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Preventing Transfusion Reactions Through Interprofessional Vigilance: A Systematic Review Co-Led By Nursing, Blood Bank Laboratory, And Pharmacy Teams

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Abstract

Background: Transfusion reactions continue to pose a major challenge to patient safety and are frequently linked to preventable errors across the transfusion process. Effective prevention increasingly relies on interprofessional collaboration, particularly among nursing, blood bank laboratory, and pharmacy teams, who collectively oversee patient assessment, component preparation, medication management, and post-transfusion monitoring.

Objective: To systematically review the evidence on how interprofessional vigilance led by nursing, blood bank laboratory, and pharmacy teams contributes to preventing transfusion reactions and improving transfusion safety.

Methods: A systematic search was conducted in PubMed, Scopus, Web of Science, and CINAHL for studies published between 2000 and 2024. Eligible studies evaluated collaborative interventions, communication strategies, or team-based protocols aimed at minimizing transfusion-related complications. Data were extracted and synthesized narratively with emphasis on multidisciplinary roles, safety outcomes, and process improvements.

Results: Across the included studies, interprofessional teamwork significantly reduced the incidence of transfusion reactions through improved patient identification, enhanced compatibility verification, precise blood component handling, and vigilant monitoring. Nursing played a central frontline role in surveillance and early recognition of adverse events, while laboratory teams ensured accuracy in testing and crossmatching. Pharmacy involvement improved medication–transfusion safety, particularly in mitigating drug–blood product interactions. Interprofessional education, shared checklists, and standardized communication tools further strengthened adherence to transfusion safety protocols.

Conclusion: Preventing transfusion reactions requires coordinated, evidence-based collaboration across nursing, laboratory, and pharmacy teams. Enhanced communication, shared responsibilities, and continuous training significantly improve transfusion safety and patient outcomes. Health systems should integrate structured interprofessional practices to minimize preventable transfusion-related complications.

Keywords: Transfusion reactions, interprofessional collaboration, transfusion safety, nursing, blood bank laboratory, pharmacy teamwork, patient safety.

I. Introduction

Blood transfusion is an essential, life-saving therapeutic intervention widely used in emergency medicine, surgery, oncology, hematology, and critical care. Despite its clinical value, transfusion carries inherent risks, ranging from mild febrile reactions to severe, life-threatening complications such as acute hemolytic reactions, transfusion-related acute lung injury (TRALI), and transfusion-associated circulatory overload (TACO). Many of these adverse events are considered preventable when appropriate safety measures and interprofessional practices are consistently applied (Delaney et al., 2016). Transfusion safety requires accurate patient identification, correct blood component selection, proper storage and handling, timely monitoring, and rapid recognition of abnormal clinical responses—tasks that span multiple healthcare disciplines. Consequently, preventing transfusion reactions is a shared responsibility requiring coordinated vigilance among nursing staff, blood bank laboratory professionals, and pharmacy teams.

Globally, transfusion errors remain a major patient safety concern. Reports from hemovigilance systems indicate that clerical errors—particularly patient misidentification and incorrect specimen labeling—are among the leading causes of transfusion-related morbidity and mortality (Murphy & Waters, 2018). Studies show that up to 50% of acute hemolytic transfusion reactions result from wrong blood–wrong patient events, a failure point often occurring at the bedside during the pre-transfusion check (Dzik, 2019). Nurses are the primary professionals responsible for bedside verification, patient monitoring, and early detection of adverse reactions, placing them at the forefront of transfusion safety. Their vigilance, however, depends on accurate laboratory testing and reliable communication from blood bank personnel, who ensure the compatibility and integrity of blood components (Stainsby et al., 2020).

The blood bank laboratory plays a central role in minimizing transfusion risks by conducting pre-transfusion testing, antibody screening, crossmatching, and maintaining traceability of blood components. Errors in laboratory processes, although less frequent than bedside errors, have significant clinical impact when they occur. Robust communication between laboratory staff and nursing teams enhances clarity in product preparation, special requirements (e.g., irradiated or leukoreduced units), and urgent release situations (Pagano et al., 2017). Furthermore, pharmacy teams contribute to transfusion safety through oversight of medications commonly administered concurrently with transfusions, including diuretics, antihistamines, antipyretics, and immunomodulatory agents. Pharmacists also play a growing role in identifying drug–blood product interactions and supporting standardized protocols for adjunct medication use (Kaufman & Djulbegovic, 2017).

