Journal of Multidisciplinary Healthcare

Dovepress
Taylor & Francis Group

Open Access Full Text Article

ORIGINAL RESEARCH

Factors Associated with Nursing Intention of Discharged Patients With Drainage Tubes During Transitional Care: a Case–Control Study

Xiaoying Ding*, Weijie Jiao*, Xue Gong, Yuanyuan Sun, Lin Sang, Ming Yu

Department of Ultrasound, Xijing Hospital, The Fourth Military Medical University, Xi'an, Shaanxi, 710032, People's Republic of China

*These authors contributed equally to this work

Correspondence: Ming Yu, Department of Ultrasound, Xijing Hospital, The Fourth Military Medical University, No. 127 Changle West Road, Xi'an, Shaanxi, 710032, People's Republic of China, Email yumingfmmu@126.com

Purpose: This study aimed to assess the crucial factors that contribute to the self-nursing intention of discharged patients with drainage tubes, with a specific emphasis on percutaneous surgeries.

Patients and Methods: A case–control study was conducted in accordance with the EQUATOR-STROBE statement. Over the period of January 2023 to December 2023, a cohort of 146 discharged patients with drainage tubes were recruited. Upon their return to the hospital for the removal of the drainage tubes, an anonymous questionnaire was administered to gather data on various aspects, including basic demographic characteristics, comprehensive disease information, and the respondents' self-nursing intention concerning the drainage tubes. Chi-square tests and binary logistic regression analysis were used to explore the factors associated with self-nursing intention and the degree of influence. Bivariate analysis was conducted to examine the relevance of the variables showing significant differences.

Results: Excluding 5 questionnaires (logic errors), 141 respondents were enrolled in this analysis (effective accomplished ratio=96.58%). The median age of study subjects was 63 years. Rank correlation analysis results showed there is statistical significance between income level and education level (SCC=0.647, $P<0.01$). Resident area is statistically significant with education level and income level (SCC=−0.635, $P<0.01$, SCC=−0.653, $P<0.01$, respectively). Binary logistic regression analysis showed that married status (OR=4.996, $p=0.077$, 95% CI: 0.841–29.664), income level (OR=3.112, $p=0.01$, 95% CI: 1.308–7.402), occupation (OR=1.124, $P=0.013$, 95% CI: 0.331–1.5), and degree of apprehending nursing video (OR=12.636, $p<0.001$, 95% CI: 4.104–38.906) were the crucial factors that affect nursing intention.

Conclusion: The degree of apprehending nursing video contributed most to nursing intention of discharged patients with drainage tubes. Transitional care teams should devise more readily available care models (eg, mobile health) tailored to the needs of older individuals.

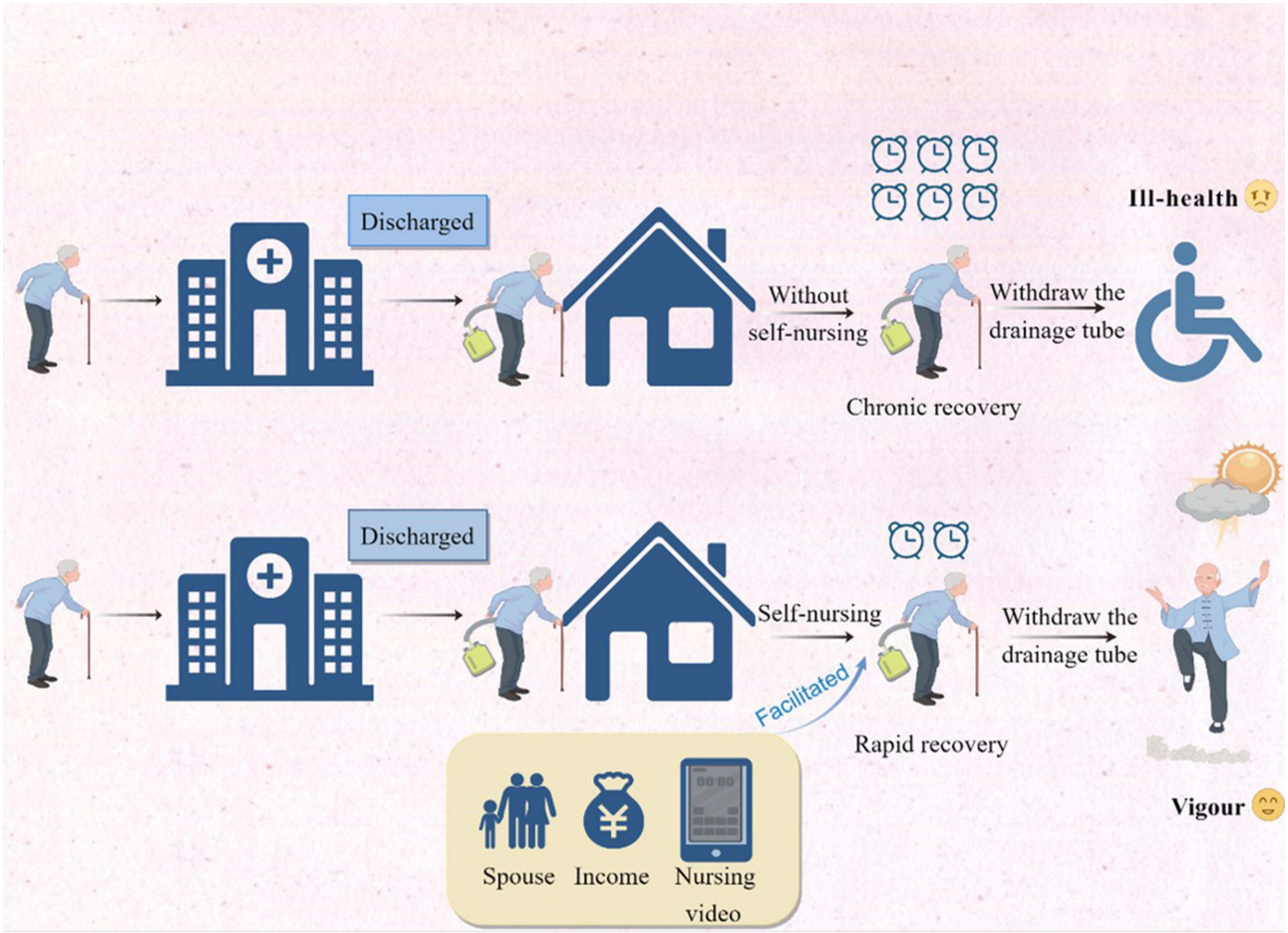
Plain language summary: In clinical practice, it has been observed that, due to various factors such as cost, older patients are more inclined to be discharged from the hospital following puncture surgery and the placement of drainage tubes. Upon discharge, the drainage tube requires careful care until the patient has sufficiently recovered to return to the hospital for its removal. However, patients often lack the basic knowledge for drainage tube nursing. Additionally, the straightforward transmission of nursing knowledge to patients often leads to rapid forgetfulness.

