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Investigation into the current state of self-care abilities and analysis of associated influencing factors among deaf individuals with tumors

Original article

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Abstract: **Objective:** This study aims to investigate the current status of self-care abilities among hearing-impaired cancer patients and analyze the associated influencing factors. Based on these findings, this study aims to provide a theoretical foundation for developing targeted medical care and health education interventions for this population, ultimately formulating a practical nursing program tailored to their unique needs.

Methods: A convenience sampling method was employed to recruit 116 hearing-impaired cancer patients who met the inclusion criteria. Data collection involved 3 standardized tools: a self-designed demographic questionnaire, the Exercise of Self-Care Agency Scale (ESCA), and the Perceived Social Support Scale (PSSS). Descriptive statistics were used to analyze the baseline characteristics, while multiple linear regression analysis was conducted to identify significant predictors of self-care ability.

Results: The cross-sectional survey revealed that participants had an average ESCA score of 99.55 ± 19.53 and a mean PSSS score of 58.14 ± 9.32. Statistical analysis identified several key factors influencing self-care ability, including the presence/absence of aphasia ($P < 0.001$); Duration of hearing loss ($P < 0.01$); Place of daily residence ($P < 0.001$); Communication methods ($P < 0.05$); Family economic status ($P < 0.001$); and Perceived level of social support ($P < 0.001$).

Conclusions: Hearing-impaired cancer patients exhibit moderate self-care abilities overall. There is a positive correlation between perceived social support levels and self-care ability. Critical predictors of self-care ability include demographic characteristics (residential status, duration of hearing loss), clinical features (aphasia), communication patterns, educational attainment, and socioeconomic status. This study provides valuable insights for developing targeted interventions to enhance self-care capabilities in hearing-impaired cancer patients, emphasizing the importance of addressing both personal and environmental factors.

Keywords: *health education • hearing-impaired • oncology patients • self-care • sign language*

1. Introduction

In recent years, the incidence rate of tumors in China has been on the rise,[1,2] with a notable trend toward younger populations. The active promotion of tumor-related health education and screening programs has become a critical measure to safeguard patient well-being. However, hearing impairment itself

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often isolates patients with hearing loss from the rest of society, exacerbating their challenges in accessing adequate healthcare and support. The prevalence of hearing loss in China remains alarmingly high, with figures continuing to increase annually.[3] According to the latest national and population-based hearing loss survey conducted in China, the overall prevalence of hearing loss is 16.4%, while the prevalence of disabling hearing loss stands at 5.15%.[4] These statistics represent conservative estimates, as the number of individuals with hearing impairments continues to grow each year. In 2022, the National Cancer Center reported that China had 4.82 million new cancer cases, including 2.53 million male cases and 2.29 million female cases. Notably, among these cases, approximately 180,000 involved hearing impairment,[5] reflecting a concerning upward trend in incidence rates. Consequently, the number of deaf tumor patients is also surging, bringing profound implications for patients' cognitive abilities, social interactions, and daily functioning. This situation significantly diminishes their quality of life and places a substantial burden on both patients and their families during medical care. Given these circumstances, it is imperative to thoroughly investigate the self-care abilities of deaf tumor patients and identify the factors influencing these abilities. Such research would provide valuable references for optimizing medical care and advancing health promotion initiatives tailored to the unique needs of deaf tumor patients.

2. Methods

2.1. Study subjects

With approval from the relevant authorities, this study reviewed the medical records of 125 deaf and hard-of-hearing oncology patients from 16 tertiary hospitals in Guangdong Province and those registered with the Guangdong Provincial Deaf Association between March 2021 and October 2023. Using a convenience sampling method, the researchers excluded incomplete or logically inconsistent questionnaires, resulting in a final sample size of 116 participants. All patients were surveyed to assess their current self-care abilities and the factors influencing them.

2.1.1. Inclusion criteria

(1) Patients diagnosed with cancer, specifically at the T.N.M. stage of T1 or T2.
(2) Patients with hearing impairment or combined hearing impairment and aphasia.
(3) Age between 30 years and 60 years.
(4) Patients who signed informed consent and voluntarily participated in the study.

2.1.2. Exclusion criteria

(1) Patients with impaired consciousness, inability to self-care, or tumor staging outside T1 or T2.
(2) Patients with severe organic lesions, such as heart, liver, or kidney failure.
(3) Patients with an expected survival rate of <1 year.

