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A Qualitative Study of the Healthcare Experience of Older Neurosurgical Cancer Patients in the Context of Intelligent Healthcare

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Abstract

Objective: To gain an in-depth understanding of the healthcare-seeking experiences, difficulties, and needs and expectations of elderly neurosurgical cancer patients in the context of intelligent healthcare, and to provide evidence for targeted optimization of care-seeking processes for this population. **Methods:** Using purposive sampling, semi-structured interviews were conducted with 8 elderly patients who sought care at SYSUCC from June to December in 2025. A phenomenological approach was used to code and categorize the data and to refine themes. **Results:** Under the context of intelligent healthcare, three themes and seven subthemes were identified among elderly patients seeking care: perceived difficulties in seeking care (perceived safety difficulties, perceived usefulness difficulties, perceived comfort difficulties), difficulties in seeking care amid digital transformation (support for intelligent and digital healthcare, poor adaptability to intelligent services), and difficulties related to self and family support (difficulties associated with multimorbidity, care-seeking difficulties due to weak family support). **Conclusion:** In this cohort of older neurosurgical cancer patients, multiple difficulties were identified in the context of intelligent healthcare. These findings suggest that this population requires societal attention and support. Healthcare professionals may consider implementing targeted interventions and strengthening support systems to improve their care-seeking experience. Future studies are needed to explore whether similar findings apply to other cancer types.

Keywords

Older Patients, Cancer, Neurosurgical, Intelligent Healthcare, Healthcare-Seeking Experience, Qualitative Research

1. Background

With rapid socioeconomic development and sustained improvements in healthcare and public health conditions, population aging has become increasingly pronounced worldwide. Population aging in China is characterized by a large scale, rapid pace, and substantial depth. According to the 2025 population data released by the National Bureau of Statistics, by the end of 2025, the total national population was 1,404.89 million, with 323.38 million people aged 60 years and above, accounting for 23.0% of the total population; among them, 223.65 million were aged 65 years and above, accounting for 15.9% of the total population [1]. Since China entered a moderately aged society, the aging process has continued to deepen and has become intertwined with and compounded by complex trends such as negative population growth, declining fertility, and advanced aging, with shifts in population structure exerting profound effects on the social security system, the provision of medical services, and the logic of social governance [2].

With the intensification of population aging, older adults' difficulties in accessing medical care have become an important area of research. Studies indicate that the challenges faced by older cancer patients in seeking medical care are multidimensional. At the level of the physical environment, inadequate barrier-free facilities in hospitals and overcrowded waiting areas undermine older cancer patients' sense of safety and comfort. At the level of digital technology, barriers such as a lack of smart devices, insufficient age-friendly functions, and poor interoperability across platforms constrain older cancer patients' access to services [3]. At the level of individual capability, limited digital literacy among older adults, weak willingness to use smart healthcare, and insufficient knowledge and skills exacerbate the gap between them and digitalized healthcare [4]. At the ethical level, scholars have noted that the development of AI in geriatric healthcare faces challenges related to the digital-intelligence divide, and that advances in digital health technologies exhibit paradoxical effects; older adults, due to insufficient participation, become marginalized as outsiders to "virtual healthcare" [5].

Although existing studies have addressed specific aspects of older cancer patients' healthcare experiences, qualitative research that adopts the older patient's own perspective to examine their authentic experiences in the context of intelligent healthcare remains insufficient. While quantitative questionnaire surveys can reveal the prevalence of problems and their associations, they have limited ability to capture older cancer patients' subtle psychological experiences, emotional changes, and behavioral decision-making processes during care seeking. Therefore, this study employs a phenomenological qualitative approach and conducts semi-structured in-depth interviews with older cancer patients to gain a deeper understanding of their healthcare experiences, the difficulties they encounter, and their needs and expectations in the context of intelligent healthcare, thereby providing empirical evidence and practical insights for developing age-friendly healthcare service systems and bridging the "digital divide" in older adults' access to care.

