews were conducted with two individuals who met the eligibility criteria to assess the guide's rigor and

suitability. The guide was revised in response to their feedback, and the final version was then established. Owing to space constraints, Table 2 presents only the core questions.The complete English version of the interview guide is provided in Supplementary File 1.

Table 2 Formal interview guide

Dimension	Representative Questions
Illness experience	When your doctor told you that you had pulmonary tuberculosis, that it could be transmitted to others, and that you needed to receive dialysis in an isolation room, how did you feel? How did you view the diagnosis?
Stress	How has living with both conditions affected your life? Probes: What effects have you experienced physically, emotionally, and in your social interactions?
External support	Who has helped you most during treatment? Probes: How has your family supported you? What help from doctors or nurses has been particularly memorable? Has talking with other patients had any positive effects on you?
Internal factors	From your perspective, what has helped you continue treatment? Probes: How do you view your illness and your future? How do you manage your emotions? What beliefs help you persist with treatment?
Coping process	How has your outlook changed since you began dialysis and anti-tuberculosis treatment? Was there a particularly difficult period? If so, how did you get through it?
Outcomes	Compared with when you first began treatment, in what ways do you feel you have grown or gained something? What do you still find difficult to adjust to?
Sharing and passing on experiences	What advice would you give to patients going through a similar experience?

Data Collection

A phenomenological research method was used, with data collected through face-to-face, semi-structured, in-depth interviews. The interviewer was the principal researcher, who had participated in the patients' routine care and established a trusting relationship with them. Given the length of dialysis sessions, interviews were conducted at the bedside in each patient's individual dialysis bay. Interruptions were minimized, and participants were encouraged to express their thoughts openly. The order of questions in the interview guide was adjusted in response to participants'

answers to facilitate fuller accounts. Interviews were audio-recorded, and non-verbal information, including body language, facial expressions, and tone of voice, was documented. Each participant was interviewed once for 25–35 minutes.

Ethics approval and consent to participate

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Changsha Central Hospital, University of South China (Approval No.2024-Yi-Shen-060). Written informed consent was obtained from all participants before their enrollment in the study.

Data Analysis

Within 24 hours of each interview, the interviewer listened to the recording repeatedly, transcribed it verbatim, and marked passages in which the participant's emotional state appeared to change. Guided by Kumpfer's Resilience Framework, the data were examined using directed content analysis [15]. The five dimensions of the framework—Stress and Risk Factors, Environmental Protection Factors, Internal Factors, Coping and Interaction Process, and Resilience Outcomes—formed the initial coding tree. Data that could not be assigned to these predefined dimensions were given emergent subcodes. Approximately 25% of the coded material required new subcodes, including statements concerning transmission-related stigma, such as "I'm afraid I'll infect my grandson." Perceived risk of transmission was ultimately identified as a core coding category distinct from those in the original framework. NVivo 20.0 was used to support coding, categorization, and synthesis, from which shared patterns and themes were developed. The researchers sought to avoid imposing

their own assumptions or experiences during analysis to preserve the credibility and authenticity of the data.

Quality Control

(1) All members of the research team—including one chief nurse, one associate chief nurse, and two specialist dialysis nurses—received training in qualitative research methods. The interview guide was discussed and revised collectively. (2) Interviews were conducted independently by the trained researcher. Before each interview, participants were informed of the study's purpose and confidentiality procedures and provided written informed consent. The interviewer maintained a neutral stance, avoided leading questions, and used follow-up questions and clarification to encourage participants to elaborate. Interviews were transcribed promptly. (3) The data were analyzed using Colaizzi's seven-step method. Two researchers coded the data independently and conducted a back-to-back comparison of their coding; disagreements were resolved through discussion with the research team.

Results

Analysis of interviews with 16 patients with uremia and pulmonary tuberculosis, guided by Kumpfer's Resilience Framework, yielded five themes and 10 subthemes describing their psychological experiences: Stress and Risk Factors (secondary stress and direct illness impact); Environmental Protection Factors (formal and informal support networks, and peer and social support); Internal Factors (behavioral, emotional, and spiritual and cognitive factors); Coping and Interaction Process (active

coping strategies, and cognitive appraisal and restructuring); and Resilience Outcomes (resilience outcomes). The hierarchical thematic coding structure is shown in Figure 2.



