Longitudinal Study on Transitional Care Needs of Elderly Patients After Total Hip Arthroplasty Discharge

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Abstract: *<u>Objective</u>: To longitudinally explore the level of transitional care needs in elderly patients after total hip arthroplasty (THA) and analyze its influencing factors. <u>Methods</u>: Using a convenience sampling method, patients who underwent THA in three Grade III-A general hospitals in Guangxi Zhuang Autonomous Region from July 2024 to October 2024 were selected as the study subjects. A general information questionnaire and a self-developed transitional care needs scale for elderly THA patients were used to conduct surveys at 1 month and 3 months post-discharge. One-way repeated measures ANOVA was employed to compare the differences in transitional care needs scores among elderly THA patients at different time points, followed by pairwise comparisons. <u>Results</u>: The time-point effect results showed that the demand scores of patients at one month and three months after discharge were 113.39±18.48 and 109.32±12.88, respectively. The total scores of transitional care needs at one month and three months after discharge showed statistically significant differences (P<0.05). Over time, the transitional care needs of elderly patients showed a declining trend. The main effect analysis results indicated that age (F=4.381, P=0.014), gender (F=6.562, P=0.011), living situation (F=8.087, P<0.001), preoperative use of assistive devices such as crutches (F=9.619, P=0.002), and presence of comorbid diseases (F=6.835, P=0.010) significantly influenced the total score of patients' transitional care needs at discharge (P<0.05). The interaction effect results showed that the interaction between time points and preoperative use of assistive devices (F=5.534, P=0.019) and living situation (F=3.608, P=0.029) were significant, affecting the total score of patients' transitional care needs at discharge (P<0.05). <u>Conclusion</u>: The transitional care needs of elderly patients after total hip arthroplasty show a declining trend over time. Factors influencing the transitional care needs of these patients in this study include age, gender, living situation, use of assistive devices such as crutches, and the presence of comorbid conditions. The highest level of care needs was observed one month post-discharge. Therefore, healthcare professionals should pay particular attention to the one-month post-discharge period and assess the patients' needs based on different demographic characteristics.*

Keywords: Elderly, Total hip arthroplasty, Transition period after discharge, Nursing care needs, Longitudinal study.

1. Introduction

Total Hip Arthroplasty (THA) is a common surgical procedure for treating hip joint disorders such as femoral neck fractures and avascular necrosis of the femoral head. Postoperative care effectively alleviates patient pain, improves hip joint function, and enhances quality of life [1]. With the rapid advancement of population aging, the incidence of hip joint diseases has been rising annually [2]. Statistics show that 65% of global elderly patients aged 65 and above undergo THA [3]. China performs over one million THA procedures annually, with projections indicating a 1-2-fold increase by 2030 [4]. Studies indicate that elderly patients often face multiple physical and psychological challenges after THA discharge, which are complex and varied [5-7]. The discharge transition period refers to the period within three months when a patient transitions from the hospital to home. Notably, 41% of patients require readmissions due to issues like prosthesis dislocation, wound infections, and persistent pain [8,9]. International research reveals a 30-day readmission rate of 8.5% post-THA, rising to 10.5% within 90 days [10,11]. During this critical discharge transition period, complications such as wound infections, poor healing, deep vein thrombosis in the lower limbs, and prosthetic-related fractures significantly hinder recovery [12,13]. Understanding evolving nursing needs during the discharge transition period for elderly THA patients and providing targeted care services is crucial for their successful recovery. Based on this, this study longitudinally investigated the level of nursing needs of elderly patients after total hip replacement surgery during the discharge transition period and analyzed the influencing factors, in order to guide medical staff to identify the high frequency time period of needs during the discharge transition period, and provide scientific reference for improving the discharge transition period nursing services.

2. Object and Method

2.1 Research Subjects

Using convenience sampling, we selected patients who underwent Total Hip Arthroplasty (THA) at three Grade III-A general hospitals in Guangxi Zhuang Autonomous Region between July and October 2024 as study subjects. Inclusion criteria: 1) Patients discharged after THA surgery; 2) Age ≥60 years; 3) Within 3 months from discharge to home-based living with regular follow-ups within three months; 4) Sufficient comprehension and verbal communication skills; 5) Informed consent and voluntary participation in the study. Exclusion criteria: 1) Patients admitted to professional care institutions post-discharge; 2) Patients with severe heart, brain, or kidney diseases; 3) Patients with severe psychological or psychiatric issues. This study has been approved by the university-level ethics committee (Approval No.2023122609).