2. Participants and Methods

2.1. Research Object

A semi-structured interview approach was adopted. Older adults who sought medical care at SYSUCC between June and December 2025 were selected as the study participants and interviewed using semi-structured interviews. Interview transcripts were reviewed to analyze the data and refine themes, with the aim of exploring the care-seeking process and the difficulties encountered by older adults, thereby partially addressing the limitations of quantitative questionnaire surveys. Inclusion criteria were as follows: age ≥ 70 years; adequate communication and expressive ability; voluntary participation in the interview. Exclusion criteria were as follows: inability to cooperate with completion of the interview; history of psychiatric disorders. All patients participated voluntarily and were fully informed of the study procedures and objectives. Participants were identified through the hospital's electronic medical record system, which screened patients aged ≥ 70 years with a confirmed neurosurgical tumor diagnosis who were scheduled for surgery during the study period. A research nurse initially approached eligible patients during their pre-admission visit to explain the study purpose and procedures. Of the 12 eligible patients invited, 8 agreed to participate; the remaining 4 declined due to feeling too fatigued (n = 2) or lack of interest (n = 2). Data saturation was determined when two consecutive interviews yielded no new codes or themes during the analysis process, following the saturation criteria proposed by Saunders *et al.* [6]. The sample size was determined based on the repetition of interview data and the absence of new themes during analysis, indicating saturation [7]. This study was reviewed and approved by the Ethics Committee of Sun Yat-sen University Cancer Center. A total of eight older cancer patients were included (six men and two women), aged 71 - 79 years. All respondents participated voluntarily and were assigned identifiers N1 - N8. Respondent characteristics are presented in Table 1.

2.2. Methods

2.2.1. Development of the Interview Guide

Based on a review of the relevant literature and the study objectives, the researchers initially drafted an interview guide. The preliminary guide was subsequently revised according to the results of the pilot interviews, and the final version was then established. The specific questions were as follows: (1) During your medical visits, have you encountered any difficulties or inconveniences? What were they specifically? (2) What factors led to these difficulties or inconveniences? (3) Do you think these smart devices are helpful for your medical visits? (4) Regarding the current digitalized healthcare-seeking process, what suggestions do you have for optimizing older adults' access to care? (5) What measures do you think could improve older adults' experience with healthcare services?

Table 1. General characteristics of interview participants (N = 8).

Serial number	Age	Gender	Diagnosis	Treatment modalities	Preoperative symptoms	Whether one feels fatigued
N1	75	Male	Intracranial space-occupying lesion	Surgery	Decreased sensation in the left extremities.	Yes
N2	78	Male	Tumors of the cerebellar vermis	Surgery	Dizziness accompanied by nausea and vomiting	Yes
N3	73	Male	Glioma	Surgery	Headache and memory impairment	Yes
N4	79	Female	acoustic neuroma	Surgery	Tinnitus, vertigo	Yes
N5	71	Female	A space-occupying lesion in the left cerebellar hemisphere.	Surgery	Dizziness and vomiting	Yes
N6	75	Male	Intracranial space-occupying lesion	Surgery	Blurred vision, dizziness, and headache.	Yes
N7	74	Male	A mass lesion in the jugular foramen region	Surgery	Worsening dizziness	Yes
N8	75	Male	A space-occupying lesion in the right cerebellopontine angle region.	Surgery	Hearing loss	Yes

2.2.2. Data Collection Methods

This study collected data using semi-structured interviews. Before the interviews, the procedures were fully explained, permission for audio recording was obtained, and the informed consent form was signed, after which the interview time was scheduled. Interviews were conducted in the department's consultation room. During the interviews, we listened attentively and observed participants' tone and intonation, facial expressions, and body language; using an immersive interviewing approach, we captured patients' authentic feelings and documented the interview content in detail. Each interview lasted 45 - 60 min. Phenomenological interviewing techniques were employed to capture patients' authentic feelings.

2.2.3. Data Organization and Analysis (Colaizzi's Phenomenological Approach)

Following Colaizzi's seven-step method: (1) reading all transcripts to gain a sense of the whole; (2) extracting significant statements; (3) formulating meanings for each significant statement; (4) clustering meanings into themes; (5) integrating findings into an exhaustive description; (6) identifying the fundamental structure; (7) returning to participants for member checking.