Note: The area of each colored block/sector represents the proportion of coded references for each theme relative to the total number of coded references.

Figure 2 Thematic map of resilience based on Kumpfer's resilience framework (N = 16)

Stress and Risk Factors

Sub-theme 1.1: secondary stress

Patients with uremia and pulmonary tuberculosis (PTB) faced treatment-related physical discomfort, financial strain, time demands, and adverse reactions. They also experienced psychosocial stressors, including social isolation, stigma, anxiety about transmitting PTB, and a diminished sense of self-worth.

N1: “The financial pressure is heavy, but there’s nothing I can do. With this illness, one part of my body hurts and then another. I still have to go for dialysis—I can’t do without it. If too many complications develop, I could die.”

N12: “I don’t ask for much, as long as there’s somewhere I can have dialysis. I like talking and preferred being in the larger dialysis room. Now I’m separated from everyone, and I feel a little lonely. At first, I also had to stay apart from my family. I couldn’t go home to my wife and children, so I rented a place on my own. I did feel lonely, and I missed them.”

Sub-theme 1.2: direct illness impact

An initial PTB diagnosis often elicited immediate reactions such as shock and denial, alongside negative interpretations of the illness as a sign of misfortune. These responses shaped patients’ initial perceptions of their condition.

N1: “It weighed heavily on me. I was so anxious. I thought, ‘Why is my life so hard?’ I’d only just started dialysis, and then the doctor told me I had this disease too.”

N12: “The PTB diagnosis didn’t feel like the end of the world. When I was first diagnosed with uremia, it felt as though I’d already been sentenced to death and was just waiting for the execution. That’s how I saw it.”

Environmental Protection Factors

Sub-theme 2.1:formal and informal support networks

Information, treatment, and emotional support from healthcare professionals, together with financial assistance, practical care, and emotional reassurance from family members, formed patients’ core support system.

N6: “I don’t have to worry about things at home. I can focus on looking after my health, without worrying about what’s happening there.”

N15: “The doctors work out what’s wrong and prescribe medicine, and the nurses explain things to us. They’re responsible and professional, and they notice changes in our condition promptly. What matters most is the warmth of my family, getting along with one another, and the help and encouragement of my children and grandchildren. With all that, and the nurses’ careful attention, I feel more and more that I want to live longer.”

Sub-theme 2.2:peer and social support

Support from fellow patients provided a sense of belonging, role models, and opportunities to share experiences. It could reduce stigma, foster hope, and help patients acquire knowledge for self-management.

N1: “The other dialysis patients tell me, ‘It’s all right. Some people have been on dialysis for years, and you’ve only just started. Don’t let it weigh on you. Just keep coming every week.’”

N4: “I often look out for others during dialysis because I’m still in fairly good spirits. Some patients feel very low. One was especially negative at first, so I talked to him. I said, ‘Your family can afford treatment. You may not be able to work now, but you’re still the head of the family—the person who holds everyone steady.’”

Internal Attributes

Sub-theme 3.1:behavioral factors

Patients actively sought disease-related knowledge and self-management skills. Mask use, isolation when required, dietary management, and regular dialysis formed

their principal strategies for reducing transmission risk and maintaining physical functioning.

N4: “If I have a question, I ask. There are lots of patients here. If it’s about medication, I ask other patients or the doctors. I see how others are doing and then make adjustments for myself.”

N8: “I’ve heard that some people may now be able to do it at home.”

N12: “I don’t know whether other people are afraid, but I’m afraid they’ll avoid people like us. After all, it can be transmitted. Even if they don’t avoid me, I have to keep my distance from them and wear my mask properly.”

Sub-theme 3.2: emotional factors

A sense of responsibility toward family motivated patients to regulate their emotions and continue treatment. In some accounts, sadness, fear, and irritability following diagnosis gradually gave way to a more positive outlook.