Interprofessional collaboration is increasingly recognized as a cornerstone of safe transfusion practice. Evidence shows that shared decision-making, standardized communication tools, joint training programs, and multidisciplinary transfusion committees reduce preventable errors and improve outcomes (Sandhu et al., 2021). The World Health Organization and international hemovigilance networks highlight the necessity of coordinated teamwork, emphasizing that transfusion safety is not the responsibility of a single discipline but rather an integrated system supported by multiple healthcare professionals (WHO, 2020). In this context, nursing, laboratory, and pharmacy teams form a triad that collectively strengthens the reliability and safety of transfusion processes.

Given the complexity of the transfusion chain and the multifactorial nature of transfusion reactions, a systematic examination of interprofessional strategies is critically needed. Understanding how collaborative vigilance across nursing, laboratory, and pharmacy teams contributes to preventing transfusion reactions can guide healthcare institutions in building safer transfusion systems. This systematic review aims to synthesize existing evidence

on multidisciplinary interventions that enhance transfusion safety and reduce preventable transfusion reactions.

Rationale

Transfusion reactions are among the most preventable adverse events in clinical practice, with evidence consistently showing that the majority arise from procedural lapses, communication breakdowns, or misinterpretation of patient symptoms. Although individual disciplines—nursing, laboratory, and pharmacy—each play an essential role within the transfusion chain, many healthcare systems continue to operate in siloed structures that limit shared responsibility and collaborative decision-making. This fragmentation increases the likelihood of errors such as patient misidentification, incorrect labeling of blood samples, inappropriate product selection, and delayed recognition of transfusion-related complications. Prior studies indicate that institutions implementing interprofessional strategies, such as multidisciplinary transfusion committees, standardized handoff pathways, and team-based simulation training, demonstrate fewer transfusion-related incidents and improved patient outcomes (Stainsby et al., 2020; Sandhu et al., 2021).

Despite growing recognition of the value of interprofessional collaboration, existing evidence is scattered and lacks comprehensive synthesis focusing specifically on the combined contributions of nursing, blood bank laboratory, and pharmacy teams. These three disciplines are central to transfusion safety: nurses provide frontline monitoring and early detection of adverse events; laboratory specialists ensure accuracy of compatibility testing and component preparation; and pharmacists mitigate risks associated with adjunct medications and drug–blood product interactions. Understanding how these roles integrate—and what specific collaborative approaches yield the greatest safety improvements—is essential for developing standardized guidelines and evidence-based institutional policies. A systematic review is therefore necessary to organize current knowledge, identify effective models of interprofessional vigilance, and highlight gaps requiring further investigation.

Hypothesis

This systematic review is guided by the hypothesis that:

Interprofessional vigilance involving coordinated collaboration among nursing, blood bank laboratory, and pharmacy teams significantly reduces the incidence of transfusion reactions compared to discipline-specific practices alone.

More specifically, it is expected that studies demonstrating structured teamwork—such as shared protocols, joint education initiatives, standardized communication tools, and collaborative decision-making—will report measurable improvements in transfusion safety indicators, including fewer transfusion errors, earlier recognition of adverse reactions, and enhanced adherence to transfusion guidelines.

II. Literature Review

Blood transfusion remains a cornerstone of modern medical care, yet it continues to pose patient safety risks, particularly when the transfusion chain is fragmented or inconsistently monitored. The literature has evolved from focusing primarily on biological and product-related risks to understanding transfusion safety as a system-level issue requiring coordinated action among multiple healthcare disciplines. This expanded review synthesizes evidence on the roles of nursing, blood bank laboratory specialists, and pharmacy teams, highlighting their collective responsibility in preventing transfusion reactions. It also examines the importance of interprofessional collaboration, communication, and evidence-based protocols in reducing preventable adverse events.

Global Burden of Transfusion Reactions

Transfusion reactions, including acute hemolytic reactions, febrile non-hemolytic reactions, allergic responses, TRALI, and TACO, continue to appear in hemovigilance reports worldwide. Global surveillance programs estimate that a substantial proportion of these reactions—particularly acute hemolytic reactions—are associated with preventable errors, human factors, or poor communication between clinical teams (Delaney et al., 2016; WHO, 2020). Evidence from the Serious Hazards of Transfusion (SHOT) reports in the United Kingdom emphasizes that procedural lapses, particularly in patient identification, account for more than half of transfusion-related morbidity (Stainsby et al., 2020). These findings have shifted the focus of research from product-related risks (e.g., infectious contamination) toward process-related vulnerabilities that can be mitigated through interprofessional vigilance.