2.2.4. Quality Control

During the research design phase, ensure that the interviews can achieve the study objectives and are operationally feasible. During implementation, familiarize yourself with the interviewees' psychological and personality characteristics before the interview to better guide them into the topic and avoid misunderstandings of the interview content. Conduct interviews flexibly according to the characteristics of different interviewees to ensure that the interview data are both rich and complete. Ensure that recording equipment and related devices function properly, and promptly transfer the recordings to a storage device after the interview. All interviews were conducted by a single researcher throughout. The study should remain neutral, avoiding leading language or statements that strongly express personal viewpoints; during the conversation, attend to the interviewee's tone, facial expressions, and any specific emotional states, and annotate and record them accordingly. After each individual interview, assign a unique code to each recording to avoid confusion. Transcribe the interview audio into text in a timely manner, and have designated personnel securely store the materials. To ensure trustworthiness, two researchers independently coded the first three interviews and compared results. Any discrepancies were resolved through discussion with a third senior researcher. Member checking was performed by returning the summarized themes to three participants for validation, all of whom confirmed that the themes accurately reflected their experiences.

3. Results

Through repeated examination of the interview data, the researchers analyzed and interpreted the materials using a phenomenological approach, ultimately identifying 3 themes and 7 subthemes: perceived barriers in seeking care (perceived safety barriers, perceived usefulness barriers, and perceived comfort barriers), barriers to seeking care under digital transformation (support for smart and digital healthcare, and poor adaptability to intelligent services), and barriers related to self and family support (barriers associated with multimorbidity and barriers to care arising from limited family support).

3.1. Theme 1: Perceived Barriers in Seeking Medical Care

3.1.1. The Dilemma of Perceived Safety

In this case study, all 8 older adults were accompanied by family members when seeking medical care; nevertheless, 3 older adults reported difficulties in perceiving safety during the care-seeking process. Interviewee N2 stated: "*There is no restroom suitable for wheelchair access* (*an accessible restroom*), *and the ward entrance door is also very narrow*; *it is inconvenient for my wheelchair.*" Interviewee N5 stated: "*There are too few chairs in the outpatient area*, *and there are also too few armrests. I felt very dizzy while waiting*!" Interviewee N7 stated: "*The elevator is overcrowded*; *I feel very dizzy and stuffy.*"

3.1.2. The Perceived Usefulness Dilemma

In this study, most older adults lacked confidence in seeking medical care. When they encountered problems during outpatient visits, they experienced distress stemming from personal factors, accompanied by self-doubt and self-denial. Interviewee N3: "*I am already an old person*; *I cannot walk well or stand steadily*, *so I can only follow my children around looking for things.*" Interviewee N6: "*I cannot see the road clearly*, *and I feel that many people are very noisy*; *I get dizzy*, *and I end up causing trouble for my children. It would be fine not to seek treatment.*" Interviewee N8: "*That mobile phone system is very hard to navigate. He said he* *would teach me, but I have problems with my ears and cannot hear clearly, so that person (the patient guide) helped me do it. Truly, I am old and useless.*"

3.1.3. The Dilemma of Perceptual Comfort

The interviews revealed that many older adults experienced poor comfort; they perceived that the hospital environment and the procedures for consultation and admission did not meet their expectations, thereby generating negative emotions. Participant N1 stated: "*I am already elderly; the queues take a long time. My spouse queued, and I had no place to sit nearby.*" Interviewee N5 stated: "*There are too few chairs in the outpatient area... I felt very dizzy while waiting!*" It should be noted that N5's dizziness was also related to her preoperative diagnosis of a space-occupying lesion in the left cerebellar hemisphere, which may have exacerbated the discomfort caused by the waiting environment. Participant N4 stated: "*I was actually okay, just a bit of tinnitus, but there really were many people in line—everywhere was crowded. If I didn't understand, I asked others; you have to keep asking. Even if people dislike me, there's nothing I can do.*"

3.2. Theme 2: Healthcare-Seeking Challenges under Digital Transformation

3.2.1. Supporting Smart and Digital Healthcare

In the context of smart healthcare, older cancer patients generally support simplifying and streamlining medical visit procedures and using digital healthcare services. In particular, wheelchair-bound older adults admitted to the hospital require further simplification of care-seeking procedures to minimize frequent movement and waiting in lines as much as possible. Interviewee N2: "*Registration is booked in advance, so there is no need to queue for registration; this is very convenient.*" Interviewee N6: "*I saw that my daughter could pay and check in on her phone and complete all the admission procedures.*" Interviewee N8: "*There are too many people in the hospital; it would be best not to queue. Use a mobile phone to handle it.*"