N1: “The people around me are good to me, so I want to be good to them too. My granddaughter even said, ‘Grandma, I get upset when you’re ill.’”

N12: “I can’t give up. Life means a great deal to me because I have my wife, and I want to stay with her. I owe her so much. She’s barely had an easy day since we married. When I became ill, our older child was three and the younger one was only a few months old. Since then, she’s carried all the household expenses on her own. Even if I can’t do much to help, I want to stay by her side for as long as I can.” (Voice breaks.)

Sub-theme 3.3: spiritual and cognitive factors

Patients' views of the meaning of life, death, and fate interacted with cognitive restructuring concerning the causes of illness, its treatability, and the value of treatment adherence. Together, these processes could support a shift from despair toward acceptance and active coping.

N14: "This disease is serious. At first, I thought it couldn't be treated. Later, I learned that tuberculosis can be treated."

N12: "I've been on dialysis for more than ten years, and I've learned to take many things in stride. If something can be treated, I'll treat it; if it can't, there's nothing I can do. These 17 years feel like time I've bought back. I don't think much beyond trying to get treatment."

N15: "I try to live happily and feel content. Some people have it harder than I do, and others have it better—that's life. Some die in their forties or fifties, and many older people have passed away too. I've lived to 67 or 68, and I'm grateful for that. So I try to be happy. It would be best if I could still look after myself without depending on others."

Coping and Interaction Process

Sub-theme 4.1: active coping strategies

Patients' coping strategies included seeking help from family, healthcare services, and social resources; regulating emotions; and addressing practical problems such as dietary restrictions and dialysis-related side effects.

N1:“People in the ward say,‘Look at your husband—when you smile, he feels better. But if you don’t, it affects him. How can he look after you then?’ So I keep my suffering to myself. I try to make him laugh, and then he makes me laugh.”

N13: “I don’t think about those things. Thinking about them doesn’t help; it only makes things worse.”

Sub-theme 4.2:cognitive appraisal and restructuring

As their illnesses progressed, some patients’ perceptions of their condition, themselves, and their future shifted from resistance, through passive acceptance, toward active meaning construction, supporting more adaptive responses.

N8: “Once you have this disease, you have to treat it, whether you like it or not. My outlook hasn’t really changed. It’s a fact, and I have to accept it.”

N12: “At first, I was irritable, even when I spoke to my family. After a while, I thought about it and realized they hadn’t caused my illness.”

N16: “There’s no point being afraid. I’ve got the disease, so I have to get it treated. That’s just how it is.”

Resilience Outcomes

Sub-theme 5.1: Psychological Resilience Outcomes

Coping outcomes varied considerably. Patients showing better adaptation described improvements in outlook, self-management, family relationships, and altruistic behavior. Those experiencing difficulties remained burdened by physical discomfort, social isolation, and anxiety arising from uncertainty about their illness and treatment.

N1: “When you’ve been ill for a long time, you learn a thing or two about it. I hope the other patients can gradually find a better frame of mind. Do what the doctor says and try not to overthink it—worrying won’t change anything.”

N9: “I just do what I can and take things as they come. Now that I have this disease, I’ll cooperate with treatment. It’s all right.”

N5: “My hands and feet cramp so badly I can’t straighten them, and I feel dizzy. Dialysis still leaves me feeling awful.”

N12: “The main problem is how awful the anti-tuberculosis medicine makes me feel. I still wonder whether I can get through these months of taking it. The side effects are so severe; they really take a toll on my body.”

Together, these five themes delineate a chain-like dynamic pathway of resilience, progressing from exposure to stress, through the mobilization of resources, internal motivation, and coping behavior, to adaptive feedback (Figure 3). However, coping approaches and adaptation outcomes varied considerably across the 16 participants. By grouping participants along two dimensions—resource accessibility, particularly access to family support and financial security, and meaning construction, encompassing perceived risk of transmission and family responsibility identification—we identified four psychological profiles within the study sample. Their characteristics are compared in Table 3.