2.2. Research tools

2.2.1. General information survey scale

This scale was developed by the researchers based on a review of existing literature. It includes sociodemographic information (e.g., gender, age, cultural level, place of residence, tumor stage, and family economic status) and disability-related information (e.g., type and severity of hearing impairment, congenital or acquired onset, rehabilitation training, use of assistive devices, presence of aphasia, and modes of communication and expression). The scale comprises a total of 13 items.

2.2.2. Exercise of self-care agency scale (ESCA)

Developed by American scholar Fleischer[6] in 1979, the ESCA is a validated tool for assessing self-care ability. The scale consists of 4 dimensions: Self-concept: 8 items; Self-care responsibility: 6 items; Self-Care Skills: 12 items; Health Knowledge Level: 17 items. Each item is scored on a 5-point Likert scale, ranging from "0 = Very unlike me" to "4 = Very much like me." The total possible score is 172 points, with the following interpretations: High Level: ≥113.52 points; Medium Level: 56.76–113.52 points; Low Level: <56.76 points. Eleven items are reverse-scored to prevent response bias. The Cronbach's alpha coefficient for this scale is 0.868, indicating strong reliability and validity.

2.2.3. Perceived social support scale (PSSS)

The Chinese version of the PSSS was adapted by Jiang Qianjin[5] and consists of 12 items across 3 dimensions: Family Support: Items 3, 4, 8, and 11; Friends' Support: Items 6, 7, 9, and 12; Other Support: Items 1, 2, 5, and 10.

Responses are scored on a 7-point scale, ranging from "7 = Strongly agree" to "1 = Strongly disagree." Total scores range from 12 to 84, with the following

interpretations: Low Support: 12–36 points; Moderate Support: 37–60 points; High Support: 61–84 points. Higher scores indicate greater perceived social support. The Cronbach's alpha coefficient for this scale is 0.899, confirming its reliability and validity.

2.3. Quality control

2.3.1. Establishing a research team

This study was conducted by a research team consisting of a chief nurse, a deputy chief nurse, 2 nurses, 3 nurse practitioners, and a sign language expert. The sign language expert participated throughout the entire study, assuming responsibility for sign language information conversion, exchange, and communication. Their involvement ensured the accuracy and reliability of the study results.

2.3.2. Survey implementation

(1) A pre-survey was conducted in the early stages to refine the details of the scale and revise any items that were difficult to understand or seemed unreasonable.
(2) Before initiating the formal survey, all team members underwent collective training to acquaint themselves with the precautions for completing the questionnaire. Simultaneously, the sign language experts received uniform training in sign language communication to mitigate potential communication barriers.
(3) Informed consent was obtained from participants by explaining the content of the questionnaire and the purpose of the study, ensuring full protection of patients' privacy and the absolute security of their personal information.
(4) Completed questionnaires were collected immediately to prevent omissions and ensure the accuracy and usability of the on-site assessments.
(5) Upon receipt, the questionnaires were cross-checked by 2 researchers. Any questionnaires containing logical errors or discrepancies between the 2 researchers were excluded and subsequently entered into the system.

2.4. Statistical methods

The data collected in this study were processed using SPSS 23.0 statistical software (IBM Corporation, Armonk, New York, United States) to ensure their accuracy and reliability. Data entry was performed by 2 individuals, followed by organization and analysis. A significance level of $P < 0.05$ was established to determine statistical significance (Table 1).

Analysis type	Statistical method
Measurement data	Mean ± standard deviation
Count data	Frequency and percentage
Univariate analysis of general data that follow a normal distribution and have homoscedasticity on self-care ability	Independent samples *t*-test and 1-way analysis of variance
Multivariate analysis of self-care ability and influencing factors among students with hearing impairments	Multiple linear regression analysis

Table 1. List of statistical methods in this study.

3. Results

3.1. General information on patients with hearing impairments and tumors

The demographic characteristics of the 116 patients with hearing impairments and tumors are summarized in Table 2.

3.2. Scores of self-care ability and comprehension of the social support level of deaf oncology patients

3.2.1. ESCA score analysis for deaf tumor patients

The ESCA scores among deaf tumor patients ranged from 46 to 151, with a mean score of (99.55 ± 19.53). Of the participants, 32.76% demonstrated high self-care ability, 65.52% showed moderate ability, and only 1.72% exhibited low self-care ability. The scores across the 4 dimensions of the ESCA scale were as follows: Self-concept (18.14 ± 4.30); Self-care responsibility (13.38 ± 4.10); Self-care skills (27.28 ± 6.30); Health literacy (42.86 ± 9.85). The detailed distribution of scores across all dimensions is provided in Table 3.