So, how can patients with drainage tubes effectively obtain basic nursing knowledge after discharge? We explored the application of the "mobile healthcare" model and the WeChat platform to disseminate nursing knowledge in the form of video content, so that patients and their families can easily obtain and learn this information anytime and anywhere. Moreover, factors associated with nursing intention for discharged patients with drainage tubes were analyzed, aiming to provide reference value for patient management during transitional care.

Keywords: self-nursing intention, drainage tube, transitional care, mobile health

Received: 14 November 2024
Accepted: 17 March 2025
Published: 27 March 2025

Graphical Abstract



Introduction

Transitional care is widely acknowledged as a patient-centered approach that facilitates patient recovery and mitigates disease progression, thereby decreasing hospital readmission rates and conserving medical resources.[1–3] In western countries, the concept of transitional care was first proposed in 1947 based on a research paper by the American Joint Committee.[4] Nowadays, it is widely agreed upon that the transition process should be effectively coordinated by a multidisciplinary team, incorporating multiple assessments and interventions such as home visits and regular telephone follow-up for patients.[5] A study reported, whereas, 34.4% of the participants anticipated home visits, while only 8.84% received home visits.[6]

The concept of a patient's self-nursing intention is their willingness to independently determine their participation in nursing activities, select appropriate nursing methods, and execute self-care based on their individual health status and personal values during the medical care process.[7] This intention underscores the patient's right to self-manage their own body and health, serving as a specific manifestation of patient autonomy within the nursing domain.[8,9] In the context of transitional care, self-nursing has the potential to enhance patients' quality of life, while simultaneously reducing readmission rates and healthcare costs.[10] Consequently, the intention to engage in self-nursing, both by patients and their family members, plays a crucial role in the success of transitional care.

With the development of medical imaging apparatus and the improvement of interventional medical technology, the obstruction symptoms of a variety of organs or parts (renal pelvis,[11] abdominis,[12] biliary,[13] thoracic cavity,[14] etc) can be

relieved through percutaneous puncture and the placement of drainage tube. A report showed that within 90 days of discharge for hepatectomy, the self-nursing behavior caused better quality of life and higher satisfaction.[15] Nevertheless, the long-term use of these tubes can lead to frequent hospital readmissions and visits to the emergency department due to issues such as blockage, displacement, detachment, and intracavitary infections. As a result, these recurring cycles have a detrimental impact on the patients' overall quality of life, health-related quality of life, and impose a financial burden on both the patients and their families in terms of healthcare costs.[16,17] Given this background, accordingly, mapping behaviors and beliefs regarding self-nursing intention with drainage tube during transitional care is of great necessity to improving the quality of life and decreasing financial burden for discharged patients.

A thorny issue, for now, is that there is a lack of effective measures to improve the capacity of patients and their family members in self-nursing.[18] Naylor et al reported that 77.8% of patients and their family member cannot comprehensively grasp the point of home nursing drainage tubes.[19] Hence, based on the current literature review, we proposed there exists a dearth of research evidence pertaining to transitional care for patients who have the intention to self-nursing after discharge. This study aims to achieve two primary objectives: (a) to investigate the factors associated with discharged patients' intention toward self-nursing; and (b) to offer valuable insights for medical administrators to better develop ways to improve patients' self-nursing ability. The main significance and results of this study are presented through the Graphic abstract.

