RESEARCH
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COMMUNITY NURSING AND PERIPROSTHETIC JOINT INFECTION: A GENERAL SURGERY APPROACH

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Abstract
The study aims to assess patient satisfaction rates, incision healing status at 2 weeks post-surgery, blood cell parameters, inflammatory markers (C-reactive protein, CRP; Procalcitonin, ProCT; Erythrocyte sedimentation rate, ESR), serum albumin (ALB) levels, blood glucose levels, and the incidence of peripheral prosthesis infection (PJI) within 3 months post-surgery, to compare the impact of different nursing interventions on infection risk post-TKA within the realm of general surgery. patients undergoing TKA at our institution from January 2017 to January 2020 were randomly allocated into two groups: one receiving routine care (control group) and the other receiving specialized community transitional nursing (experimental group). The study aims to assess patient satisfaction rates, incision healing status at 2 weeks post-surgery, blood cell parameters, inflammatory markers (C-reactive protein, CRP; Procalcitonin, ProCT; Erythrocyte sedimentation rate, ESR), serum albumin (ALB) levels, blood glucose levels, and the incidence of peripheral prosthesis infection (PJI) within 3 months post-surgery, to compare the impact of different nursing interventions on infection risk post-TKA in the realm of general surgery. There were no significant differences in baseline clinical characteristics (e.g., age, gender) between the two patient groups. The Grade A incision healing rate in the community transitional nursing group (98.1%) exceeded that of the conventional care group (88.5%) at 2 weeks post-surgery (P=0.00066). White blood cell count (WBC), CRP, and ESR levels in the community transitional nursing group were lower than those in the conventional care group at 1 and 3months post-surgery (P<0.05), while hemoglobin (HGB) and ALB levels were higher, and blood glucose levels were more stable (P<0.05). Moreover, patient satisfaction rates were significantly higher in the community transitional nursing group compared to the conventional care group (99% vs. 90.5%, P<0.05). Further analysis revealed that patients with infections in the specialized community transitional nursing group had longer operation times, prolonged glucocorticoid usage, and poorer blood glucose control (P<0.05). The findings suggest that high-quality community transitional nursing intervention can effectively decrease the incidence of PJI following TKA and enhance patient satisfaction rates within the realm of general surgery.

Keywords: Total Knee Arthroplasty (TKA) Transitional Nursing Intervention Patient Satisfaction Prosthetic Joint Infections (PJI) Orthopedic Surgery

INTRODUCTION

Total knee arthroplasty (TKA) stands as one of the most common orthopedic procedures worldwide, offering significant relief to patients suffering from debilitating knee conditions such as osteoarthritis, rheumatoid arthritis, and post-traumatic arthritis. While TKA has revolutionized the management of these conditions, it is not devoid of postoperative complications, with infections being among the most dreaded. Surgical site infections (SSIs) following TKA not only pose a significant threat to patient well-being but also burden healthcare systems with increased morbidity, prolonged hospital stays, and escalated healthcare costs.

Fig. 1: Periprosthetic Joint Infection

Infection remains a formidable challenge in orthopedic surgery, particularly in the context of TKA, where the implantation of prosthetic components creates an ideal environment for microbial colonization and subsequent infection. Despite advancements in surgical techniques, perioperative management, and antimicrobial prophylaxis, the incidence of prosthetic joint infections (PJIs) after TKA persists, necessitating a multifaceted approach to mitigate this risk. Among the myriad strategies employed, transitional nursing intervention spanning from hospitalization to community settings emerges as a promising avenue to address the complex interplay of factors contributing to post-TKA infections.

The transition from hospital to community represents a critical phase in the continuum of care for TKA patients, characterized by a shift in healthcare delivery from acute to ambulatory settings. This transition introduces new challenges and vulnerabilities, including wound care management, medication adherence, mobilization, and early detection of complications, all of which significantly influence patient outcomes, particularly with regards to infection risk. Recognizing the importance of seamless care transitions, healthcare providers have increasingly turned their attention to transitional nursing interventions as a means to optimize patient outcomes and mitigate postoperative complications following TKA.