2.2 Research Methods

2.2.1 Research tools

The general information questionnaire included general demographic data (gender, age, BMI, place of recuperation after discharge, educational background, marital status, living situation, economic status, etc.) and disease data (surgical limb, preoperative diagnosis, preoperative use of crutches and other auxiliary devices, preoperative self-care status, whether there are other diseases, etc.).

(1) Discharge transition nursing needs scale for elderly patients after total hip replacement.

(2) The scale was developed strictly following standardized procedures, comprising five dimensions: Physiological Care Needs (1 item), Health and Safety Management Needs (1 item), Emotional Belonging and Social Support Needs (1 item), Privacy Protection and Respect Needs (1 item), and Self-Transcendence and Potential Realization Needs (33 items). Using the Likert 5-point scale (1-5 points, with "not needed" as the lowest and "very needed" as the highest), total scores range from 33 to 165, where higher scores indicate greater care need levels. Validity analysis showed a Cronbach's α-coefficient of 0.936, with dimension-specific coefficients ranging from 0.768 to 0.915. Dimension-total correlations ranged from 0.537 to 0.841, while the Inter-item Validity Index (I-CVI) reached 0.857-1, and the S-CVI/UA ratio stood at 0.991. The overall test-retest reliability was 0.960.

2.2.2 Data collection and quality control

For patients discharged within one month, researchers conduct on-site home visits. Those discharged three months later receive follow-up calls. During questionnaire completion, staff should provide real-time guidance using standardized protocols. When conducting phone interviews, researchers must introduce themselves, explain the purpose of the call, and clearly state the duration and response format. When collecting questionnaires, investigators meticulously verify for missing responses and exclude duplicates. Phone interviews strictly adhere to scheduled timelines, with staff presenting questions and recording answers to ensure data accuracy. Sufficient follow-up contact is maintained through establishing strong nurse-patient relationships during hospitalization, demonstrating care through patient-centered communication and providing thorough responses to inquiries throughout the process.

2.3 Statistical Methods

After double-checking, the data were entered into EXCEL and imported into SPSS24.0. For continuous variables with normal distribution, mean ± standard deviation was used; for non-normal distributions, median and proportion were described. Count data were represented by frequency and percentage. The dependent variable in this study was patient demand scores. Since the research subjects were the same group of patients, we primarily aimed to describe the trend of demand changes over time. As conventional ANOVA increases the risk of Type I error, repeated measures ANOVA was employed instead. In repeated measures ANOVA, the assumption of sphericity must be tested. Non-sphericity was corrected using Greenhouse-Geisser method. If no interaction effect between time points and related factors was observed,

Bonferroni correction was applied to multiple comparisons at α=0.05. When interactions existed, Stachy method was used for correction, with $P < 0.05$ considered statistically significant.

3. Results

3.1 General Information of 119 Patients

In this study, 125 patients were included. Two patients were lost one month after surgery, including one patient who refused to participate in the survey and one patient who died; four patients were lost three months after surgery, including two empty phone numbers and two uncontactable patients, a total of six cases, with a total loss rate of 4.8%. The general information of patients is shown in Table 1.

Table 1: General information of patients with postoperative transition period after total hip replacement in the elderly (n=119)

project	classify	number of people	percentage (%)
age	60-70 years	65	54.6
	71-80 years	38	31.9
	81-90 years	16	13.5
sex	man	70	58.8
	woman	49	41.2
Place of recuperation after discharge	city	18	15.1
	rural area	101	84.9
degree of education	Junior high school and below	108	90.8
	High school (including technical secondary school)	11	9.2
	University (including college)	0	0
marital status	married	114	95.8
	unmarried	0	0
	dissociaton	0	0
	bereft of one's spouse	5	4.2
Living conditions	living alone	0	0
	Living with a spouse only	8	6.7
	Only live with your children	51	42.9
	Live with your spouse and children	60	50.4
Household monthly income	< three thousand yuan	31	26.1
	3001~5000 yuan	67	56.3
	5001~10000 yuan	21	17.6
	> ten thousand yuan	0	0
Hospitality funds	Urban employee medical insurance	8	6.7
	Basic medical insurance for urban and rural residents	109	91.6
	commercial insurance	0	0
	at one's own expense	2	1.7
	other	0	0
Surgical limb	hemi	117	98.3
	bilateral	2	1.7
PODx	transcervical fracture	58	48.7
	Avascular necrosis of the femoral head	61	51.3
	other	0	0
Whether to use crutches and other auxiliary devices before surgery	yes	46	38.7
	deny	73	61.3
Self-care status before surgery	complete self-help	1	0.8
	partial self-help	118	99.2
	be completely dependent on	0	0
Whether it is combined with other diseases	yes	107	89.9
	deny	12	10.1
BMI	BMI<18.5	4	3.4
	18.5≤BMI<25	105	88.2
	25≤BMI<30	10	8.4