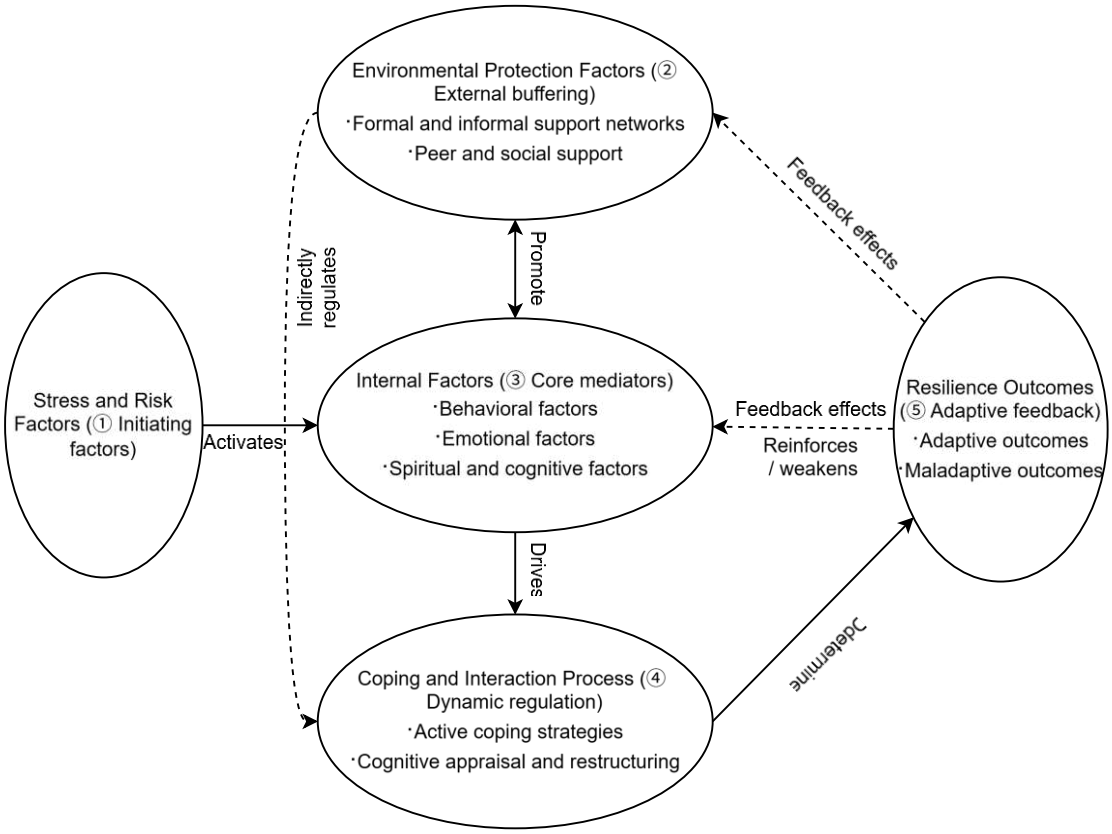


Figure 3 Chain-like dynamic pathway model of resilience in uremia patients with pulmonary tuberculosis based on Kumpfer's framework

Discussion

Guided by Kumpfer's Resilience Framework, this study used in-depth interviews with 16 patients with uremia and pulmonary tuberculosis (PTB) to identify a dynamic, chain-like pathway of resilience: stress exposure → environmental buffering → internal factors → coping processes → resilience outcomes. Four psychological profiles were identified: the altruistic-approach, cognitive-acceptance, resource-depletion, and guilt-avoidance types. The direction of resilience development was shaped neither by external support nor by individual capacity alone. Rather, under sustained illness-related stress, environmental factors and individual cognitions interacted, while coping behaviors were repeatedly adjusted, producing a nonlinear dynamic process. Adaptive outcomes appeared to depend on the direction of

feedback: when coping behaviors drew on external resources to revise negative cognitions, a positive feedback loop could develop; when this process failed, maladaptation could intensify. These findings suggest that clinical interventions should extend beyond the provision of resources. Tiered nursing should address the principal blocking nodes associated with each profile through cognitive restructuring, activation of coping behaviors, and restoration of resources, with the aim of interrupting maladaptive vicious cycles.