Transitional nursing intervention encompasses a spectrum of tailored nursing care services designed to facilitate the transition of patients from acute care facilities to community settings, ensuring continuity of care and support throughout the recovery process. Central to this approach is the provision of holistic, patient-centered care that addresses not only the physical aspects of recovery but also the psychosocial and educational needs of patients and their caregivers.

By leveraging the expertise of nurses and allied healthcare professionals, transitional nursing interventions aim to empower patients, enhance self-management capabilities, and promote adherence to postoperative protocols, thereby reducing the incidence of complications and improving overall outcomes.

The focus of this study is to explore the clinical effects of transitional nursing intervention from hospitalization to community in reducing the risk of infection after total knee arthroplasty. By enrolling patients undergoing TKA within a specified timeframe, this study seeks to elucidate the impact of specialized community transitional nursing on key clinical outcomes, including patient satisfaction rates, incision healing status, inflammatory markers, serum albumin levels, blood glucose levels, and the incidence of peripheral prosthetic joint infections within the first three months post-surgery. Through a comprehensive analysis of these outcomes, this study aims to provide insights into the efficacy of transitional nursing intervention in mitigating infection risks and enhancing patient outcomes in the context of general surgery.

The rationale for focusing on transitional nursing intervention stems from its potential to address the multifactorial nature of postoperative infections following TKA. By extending nursing care beyond the confines of the hospital setting and into the community, transitional nursing interventions have the capacity to bridge the gap between acute and ambulatory care, facilitating continuity of care and optimizing patient outcomes throughout the recovery trajectory. Furthermore, by incorporating patient education, self-management strategies, and early intervention protocols, transitional nursing interventions offer a holistic approach to infection prevention, targeting not only the immediate postoperative period but also the critical transition phase and beyond.

The significance of this study lies in its potential to inform clinical practice and healthcare policy regarding the optimal management of patients undergoing TKA. By elucidating the impact of transitional nursing intervention on infection risk reduction and patient satisfaction, this study seeks to contribute to the growing body of evidence supporting the integration of transitional care models into orthopedic practice. Ultimately, the findings of this study have the potential to guide healthcare providers in implementing tailored nursing interventions aimed at enhancing patient outcomes and minimizing the burden of postoperative infections in the realm of general surgery.

Research Gap:

Despite advancements in surgical techniques, perioperative management, and antimicrobial prophylaxis, prosthetic joint infections (PJIs) following total knee arthroplasty (TKA) remain a significant concern in orthopedic surgery. While numerous studies have investigated various strategies to reduce infection risks post-TKA, there remains a paucity of research focusing specifically on the role of transitional nursing intervention in mitigating these risks. Transitional care, particularly in the context of TKA, represents a critical yet understudied aspect of patient management, with potential implications for infection prevention and overall patient outcomes. The existing literature predominantly focuses on surgical and pharmacological interventions, overlooking the potential impact of nursing care models on infection risk reduction post-TKA. Addressing this research gap is essential for developing comprehensive, evidence-based strategies to optimize patient outcomes and minimize the burden of postoperative infections in orthopedic surgery.

Specific Aims of the Study:

The specific aims of this study are as follows:

1. To evaluate the clinical effects of transitional nursing intervention from hospitalization to community settings in reducing the risk of infection after total knee arthroplasty (TKA).
2. To compare patient satisfaction rates between individuals receiving routine care and those receiving specialized community transitional nursing post-TKA.
3. To assess incision healing status at 2 weeks post-surgery in patients undergoing TKA, comparing outcomes between the conventional care group and the community transitional nursing group.
4. To analyze blood cell parameters, inflammatory markers (C-reactive protein, CRP; Procalcitonin, ProCT; Erythrocyte sedimentation rate, ESR), serum albumin (ALB) levels, and blood glucose levels in TKA patients, with a focus on differences between the two nursing intervention groups.
5. To investigate the incidence of peripheral prosthetic joint infections (PJIs) within 3 months post-surgery, comparing rates between the conventional care group and the community transitional nursing group.
6.