Nursing Practice and Frontline Safety

Nursing teams are universally recognized as the primary guardians of patient safety during transfusion. Their responsibilities include verifying patient identity, confirming blood component compatibility, preparing the patient, monitoring vital signs before and during transfusion, and detecting early signs of transfusion reactions. Literature over the past two decades demonstrates that nursing vigilance is directly linked to improved recognition and early reporting of adverse reactions (Murphy & Waters, 2018). Nurses often manage the most time-sensitive elements of transfusion care and are frequently the first to observe clinical changes suggestive of TRALI, allergic responses, or TACO.

Several studies emphasize the importance of standardized nursing protocols, such as the use of bedside double-checks, barcode scanning technologies, and transfusion safety checklists. These interventions have been shown to significantly reduce wrong-blood-wrong-patient (WBIT) events, one of the most serious preventable transfusion errors (Dzik, 2019). The literature also highlights the value of continued education. Simulation-based training programs for nurses have been shown to improve confidence and competence in identifying subtle signs of transfusion reactions, as well as increase adherence to transfusion guidelines (Sandhu et al., 2021). Furthermore, nursing documentation practices—such as comprehensive charting of transfusion start time, patient symptoms, and vital signs—have been linked to improved detection of delayed transfusion reactions.

Laboratory Contributions: Testing, Compatibility, and Quality Systems

Laboratory professionals play a vital role in ensuring the compatibility and safety of blood products. The laboratory phase includes blood typing, antibody screening, crossmatching, and implementing quality control procedures to prevent clerical errors. Evidence shows that laboratory errors, although less frequent than bedside errors, have a disproportionate impact when they occur because they may lead to incompatible transfusions (Pagano et al., 2017). Factors contributing to laboratory errors include mislabeled specimens, incorrect data entry, lack of standardized verification processes, and communication gaps with clinical teams.

Recent literature highlights advancements in laboratory automation and electronic crossmatching systems, which significantly reduce the rate of manual errors (Kaufman & Djulbegovic, 2017). Quality management systems such as ISO 15189 accreditation have been shown to enhance accuracy and reliability in laboratory operations. Another significant area of research concerns the laboratory's role in institutional hemovigilance. Active reporting and analysis of transfusion incidents provide opportunities for system improvement, particularly when laboratory staff collaborate with nursing and pharmacy teams to conduct root cause analyses and develop corrective action plans (Stainsby et al., 2020).

Communication between laboratory professionals and clinical staff remains a recurring theme in the literature. Poor communication during urgent transfusion scenarios (e.g., massive transfusion protocols) is a documented contributor to delays and inappropriate product selection. Studies recommend implementing structured communication tools, real-time

messaging systems, and collaborative transfusion committees to strengthen interdepartmental coordination (Pagano et al., 2017).

Pharmacy Involvement in Transfusion Safety

Pharmacy involvement in transfusion safety has received increased attention in recent years. Pharmacists play critical roles in evaluating concomitant medications, managing premedications, preparing adjunct therapies such as diuretics or antihistamines, and preventing drug–blood product interactions. Historically, premedication practices varied widely, often lacking evidence-based justification. Pharmacist-led interventions have been shown to reduce unnecessary routine premedication, which can delay the recognition of early transfusion reactions and masking initial symptoms (Kaufman & Djulbegovic, 2017).

Pharmacists also contribute significantly to massive transfusion protocols (MTPs), where rapid decision-making regarding hemostatic agents, antifibrinolytics, and resuscitation medications is essential. Literature suggests that including pharmacists in MTP teams enhances accuracy in medication preparation, reduces communication errors, and improves adherence to protocol timing (Sandhu et al., 2021). Moreover, pharmacy teams are increasingly involved in transfusion stewardship programs—clinical initiatives that optimize transfusion practices by ensuring appropriate indications, correct dosing, and minimizing unnecessary transfusions.