3.2 Postoperative Scores of Each Dimension and Total Score at Each Time Point in Elderly Patients After Total Hip Replacement

The physiological care and total score requirements of elderly patients after total hip replacement during the one-month discharge transition period showed a downward trend over time. The demand for health management safety was highest at one month and three months after discharge. See Table 2 for details.

Table 2: Descriptive analysis of dimensions and total scores within one month and three months after discharge (n=119)

project	time point	mean	standard deviation
Physiological care needs	One month	34.12	7.95
	trimester	24.86	6.52
Health management and safety requirements	One month	42.12	6.62
	trimester	43.71	5.12
Emotional belonging and need for social support	One month	13.66	2.85
	trimester	15.28	2.60
Privacy protection and respect needs	One month	10	2.37
	trimester	10.99	1.87
Self-transcendence and the need for potential	One month	13.50	2.53
	trimester	14.49	2.63
total points	One month	113.38	18.48
	trimester	109.32	12.88

3.3 Comparison of Nursing Needs Scores in Different Periods of Discharge Transition for Elderly Patients After THA

The test statistic W=1 in the time-point effect analysis (p<0.001, degrees of freedom=0) indicates non-sphericity. The multivariate analysis using regression paths revealed F=6.519 with p=0.012 <0.05, under 1 degree of freedom.

Greenhouse-Geisser's correction (F=6.519, p=0.012 <0.05, degrees of freedom=1) confirmed significant time-dependent differences in postoperative transition period nursing needs among elderly THA patients.

A statistically significant difference (P <0.05) was observed in the total nursing care needs scores between one month and three months post-discharge. Among 119 patients, the total score for the first month after discharge was 113.39±18.48, while it dropped to 109.32±12.88 by the third month, representing a decrease of 4.067 points compared to the initial period (95% CI: 0.913-7.222). Detailed data are presented in Table 3.

Table 3: Simple comparison results (n=119)

(I) time point	(J) time point	Mean difference (I-J)	standard error	conspicuousness b	95% confidence interval for the difference lower limit	superior limit
T1	T2	4.067*	1.593	0.012	0.913	7.222
T2	T1	-4.067*	1.593	0.012	-7.222	-0.913

3.4 Analysis of Main Effects

The analysis of variance results indicated that post-discharge rest location, educational level, marital status, household monthly income, hospitalization expenses, surgical limb type, preoperative diagnosis, preoperative self-care ability, and BMI (P> 0.05) did not significantly affect the total nursing needs score during the discharge transition period. However, age, gender, residential circumstances, preoperative use of crutches or other assistive devices, and presence of comorbidities (P <0.05) were found to significantly influence this score. Detailed findings are presented in Table 4.

Table 4: Main effect test results

source	Class iii sums of squares	free degree	mean square	F	P
Modified model	17943.745a	19	944.408	4.802	<0.001
nodal increment	58570.131	1	58570.131	297.780	<0.001
age	1723.335	2	861.668	4.381	0.014
sex	1290.772	1	1290.772	6.562	0.011
Place of recuperation after discharge	0.189	1	0.189	0.001	0.975
degree of education	1.083	1	1.083	0.006	0.941
marital status	379.177	1	379.177	1.928	0.166
Living conditions	3181.242	2	1590.621	8.087	< 0.001
Household monthly income	187.522	2	93.761	0.477	0.621
Hospitality funds	386.741	2	193.371	0.983	0.376
Surgical limb	649.035	1	649.035	3.300	0.071
PODx	2.587	1	2.587	0.013	0.909
Whether to use crutches and other auxiliary devices before surgery	1891.950	1	1891.950	9.619	0.002
Self-care status before surgery	356.908	1	356.908	1.815	0.179
Whether it is combined with other diseases	1344.367	1	1344.367	6.835	0.010
BMI	60.189	2	30.095	0.153	0.858

a. R^2 = 0.295 (adjusted R^2= 0.234)