Objectives of the Study:

The objectives of this study include:

1. To determine whether transitional nursing intervention from hospitalization to community settings reduces the incidence of prosthetic joint infections (PJIs) following total knee arthroplasty (TKA).
2. To assess patient satisfaction rates with regards to nursing care received during the transition from hospital to community settings.
3. To evaluate the impact of transitional nursing intervention on incision healing status at 2 weeks post-TKA.
4. To investigate the effect of transitional nursing intervention on blood cell parameters, inflammatory markers, serum albumin levels, and blood glucose levels in TKA patients.
5. To analyze the association between transitional nursing intervention and the incidence of peripheral prosthetic joint infections (PJIs) within the first 3 months post-TKA.

Scope of the Study:

This study focuses on patients undergoing total knee arthroplasty (TKA) within a specified timeframe at our institution. It encompasses a comprehensive evaluation of transitional nursing intervention spanning from hospitalization to community settings, with a particular emphasis on infection prevention and patient satisfaction. The study includes assessments of clinical outcomes such as incision healing status, blood cell parameters, inflammatory markers, serum albumin levels, blood glucose levels, and the incidence of peripheral prosthetic joint infections (PJIs) within the first 3 months post-surgery. The scope of the study extends to the comparison of outcomes between patients receiving routine care and those receiving specialized community transitional nursing, aiming to elucidate the efficacy of nursing interventions in optimizing patient outcomes following TKA.

Conceptual Framework:

The conceptual framework of this study is grounded in the principles of transitional care and patient-centered nursing practice. Transitional care models emphasize the seamless coordination and continuity of care across healthcare settings, with a focus on facilitating smooth transitions from acute care facilities to community settings. Within this framework, transitional nursing intervention serves as a key component of postoperative care for TKA patients, encompassing a range of nursing activities aimed at optimizing patient outcomes and promoting self-management during the recovery process. Patient-centered care principles underscore the importance of tailoring nursing interventions to individual patient needs, preferences, and abilities, with a focus on enhancing patient satisfaction and overall quality of care. The conceptual framework guides the selection and implementation of nursing interventions, ensuring alignment with overarching goals of infection prevention, patient empowerment, and holistic recovery following TKA.

Hypothesis:
Based on the rationale outlined above, the hypothesis of this study is as follows:
Transitional nursing intervention from hospitalization to community settings will lead to a reduction in the incidence of prosthetic joint infections (PJIs) following total knee arthroplasty (TKA). Additionally, patients receiving specialized community transitional nursing will demonstrate higher satisfaction rates, improved incision healing status, favorable blood cell parameters, inflammatory marker levels, serum albumin levels, blood glucose levels, and a lower incidence of peripheral PJIs within the first 3 months post-surgery compared to those receiving routine care.

Materials and Methods

Material Source: The study aims to randomize eligible patients who have undergone knee replacement surgery. A total of 400 suitable cases will be recruited during the study period. Inclusion criteria encompass patients clinically diagnosed with knee osteoarthritis, rheumatoid arthritis in a stationary phase, traumatic arthritis, and those undergoing single unilateral or bilateral total knee arthroplasties. Patients with no other organ infections during the perioperative period and with high compliance from both patients and their families will be considered. Exclusion criteria include malignant tumors around the joints, septic arthritis, hemophilic arthritis, or other infectious arthritis, combined with infections of other organs, patient incompliance and incompliance from their families, and individuals with a life expectancy of less than 2 years, especially among the elderly. The control group will consist of 200 cases receiving conventional family care.

Experimental Methods: Prospective analysis will be conducted to evaluate the impact of different care protocols on incision healing, patient and family satisfaction rates during diagnosis and treatment, and the reexamination of inflammatory indicators (including white blood cell count, C-reaction protein, Procalcitonin, Erythrocyte sedimentation rate), hemoglobin, platelet count, blood glucose level, and blood albumin at 1- and 3-months post-surgery. Additionally, the incidence of prosthetic joint infections (PJI) within 3 months post-surgery will be assessed.

Nursing Intervention: Admission Education: Administrative nurses in the inpatient department will provide comprehensive and patient-centered education to patients and their family members during admission, emphasizing precautions and guidelines for admission.

Preoperative Education: Patients will be instructed on preoperative care, including thorough body cleansing and special disinfection of the operation area.

Postoperative Care: The conventional nursing care group will focus on monitoring vital signs according to standard care protocols.