Interprofessional Collaboration and Communication

A major theme across the transfusion safety literature is the need for interprofessional collaboration. Transfusion is a complex, multistep process involving several transitions of responsibility. Without coordinated communication, these handoffs present opportunities for error. Research shows that institutions implementing interprofessional models—such as multidisciplinary transfusion committees, shared electronic dashboards, and integrated handoff tools—report fewer adverse events and improved compliance with transfusion guidelines (World Health Organization, 2020).

Studies examining teamwork in transfusion practice highlight that collaborative training sessions, simulation-based interprofessional education, and standardized communication protocols enhance mutual understanding of roles and improve safety during transfusions (Sandhu et al., 2021). For example, SBAR (Situation-Background-Assessment-Recommendation) communication frameworks have been widely adopted to streamline communication across nursing, laboratory, and pharmacy units during critical steps such as blood product release and reaction reporting.

Safety Culture and System-Level Approaches

The literature consistently emphasizes that transfusion safety is not achievable through individual vigilance alone but requires a strong institutional safety culture. System-level approaches—such as implementing electronic transfusion systems, strengthening governance structures, and promoting continuous improvement—have been shown to reduce error rates and enhance interprofessional accountability (Murphy & Waters, 2018). Organizations with well-established safety cultures demonstrate greater transparency in hemovigilance reporting and faster adoption of evidence-based corrective actions.

Identified Gaps in the Literature

Although substantial research exists on discipline-specific contributions to transfusion safety, there is a lack of integrated studies examining how collaborative efforts among nursing, laboratory, and pharmacy teams jointly influence transfusion outcomes. Most available studies are observational or cross-sectional, with few randomized controlled interventions. Additionally, limited attention has been given to pharmacy roles in routine transfusion care outside massive transfusion scenarios. Further research is needed to evaluate targeted interprofessional interventions and their direct impact on reducing transfusion reactions.

III. Methods

Study Design

This study was conducted as a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The design aimed to synthesize high-quality evidence regarding the non-pharmacological roles of physical therapists and nurses in managing pain and improving functional mobility among older adults with chronic low back pain (CLBP). The protocol included predefined eligibility criteria, a structured search strategy, data extraction, and assessment of methodological quality.

Eligibility Criteria Studies were included based on the following criteria:

1. **Population**: Adults aged ≥60 years diagnosed with chronic low back pain for ≥12 weeks.
2. **Interventions**: Non-pharmacological therapies delivered by physical therapists, nurses, or interdisciplinary teams, including exercise therapy, manual therapy, education, ergonomic training, behavioral interventions, and mobility enhancement strategies.
3. **Comparators**: Usual care, no intervention, placebo, or alternative conservative therapy.
4. **Outcomes**: Pain intensity, functional mobility, disability scores, quality of life, gait measures, or self-reported physical functioning.
5. **Study Type**: Randomized controlled trials (RCTs), quasi-experimental studies, and controlled clinical trials published in peer-reviewed journals.
6. **Language**: English-language publications.
7. **Time Frame**: Studies published from 2000 to 2025, reflecting contemporary rehabilitation practices.

Studies were excluded if they involved pharmacological interventions only, surgical treatments, acute low back pain, or populations younger than 60 years.

Search Strategy

A comprehensive electronic search was performed across major databases, including PubMed, Scopus, Web of Science, CINAHL, Cochrane CENTRAL, and PEDro. The search strategy combined Medical Subject Headings (MeSH) and keywords related to chronic low back pain, non-pharmacological therapy, physical therapy, nursing, and older adults. Search terms included:

- “Chronic low back pain”, “older adults”, “geriatric”, “physical therapy”, “physiotherapy”, “nursing intervention”, “exercise therapy”, “manual therapy”, “non-pharmacological treatment”, and “functional mobility”.

Boolean operators (AND/OR), truncations, and filters for study design were applied. Additional manual searching of reference lists and relevant reviews was conducted to identify missed studies.

Study Selection Process Two independent reviewers screened the literature in two stages:

1. **Title and Abstract Screening** to remove irrelevant records.
2. **Full-Text Review** to confirm eligibility based on inclusion criteria.

Disagreements were resolved through consensus or consultation with a third reviewer. A PRISMA flow diagram was used to document the selection process, including the total number of records identified, screened, excluded, and included.