Materials and Methods

Study Sample

In order to explore the factors associated with self-nursing intention of discharged patients with drainage tubes, this study design has followed the EQUATOR-STROBE statement (case–control study). Data were collected from January 2023 to December 2023. Patients who underwent percutaneous puncturing surgery and placed drainage tubes in our hospital were selected (N=146). We performed the structured questionnaire survey among the discharged patients when they returned to the hospital to withdraw the drainage tube. The structured questionnaire applied in the study can be divide into baseline demographic information, detailed disease information, and self-nursing intention. The patients were divided into an experimental group (nursing the drainage tube) and a control group (not nursing the drainage tube) according to the content of the questionnaire when they returned to hospital for withdrawal of the drainage tube. All variables were considered as categorical variables, except "Age". Cut-off points for education level, income, and resident area were chosen to ensure balance in each stratum.

Inclusion and Exclusion Criteria

All enrolled participants need to meet the following conditions: (a) at least 18 years old; (b) patients who underwent percutaneous puncture (renal pelvis, abdominis, biliary, thoracic cavity) and placement of 8F pigtail drains; (c) excellent mental status after catheterization; (d) willing to participate in this research.

Participants with any of the following criteria were excluded: (a) suffered from cancer with expected survival time of less than six months; (b) with multiple organ dysfunction; (c) with several mental disorders that cannot communicate fluently.

Research Question

What are the factors associated with nursing intention of discharged patients with drainage tubes during transitional care?

Customized Self-Nursing Questionnaire Composition

This questionnaire was developed with reference to the Mandarin version of the self-care ability scale for older people.[20–22] Meanwhile, low education level is often accompanied by low income,[23] which in turn may reduce people's health awareness and self-nursing intention. Moreover, residential area and transportation level may also affect the self-nursing support.[18] Therefore, the questionnaire used in this study also incorporated the above factors.

The first part of questionnaire inquired basic demographic characteristics of respondents about the enrolled participants, including gender, age, marital status, occupation, education level, personal monthly income, and resident area.

Marital Status, Occupation, and Resident Area

One item assessed marital status ("Have you been married or not") by a two-choice question with possible answers (a) Yes, I have married, or (b) No, I am not married. Two items assessed the convenience of patients to seek medical treatment with resident area (urban/rural). A multiple-choice question was applied to assess the occupation of patients: (a) unemployed; (b) blue collar; (c) white collar.

Level of Education and Personal Monthly Income

Two items assessed the level of ability for patients to seek for medical treatment.

The education level was assessed by a multiple-choice question with answers (a) junior high school and below (9 years), (b) junior high school to senior (12 years), (c) beyond college (12 years). Also, the level of personal monthly income was assessed by a multiple-choice question with answers (a) below 1000 yuan, (b) 1000–3000 yuan, (c) beyond 3000 yuan.

The second part of the questionnaire inquired detailed disease information from respondents about the duration period of disease, the placement organ of the drainage tube, and whether they apprehend the nursing video.

Mobile Health in Transitional Care

In this study, we employed a model of "**WeChat-based mobile health**" to effectively enhance the self-nursing operations and doctors' advice by providing video data on the WeChat platform. This approach aimed to support patients in managing their drainage tube and improving their recovery progress. Supplementary Files contain additional details information regarding the self-nursing knowledge and processing steps. Meanwhile, supplementary videos provided the related self-nursing procedure. Specifically, video S1, video S2 and video S3 refer to step "2.1 Disinfection", video S4 and video S5 refer to step "2.2 Replacement of catheter anchors and applicators", video S6 refers to step "2.3 Replacntment of drainage bags", and video S7 refers to step "2.4 Flusing the drainage tube".

Data collection procedure and patients' follow-up information

In this study, the facility where the surgery was performed and the patients were followed up was a tertiary institution. Besides, the institution was in the public sector. Meanwhile, to maintain the integrity of the gathered data, a supervisor oversaw the data collection process is necessary and provided a day of orientation to the data collectors. The orientation session was centered on elucidating the significance of the questionnaire contents and the criteria for an incomplete patient record. The questionnaire was devised in Mandarin and subsequently reviewed by experts to ensure coherence.

On the day for patient discharging, two experienced medical workers explained the aims of the study to eligible participants and asked them to sign informed consent forms. Then, they were provided the QR code containing the essentials points of self-nursing behavior. Subsequently, when these discharged patients return to the hospital for withdrawing the drainage tubes, the questionnaire was completed under the supervision of doctors and nurses (both were at least occupied in clinical medical work for seven years). For those patients who are unable to complete the questionnaire alone due to hearing or visual impairment, their accompanied family member will complete the answers on their behalf. Figure 1 manifests the data collection procedure.

Sample Size Calculation

Before this research project begun, we calculated the sample size according to the following steps. Referring to the literature as reported before,[24,25] the p1 for "group of cases" was set to 0.3, the p2 for "control group" was set to 0.7, significance level α was set to 0.05, the power of 1–β was set to 0.9, and the ratio of sample size between the test group and the control group was set to 1:1. Applying the R language to calculate the sample size, the sample size of "group of cases" and "control group" was 28, respectively. Considering a 10% loss to follow-up and refusal to follow-up, at least 32