Functional Differentiation of External Support and Corresponding Nursing Targets

External support networks provided an initial buffer as patients began to cope with illness-related stress. However, formal, family, and peer support served distinct functions, indicating that nursing interventions should mobilize each source according to patients' needs. Formal support centered on professional information, treatment guidance, and emotional support from healthcare professionals. As N1 observed, "The doctors and nurses are all very good … It feels as warm as home here." Such support could ease some of the burden of managing both conditions and help correct misconceptions about transmission risk, thereby supporting treatment adherence. Previous studies have documented the contribution of formal support to treatment adherence [16,17]; our findings also indicate its potential value in reducing perceived illness burden and addressing inaccurate risk perceptions. Family care, financial assistance, and emotional reassurance were the most immediate and sustained sources of external support. In this study, attentive family care encouraged some patients to

reciprocate emotionally: they persisted with treatment partly because they did not want to let their families down. This reciprocal emotional process is consistent with the observations of McCauley et al. [18]. When assessing family support, nurses should therefore consider both the availability of care and whether patients experience that care as a source of motivation to continue treatment. The latter may help initiate a protective feedback loop.

The role of peer support in reducing stigma, strengthening belonging, and fostering hope is consistent with previous research [19-22]. Our findings suggest, however, that peer support was not equally accessible or acceptable to all patients. Some could not participate in patient groups because of financial constraints or a lack of someone to accompany them; others avoided contact with peers because of heightened concern about transmission. Before incorporating peer support into routine health education, nurses should therefore determine whether limited participation reflects practical barriers or avoidance driven by perceived transmission risk.

These distinct functions of external support call for a shift from simply providing resources to activating the forms of support most relevant to each patient. Repeated assessment of patients' changing needs can help nurses mobilize appropriate resources and strengthen positive feedback loops.

Reciprocal Cycle Between Cognitive Restructuring and Coping Behaviors

The buffering effects of external resources depend on how individuals interpret and use them. In this study, cognitive change appeared to precede behavioral adjustment. Early in the illness course, this change often amounted only to an initial reduction in

the sense of crisis, rather than a broader reconstruction of meaning. Although external support could facilitate such change, its consolidation into a more stable cognitive framework appeared to depend on repeated feedback from active coping. Most participants initially held pessimistic expectations about survival. Over time, some came to understand illness as part of their life course, while generalized fear gave way to more specific concerns, as illustrated by N12 and N14. This shift created space for behavioral change. Patients could come to view symptom logging and communication with healthcare professionals as ways to regain a sense of control, with subsequent experiences reinforcing their revised understanding rather than merely prompting passive compliance. Previous research suggests that information provision or emotional reassurance alone is insufficient to sustain behavioral change [23,24]. Our findings suggest that changes in patients' expectations about their future may help make reassurance meaningful and behavioral support acceptable.

Active coping strategies may improve disease management directly while also helping patients recognize and use available environmental resources. A central finding was that the initiation of active coping was closely linked to cognitive restructuring. Once active coping began, favorable experiences could reinforce new ways of understanding illness, creating a self-reinforcing cycle of cognition, behavior, and feedback. Where cognitive restructuring did not occur, patients could remain reliant on avoidance; negative experiences might then reinforce catastrophic interpretations and amplify perceived stress, contributing to a progressive cycle of maladaptation.

Clinical interventions need not follow a fixed sequence of cognitive, emotional, and behavioral components. Instead, nurses should identify the principal barrier to a positive feedback loop at a given time: a rigid cognitive framework, a prolonged absence of constructive behavioral feedback, or a structural lack of external resources. Pressing patients to change their behavior before their understanding of the illness has shifted may increase frustration. Conversely, when patients are willing to act but lack the necessary skills, timely structured behavioral support may help them regain a sense of control and reinforce cognitive change.