3.2.2. Limited Adaptability of Intelligent Services

Older adults are inherently disadvantaged in the domain of modern information technology and therefore have difficulty benefiting from the convenience afforded by intelligent services. Research indicates that although older cancer patients hold positive and supportive attitudes toward smart healthcare, they often struggle to use it in practice. Difficulties in using self-service devices, challenges with smartphone operation, physical discomfort, and low willingness to relearn, among other factors, all impede older cancer patients' access to intelligent services. Interviewee N6: "*I can hardly see anything clearly anymore; if you ask me to use a phone to pay, I can't do it.*" Interviewee N3: "*If you ask me to use a phone to operate it, I can't remember that much. I don't want to deal with it; I can't learn it.*" Interviewee N7: "*There were so many people lining up at that self-service machine. You have to enter a number or something, and I don't really know how to* *operate it.*"

3.3. Theme 3: Challenges in Self- and Family-Support

3.3.1. The Dilemma of Patients' Own Multimorbidity

Older adults often have multiple underlying conditions, such as hypertension, diabetes, and heart disease, which increase surgical risk and lead to more postoperative complications. Among all respondents, 6 older adults had comorbidities, with unstable blood pressure or inadequate disease control, creating substantial challenges for seeking care and undergoing surgery. Respondent N2 stated: "*I am very worried about whether my blood pressure will affect this surgery. Will I no longer feel dizzy after the operation? Will it become more severe?*" Respondent N7 stated: "*I take that medicine on time every day. The previous doctor did not say there was any problem. Now they say I have to stop the medication for a week before I can have surgery. That is very inconvenient, but for safety we have to wait.*"

3.3.2. Barriers to Healthcare Seeking under Limited Family Support

Because older adults often have limited self-care capacity, some can care for themselves only partially and require family members or caregivers 24 hours a day for assistance. However, in some families, adult children are not nearby, leaving older adults to seek medical care alone and resulting in weak family support. Interviewee N1 stated: "*My spouse accompanies me, and my daughter is abroad. The two of us elderly people do not know how to do anything, so we can only ask others for help. After the surgery, we will have to rely on someone to hire a dedicated caregiver.*" Interviewee N8 stated: "*My hearing is a bit worse on the right side, but I can still hear. The children are all busy; when people get old, they can only rely on their spouse to take care of them. I have already told the care worker to help more. There is no other way.*"

3.4. Needs and Expectations Expressed by Older Patients

When asked about improvements, participants articulated several concrete needs and expectations.

3.4.1. Need for Human Assistance alongside Digital Services

Interviewee N3: "The machine is too hard to use. If there could always be a staff member standing next to it, just to help us old folks when we get stuck." Interviewee N8: "I don't ask for much—just someone to speak a little louder and slower, and not get annoyed when I can't hear."

3.4.2. Expectation for Streamlined, One-Stop Procedures

Interviewee N2: "It would be great if the registration, payment, and lab tests could all be done in one place, so I don't have to move my wheelchair back and forth." Interviewee N5: "Why can't they call us by number and let us wait in a quieter room? That would help with my dizziness."

3.4.3. Need for Better Family Support Arrangements

Interviewee N1: “The hospital should tell us clearly before admission whether we need a caregiver, and help us find one if necessary. We, old people don’t know where to find reliable help.”

4. Discussion

4.1. Multidimensional Manifestations and Underlying Attributions of Older Cancer Patients’ Perceived Dilemmas in Seeking Medical Care

This study finds that older neurosurgical cancer patients’ healthcare-seeking difficulties in intelligent healthcare settings are not unidimensional; rather, they constitute a compound set of perceived difficulties encompassing safety, usefulness, and comfort, with the three dimensions intertwined and mutually reinforcing.

At the level of perceived safety, respondents reported problems such as the absence of accessible toilets, narrow wheelchair routes (N2), insufficient armrests on waiting-area seats (N5), and overcrowded elevators (N7), revealing deficiencies in age-friendly design of the hospital’s physical environment. This finding is consistent with previous research [8], indicating that inadequate accessibility facilities in healthcare institutions directly threaten the mobility safety of older cancer patients, particularly imposing a substantial risk of falls and psychological stress on wheelchair users [9]. Notably, in this study, accounts of perceived-safety difficulties were often accompanied by descriptions of physical symptoms (e.g., dizziness and nausea), suggesting that environmental barriers may exacerbate physiological discomfort among older cancer patients, thereby creating a negative “environment-symptom” cycle.