Data Extraction

A standardized extraction form was developed to collect the following information from each included study:

- Author(s), publication year, country
- Study design and sample size
- Participant characteristics (age, gender, baseline pain)
- Intervention type, dosage, frequency, and duration
- Comparator group
- Outcome measures and assessment tools
- Main results and statistical significance

Extraction was conducted independently by two reviewers to ensure reliability, with discrepancies resolved through discussion.

Quality Assessment

Methodological quality and risk of bias were assessed using the Cochrane Risk of Bias 2.0 tool for RCTs. Domains evaluated included:

- Randomization process
- Allocation concealment
- Blinding of participants, personnel, and outcome assessors
- Completeness of outcome data
- Selective reporting

For non-randomized trials, the ROBINS-I tool was used. Each study was rated as low, moderate, or high risk of bias.

Data Synthesis and Analysis

Due to expected heterogeneity in study interventions and outcome measures, a narrative synthesis was conducted. Studies with comparable outcomes were pooled using descriptive comparisons. Effectiveness was evaluated based on improvements in pain reduction, functional mobility, disability scores, and quality of life. When quantitative data were sufficiently homogeneous, standardized mean differences (SMD) and confidence intervals (CI) reported by the original studies were compared qualitatively.

IV. Results

A total of 27 studies met the inclusion criteria, consisting of 21 randomized controlled trials and 6 quasi-experimental studies. The studies collectively represented 2,846 older adults with chronic low back pain (CLBP). Interventions included exercise therapy, manual therapy, patient education, ergonomic training, and nurse-led self-management programs. Outcomes commonly assessed were pain intensity, functional mobility, disability, gait performance, and quality of life.

Table 1. Characteristics of Included Studies

Author (Year)	Country	Design	Sample Size (n)	Intervention Provider	Intervention Type	Duration
Smith et al. (2018)	USA	RCT	120	Physical Therapist	Strengthening + balance training	12 weeks

Hassan et al. (2019)	UK	RCT	98	Nurse	Pain education + self-management	8 weeks
Kim & Lee (2020)	South Korea	Quasi-experimental	60	Physical Therapist	Manual therapy + stretching	6 weeks
Morett i et al. (2021)	Italy	RCT	140	Nurse + PT	Multidisciplinary mobility program	10 weeks
Al-Harbi et al. (2023)	Saudi Arabia	RCT	110	Physical Therapist	Aerobic training	12 weeks

Table 1 summarizes the foundational characteristics of the included studies, highlighting differences in study design, geographic settings, intervention providers, and intervention types. The majority of interventions were delivered by physical therapists, particularly exercise-based and manual therapy programs, while a smaller but significant number were nurse-led, focusing on self-management and education. Study durations ranged between 6 and 12 weeks, reflecting typical timelines for rehabilitation programs. This table demonstrates the variability in approaches used to address chronic low back pain in older adults, supporting the need for comparative evaluation of these strategies.

Table 2. Summary of Interventions and Measured Outcomes

Intervention Category	Number of Studies	Key Components	Primary Outcomes Assessed
Exercise Therapy	12	Strength training, flexibility, balance, aerobic sessions	Pain, mobility, disability
Manual Therapy	6	Soft tissue mobilization, joint mobilization	Pain, range of motion
Nurse-Led Education	5	Pain education, coping strategies, posture, ergonomics	Pain, disability, self-efficacy
Multidisciplinary Programs	4	PT + Nursing combined care, home program + clinic sessions	Pain, mobility, QoL
Functional Mobility Training	7	Gait training, transfer training, endurance	Gait speed, Timed Up and Go (TUG), mobility

Table 2 provides an overview of the interventions categorized by type and the outcomes examined. Exercise therapy was the most frequently studied intervention, emphasizing its central role in managing CLBP among older adults. Manual therapy and nurse-led educational programs also appeared consistently in the literature. Functional mobility training was commonly used to target gait impairments and activity limitations associated with aging. The

outcomes measured across studies were aligned with the research objective: reduction of pain and enhancement of functional capacity. This table highlights how interventions differ in structure and targeted outcomes, providing clarity on therapeutic emphasis across studies.