Group Differences in Resilience Characteristics and Multidimensional Patient Personas of Care Needs

Differences among the four resilience profiles are consistent with the central proposition of Kumpfer's Resilience Framework: resilience outcomes emerge through dynamic interactions between environmental resources and individual cognitions. Variation in these interactions was associated with different adaptive outcomes. Resource accessibility and the ways patients constructed meaning were two important dimensions distinguishing the profiles. Each profile was characterized by a different blocking node in the resilience pathway, providing a potential target for stratified intervention.

The altruistic-approach type was characterized by a relatively direct conversion of external protection into internal motivation. Patients internalized care from a spouse or children as a moral responsibility to persist with treatment and viewed their own coping as a form of relationship reciprocity. Their strategies, however, focused

heavily on responding to their families' emotional investment, with limited opportunities for self-care or emotional expression. They tended to share good news while concealing difficulties from family members and managing distress alone. Although this pattern could appear adaptive, emotional labor exhaustion might accumulate. Changes in family support or a recurrence of illness could therefore leave these patients particularly vulnerable when family responsibility was their principal source of motivation.

The cognitive-acceptance type was distinguished by a tendency to process illness in practical, routine terms, which appeared to lessen its emotional impact. These patients sought help infrequently but did not reject support when it was available, allowing them to maintain a relatively stable state with limited active coping. This apparent stability, however, could reflect passive compliance. Although it might support short-term adaptation, limited preparation for unexpected complications could leave these patients vulnerable.

For the resource-depletion type, the resilience pathway was disrupted at the level of environmental protection. These patients were often widowed or divorced, or lived apart from their children. N5 expressed concern that "people might dislike me," while N9 stated, "I don't have much hope; I just take things as they come." Limited social connections compounded financial strain, leaving patients with few external resources. Although they retained a desire to live, they lacked some of the social support needed to sustain regular treatment. The blocking node therefore appeared

near the beginning of the resilience pathway, in a state of seeking support but failing to obtain it.

The guilt-avoidance type showed a different pattern. Family support was available, but patients withdrew from this protective resource as soon as they perceived illness-related stress. Although married, they had often been the primary caregiver in their household. Interview accounts conveyed self-blame about being "unable to earn money … and becoming a burden to the family," alongside a strong fear of "infecting family members." These stigmatizing perceptions contributed to withdrawal despite the availability of support. Treatment adherence was maintained largely as a routine obligation, while participation in family roles diminished. Within the proposed typology, this profile appeared to involve the most pronounced disruption of the resilience pathway and the greatest challenges for intervention.

Recommendations for Implementing Stratified Clinical Interventions Based on Persona-Specific Blocking Nodes

The different blocking nodes identified across the four profiles suggest that stratified care should extend beyond assigning patients to categories and address the specific points at which their resilience pathways are disrupted. These profiles should not be regarded as fixed: patients may move between them as their illnesses progress or as their financial circumstances and family relationships change. Reassessment of psychological motivation and the use of available support should therefore form part of ongoing care. For patients with the altruistic-approach type, interventions should strengthen self-care and emotional coping to reduce the risk of exhaustion. Because

these patients tend to “keep their suffering to themselves,” nurses should assess psychological burden through open-ended questions during dialysis or follow-up, alongside clinical indicators such as creatinine clearance and sputum conversion. The aim is to preserve patients’ valued contribution to their families while helping them identify at least one way to express distress or seek help without guilt. Self-care can thus become a feedback component within their resilience pathway.

Patients with the cognitive-acceptance type generally engage with routine health education. Intervention should focus on activating active coping and establishing a means of recognizing warning signs. Nurses can help patients develop specific action plans to reduce the risk of difficulty adapting when unexpected complications arise. Brief screening during extended nursing care should also address tolerance of drug side effects, sleep quality, and changes in appetite, so that accumulating difficulties are not overlooked beneath an apparently stable presentation.

For patients with the resource-depletion type, interventions should focus directly on restoring environmental protection factors, with care extending beyond the hospital. The primary nurse should work with community healthcare professionals to help patients access temporary assistance or applicable subsidies. Regular follow-up can identify gaps in informal support networks and facilitate connections to available support, strengthening the external conditions needed for continued treatment and active coping.