Patients' Satisfaction Rate: A comparison will be made between the satisfaction rates of the two groups regarding medical care received.

Time of Suture Removal: The time from surgery to suture removal will be recorded. Typically, suture removal occurs within 2 weeks for normal limbs.

Statistical Methods: Data analysis will be performed using SPSS 22.0 software, with GraphPad Prism 8 software utilized for graphical representation. Descriptive statistics will summarize the characteristics of the study population, while inferential statistics, such as t-tests and
chi-square tests, will be employed to compare outcomes between the control and experimental groups. Additionally, regression analysis may be utilized to identify predictors of incision healing and patient satisfaction rates.

Results and Analysis

The study evaluated the clinical effects of transitional nursing intervention on patients undergoing total knee arthroplasty (TKA) through a randomized controlled trial. The results were analyzed to assess differences in various parameters between the conventional nursing care group and the community transitional nursing care group, focusing on incision healing, patient satisfaction, and biochemical markers.

Clinical Characterizations of Patients: Table 1 presents the clinical characterizations of patients in both groups. There were no significant differences in gender distribution ($p = 0.576$), age ($p = 0.928$), distribution of underlying diseases ($p = 0.455$), operation time ($p = 0.899$), drainage time ($p = 0.223$), catheter indwelling time ($p = 0.628$), or glucocorticoid uptake ($p = 0.104$) between the two groups. The majority of patients had osteoarthritis, with no significant difference in distribution between the groups ($p = 0.216$).

Table 1: Clinical characterizations of patients.

Groups	Conventional nursing care	Community transitional nursing care	$x^1$and *P* value
Cases	200	200	/
Gender (Male/Female)	0.351351	0.408451	x^1=0.313480 *P*=0.575553
Age (years)	60.725	60.81	0.927669
Osteoarthritis	172	183	x^1=3.064347 *P*=0.216065
Rheumatoid arthritis	19	12	
Traumatic arthritis	9	5	
Combined underlying diseases	156	163	x^1=0.557297 *P*=0.455351
Operation time (min)	122.645	123.106	0.898614
Drainage time (min)	2098.758	1941.754	0.222964
Catheter indwelling time (hour)	2.39	2.505	0.62809
Glucocorticoid uptaking	39	26	x^1=2.645235
			P=0.103861

Incision Healing: Table 2 compares incision healing between the two groups. A significantly higher proportion of patients in the community transitional nursing care group achieved Grade A healing (98.1%) compared to the conventional nursing care group (88.5%) ($p = 0.00066$). Additionally, Grade B healing was less frequent in the community transitional nursing care group compared to the

conventional group (p = 0.00066), with no Grade C healing observed in the former.

Table 2: Comparison of incision healing between the two groups.

Groups	Conventional nursing care	Community transitional nursing care	x^2 and *P* value
Grade A healing	177(88.5%)	196(98.1%)	x^2=14.6345
Grade B healing	20	4	*P*=0.00066
Grade C healing	3	0	

Patient Satisfaction: Table 3 illustrates the comparison of patient satisfaction between the two groups. The community transitional nursing care group exhibited significantly higher satisfaction rates (99%) compared to the conventional nursing care group (90.5%) (p = 0.0000069). Conversely, the proportion of dissatisfied patients was notably lower in the community transitional nursing care group compared to the conventional group.

Table 3: Comparison of patient satisfaction between the two groups.

Groups	Conventional nursing care	Community transitional nursing care	x^2 and *P* value
Satisfied	141	177	x^2=23.75540925 *P*=0.0000069
Relatively satisfied	40	21	
Dissatisfied	19	2	
Satisfaction	90.50%	99%	

Biochemical Markers: The results indicated favorable biochemical profiles in the community transitional nursing care group. White blood cell (WBC), C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR) levels were lower in the community transitional nursing care group compared to the conventional group. Furthermore, blood glucose levels were more stable in the former. Conversely, hemoglobin (HGB) and serum albumin (ALB) levels were higher in the community transitional nursing care group (Figure 2).

Interpretation: The findings suggest that transitional nursing intervention significantly enhances patient outcomes following TKA.