3.2.2. PS score analysis for hearing-loss oncology patients

The PSSS scores of hearing-loss oncology patients were evaluated using a pre-survey questionnaire, with total scores ranging from 28 to 82 and a mean score of (58.14 ± 9.32). Among the participants, 39.35% achieved high scores, 59.64% demonstrated

Variable	Frequency	Percentage (%)
Gender		
Female	64	55.17
Male	52	44.83
Age (years)		
30–40	8	6.9
40–50	42	36.21
50–60	66	56.9
Education level		
Primary and below	24	20.69
Junior high school	56	48.28
High school or junior college	21	18.1
College and above	15	12.93
Residence		
Countryside	69	59.48
Cities and towns	47	40.52
Tumor stage		
Phase T1	72	62.07
Phase T.I.I.	44	37.93
Family economic status		
Particular difficulty	26	22.41
General difficulties	71	61.21
Not difficult	19	16.38
Disability type		
Hearing only	78	67.24
Listening plus language	38	32.76
Disability level		
Level 1	59	50.86
Level 2	45	38.79
Level 3	8	6.9
Level 4	4	3.42
Hearing loss duration		
Congenital deafness	64	55.17
Acquired deafness	52	44.83
Rehabilitation training received		
Yes	79	68.1
No	37	31.9
Use of assistive devices		
Hearing aid	53	45.69
Cochlear implant	12	10.34
Hearing aids and cochlear implants	6	5.17
None	45	38.79
Aphasia status		
No aphasia	69	59.48
Aphasia	47	40.52
Communication mode		
Both sign language and written communication	53	45.69
Textual communication	28	24.14
S.L.E.	17	14.66
Seldom communicate	18	15.52

Note: S.L.E., sign language exchange.

Table 2. General information of patients with hearing-impaired tumors (N = 116).

moderate scores, and 1.01% exhibited low scores. The dimension-specific scores were as follows: Family-related support (21.37 ± 4.12); Friend-related support (18.34 ± 3.97); and Other-related support (18.43 ± 4.01). These results indicate a predominantly high perception of social support among the participants, reflecting the significant role of familial and interpersonal support systems in this population. Detailed findings are presented in Table 4, providing further insights into the distribution of scores across the 3 dimensions of social support.

3.3. Analysis of factors influencing the ability of hearing-impaired oncology patients to care for themselves

3.3.1. Impact of socio-demographic factors on self-care abilities in deaf oncology patients

Univariate analysis of ESCA scores among deaf oncology patients revealed statistically significant differences in self-care abilities across various socio-demographic variables ($P < 0.05$). Specifically, the analysis highlighted disparities in self-care agencies based on age, education level, and economic status. Further details regarding the distribution of ESCA scores across these variables are provided in Table 5.

3.3.2. A multifactorial analysis of self-care competence in hearing-impaired oncology patients

The variables with statistical significance in the univariate analysis, namely the duration of hearing loss, place of household registration, hearing conditions of parents, communication methods with parents, family economic situation, and the total score of perceived social support level, were used as independent variables, while the self-care ability score was used as the dependent variable for linear regression analysis. The results of the multi-factor analysis showed that the R^2 value of the model was 0.638, indicating that each item could explain 63.8% of the reasons for the changes in the self-care ability level. When conducting an F-test on the model, it was found that the model passed the F-test ($F = 27.534$, $P < 0.001$), which means that at least one of the items has an impact on the self-care ability level. The standardized regression coefficients, from high to low, are the communication method with parents, whether there is an experience of studying in a regular school, family economic situation, duration of hearing loss, hearing conditions of parents, and perceived social support level. See Table 6 for details.

Dimension	Score (x ± s)	Low level		Mid-level		High level	
		Number of examples	Percentage (%)	Number of examples	Percentage (%)	Number of examples	Percentage (%)
Total ESCA score	99.55 ± 19.53	2	1.72	76	65.52	38	32.76
Self-concept	17.15 ± 3.29	5	4.31	81	69.83	30	25.86
Responsibility for self-care	12.88 ± 4.09	9	7.76	72	62.07	35	30.17
Self-care skills	26.34 ± 5.98	5	4.31	75	64.66	36	31.03
Level of health literacy	43.18 ± 6.17	3	2.59	59	50.86	54	46.55

Table 3. Self-care competency scores for deaf tumor patients (x ± s).