For patients with the guilt-avoidance type, interventions should focus on adjusting illness-related beliefs. Rather than relying on information provision alone, nurses

should use motivational interviewing to help patients distinguish the risk of airborne transmission from the risks they associate with routine household contact. Safe family interactions should then be restored gradually, guided by an assessment of infectiousness and appropriate infection prevention measures. Success should not be defined as an immediate return to all forms of family contact. Instead, the aim is to help patients safely reintegrate at least one source of family support into their resilience pathway and begin to move beyond the self-label of a “source of infection” toward their identity as a family member. This process may require sustained support and gradual goals.

Conclusion

Guided by Kumpfer's Resilience Framework, this study interviewed 16 patients with uremia and PTB, identified five core themes, developed a chain-like dynamic pathway model of resilience, and characterized four psychological profiles. Profile-specific intervention recommendations were proposed to inform clinical nursing care. However, the proposed “dynamic” trajectory was reconstructed from patients’ retrospective narratives within a cross-sectional design. The study therefore could not directly observe changes in resilience over a longer treatment period, particularly changes in feedback-loop strength or the conditions associated with turning points. The saturation and generalizability of the profiles also require further examination in multicenter, large-sample studies. In addition, potential interactions between transmission-related stigma and factors such as the frequency of dialysis complications and doctor-patient communication warrant closer investigation. Future

research could develop a profile assessment tool for this population and evaluate the effectiveness of profile-matched stratified interventions.

List of abbreviations

CKD: Chronic Kidney Disease

MHD: Maintenance hemodialysis

PTB: Pulmonary tuberculosis

AVF: Arteriovenous Fistula

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Changsha Central Hospital Affiliated to University of South China (Approval No.2024-Yi-Shen-060). Written informed consent was obtained from all participants before data collection.

Trial registration

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to privacy and ethical restrictions but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Chao Fu and Chuanfang Wu conceptualized and designed the study. Shan Wu and Chang Luo conducted the literature search, recruited participants, and performed the semi-structured interviews.Yujie Liu and Wenyan Liao transcribed the interviews, coded the data, and conducted the thematic analysis. Chao Fu, Yujie Liu, and Wenayn Liao mapped the themes onto Kumpfer's resilience framework. Chao Fu drafted the manuscript. Shan Wu, Chang Luo, and Yujie Liu contributed to data interpretation and critical revision of the manuscript. Chuanfang Wu supervised the study, provided methodological guidance, and acquired funding. All authors read and approved the final manuscript.

References

1. Chen YA, Mei DD, Guo SL. Effect of family empowering mode on improving negative mood and compliance in hemodialysis patients with uremia. Chin Nurs Res. 2023;37(17):3217-3220.
2. Francis A, Harhay MN, Ong ACM, et al. Chronic kidney disease and the global public health agenda: an international consensus. Nat Rev Nephrol. 2024;20(7):473-485. https://doi.org/10.1038/s41581-024-00820-6.
3. Chen HX, Zhang ZZ, Wang XL. Clinical observation on the efficacy of Fuyang Jieniaodu Decoction in treating renal anemia in maintenance hemodialysis patients. Chin J Tradit Med Sci Technol. 2023;30(5):928-930.
4. Beyene E, Demissie Z, Jote WT, et al. Burden of tuberculosis in end stage renal disease patients undergoing maintenance hemodialysis: a multicenter study and experience from Ethiopian dialysis setting. Int J Nephrol Renovasc Dis. 2024;17:59-69.https://doi.org/10.2147/IJNRD.S450565.
5. Chandra S, Devassy TV. Epidemiological and management challenges in tuberculosis with chronic kidney disease. Indian J Tuberc. 2025;72(1):S64-S67.https://doi.org/10.1016/j.ijtb.2025.02.001.
6. Tang ZH, Liu XL, Luo XH, et al. Effect of prospective nursing on pulmonary tuberculosis complications in patients with end-stage renal disease undergoing maintenance hemodialysis. J Clin Nurs Pract. 2024;10(5):25-28.
7. Shi Y, Liang ZQ, Zhang YJ, et al. Latent profiles of psychological resilience in patients with chronic disease and their association with social support and activities of daily living. BMC Psychol. 2025;13(1):792.https://doi.org/10.1186/s40359-025-03115-y.
8. Poudel B, Timalsina R. Factors associated with resilience among patients with end-stage kidney disease receiving hemodialysis in a teaching hospital: a cross-sectional study. BMC Nephrol. 2025;26(1):99.https://doi.org/10.1186/s12882-025-04008-3.
9. Liu J, Zhang YJ, Yang YJ, et al. Investigation of mental resilience and its influencing factors in young and middle-aged maintenance hemodialysis patients. Chin J Blood Purif.