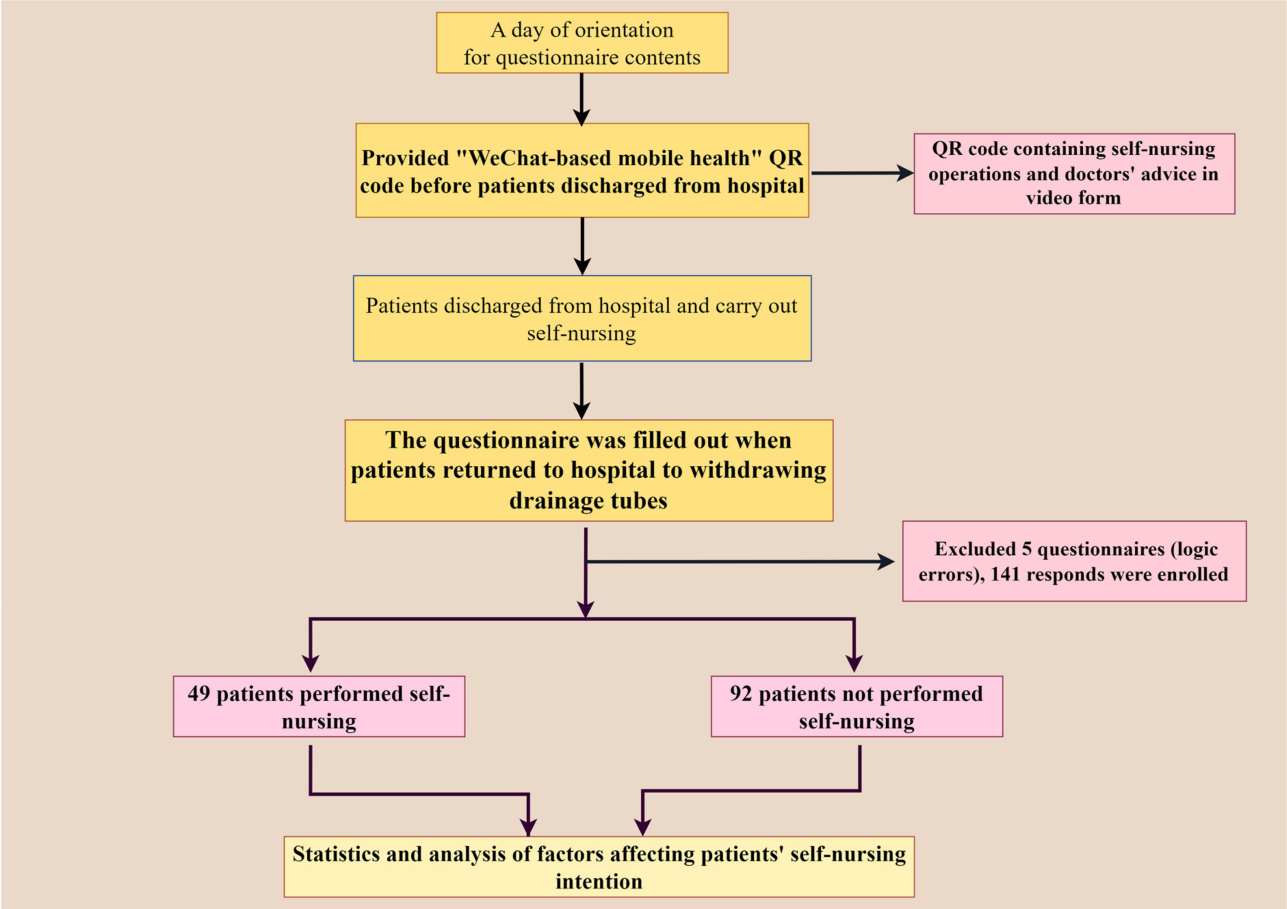


Figure 1 Data collection procedure and patients' follow-up information flow chart.

cases in the "group of cases" and 32 cases in the "control group" are required, with a total sample size of 64 cases. Hence, a total of 141 patients were included in our study, which meets the sample size requirement.

Statistical Analysis

The statistical data were analyzed through Statistical Package for Social Science 26.0 software (SPSS IBM, Armonk, NY, USA). The basic demographic characteristics of enrolled patients were described as number and percentage. The mean value ± standard deviation was utilized to describe continuous variable. Chi-square tests were used to determine whether each variable was significantly different between patients' intention to nursing the drainage tube. It should be considered that $P<0.05$ is an appropriate threshold for selecting variables. Bivariate analysis was used to analyze the association of the significant difference variables. Finally, binary logistic regression analysis was utilized to investigate the influence on the degree of associated factors among their nursing intention. All significance level was set as 0.05 (two-tailed) for statistical significance.

Results

Sociodemographic Characteristics Results

The questionnaire was distributed to 146 patients who returned to the hospital for withdrawal of the drainage tube. After excluding 5 questionnaires with logic errors, 141 eligible participants completed the survey. The effective accomplished ratio is 96.58% (141/146). The detailed information about patients' baseline demographic information is presented in Table 1. The study population enrolled in this study was mostly older and the median is 63 years old. Consequently, 59.6% (84/141) study subjects were unemployed. Meanwhile, 72.6% (102/141) of participants did not access to

https://doi.org/10.2147/JMDH.S500220

Table 1 Basic Demographic Characteristics of Enrolled Patients (N=141) [A]