Principal component analysis revealed that living arrangements significantly influenced the total nursing care needs during the discharge transition period (F=8.087, P<0.001). In this study, the group living with spouses (8 people), children (51 people), and both spouses and children (60 people) showed statistically significant differences in total needs when compared to the groups living solely with spouses, children, or both (P<0.05), while the group living solely with children showed no significant difference (P>0.05) (see Table 5). The analysis further demonstrated that among patients discharged one month and three months post-discharge, those living solely with spouses exhibited the highest nursing care needs, with scores of 133.75±17.80 and 115.75±11.36

respectively.

Table 5: Results of multiple comparison of living conditions

(I) Housing	(J) Housing	Mean difference (I-J)	standard error	conspicuousness b	95% confidence intervalb for the difference lower limit	superior limit
1	2	14.2304*	3.77113	0.001	5.1322	23.3286
	3	14.4833*	3.73258	<0.001	5.4781	23.4885
2	1	-14.2304*	3.77113	0.001	-23.3286	-5.1322
	3	0.2529	1.88876	1.000	-4.3039	4.8098
3	1	-14.4833*	3.73258	<0.001	-23.4885	-5.4781
	2	-0.2529	1.88876	1.000	-4.8098	4.3039

Based on measured averages.
The error term is the mean square (error) = 196.689.

* The significance level of the mean difference is 0.05.
1= live only with spouse, 2= live only with children, 3= live with spouse and children.

The analysis of main effects revealed that age significantly influenced patients' overall need scores (F=4.441, P=0.013). The study included 65 participants aged 60-70, 38 aged 71-80, and 16 aged 81-90. Multiple comparisons demonstrated significant differences in overall need scores between the 60-70 and 71-80 age groups, as well as the 60-70 and 81-90 age groups (P<0.05), while no significant differences were observed between the 71-80 and 81-90 age groups. Detailed data are presented in Table 6. Notably, patients with the highest overall need scores at 1-month and 3-month post-discharge were those aged 81-90, with scores of 120.44±12.50 and 117.81±17.93 respectively.

Table 6: Results of multiple age comparison

(I) age	(J) age	Mean difference (I-J)	standard error	conspic uousnes s	95% confidence interval	
					lower limit	superior limit
1	2	-7.3796*	2.02510	0.001	-12.2653	-2.4938
	3	-11.6707*	2.76759	<0.001	-18.3477	-4.9936
2	1	7.3796*	2.02510	0.001	2.4938	12.2653
	3	-4.2911	2.95543	0.444	-11.4214	2.8391
3	1	11.6707*	2.76759	<0.001	4.9936	18.3477
	2	4.2911	2.95543	0.444	-2.8391	11.4214

Based on measured averages.
The error term is the mean square (error) = 196.689.
* The significance level of the mean difference is 0.05.
1=60-70 years old, 2=71-80 years old, 3=81-90 years old.

The results of the main effect showed that gender significantly affected the total score of patients' needs. In this study, there were 70 male patients and 49 female patients. One month after discharge, the total score of male patients was (109.74±18.53 VS 118.59±11.29), and three months after discharge, the total score of female patients was (106.77±11.76 VS 112.94±13.61). The total score of female patients was higher than that of male patients.

The use of assistive devices like crutches before surgery and the presence of comorbidities significantly influence the total demand score. The scores at two time points were: patients using crutches and those with comorbidities showed the highest demands, with crutch usage scores being 121.80±14.65 and 111.89±10.80 at both time points. For patients with comorbidities, the scores were 120.53±14.42 and 112.26±11.48 at the two time points.

3.5 Interaction Effect Analysis

The interaction effect analysis revealed significant correlations between time points and preoperative assistive device use (F=5.534, P=0.019), as well as between residential circumstances (F=3.608, P=0.029). This indicates that patients' total demand scores may vary across time points depending on preoperative limb conditions and living environments. Subsequent analyses then examined the simple effects of preoperative limb status, residential circumstances, and temporal factors.