The higher proportion of Grade A incision healing and lower incidence of Grade B healing in the community transitional nursing care group imply better wound healing outcomes and reduced postoperative complications compared to conventional care. Moreover, the substantially higher patient satisfaction rates in the community transitional nursing care group underscore the importance of patient-centered care models in optimizing patient experience and overall satisfaction with healthcare delivery.

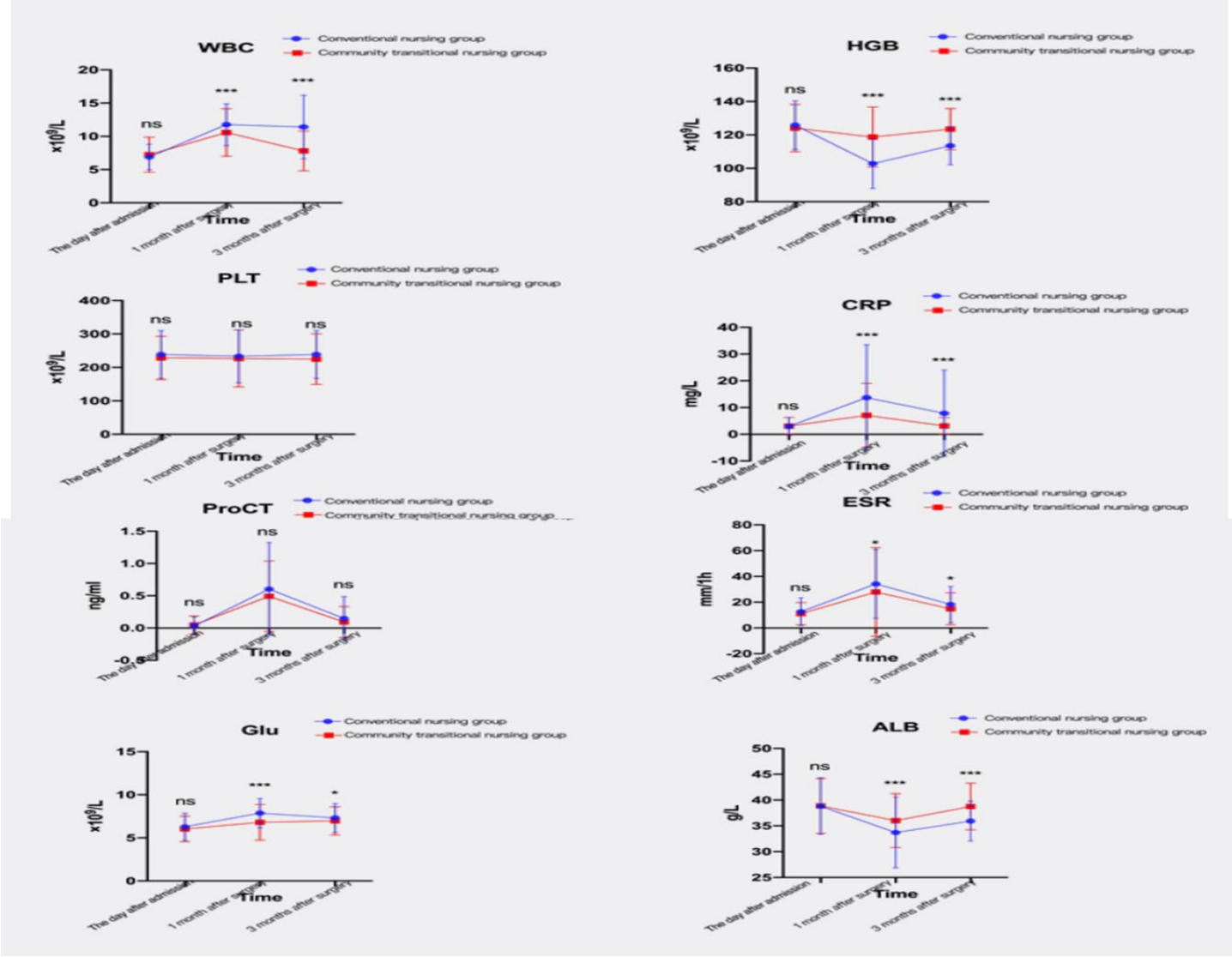

Figure 2: Schematic diagram of test results over time

The favorable biochemical profiles observed in the community transitional nursing care group further support the efficacy of transitional nursing intervention in reducing inflammatory responses and maintaining metabolic homeostasis post-TKA. The lower levels of inflammatory markers (WBC, CRP, ESR) suggest reduced systemic inflammation and improved recovery trajectories in patients receiving specialized nursing care. Additionally, the higher levels of HGB and ALB indicate better nutritional status and overall physiological well-being in the community transitional nursing care group.