Variables	Patients' Intention to Nursing the Drainage Tube				
	Total N=141	Nursing N=49 (34.8%)	Not nursing N=92 (65.2%)	χ^2	*P*
Individual items	Proportion				
Gender	61.5 ± 13.01	62.16 ± 13.72	61.14 ± 12.69		
Male	77 (54.6%)	27 (55.1%)	50 (54.4%)		
Female	64 (45.4%)	22 (44.9%)	42 (45.6%)	0.007	0.932
Age, years [B]					
Marital status					
Married	121 (85.8%)	46 (93.9%)	75 (81.5%)		
Others	20 (14.2%)	3 (6.1%)	17 (18.5%)	4.01	0.045
Occupation					
Unemployed	84 (59.6%)	31 (63.3%)	53 (57.6%)		
Blue collar	35 (24.8%)	12 (24.5%)	23 (25.0%)		
White collar	22 (15.6%)	6 (12.2%)	16 (17.4%)	0.718	0.698
Education level					
< Junior middle school (9 years)	51 (36.2%)	7 (14.3%)	44 (47.8%)		
Senior middle school (12 years)	51 (36.2%)	24 (49.0%)	27 (29.3%)		
> College (12 years)	39 (27.7%)	18 (36.7%)	21 (22.8%)	15.586	<0.001
Income level [C]					
< 1000 yuan	39 (27.7%)	3 (6.1%)	36 (39.1%)		
1000–3000 yuan	38 (27.0%)	12 (24.5%)	26 (28.3%)		
> 3000 yuan	64 (45.5%)	34 (69.4%)	30 (32.6%)	22.291	<0.001
Resident area					
Rural area	61 (43.3%)	11 (22.4%)	50 (54.3%)		
Urban area	80 (56.7%)	38 (77.6%)	42 (45.7%)	13.254	<0.001
Disease duration period					
< 1 month	35 (24.8%)	9 (18.4%)	26 (28.3%)		
1–3 months	37 (26.2%)	19 (38.8%))	18 (19.6%)		
> 3 months	69 (48.9%)	21 (42.9%)	48 (52.2%)	6.324	0.042
The placement organ of drainage tube					
Thoracic cavity	26 (18.4%)	7 (14.3%)	19 (20.7%)		
Abdominis	29 (20.6%)	12 (24.5%)	17 (18.5%)		
Biliary	49 (34.8%)	17 (34.7%)	32 (34.8%)		
Renal pelvis	37 (26.2%)	13 (26.5%)	24 (26.1%)	1.267	0.737
Whether apprehend the nursing video					
Yes	74 (52.5%)	44 (89.8%)	31 (33.7%)		
No	66 (46.8%)	5 (10.2%)	61 (66.3%)	39.538	<0.001

Notes: A Reported as n (%) unless indicated otherwise. [B] The median age of the participants is 63 years. [C] Personal monthly income (1000 yuan approximately equal to 145.5 USD).

a relatively higher education (senior middle school or above) and 54.5% (77/141) of their personal monthly income level was below 3000 yuan (approximately equal to 435.9 USD).

Drainage Tube Self-Nursing Activities

According to the findings of the chi-square test (Table 1), there exists a significant association between the personal characteristics of participants and disease-related factors with the self-nursing intention for their drainage tube ($P<0.05$). Specifically, individuals who are married, possess higher levels of education, have a substantial income, reside in urban areas, have a longer duration of illness, and are capable of comprehending nursing videos demonstrate a greater inclination toward nursing their drainage tube. In the group of individuals with nursing drainage tubes, a majority of

85% (42 out of 49) had completed their education up to senior middle school. Additionally, nearly 70% (34 out of 49) reported a personal monthly income exceeding 3000 yuan. Furthermore, 77.6% (38 out of 49) resided in urban areas, and 89.8% (44 out of 49) demonstrated an understanding of the nursing video. Conversely, in the group without nursing drainage tubes, these proportions significantly decreased to 52.1%, 32.6%, 45.7%, and 33.7%, respectively.

Rank Correlation Analysis of Self-Nursing Intention to Drainage Tube

To explore the correlation between these variables with significant differences of self-nursing intention, a rank correlation analysis was conducted. The results manifested that there is statistically significant between income level and education level (SCC=0.647, $P<0.01$), suggesting that patients with higher income levels are more likely to have higher education levels. Besides, resident area is also statistically significant with education level and income level (SCC=−0.635, $P<0.01$, SCC=−0.653, $P<0.01$, respectively), suggesting that patients with higher income levels are more likely to have higher education levels and reside in urban areas. Additionally, participants showed a tendency to better comprehend the nursing video when they received spiritual encouragement from their spouse (SCC=0.228, $P=0.007$). More detailedinformation is presented in Table 2.

Binary Logistic Regression Analysis of Self-Nursing Intention to the Drainage Tube

Marital status, education level, income level, and resident area were included to construct a bivariate logistic regression equation. The findings revealed a significant association between marital status and self-nursing intention (OR=4.996, $P=0.047$, 95% CI: 0.841–29.664), suggesting that having a spouse positively influences individuals' willingness to provide care. Furthermore, the study revealed that employed participants, particularly those in white-collar occupations, exhibited a significantly greater inclination toward pursuing a nursing career compared to their unemployed counterparts (OR=1.124, $P=0.013$, 95% CI: 0.331–1.5). Moreover, the inclination toward nursing the tube was found to be significantly correlated with personal monthly income level (OR=3.112, $P=0.01$, 95% CI: 1.308–7.402), suggesting individuals with a higher monthly income demonstrated a stronger tendency to pursue this profession. Furthermore, it was observed that participants who were able to comprehend the nursing video displayed an obvious inclination toward nursing the drainage tube (OR=12.636, $P<0.001$, 95% CI: 4.104–38.906). More detail results are presented in Table 3.