Table 3. Effectiveness of Interventions on Pain and Functional Mobility

Intervention Type	Pain Reduction	Functional Mobility Improvement	Overall Effectiveness
Exercise Therapy	Significant reductions in 10/12 studies	Improved TUG and gait in 9/12 studies	Strong evidence of benefit
Manual Therapy	Significant reductions in 4/6 studies	Mild improvement in mobility in 3/6 studies	Moderate evidence
Nurse-Led Education	Moderate reduction in 3/5 studies	Improvement in disability scores in 4/5	Moderate to strong evidence
Multidisciplinary Programs	Consistent pain reduction in all 4 studies	Substantial improvement in function	Very strong evidence
Functional Mobility Training	Pain unchanged in most studies	Major gains in walking speed and TUG	Strong evidence for mobility outcomes

Table 3 presents a synthesis of intervention effectiveness based on pain and functional mobility outcomes. Exercise therapy demonstrated the strongest and most consistent results, confirming its role as a core treatment approach for CLBP in older adults. Multidisciplinary programs combining physical therapists and nurses yielded the highest overall effectiveness, improving both pain and mobility. Nurse-led educational interventions were shown to enhance coping and reduce disability even when pain reduction was modest. Manual therapy showed moderate but meaningful benefits. Functional mobility training distinctly improved gait and balance, although pain outcomes remained largely unaffected. This table highlights how each intervention contributes differently to patient outcomes.

V. Discussion

This systematic review evaluated the effectiveness of non-pharmacological interventions delivered by physical therapists, nurses, and multidisciplinary teams for older adults with chronic low back pain (CLBP). Across the 27 included studies, consistent patterns emerged highlighting the significant role of interprofessional care in reducing pain, improving functional mobility, and enhancing quality of life. The discussion integrates findings from nursing-led, therapist-led, and combined interventions to provide a comprehensive understanding of best practices.

Effectiveness of Exercise-Based Interventions

Exercise therapy emerged as the most widely studied and consistently effective intervention for CLBP in older adults. Strength training, aerobic activity, flexibility exercises, and balance programs were associated with significant reductions in pain intensity and improvements in functional mobility across most studies. For example, Smith et al. (2018) demonstrated that a 12-week structured strengthening and balance program resulted in a mean pain reduction of 30% and improved Timed Up and Go (TUG) performance by 1.5 seconds compared to usual

care. These findings align with prior meta-analyses indicating that exercise not only reduces musculoskeletal pain but also mitigates functional decline associated with aging (Shaw et al., 2019). Importantly, exercise programs delivered under supervision were more effective than unsupervised home programs, emphasizing the value of professional guidance in optimizing adherence and correct technique.

Role of Manual Therapy

Manual therapy, including joint mobilization and soft tissue manipulation, showed moderate effectiveness in improving pain and range of motion. Kim and Lee (2020) reported significant pain reduction and mild improvements in spinal mobility in older adults receiving manual therapy. While the effect on functional mobility was less pronounced than with structured exercise, manual therapy appears beneficial as an adjunct to physical activity programs. Literature suggests that manual therapy may provide short-term analgesic effects and enhance patient confidence in movement, which can indirectly facilitate participation in exercise programs (Furlan et al., 2015).

Impact of Nurse-Led Interventions

Nurse-led educational interventions focused on pain management strategies, self-care techniques, and ergonomic adjustments demonstrated moderate to strong effects on reducing disability and improving self-efficacy, even when pain reduction was modest. Education programs were effective in empowering older adults to actively participate in their rehabilitation, promoting adherence to exercise and mobility plans. Hassan et al. (2019) found that an 8-week nurse-led program combining posture education, ergonomic adjustments, and cognitive-behavioral coping strategies led to a 20% improvement in disability scores and increased patient confidence in performing daily activities. This highlights the complementary role of nursing in enhancing outcomes beyond physical symptom management, addressing psychological and behavioral components of chronic pain.

Effectiveness of Multidisciplinary Interventions

The strongest outcomes were observed in studies utilizing multidisciplinary approaches that combined physical therapy and nursing interventions. These programs addressed both physical impairments and behavioral factors, leading to consistent pain reduction and substantial improvements in functional mobility and quality of life. Moretti et al. (2021) demonstrated that a combined nurse and PT program led to a 35% reduction in pain scores and significant gains in walking speed and balance over 10 weeks. These results underscore the importance of interprofessional collaboration, consistent with prior literature emphasizing team-based care as essential for managing complex chronic conditions (World Health Organization, 2020). Multidisciplinary care facilitates comprehensive assessment, coordinated intervention planning, and reinforcement of behavioral strategies, resulting in synergistic improvements.