No interaction effects were observed between time points and variables including age (F=0.040, P=0.960), gender (F=0.429, P=0.513), post-discharge convalescent location (F=2.849, P=0.093), educational level (F=0.685, P=0.409), marital status (F=0.843, P=0.360), household monthly income (F=1.054, P=0.350), hospitalization expenses (F=0.679, P=0.508), surgical limb (F=3.816, P=0.052), preoperative diagnosis (F=0.197, P=0.657), preoperative self-care ability (F=0.236, P=0.628), presence of comorbidities (F=2.224, P=0.137), or BMI (F=0.655, P=0.520).

As can be seen from Table 7 and 8, only the total score of patients' needs for living with their spouses, living with their children and using auxiliary devices showed significant changes at T1 and T2 (P <0.05), while the demand changes of patients living with their spouses and children and not using auxiliary devices were not significant at T1 and T2 (P> 0.05).

The results of Table 9 and 10 showed that there were significant differences in the total T1 demand score between those who lived only with their spouses and those who lived only with their children, those who lived only with their spouses and those who lived only with their spouses and children, and those who used or did not use auxiliary devices before surgery (P <0.05).

The results in Table 11 showed that the patients with only living with their spouses had the highest need at T1 time point, with a score of 133.75±17.80, and the results in Table 12 showed that the patients with the use of assistive devices had the highest need at T1 time point, with a score of 121.80±14.65.

Table 7: Simple effect analysis of time point trend of residence situation

(I) Residency	(I) time point	(J) time point	Mean difference (I-J)	standard error	conspicuousnes s b	95% confidence interval	
						lower limit	superior limit
1	T1	T2	18.000*	7.701	0.020	2.827	33.173
	T2	T1	-18.000*	7.701	0.020	-33.173	-2.827
2	T1	T2	7.392*	3.050	0.016	1.383	13.402
	T2	T2	-7.392*	3.050	0.016	-13.402	-1.383
3	T1	T2	-0.600	2.812	0.831	-6.140	4.940
	T2	T1	0.600	2.812	0.831	-4.940	6.140

Estimate marginal mean based on
* The significance level of the mean difference is 0.05.
b. Multiple comparison adjustment: the Stark method.
T1: one month, T2: three months, 1= only live with the spouse, 2= only live with the children, 3= live with the spouse and children.

Table 8: Trend analysis of the time point of whether or not auxiliary devices were used before surgery

(I) Whether auxiliary devices are used before surgery	(I) time point	(J) time point	Mean difference (I-J)	standard error	conspicuousnes s b	95% confidence interval	
						lower limit	superior limit
1	T1	T2	9.913*	3.168	0.002	3.671	16.155
	T2	T1	-9.913*	3.168	0.002	-16.155	-3.671
2	T1	T2	0.397	2.515	0.875	-4.558	5.352
	T2	T1	-0.397	2.515	0.875	-5.352	4.558

Estimate marginal mean based on
* Significance level for mean difference: 0.05. b. Multiple comparison adjustment: Stark method. T1: one month, T2: three months, 1=use of crutches and other assistive devices, 2=non-use of crutches and other assistive devices.

Table 9: Analysis of simple effects with residential conditions

time point	(I) live	(J) live	Mean difference (I-J)	standard error	conspicuousness b	95% confidence interval for the differenceb	
						lower limit	superior limit
T1	1	2	19.534*	5.857	0.003	5.447	33.621
		3	23.783*	5.797	< 0.001	9.840	37.726
	2	1	-19.534*	5.857	0.003	-33.621	-5.447
		3	4.249	2.934	0.383	-2.806	11.304
	3	1	-23.783*	5.797	< 0.001	-37.726	-9.840
		2	-4.249	2.934	0.383	-11.304	2.806
T2	1	2	8.926	5.857	0.339	-5.160	23.013
		3	5.183	5.797	0.753	-8.760	19.126
	2	1	-8.926	5.857	0.339	-23.013	5.160
		3	-3.743	2.934	0.494	-10.799	3.312
	3	1	-5.183	5.797	0.753	-19.126	8.760
		2	3.743	2.934	0.494	-3.312	10.799

Estimate marginal mean based on
* The significance level of the mean difference is 0.05.
b. Multiple comparison adjustment: the Stark method.
T1: one month, T2: three months, 1= only live with the spouse, 2= only live with the children, 3= live with the spouse and children.