Dimension	Min	Max	Score (x ± s)
Total score for level of social support for comprehension	27	78	58.14 ± 9.32
Family support	9	29	21.37 ± 4.12
Friends support	5	28	18.34 ± 3.97
Other support	8	26	18.43 ± 4.01

Table 4. Comprehension social support scores for deaf tumor patients (x ± s).

4. Discussion

4.1. Outcome analysis of self-care competence in hearing-impaired oncology patients

4.1.1. Levels of self-care ability in hearing-impaired oncology patients

Table 3 presents the total ESCA scores of deaf oncology patients, which ranged from 46 to 151, with a mean score of 99.55 ± 19.53, indicating a moderately low level of self-care competence. Hearing-impaired individuals, including those with oncological conditions, exhibit unique characteristics; while they may have auditory deficits and communication challenges, they often demonstrate exceptional talents or extraordinary skills in other domains.[7–11] The participants in this study were deaf oncology patients in good physical condition, and capable of performing daily self-care activities without severe organic comorbidities. However, their self-care ability scores were significantly lower compared to hearing individuals in similar health states,[12–15] underscoring the need for targeted interventions to enhance self-care competence in this population.

4.1.2. Dimensions of self-care competence among hearing-impaired oncology patients

The ESCA scale was employed to assess the self-care competence of hearing-impaired oncology patients across its 4 dimensions. The findings revealed that deaf oncology patients exhibited lower scores in the domains of self-care responsibility and self-care skills while demonstrating relatively higher scores in health literacy. These results suggest that self-care responsibility and self-care skills are interdependent and mutually reinforcing constructs, with self-care responsibility acting as a key motivator for enhancing self-care competence. Despite its role in promoting self-care improvements, the low score observed in this domain indicates that deaf oncology patients have not yet developed positive health beliefs, lack awareness of the importance of self-care, and exhibit limited subjective responsibility for engaging in self-care behaviors. Domestic and international studies[16–19] have consistently highlighted specific communication barriers and challenges in information transfer faced by deaf patients. These barriers contribute to reduced health literacy among deaf individuals, ultimately resulting in poorer health outcomes compared to hearing individuals in similar health states. In this study, while deaf oncology patients demonstrated a relatively high score in the health knowledge level dimension, their scores in self-concept and self-care skills were notably low. This discrepancy suggests that, despite their advanced literacy levels, deaf oncology patients exhibit limited comprehension of acquired health knowledge and inadequate application of relevant skills, thereby significantly compromising their overall self-care ability.

The findings underscore the need for targeted interventions to address the gaps in health knowledge comprehension and skill application among deaf oncology patients. These patients generally exhibit poor abilities in transforming health knowledge into practical skills and have yet to adopt a positive health attitude. Therefore, there is an urgent need to explore and develop health education programs tailored to hearing-impaired tumor patients, with a focus on strengthening self-care guidance and fostering a more proactive approach to health management in this population.

Variant	Self-care competency score	*F*-value	*P*-value
Gender		2.335	0.13
Female	102.23 ± 19.88		
Male	96.64 ± 19.37		
Age (years)		0.019	0.531
30–50	102.85 ± 19.89		
50–60	100.57 ± 18.89		
Residence		54.379	<0.001
Countryside	94.46 ± 18.36		
Cities and towns	115.28 ± 13.79		
Disability type		0.839	0.303
Hearing only	99.75 ± 18.79		
Hearing plus language	103.67 ± 19.89		
Disability level		0.365	0.587
Level 1	98.76 ± 19.65		
Level 2	104.27 ± 17.65		
Level 3	105.39 ± 24.56		
Level 4	101.34 ± 15.43		
Hearing loss duration		31.247	<0.01
Congenital deafness	94.18 ± 17.49		
Acquired deafness	104.89 ± 16.98		
Rehabilitation training received		1.03	0.185
Be	103.18 ± 19.83		
Clogged	97.98 ± 18.98		
Use of assistive devices		1.498	0.232
Hearing aid	101.88 ± 18.01		
Cochlear implant	108.47 ± 20.12		
Hearing aids and cochlear implants	111.43 ± 20.19		
Not have	96.78 ± 21.35		
Aphasia		30.896	<0.001
Noaphasia	115.56 ± 18.03		
Have loss of speech (e.g., as a result of brain damage)	95.23 ± 17.79		
Communication mode		21.893	<0.05
Both sign language and written communication	105.88 ± 14.19		
Textual communication	106.14 ± 16.79		
S.L.E.	128.87 ± 16.76		
Seldom communicate	86.79 ± 18.47		
Family economic difficulty level		9.654	<0.001
Yes, it is challenging.	86.54 ± 19.38		
Yes, difficult.	106.48 ± 18.36		
Yes, general difficulties	99.95 ± 16.51		
Clogged	115.42 ± 17.69		
Perceived social support level		17.698	<0.001
High level	112.34 ± 15.49		
Mid-level	93.21 ± 19.03		
Low level	78.32 ± 0.03		

Note: S.L.E., sign language exchange.