Discussion

In China, the number of physicians and nurses per 1000 persons is 2.06 and 2.13, respectively, which is much lower than in developed countries.[26] Meanwhile, the availability and high-quality medical resources are mainly concentrated in large

Table 2 Bivariate Analysis of Variables with Significant Difference

		Marital Status	Education Level	Income Level	Resident Area	Disease Duration Period	Whether Apprehend Nursing Video
Marital status	SCC [A]	1					
	P						
Education level	SCC	−0.065	1				
	P	0.442					
Income level	SCC	0.06	0.647**	1			
	P	0.481	<0.01				
Resident area	SCC	−0.096	−0.635**	−0.653**	1		
	P	0.256	<0.01	<0.01			
Disease duration	SCC	0.1	−0.135	−0.047	−0.069	1	
period	*P*	0.237	0.11	0.583	0.413		
Whether apprehend	SCC	0.228**	0.406**	0.428**	−0.411**	−0.052	1
nursing video	*P*	0.007	<0.01	<0.01	<0.01	0.539	

Note: ** There is a correlation when the significance level is less than 0.01.
Abbreviation: [A] SCC = Spearman correlation coefficient.

https://doi.org/10.2147/JMDH.S500220

Table 3 Binary Logistic Regression Analysis of Self-Nursing Intention

Variables	Items	B	S.E.	Wald	*P*	OR	95% CI	
Constant		−6.864	2.440	7.915	0.005	0.001		
Marital status	Others (ref. [A])							
	Married	1.609	0.909	3.133	0.047	4.996	0.841	29.664
Occupation	Unemployed (ref.)			8.761	0.013			
	Blue collar	−0.751	0.578	1.688	0.194	0.472	0.152	1.465
	White collar	−2.091	1.213	10.599	0.003	1.124	0.331	1.500
Education level		0.248	0.438	0.322	0.570	1.282	0.544	3.024
Income level		1.135	0.442	6.593	0.010	3.112	1.308	6.402
Resident area	Urban (ref.)							
	Rural	0.258	0.699	0.136	0.712	1.294	0.329	5.096
Disease duration period		0.045	0.289	0.024	0.876	1.046	0.594	1.842
Whether apprehend nursing video	No (ref.)							
	Yes	2.537	0.574	19.545	<0.001	12.636	4.104	38.906

hospitals located in large or medium-sized cities, which are difficult for patients in rural and remote areas to access.[27,28] Besides, different from developed countries, the cost of transitional care is not a part of the basic medical insurance system in China, which leads to a greater financial burden being placed on older people.[6] In the majority of cases, the family members of patients assume various roles in the treatment and rehabilitation process within hospitals, serving as providers of patient information, facilitators of doctor–patient communication, and coordinators of family resources.[29] Accordingly, during transitional care, the self-nursing capacity for patients and their family members is very important. This ability has the potential to monitor the patient's condition, leading to a shorter recovery period, decreased financial strain on the family, and a reduction in postoperative complications.

The traditional transitional care model in China has a drawback as it heavily depends on the medical expertise of clinical nurses and the frequency of follow-up visits. Moreover, the accuracy of information was emphasized as a key to ensuring transitional care.[30] To address this, we leverage the portability of mobile health services by creating instructional videos on key points of drainage tube nursing (Supplement video). This approach aims to enhance patients' comprehension and proficiency in performing the necessary procedures. Actually, the mobile health was emerged as novel transitional care model and already shown potential value in patients' care,[15,31] which constructed our research inspiring.

It should be noted that the chi-square test shows that various factors can affect participants' intention for nursing their drainage tube. Nevertheless, according to binary logistic regression analysis, the important factors for self-nursing inclination are income level (OR=3.112), marital status (OR=4.996), occupation (white collar, OR=1.124), and the comprehension to nursing video (OR=12.636). These kinds of results seem paradoxical. However, it is in accord with the reality of contemporary Chinese society. For the poor family, ill-health is said to be fundamental cause of poverty, mainly because poor people are forced to live in unhealthy environments without decent shelter, clean water, or adequate sanitation.[32,33] The same results were reported in other study that showed that poorer households had lower capacities to pay and that even low healthcare costs had heavy impacts on their household.[34]

On the other hand, white-collar workers typically serve as the primary earners for their families. Once they are discharged with a drainage tube, they are unable to perform work, leading to a massive loss of income during the recovery period. As Fernandez-Cacho and Ayesa-Arriola reported, patients carried the tube not only express the degree of physical impairment, but also the enormous social and labor impact.[35] Accordingly, white-collar workers exhibit a heightened proclivity for seeking nursing care to restoring their income level. Simultaneously, the presence of the

patient's spouse is essential as they provide increased caregiver support and often experience a deepening of their relationship with the care recipient, which can expedite the recovery process. Meanwhile, the degree for comprehension of the nursing video contributed most to the patients' intention to self-nursing (OR=12.636), suggesting that during the transitional care stage, medical institutions should develop a form of nursing knowledge that is easier for patients to understand. Making nursing knowledge into videos may provide some potential application value.