At the level of perceived usefulness, older cancer patients generally exhibit reduced self-efficacy and a negative willingness to seek medical care. Statements by interviewees such as N3 (“I can’t walk far, and I can’t stand steadily; I can only follow my child around looking for [the right place]”), N6 (“I’m just causing my child more trouble; it’s fine not to get treated”), and N8 (“Honestly, I’m old and useless”) reflect learned dependence and self-denial when older cancer patients face complex care-seeking procedures and the operation of smart devices. This phenomenon can be understood through the lens of socioemotional selectivity theory: when older adults repeatedly encounter technological or procedural setbacks, they tend to attribute failure to irreversible declines in their own abilities, thereby developing a sense of “disempowerment,” relinquishing agency, and becoming overly reliant on family members or patient navigators. Some scholars further note that the psychological costs of this “digital disadvantage” may exceed the technical barriers themselves; older adults’ self-identity is eroded in healthcare settings, and their sense of dignity as independent individuals is threatened [10]. This suggests that healthcare providers seeking to improve older adults’ care-seeking experiences must not only optimize technology, but also attend to psychological empowerment and the preservation of dignity among older cancer patients.

At the level of perceived comfort, patients reported experiences such as long waiting times with no place to sit (N1), vomiting caused by prolonged elevator waits (N5), and being resented for asking repeated questions (N4). These examples reflect a profound mismatch between the care-seeking processes in large hospitals and the physiological tolerance of older cancer patients. Older neurosurgical patients often present with preoperative symptoms like dizziness, vertigo, and nausea, making them far less tolerant of crowded, noisy waiting areas or prolonged standing than other populations [11]. This finding elevates the dilemma of care-seeking comfort from a general issue of "service satisfaction" to one concerning patient safety and equitable access to care. Importantly, the perceived safety and comfort difficulties cannot be entirely attributed to the hospital environment alone. Neurosurgical conditions frequently involve dizziness, vertigo, and gait disturbances, which can lower patients' tolerance to crowded spaces, prolonged standing, and elevator use. Thus, what appears as an environmental barrier may actually result from an interaction between disease-specific symptoms and suboptimal facility design. Future environmental interventions should therefore take into account the symptom profiles of specific patient populations.

4.2. Theoretical Elucidation of the "Attitude-Behavior" Paradox in Digital Transformation

An important and noteworthy finding of this study is that participants exhibited a pronounced "attitude-behavior" paradox toward smart healthcare. On the one hand, they explicitly express recognition and support for digitalized care processes (N2: "Appointments are booked in advance, so there's no need to line up to register; it's really convenient"; N6: "I see my daughter can pay and check in on her phone and complete all the admission procedures"; N8: "It would be best if there's no need to queue at all"). On the other hand, at the level of actual use, they commonly encounter difficulties characterized by poor adaptability to intelligent services. To some extent, this finding revises the stereotype in parts of the prior literature that portrays older adults simply as "technology rejecters," and reveals a more complex interactive landscape.

From the perspective of the Technology Acceptance Model, older cancer patients exhibit high perceived usefulness of digital healthcare (*i.e.*, they recognize its value in reducing time spent queuing and traveling) but extremely low perceived ease of use (*i.e.*, they believe they are unable to operate it). When barriers to perceived ease of use are excessively high, actual usage behavior is unlikely to occur even if usefulness is fully recognized. In this study, statements by interviewees such as N6 ("I can barely see anything now; if you ask me to pay with a phone, I can't do it") and N3 ("If you ask me to use a phone, I can't remember that many steps; I don't want to bother, and I won't be able to learn it") strongly corroborate the applicability of this model among older adults [12]. In addition, older adults' barriers to perceived ease of use arise not only from a lack of digital skills but are also closely associated with declines in physical function: physiological factors such as blurred vision, hearing loss, and memory decline directly constrain their basic ability to operate smart devices.

This study further found that some older cancer patients, while acknowledging the convenience of smart devices, exhibit a tendency toward "low willingness to relearn." This is not merely "passive withdrawal," but rather a rational judgment made after older adults comprehensively evaluate their physical condition, learning costs, and expected benefits. When the learning costs of technology exceed what older adults can bear, "not learning" itself can be understood as a self-protective strategy [13]. Therefore, the key to bridging the digital divide should not be to compel older adults to "learn and adapt to technology," but to promote technology that "proactively adapts to older adults"—by lowering operational barriers through "de-textualized" designs such as voice interaction, large-font interfaces, and facial recognition, while retaining necessary in-person service counters as a safety net.