Table 10: Simple effect analysis with or without preoperative use of assistive devices

time point	(I) assistive technology	(J) assistive technology	Mean difference (I-J)	standard error	conspicuousness b	95% confidence intervalb for the difference	
						lower limit	superior limit
T1	1	2	13.722*	2.860	< 0.001	8.087	19.357
	2	1	-13.722*	2.860	< 0.001	-19.357	-8.087
T2	1	2	4.206	2.860	0.143	-1.429	9.842
	2	1	-4.206	2.860	0.143	-9.842	1.429

Estimate marginal mean based on
* The significance level of the mean difference is 0.05.
b. Multiple comparison adjustment: the Stark method.
T1: one month, T2: three months, 1= use crutches and other auxiliary devices, 2= do not use crutches and other auxiliary devices.

Table 11: Total demand of patients with different residential conditions (n=119)

time point	Living conditions	Total needs score
T1	1	133.75±17.80
	2	114.22±19.36
	3	109.97±16.07
T2	1	115.75±11.36
	2	106.82±12.69
	3	110.57±12.91

T1: one month, T2: three months, 1= only live with spouse, 2= only live with children, 3= live with both spouse and children

Table 12: Preoperative use of assistive devices Total patient demand (n=119)

time point	Use of assistive devices before surgery	Total needs score
T1	1	121.80±14.65
	2	108.08±18.75
T2	1	111.89±10.80
	2	107.68±13.84

T1: one month, T2: three months, 1= use crutches and other auxiliary devices, 2= do not use crutches and other auxiliary devices.

4. Discussion

4.1 The Elderly Patients Who Have Undergone THA are in Urgent Need of Health Security Management During the Discharge Transition Period, but Have Low Demand for Privacy Protection and Respect

Among elderly patients undergoing total hip arthroplasty (THA), the highest health management needs were observed at 1-month and 3-month post-discharge, particularly for rehabilitation exercise guidance. Physiological care requirements, mainly concerning supine and lateral positioning precautions, ranked second. Privacy protection and respect requirements showed the lowest scores at both time points. The study revealed that health management needs scored 42.12±6.62 and 43.71±5.12 respectively, while privacy protection and respect requirements scored 10±2.37 and 10.99±1.87. According to Maslow's hierarchy of needs, this pattern primarily stems from: The prolonged rehabilitation period for elderly THA patients, with most postoperative training conducted outside hospitals. Individual differences significantly affect recovery timelines, typically restoring pre-surgery mobility within 6-10 weeks. Recovery trajectories vary across age groups, with elderly patients

generally recovering more slowly [14]. During extended rehabilitation, caregivers' limited knowledge about recovery protocols often leads to inadequate guidance, highlighting the urgent need for professional rehabilitation counseling [15]. As older adults gain better understanding of disease risks and complications, they develop heightened awareness of secondary falls and seek practical emergency response strategies – findings consistent with Xu Ting et al.'s research [16]. Furthermore, from the perspective of physiological considerations in postoperative functional recovery for elderly patients, some older individuals inherently face challenges such as sarcopenia, poor balance, and slower recovery rates. Compounded by muscle weakness and balance disorders caused by surgical trauma, these combined factors may lead to difficulties in self-management during the discharge transition period, increasing risks of falls and prosthesis dislocation [17]. Consequently, there is a high demand for professional rehabilitation guidance. However, the need for privacy protection and respect remains minimal, primarily due to China's profound cultural heritage and the elderly's emphasis on privacy protection. This suggests that healthcare providers should prioritize meeting patients' health security management needs and physiological care requirements during the discharge transition period. For instance, through multi-team collaboration in home rehabilitation systems, remote information push, data reporting, and communication functions can be utilized for post-discharge rehabilitation guidance [18]. By integrating resources from hospital, community, and family through multidisciplinary team collaboration, diversified nursing services can be provided during the discharge transition period to promote patient recovery.