There are still several limitations in our study. Firstly, it is imperative to acknowledge that this study was conducted solely at a single center, potentially leading to confirmation bias and restricting the applicability of the findings to alternative settings. Secondly, further research is needed to demonstrate the validity and feasibility of the questionnaire. To bolster the credibility of the outcomes, future investigations may benefit from undertaking a multicenter cross-sectional or prospective study encompassing a larger cohort of participants. Additionally, it is worth mentioning that patients may have experienced recall or observation bias when completing the questionnaires, potentially leading to concealed answers.

Conclusion

Our findings indicate that factors such as marital status, occupation, personal monthly income, and comprehension of nursing videos for patients are correlated with the individual's inclination toward self-nursing of the drainage tube during transitional care. Married couples and high-income families can substantially enhance patients' care experiences and health outcomes by providing emotional support. Meanwhile, since the degree of apprehending nursing video contributed most to self-nursing intention of discharged patients with drainage tubes, transitional care teams ought to develop more accessible and more understandable nursing knowledge frameworks. Generate persuasive medical guidance in the form of video presentations may lighten the potential clinical practice value.

Ethical Considerations and Informed Consent

This study was performed in line with the principles of the Declaration of Helsinki. The Ethics Committee of Xijing Hospital approved this study (KY-20232080-C-1). The questionnaire survey was anonymous. All participants provided informed consent and the consent was written at the initiation of diagnosis, allowing for further clinical research using their clinical records.

Acknowledgments

The authors express their gratitude to HOME for Researchers (www.home-for-researchers.com/) for providing language polishing services, as well as to Figdraw to the assistance in figure creating.

Author Contributions

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

Funding

The research was funded by "The Clinical Research Project of Fourth Military Medical University (2022LC2219)".

Disclosure

The authors report no conflicts of interest in this work.

References

1. Lam M, Li L, Anderson KK, Shariff SZ, Forchuk C. Evaluation of the transitional discharge model on use of psychiatric health services: an interrupted time series analysis. *Journal of Psychiatric and Mental Health Nursing*. 2020;27(2):172–184. doi:10.1111/jpm.12562