4.3. Vulnerability Analysis at the Intersection of Multimorbidity and Weakened Family Support

All eight older neurosurgical patients included in this study exhibited fatigue symptoms of varying severity, and most had underlying conditions such as hypertension. The reality of multimorbidity not only increases perioperative medical risk but also heightens, at the psychological level, patients' uncertainty and anxiety regarding treatment prognosis. Participant N2's question—"I'm very worried about whether my blood pressure will affect this surgery; after the surgery, will I stop feeling dizzy?"—and the ambivalence expressed by N7 due to having to discontinue medication while waiting for surgery, highlight the dilemma faced by older surgical patients between "control of comorbid conditions" and the "urgency of tumor treatment." Previous studies have shown that multimorbidity significantly increases the incidence of postoperative complications and length of hospital stay in older cancer patients, while also challenging patients' psychological resilience and treatment adherence [14].

More importantly, this study finds that the challenges of multimorbidity and inadequate family support are intertwined and mutually reinforcing. Some older cancer patients, because their children live abroad (N1) or are occupied with demanding work (N8), face the reality of "empty-nest medical care" and can rely only on similarly elderly spouses for mutual support, forming a fragile caregiving model of "elderly caring for the elderly." Under this model, both partners may be unable, due to limited capacity, to cope effectively with complex care-seeking procedures and postoperative care needs, ultimately forcing them to depend on hired caregivers (N1: "After the surgery, I could only ask for help to hire a dedicated attendant"; N8: "I've already told the caregiver to help out more").

This finding reflects the macro-level social reality in China in which the family's eldercare function is weakening amid the concurrent trends of population aging and declining fertility. Some scholars have noted that, as family structures become increasingly nuclear and children's geographic mobility intensifies, the traditional intergenerational caregiving chain is facing the risk of rupture [15]. When family support is insufficient to meet the healthcare and caregiving needs of older cancer patients, medical institutions must assume greater social support responsibilities. However, most hospitals currently exhibit clear shortcomings in staffing medical social workers, developing volunteer service systems, and providing post-discharge continuity of care, making it difficult to effectively compensate for gaps in family caregiving. Therefore, establishing an end-to-end age-friendly service system spanning "admission assistance-inpatient care-discharge preparation-post-discharge follow-up" should be a key direction for future healthcare service reform.

4.4. Limitations

Several limitations should be acknowledged. First, this study included only eight participants from a single tertiary cancer center, all of whom had neurosurgical diagnoses. The findings may not be transferable to older cancer patients with other tumor types or those receiving non-surgical treatments (e.g., chemotherapy, radiotherapy). Second, all participants were receiving care at a large urban hospital with well-developed digital infrastructure; the experiences of older patients in rural or community settings may differ substantially. Third, the cross-sectional design captures patients' experiences at a single time point, whereas care-seeking difficulties may evolve over the treatment trajectory. Fourth, although saturation was claimed, a sample of eight is relatively small for phenomenological research; additional interviews might have revealed further themes. Finally, social desirability bias may have influenced participants' responses, particularly regarding their attitudes toward smart healthcare. Future multicenter studies with larger, more diverse samples and longitudinal designs are needed to validate and extend these findings.

4.5. Conclusion

In this cohort of older neurosurgical cancer patients, multiple difficulties were identified in the context of intelligent healthcare, including perceived safety, usefulness, and comfort barriers, challenges related to digital service adaptation, and vulnerabilities arising from multimorbidity and limited family support. These findings suggest that this specific population requires societal attention and support. Healthcare professionals may consider implementing targeted interventions and strengthening support systems to improve their care-seeking experience. Future studies are needed to explore whether similar findings apply to other cancer types or healthcare settings.