4.2 Elderly Patients with THA Have High Needs for Emotional Belonging and Social Support, and are Eager to be Valued and Cared for

In this study, the scores for emotional belonging and social support needs at 1-month and 3-month post-discharge were 13.66±2.85 and 15.28±2.60, respectively. Due to the prolonged recovery period after THA surgery, elderly patients often experience anxiety and depressive emotions during the discharge transition phase [19]. With limited physical function and self-care abilities, these patients struggle with self-care management and urgently require caregiving support. Given their shorter hospital stays and advanced age, family members play a crucial role in care provision. Nordic researchers indicate that 60% of elderly THA patients require urgent spousal care during home rehabilitation [20], yet studies reveal 74% of caregivers lack adequate caregiving knowledge and skills [21]. Emotional support and encouragement from caregivers during the discharge transition can effectively alleviate anxiety and depressive symptoms while boosting patients' confidence in recovery [22]. This demonstrates that family support and caregiving significantly facilitate rehabilitation for elderly THA patients, highlighting the need for healthcare professionals to prioritize training and guidance for family caregivers during discharge transitions. Such measures will better address the transitional care needs of elderly THA patients.

4.3 The Total Score of Nursing Needs During Discharge Transition Period Decreased with Time in Elderly Patients After THA

One-way repeated measures ANOVA analysis revealed that the total nursing needs scores for 119 patients were 113.39±18.48 in the first month after discharge and 109.32±12.88 in the third month, representing a decrease of 4.067 points compared to the initial month (95% CI: 0.913-7.222). The statistically significant difference between these two time points (P<0.05) demonstrated a downward trend in transitional care needs over time. The study showed that nursing demands gradually decreased during the first and third months post-discharge, with caregiving burden dropping from 50% at discharge to 36% by the third month. These time-dependent changes in nursing needs align with recovery patterns observed in similar studies [23]. Notably, peak transitional care demands occurred one month post-discharge, highlighting the need for healthcare providers to prioritize this critical phase. Comprehensive extended care services — including home visits, early health issue management, personalized rehabilitation guidance, and psychological counseling—should be coordinated with community and family support systems to ensure continuous professional care throughout the discharge transition period.

4.4 The Nursing Needs of Elderly Patients After THA Discharge Transition Show Multidimensional Changes

The survey results indicate that within three months post-surgery, elderly patients undergoing total hip arthroplasty (THA) show a declining trend in physiological care needs during the discharge transition period. However, demand for health security management, emotional belonging and social support, privacy protection and respect, as well as self-actualization and potential realization all demonstrate increasing trends. This phenomenon may stem from multiple factors: The emergence of rapid rehabilitation has shortened hospital stays, making it challenging for patients to quickly acquire relevant disease care knowledge [24]. Compounded by population aging, structural changes in family dynamics, underdeveloped community healthcare infrastructure in China, and insufficient resource integration in rural medical facilities, coupled with healthcare worker shortages, patients face significant unmet needs for professional guidance in diet, medication, daily activities, and wound care after discharge [25,26]. As physical functions gradually recover and patients become more adept at managing daily activities and wound care, their physiological care requirements are largely satisfied. Post-thyroid surgery elderly patients, constrained by permanent prosthetic use during the discharge transition period, experience heightened safety management needs, emotional support demands, and social interaction requirements due to increased awareness of disease risks and concerns about prosthesis dislocation [27]. Therefore, healthcare providers should conduct dynamic assessments based on patients' evolving conditions and provide personalized nursing support to address their diverse care needs.