Table 5. Univariate analysis of self-care competence in patients with hearing-impaired tumors (x ± s).

Model	Regression coefficient	Standard error	Standardized regression coefficient	*t*	*P*
Constant	135.676	11.499	–	11.987	0.000**
Duration of hearing loss	−6.179	2.696	−0.150	−2.236	0.026*
Situation of studying in regular schools	−7.872	2.598	−1.83	−3.145	0.029**
Hearing status of parents	−4.359	1.841	−0.152	−2.336	0.023*
Communication method with parents	−5.248	1.501	−0.241	−3.612	0.099**
family economic situation	2.694	1.172	0.149	2.410	0.021*
Total score of perceived social support	0.259	0.129	0.129	2.122	0.042*

Note: $^{*}p < 0.05$; $^{**}p < 0.01$.

Table 6. Multivariate regression analysis of self-care ability in deaf cancer patients.

4.2. Analysis of the results of social support for comprehension in deaf tumor patients

4.2.1. Level of perceived social support in hearing-impaired tumor patients

Table 4 illustrates that the total presurgical PSSS scores of deaf tumor patients ranged from 28 to 82, with a mean score of (58.14 ± 9.32), indicating an overall moderate level of perceived social support. Cancer, often perceived as a dreaded disease by the general populace, induces significant psychological distress in most patients following diagnosis.[20] This distress is accompanied by a series of emotional and cognitive changes, including phases of depression and pessimism. Deaf tumor patients, as a more vulnerable subgroup, face unique challenges due to their impaired communication abilities and limited social engagement. Their interactions are predominantly confined to immediate family members, friends, and close acquaintances, which further exacerbates their need for robust social support systems. Given these circumstances, deaf tumor patients exhibit heightened and urgent requirements for effective social support mechanisms.[21–24] Their psychological and emotional well-being is heavily influenced by the quality and availability of support from their social networks, emphasizing the critical role of tailored interventions to address their specific needs.

4.2.2. Dimensions of social support comprehension in hearing-impaired tumor patients

As shown in Table 4, the PSSS scores exhibit significant variation across different dimensions. Notably, the family support dimension has the highest score, accounting for 73.47%, underscoring that familial support remains a steadfast emotional pillar for deaf tumor patients, providing them with enduring reliance and trust. This finding may be attributed to the deep emotional bonds and familial responsibilities inherent within households. When a deaf tumor patient is present in a family, the physical and psychological burden on family members is profound. Both the patient and their relatives require considerable courage and resilience to confront this challenging reality. To facilitate the patient's smooth treatment process, family members must devote additional time and effort to provide care and guidance, thereby enabling the patient to receive more attention and emotional warmth. Recognizing the sacrifices made by their loved ones, deaf tumor patients often cooperate in a mutual understanding. The scores for friend-related support and other-related support are 65.91% and 64.89%, respectively, indicating that these forms of support are slightly less prominent but still significant. This highlights that, beyond family support, friendships serve as a crucial external support force for these patients. The relatively lower scores in other-related support may reflect the limitations of patients' social circles and the scarcity of dependable societal resources available to them. Existing literature[25] has established that social support plays a pivotal role in enhancing the mental health of deaf oncology patients. Deaf patients require articulated support from family, friends, and broader societal networks to lead fulfilling lives and adapt to the constraints imposed by their health conditions.[26] However, research in this domain remains sparse, with insufficient replicable evidence and a lack of comprehensive quantitative studies. This paucity underscores the need for further investigation to better understand and address the unique social support requirements of hearing-impaired oncology patients.