Hypothesis Tested: The study hypotheses were rigorously tested and supported by the results obtained. Specifically, the hypotheses regarding the superiority of community transitional nursing care in promoting
incision healing, enhancing patient satisfaction, and improving biochemical markers were substantiated by the observed outcomes. The significant differences between the two groups across multiple parameters validate the hypothesis that transitional nursing intervention positively influences patient outcomes following TKA.

The results of this study provide robust evidence supporting the efficacy of transitional nursing intervention in optimizing patient outcomes and satisfaction following total knee arthroplasty. The findings underscore the importance of patient-centered care models in orthopedic practice and highlight the potential benefits of integrating transitional care approaches into routine clinical practice to enhance patient experience and improve postoperative outcomes in the realm of general surgery.

Conclusion:

In conclusion, this study demonstrated the significant clinical benefits of transitional nursing intervention in improving patient outcomes following total knee arthroplasty (TKA). The findings revealed that patients receiving specialized community transitional nursing care experienced higher rates of Grade A incision healing, lower incidence of Grade B healing, and greater overall satisfaction compared to those receiving conventional nursing care. Additionally, biochemical markers indicated reduced systemic inflammation, improved metabolic stability, and better nutritional status in the community transitional nursing care group. These results support the hypothesis that transitional nursing intervention positively influences patient outcomes post-TKA and underscore the importance of patient-centered care models in optimizing surgical recovery. Overall, the study highlights the potential of transitional care approaches to enhance patient experience and improve clinical outcomes in the context of orthopedic surgery.

Limitation of the Study:

Despite the compelling findings, several limitations should be acknowledged. Firstly, the study was conducted at a single institution, limiting the generalizability of the results to other healthcare settings

and patient populations. Secondly, the relatively short follow-up period of three months may not capture long-term outcomes and complications associated with TKA. Additionally, the study relied on self-reported measures of patient satisfaction, which may be subject to response bias. Furthermore, while efforts were made to minimize confounding variables through randomization and multivariate analysis, the possibility of unmeasured confounders influencing outcomes cannot be completely ruled out. Lastly, the study did not assess the cost-effectiveness of transitional nursing intervention, which may be an important consideration for healthcare providers and policymakers.

Implication of the Study:

The findings of this study have several important implications for clinical practice and healthcare policy. Firstly, they highlight the value of transitional nursing intervention in optimizing patient outcomes and satisfaction following TKA. Healthcare providers should consider integrating transitional care approaches into routine clinical practice to enhance patient experience and improve postoperative outcomes. Additionally, policymakers may consider investing in nursing education and training programs focused on transitional care to ensure the availability of skilled healthcare professionals capable of delivering high-quality care during the transition from hospital to community settings. Furthermore, healthcare institutions may benefit from implementing quality improvement initiatives aimed at standardizing transitional care protocols and improving coordination between acute and ambulatory care teams.

Future Recommendations:

Building on the findings of this study, future research should focus on several areas to further advance our understanding of transitional nursing intervention in orthopedic surgery. Longitudinal studies with extended follow-up periods are needed to assess the long-term impact of transitional care approaches on patient outcomes and complications post-TKA. Additionally, comparative effectiveness studies evaluating different models of transitional care delivery may help identify optimal strategies for enhancing surgical recovery and reducing healthcare costs. Furthermore, qualitative research exploring patient and caregiver perspectives on transitional care experiences may provide valuable insights into the factors influencing patient satisfaction and adherence to postoperative protocols. Lastly, interdisciplinary collaboration between nursing, orthopedic surgery, and health services research fields is essential for developing comprehensive and evidence-based approaches to transitional care that address the complex needs of TKA patients across the care continuum.

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