4.5 Residence Status Affects the Level of Nursing Needs During Discharge Transition in Elderly Patients After THA

According to the results of principal effects analysis and

interaction effects, the postoperative needs of elderly THA patients living with their spouses peaked one month after discharge, indicating that we should focus on these needs during this critical period. The psychological mechanism behind this may stem from increased caregiving pressure on spouses. As the closest family members, spouses typically demonstrate stronger caregiving willingness and provide more meticulous care services [28]. However, as informal caregivers, spouses face heavy long-term caregiving burdens due to age and health conditions, making it difficult for them to sustain adequate support. Research shows that caregivers often experience burnout in early postoperative stages, leading to unmet patient needs [29], which aligns with our findings. Additionally, patients living solely with their spouses exhibit the highest transitional care needs, likely related to insufficient social support. Their nuclear families consist only of the patient and spouse, lacking support from relatives or multiple children [30]. Combined with limited community resources and socioeconomic-cultural constraints, these patients face heightened transitional care demands [31]. Unmet needs may increase readmission rates, with one-month post-discharge being the peak period. Studies show that 3.4% of elderly THA patients are readmitted within 30 days after discharge, primarily due to infections and falls [32]. In the United States, reducing readmissions has become a recognized benchmark for healthcare quality. In 2012, the United States implemented the "Readmission Reduction Initiative," under which medical insurance companies reduced payments for hospitals with high 30-day readmission rates, requiring hospitals to bear the costs themselves to improve care quality [33]. This measure led to a decline in readmission rates in the U.S. China's Diagnosis-Related Groups (DRG) payment reform, however, started later with incomplete supporting infrastructure. For elderly patients undergoing Total Hip Arthroplasty (THA) who experience complications leading to readmissions, China could draw lessons from American practices by optimizing discharge transition care. Specifically, for patients living solely with their spouses, discharge plans should include home visits and spouse care training programs. Strengthening healthcare worker training and prioritizing post-discharge care needs for one month are crucial for reducing readmissions and ensuring smooth patient transitions.

4.6 Age and Gender Affect the Level of Nursing Needs of Elderly Patients After THA

Age and gender are critical factors influencing postoperative transitional care needs in elderly patients undergoing Total Hip Arthroplasty (THA). This study demonstrates a significant positive correlation between patient age and nursing requirements, with higher age correlating with greater transitional care demands. Older patients, who often experience memory decline, limited financial capacity, and unfamiliarity with smart devices, represent the most complex, numerous, and urgent group in rehabilitation care [34]. The underlying reason lies in their increased challenges in daily activities such as walking, getting out of bed, and using the toilet, which directly heightens their reliance on professional nursing services—a finding consistent with Stuck's research [35]. Additionally, female patients require more intensive transitional care than males due to higher osteoporosis incidence, which increases fracture risks and necessitates

more meticulous fall prevention measures. Notably, studies show women are more prone to postoperative complications within 30 days, likely because their transitional care needs remain unmet [36], a conclusion corroborated by this study. Therefore, prioritizing transitional care for elderly female patients and providing timely extended community-based nursing services are essential to reduce complication rates.

4.7 Preoperative Use of Crutches and Other Assistive Devices, and the Level of Nursing Needs of Elderly Patients with THA After Discharge Transition Due to Complications

The main effect and interaction effects indicate that patients using assistive devices such as crutches have higher nursing care needs during the discharge transition period, particularly within the first month post-discharge. Patients who used assistive devices preoperatively face more challenging recovery processes due to factors like muscle weakness, balance disorders, and comorbidities, leading to greater nursing demands [37]. One month after surgery, patients using assistive devices experience heightened mobility restrictions from both surgical trauma and pre-existing functional impairments, necessitating continued use of devices for gait maintenance and fall prevention. This suggests that patients with assistive devices exhibit delayed recovery trajectories compared to those without preoperative aids. Studies show that postoperative physical activity levels at three months can be predicted by crutch usage duration, with prolonged crutch use in preoperative patients requiring increased nursing support [38], a finding consistent with our findings. Additionally, coexisting conditions significantly influence nursing needs. Patients with comorbidities require enhanced care primarily because they need both specialized rehabilitation services to restore physical function and additional medical interventions for their complications. Therefore, it is recommended to incorporate preoperative assistive device use into discharge plan risk assessment systems. For these patients, we recommend strengthening transitional care through multidisciplinary collaboration, implementing dynamic assessments of nursing needs, adjusting priorities in phases, and establishing a comprehensive discharge transition support network.

5. Summary

The discharge transition period for elderly patients undergoing total hip replacement surgery demonstrates heightened care needs during the first month post-discharge. Healthcare providers should prioritize monitoring patients during this critical phase, promptly identifying potential requirements and delivering tailored nursing interventions. However, this study's longitudinal tracking only assessed patient needs at 1-and 3-month post-discharge intervals, which proved insufficient for analyzing the discharge transition period's care demand curve. Additionally, the limited number of home visits (only one) posed challenges for comprehensive follow-up. Future improvements include adding three follow-up time points (1, 2, and 3 months) to refine demand trajectory analysis, expanding multi-center collaborations to increase sample size, and implementing intelligent follow-up tools to reduce workload.

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