2. Cross KL, Johnson P, Allard BL, Shuman CJ. Clinical nurse specialists' perceptions of transitioning into a rural community-based transitional care Role. *The Journal of Nursing Administration*. 2020;50(9):456–461. doi:10.1097/NNA.0000000000000916
3. Bøje RB, Musaeus P, Sørensen D, Ludvigsen MS. Toward nurses' transformative agency in transitional care for older adults: a change-laboratory intervention. *Global Qualitative Nursing Research*. 2022;9:23333936221087622. doi:10.1177/23333936221087622
4. Griffin KM. Evolution of transitional care settings: past, present, future. *AACN Clinical Issues*. 1998;9(3):398–408.
5. Baldassano R, Ferry G, Griffiths A, Mack D, Markowitz J, Winter H. Transition of the patient with inflammatory bowel disease from pediatric to adult care: recommendations of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition. *J Pediatr Gastroenterol Nutr*. 2002;34(3):245–248. doi:10.1097/00005176-200203000-00001
6. Cui M, Hua J, Shi X, et al. Factors associated with instrumental support in transitional care among older people with chronic disease: a cross-sectional study. *BMC Nurs*. 2022;21(1):230. doi:10.1186/s12912-022-01014-w
7. Chipu M, Downing C. Professional nurses' facilitation of self-care in intensive care units: a concept analysis. *Int J Nurs Sci*. 2020;7(4):446–452. doi:10.1016/j.ijnss.2020.08.002
8. Sedlar N, Lainscak M, Farkas J. Self-care perception and behaviour in patients with heart failure: a qualitative and quantitative study. *ESC Heart Fail*. 2021;8(3):2079–2088.
9. Vellone E, Riegel B, Alvaro R. A situation-specific theory of caregiver contributions to heart failure self-care. *J Cardiovasc Nurs*. 2019;34 (2):166–173. doi:10.1097/JCN.0000000000000549
10. Bailey A, Mallow J, Perceived Self-Efficacy TL. Confidence, and skill among factors of adult patient participation in transitional care: a systematic review of quantitative studies. *SAGE Open Nurs*. 2022;8:23779608221074658. doi:10.1177/23779608221074658
11. Jiao W, Gong X, Sun Y, Sang L, Ding X, Yu M. Ultrasound contrast agent assisted ultrasonography guidance percutaneous nephrostomy for non-hydronephrotic kidney. *Ultrasound J*. 2024;16(1):14. doi:10.1186/s13089-024-00362-9
12. Aithal GP, Palaniyappan N, China L, et al. Guidelines on the management of ascites in cirrhosis. *Gut*. 2021;70(1):9–29. doi:10.1136/gutjnl-2020-321790
13. Pedersoli F, Schroder A, Zimmermann M, et al. Percutaneous transhepatic biliary drainage (PTBD) in patients with dilated vs. nondilated bile ducts: technical considerations and complications. *Eur Radiol*. 2021;31(5):3035–3041. doi:10.1007/s00330-020-07368-6
14. Song L, Chen X, Zhu L, et al. Perioperative outcomes of bi-pigtail catheter drainage strategy versus conventional chest tube after uniportal video-assisted thoracic lung surgery. *Eur J Cardiothorac Surg*. 2023;64(6). doi:10.1093/ejcts/ezad411
15. Wang M, Long F, Liu D, Zhuo Y, Tian L, Liang H. Application of wechat-utilized mobile health in transitional care among patients undergoing hepatectomy: a pilot study. *Clinical Nursing Research*. 2023;32(2):298–305. doi:10.1177/10547738221143664
16. Gurkova E, Sturekova L, Mandysova P, Sanak D. Factors affecting the quality of life after ischemic stroke in young adults: a scoping review. *Health Qual Life Outcomes*. 2023;21(1):4. doi:10.1186/s12955-023-02090-5
17. Bonetti L, Tolotti A, Anderson G, et al. Nursing interventions to promote patient engagement in cancer care: a systematic review. *Int J Nurs Stud*. 2022;133:104289. doi:10.1016/j.ijnurstu.2022.104289
18. Wang J, Ying M, Temkin-Greener H, et al. Care-partner support and hospitalization in assisted living during transitional home health care. *J Am Geriatr Soc*. 2021;69(5):1231–1239. doi:10.1111/jgs.17005
19. Naylor MD, Aiken LH, Kurtzman ET, Olds DM, Hirschman KB. The care span: the importance of transitional care in achieving health reform. *Health Affairs*. 2011;30(4):746–754. doi:10.1377/hlthaff.2011.0041
20. Guo L, Wei M, Namassevayam G, Söderhamn U, Liu Y, Guo Y. Factor analysis of the Chinese version of the self-care ability scale for the elderly: a multi-centre cross-cultural validation study. *International Journal of Nursing Practice*. 2023;29(2):e13060. doi:10.1111/ijn.13060
21. Gao H, Söderhamn U, Cliffordson C, Guo L, Guo Q, Liu K. Reliability and validity of the Chinese version of the self-care ability scale for the elderly. *Journal of Clinical Nursing*. 2017;26(23–24):4489–4497. doi:10.1111/jocn.13779
22. Han G, Ulrika S, Christina C, Lijia G, Qiyun G, Kun L. Self-care ability scale for the elderly--Chinese version. *PsycTESTS Dataset*. 2017.
23. Wang J, Zhao Z, Yang J, Ng M, Zhou M. The association between education and premature mortality in the Chinese population: a 10-year cohort study. *The Lancet Regional Health Western Pacific*. 2024;47:101085. doi:10.1016/j.lanwpc.2024.101085
24. Jiao W, Huang Y, Lei Y, Zhang J, Yu M. Ultrasonography - a novel auxiliary interpretive approach for tuberculin-purified pure protein derivative skin test: a comparative study. *Ther Adv Respir Dis*. 2023;17:17534666231213638. doi:10.1177/17534666231213638
25. Chow JS S-C, Wang H. Sample size calculations in clinical research. *chapman hall* 2003.
26. Zhang X, K-h L, Guo X. Promoting China's mHealth market: a policy perspective. *Health Policy and Technology*. 2017;6(4):383–388. doi:10.1016/j.hlpt.2017.11.002
27. Cai C, Xiong S, Millett C, Xu J, Tian M, Hone T. Health and health system impacts of China's comprehensive primary healthcare reforms: a systematic review. *Health Policy Plan*. 2023;38(9):1064–1078. doi:10.1093/heapol/czad058
28. Li X, Krumholz HM, Yip W, et al. Quality of primary health care in China: challenges and recommendations. *Lancet*. 2020;395(10239):1802–1812. doi:10.1016/S0140-6736(20)30122-7
29. Ting GY LI, Fei SHA, Xue DONG, Chenxi MIAO, Yongli LIU. The status quo and influencing factors of readiness of primary caregivers of patients transferred out from Intensive Care Units. *Chinese Nursing Management*. 2018;18(10):1347–1351.
30. Gilliam M, Krein SL, Belanger K, Fowler KE, Dimcheff DE, Solomon G. Novel combined patient instruction and discharge summary tool improves timeliness of documentation and outpatient provider satisfaction. *SAGE Open Med*. 2017;5:2050312117701053. doi:10.1177/2050312117701053
31. Guo Y, Lane DA, Chen Y, Lip GYH. Mobile health technology facilitates population screening and integrated care management in patients with atrial fibrillation. *Eur Heart J*. 2020;41(17):1617–1619. doi:10.1093/eurheartj/ehaa161
32. Chang L, Fujin Y. Relative deprivation and health revisited: new evidence from middle-aged and older adults in rural China. *China Economic Review*. 2023.
33. Wenzhe Q, Lingzhong X, Shanshan W, Hui S. Income, relative deprivation and the self-rated health of older people in Urban and Rural China. *Frontiers in Public Health*. 2021.
34. Laokri S, Dramaix-Wilmet M, Kassa F, Anagonou S, Dujardin B. Assessing the economic burden of illness for tuberculosis patients in Benin: determinants and consequences of catastrophic health expenditures and inequities. *Trop Med Int Health*. 2014;19(10):1249–1258. doi:10.1111/tmi.12365
35. Fernandez-Cacho LM, Ayesa-Arriola R. Quality of life, pain and anxiety in patients with nephrostomy tubes. *Rev Lat Am Enfermagem*. 2019;27:e3191. doi:10.1590/1518-8345.3039.3191