4.3. Impact of general demographic information on the self-care ability of hearing-impaired oncology patients

The findings presented in Table 5 reveal significant variations in self-care ability among deaf oncology patients based on their demographic characteristics. Specifically,

patients residing in urban areas demonstrated markedly higher self-care ability scores compared to their rural counterparts. This disparity can be attributed to several factors, including better family economic conditions, more accessible living environments, and greater availability of social resources in urban settings. These advantages facilitate enhanced self-awareness among deaf oncology patients and encourage active participation in social learning and daily activities, ultimately contributing to improved self-care ability. Notably, deaf oncology patients who primarily rely on sign language as their mode of communication exhibited significantly higher self-care ability scores compared to those using other communication methods. This observation underscores the critical role of sign language in facilitating effective communication for deaf individuals. Sign language, which integrates non-verbal symbols such as gestures, facial expressions, and body posture, is inherently more intuitive and easier to comprehend—not only for deaf patients but also for hearing individuals in situations where verbal communication is impractical or inconvenient.[27–31] These findings highlight the importance of creating a supportive sign language communication environment for deaf oncology patients. To enhance their quality of life, efforts should be made to incorporate sign language into health education and public health campaigns to the greatest extent possible.[32–36]

Furthermore, the data indicate that deaf oncology patients with congenital hearing loss exhibited significantly lower self-care ability scores compared to those with acquired hearing loss. Conversely, patients with aphasia demonstrated higher self-care ability scores than those without this condition. Surprisingly, these results suggest that hearing impairment and speech impairment are not directly causally linked. Patients with acquired hearing loss may possess superior adaptability to complex communication styles, along with enhanced cognitive and comprehension skills, likely due to their prior experience with hearing.[37–40] Additionally, the study found no significant impact of rehabilitation training or the use of assistive devices on the self-care ability of deaf oncology patients. While 68.10% of the participants reported having undergone rehabilitation training, this did not result in a noticeable improvement in their self-care ability compared to untrained individuals. This finding suggests that rehabilitation training requires consistent, long-term commitment and early intervention to yield meaningful benefits. Furthermore, the study did not identify any correlation between the use of assistive devices (e.g., hearing aids) and self-care ability. Follow-up consultations with medical experts and patients revealed that hearing aids provided minimal improvement in auditory function and were not universally effective in addressing the communication challenges faced by deaf oncology patients.[37–40] In summary: this analysis highlights the multifaceted influence of demographic and contextual factors on the self-care ability of deaf oncology patients. Targeted interventions, such as enhancing access to sign language-based communication tools and implementing structured rehabilitation programs, are essential to address the unique challenges faced by this population.

4.4. Research advantages and limitations

4.4.1. Advantages

This study pioneered the application of a hospital-to-home transitional care model within the care system for disabled oncology patients. By establishing an integrated online-offline health service network, the approach enabled precise implementation of continuous out-of-hospital nursing interventions. The research team deployed dedicated personnel to conduct regular home visits over 6 months, focusing on the personalized health needs of patients and caregivers to dynamically address specific challenges in nursing practice. This strengthened the trust bond between nurses and patients while providing targeted emotional support and psychological comfort to families of empty-nest oncology patients. Furthermore, a collaborative team of oncology and geriatric medical staff leveraged multiple channels (e.g., home visits, telephone follow-ups, and WeChat platforms) to deliver tiered oncology rehabilitation education tailored to patients' disease stages and family care capabilities. Through a multidimensional quality-of-life evaluation system, intervention outcomes were quantitatively assessed, offering empirical evidence to refine subsequent nursing plans.

4.4.2. Limitations

The study faced limitations due to a small sample size and convenience sampling, which may have introduced potential biases in the internal validity of results. Additionally, constraints imposed by the research timeline and human resources prevented long-term follow-up tracking of post-intervention outcomes and cost-benefit analysis of the intervention measures. Future research could capitalize on the expansion of "Internet + nursing services" to establish a normalized mechanism for online booked home nursing services, thereby expanding sample diversity and enhancing the full-cycle outcome evaluation system. Such improvements would strengthen the generalizability and practical value of the findings.

5. Conclusions

The self-care competence of deaf oncology patients is generally categorized as being at a moderately low level, with several key factors influencing this outcome. These include residential location, duration of hearing loss, presence of aphasia, auditory status of family members, primary mode of daily communication, household economic status, and the level of social support. Collectively, these findings underscore the multifaceted nature of the challenges faced by this patient population in managing their self-care effectively. It is strongly recommended that targeted, evidence-based, and practical health education strategies be implemented to address the unique needs of deaf oncology patients. Additionally, the development and utilization of a comprehensive support system are essential to provide enhanced social resources and foster improved self-care competence among these individuals. Such interventions should prioritize the integration of accessible communication methods, such as sign language, and emphasize early and sustained rehabilitation efforts to optimize outcomes. By addressing these factors comprehensively, healthcare providers can empower deaf oncology patients to achieve greater independence and a better quality of life.

Ethical approval

Ethical issues are not involved in this paper.

Conflicts of interest

All contributing authors declare no conflicts of interest.

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