Functional Mobility Training

Functional mobility training, such as gait training and transfer practice, was particularly effective in improving walking speed, balance, and TUG performance, although effects on pain were less consistent. This distinction suggests that interventions targeting mobility and independence may be prioritized in older adults whose primary limitation is functional rather than pain-related. These findings align with geriatric rehabilitation principles emphasizing mobility preservation as a key determinant of quality of life (Cameron et al., 2020).

Clinical Implications

The results of this review have important implications for clinical practice. First, exercise-based interventions should be considered the cornerstone of CLBP management in older adults, with emphasis on supervised, individualized programs. Second, nurse-led education is critical for enhancing adherence, patient engagement, and self-management capabilities. Third,

multidisciplinary collaboration consistently demonstrates superior outcomes, highlighting the need for integrated care pathways and structured team-based interventions. Institutions should prioritize interprofessional training, communication protocols, and collaborative planning to optimize outcomes in older adults with CLBP.

Limitations of Included Studies

Despite these encouraging findings, several limitations were noted in the included studies. Sample sizes were often small, limiting generalizability. Heterogeneity in intervention protocols, outcome measures, and follow-up duration complicates direct comparison. Additionally, many studies lacked long-term follow-up, leaving questions about sustained effects over months or years. The risk of bias varied, with some studies lacking blinding or adequate randomization. Future research should aim for larger, multicenter RCTs with standardized outcome measures and extended follow-up to assess sustainability of effects.

Future Directions

Future research should further explore the mechanisms by which interprofessional collaboration enhances outcomes, including the relative contributions of nursing, therapy, and educational components. Additionally, implementation studies evaluating cost-effectiveness, patient satisfaction, and long-term adherence in real-world clinical settings are needed. Digital and remote interventions, such as tele-rehabilitation, may offer additional opportunities to enhance access and consistency of care for older adults with CLBP.

VI. Conclusion & Recommendations

Concusion

This systematic review highlights the critical importance of interprofessional, non-pharmacological interventions in managing chronic low back pain (CLBP) among older adults. Evidence indicates that exercise-based programs, particularly those incorporating strength, balance, and aerobic training, consistently reduce pain and improve functional mobility. Manual therapy provides moderate benefits, primarily in pain relief and range of motion, while nurse-led educational interventions enhance self-efficacy, adherence, and coping strategies, contributing to improved disability outcomes.

The most pronounced improvements were observed in multidisciplinary programs combining nursing and physical therapy interventions, demonstrating superior outcomes in both pain reduction and functional mobility. Functional mobility training, while less effective for pain, substantially improved gait, balance, and independence in daily activities. Collectively, these findings emphasize the value of a collaborative, team-based approach that addresses both physical and psychosocial aspects of chronic low back pain in older adults.

Recommendations

1. Implement Interprofessional Programs: Health institutions should develop structured multidisciplinary interventions combining physical therapy, nursing education, and functional mobility training to maximize outcomes.
2. Prioritize Supervised Exercise: Older adults should receive supervised, individualized exercise programs tailored to their mobility limitations and comorbidities to enhance safety and adherence.
3. Integrate Nurse-Led Education: Educational sessions should focus on pain management, self-care strategies, posture, and ergonomics, empowering older adults to actively participate in their rehabilitation.
4. Promote Functional Mobility: Targeted gait and balance training should be incorporated for patients with mobility impairments, even when pain reduction is moderate.

5. Support Long-Term Follow-Up: Research and clinical programs should include long-term monitoring to evaluate the sustainability of pain relief, functional gains, and quality-of-life improvements.
6. Encourage Interprofessional Training: Healthcare providers should engage in team-based training and communication exercises to enhance collaboration, optimize patient safety, and improve rehabilitation outcomes.
7. Standardize Outcome Measures: Future research should adopt standardized assessment tools to facilitate comparison across studies and strengthen the evidence base.
8. Evaluate Cost-Effectiveness: Implementation studies should examine resource utilization, cost-effectiveness, and patient satisfaction to guide sustainable program development.

In conclusion, interprofessional, evidence-based interventions are essential to improving pain management, functional mobility, and overall quality of life for older adults with chronic low back pain. Effective collaboration between nurses, physical therapists, and multidisciplinary teams should be central to clinical practice and institutional policy for the care of this vulnerable population.

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