2019;18(8):571-574.
10. Huang YL, Yang QQ, Zhao SY. Application of mindfulness-based stress reduction combined with psychological intervention in patients with pulmonary tuberculosis. Psychol Mon. 2025;20(16):175-177,180.
11. Zheng LJ, Zhang YC. Analysis of psychological status, psychological resilience and social support among young and middle-aged patients with pulmonary tuberculosis. Nurs Pract Res. 2021;18(5):684-687.
12. Kumpfer KL. Factors and processes contributing to resilience. In: Glantz MD, Johnson JL, editors. Resilience and development: positive life adaptations. Boston: Springer; 2002. p.179-224.
13. Cheng HT, Zhou Y, Zhou JY, et al. Experiences of psychological resilience in coping with diabetes based on the Kumpfer resilience framework: a qualitative study. Chin J Mod Nurs. 2025;31(9):1154-1162.
14. Chinese Antituberculosis Association. Diagnosis process for etiology negative pulmonary tuberculosis: T/CHATA 008-2020. Beijing: Chinese Antituberculosis Association; 2020.
15. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107-115.
16. He XP. Effect of humanistic care on medication adherence and nursing satisfaction in patients with AIDS complicated with pulmonary tuberculosis. Contemp Med. 2020;26(4):182-183.
17. Gow K, Rashidi A, Whithead L. Factors influencing medication adherence among adults living with diabetes and comorbidities: a qualitative systematic review. Curr Diabetes Rep. 2024;24(2):19.https://doi.org/10.1007/s11892-023-01532-0.
18. McCauley R, Ryan K, McQuillan R, et al. Mutual support between patients and family caregivers in palliative care: a qualitative study. Palliat Med. 2023;37(10):1520-1528.https://doi.org/10.1177/02692163231205130.
19. Yang J, Jiang Y, Wu Q, et al. Evaluation of peer education effectiveness among patients with pulmonary tuberculosis in Kashgar region. Chin Nurs Res. 2023;37(18):3392-3395.
20. Anderson E, Powers R, Pang KC, et al. The longitudinal impact of a peer support program on adolescents experiencing chronic illness. J Paediatr Child Health. 2025;61(9):1486-1494.https://doi.org/10.1111/jpc.70139.
21. Lin XB, Wu WY. Effect of acceptance and commitment therapy combined with peer support on hope level, coping style and stigma in patients with AIDS. Chin Foreign Med Res. 2023;21(30):168-172.
22. Virtič Potočnik T, Mihevc M, Zavrnk Č, et al. Evaluation of a specialist nurse-led structured self-management training for peer supporters with type 2 diabetes mellitus with or without comorbid hypertension in Slovenia. BMC Nurs. 2024;23(1).https://doi.org/10.1186/s12912-024-02239-7.
23. Huang R, Zhu Z, He M, et al. The curative-to-preventive perspective shift of medical students through community dementia programs: a qualitative study based on transformative learning theory. Front Public Health. 2026;13:1708455.https://doi.org/10.3389/fpubh.2025.1708455.
24. Darnall BD, Burns JW, Hong J, et al. Empowered Relief, cognitive behavioral therapy, and health education for people with chronic pain: a comparison of outcomes at 6-month follow-up for a randomized controlled trial. Pain Rep. 2024;9(1):e1116.https://doi.org/10.3389/fpubh.2025.1708455.

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