5. Implications and Recommendations

Based on the foregoing discussion, this study offers the following implications for clinical practice. First, the design of hospital physical environments may benefit from adhering to universal design principles and comprehensively implementing age-friendly adaptations in key areas such as outpatient clinics, wards, and toilets, with particular attention to the specific needs of older neurosurgical cancer patients who use wheelchairs. Second, digital transformation could uphold the principle that "technology serves people" by developing age-friendly user interfaces while retaining human assistance at critical points, so that intelligent and human services coexist and complement each other. Third, greater emphasis could be placed on the psychological empowerment of older neurosurgical cancer patients by safeguarding their dignity and autonomy during care-seeking through proactive support and streamlined procedures. Fourth, for older neurosurgical cancer patients with multimorbidity and limited family support, healthcare institutions may consider proactively conducting high-risk screening and intervening early by providing comprehensive assessment, case management, and continuity-of-care services.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] (19 Jaunary 2026) Wang, P.P.: In 2025, China's Total Population Was 1,404.89 Million High-Quality Population Development Continues to Advance. China Information News. (In Chinese) https://www.stats.gov.cn/xxgk/jd/sjjd2020/202601/t20260119_1962338.html

[2] Zhao X.Y. (2025) In China, the Population Aged 60 Years and above Has Exceeded 310 Million. China Population News. (In Chinese)

[3] Chen, B.L., Du, X.Y., Chen, B.L., *et al.* (2025) A Study on Countermeasures to the Difficulties Faced by Older Adults in Beijing in Accessing Medical Care in the Digital and Intelligent Era. (In Chinese)

[4] Wu, Z.C. (2025) Five Departments Jointly Issued a Policy Document to Promote the Application of "AI + Healthcare and Health Services". *Journal of Traditional Chinese Medicine Management*, **21**, 136. (In Chinese)

[5] Wang, Q. (2025) An Ethical Analysis of the Digital Intelligence Divide in Artificial Intelligence for Elderly Healthcare. *Medicine and Philosophy*, **46**, 12-16. (In Chinese)

[6] Saunders, B., Sim, J., Kingstone, T., *et al.* (2018) Saturation in Qualitative Research: Exploring Its Conceptualization and Operationalization. *Quality & Quantity*: *International Journal of Methodology*, **52**, 1893-1907. https://doi.org/10.1007/s11135-017-0574-8

[7] Sanders, C. (2003) Application of Colaizzi's Method: Interpretation of an Auditable Decision Trail by a Novice Researcher. *Contemporary Nurse*, **14**, 292-302.

[8] Zhang, X. and Chen, M.Y. (2025) Research on Optimization Strategies for Age-Friendly Outpatient Services in China's Public Hospitals under the Policy Context of "Internet+". *Chinese Hospitals*, **29**, 2-5. (In Chinese)

[9] Li, Y.F., Zhang, Y.N., Jia, Y.Z., *et al.* (2025) A Review and Prospects of Research on the Development of Barrier-Free Environments in China's Public Hospitals. *Chinese Hospitals*, **29**, 82-85. (In Chinese)

[10] Liu, F., Yin, X.B., Huang, Y.T., *et al.* (2024) Barriers and Facilitators to Bridging the

Healthcare Digital Divide for the Older Adults: A Qualitative Research from Patients in China. *Japan Journal of Nursing Science*, **21**, e12626. https://doi.org/10.1111/jjns.12626

[11] Qin, Y.M., Zhao, Y.N. and Liu, Y. (2025) Pathway Analysis of the Impact of Digital Health Literacy on Social Frailty among Older Community-Dwelling Patients with Chronic Diseases. *Journal of Nursing Science*, **40**, 95-99. (In Chinese)

[12] Meng, T.W. and Wang, Z.Z. (2025) A Study on Factors Influencing Elderly Users' Adoption Intention of Smart Healthcare: A Digital Literacy Perspective. *Information Exploration*, **2**, 76-83. (In Chinese)

[13] Wang, Y.L. and Zhao, B.W. (2025) Reflections on the Digital Inclusion of Older Adults from an Inclusivity Perspective: The "Unidimensional" Elderly. *Theory Monthly*, **1**, 127-134. (In Chinese)

[14] Liu, X.H., Lu, Y.X., Chen, Y., *et al*. (2025) A Qualitative Study on the Challenges in Managing Multimorbidity among Older Community-Dwelling Patients with Chronic Diseases. *Chinese Journal of Nursing*, **60**, 1764-1769. (In Chinese)

[15] Zhu, Y.Y. (2024) Reconstructing Family Policy from the "Changes" and "Invariances" in Transformations of Chinese Families. Science Herald. (In Chinese)