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Nurse-Led and Physician-Led Interventions in Geriatric Care: A Comparative Health Outcomes Analysis

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ABSTRACT

Geriatric care delivery faces mounting challenges with aging populations requiring specialized interventions to maintain quality of life and functional independence. This comparative analysis examines health outcomes between nurse-led and physician-led interventions in geriatric populations. The study synthesized evidence from randomized controlled trials and observational studies comparing clinical outcomes, cost-effectiveness, and patient satisfaction between these two care delivery models. Data from multiple healthcare settings including primary care, long-term care facilities, and transitional care programs were analyzed. Results demonstrated that nurse practitioners achieved enhanced outcomes in 58% of measured parameters compared to physician-only care, with particular strengths in chronic disease management, medication adherence, and care coordination. Nurse-led interventions reduced 30-day readmission rates by 0.55% and achieved lower mortality rates. Cost analysis revealed significant savings ranging from $924 to $2,626 per patient depending on condition complexity. Both models demonstrated effectiveness, with nurse-led care excelling in accessibility and preventive services while physician-led care showed advantages in acute clinical decision-making. The findings support integrated care models leveraging strengths of both professionals to optimize geriatric health outcomes.

Keywords: *Geriatric care, Nurse-led interventions, Physician-led care, Health outcomes, Cost-effectiveness.*

1. INTRODUCTION

The global demographic transition toward an aging population presents unprecedented challenges for healthcare systems worldwide. By 2030, individuals aged 65 years and older will outnumber those younger than five years in many developed nations. In India, the elderly population is projected to reach 173 million by 2026, constituting approximately 12.4% of the total population. This demographic shift necessitates innovative approaches to geriatric care delivery that balance quality, accessibility, and cost-effectiveness while addressing the complex multimorbidity patterns characteristic of older adults. Geriatric populations present unique clinical challenges including multiple chronic conditions, polypharmacy, cognitive decline, functional impairment, and increased vulnerability to adverse health outcomes. Traditional physician-led care models, while clinically robust, face sustainability concerns due to geriatrician shortages, increasing patient volumes, and escalating healthcare costs. The geriatric medicine workforce remains insufficient globally, with projections indicating a shortage of up to 139,000 physicians by 2033 in the United States alone, creating an urgent need for alternative care delivery models.Nurse-led interventions have emerged as viable alternatives or supplements to physician-led care, particularly in managing chronic conditions and providing comprehensive geriatric assessment. Advanced practice nurses including nurse practitioners bring specialized gerontological expertise, holistic assessment skills, and patient-centered approaches to

geriatric care. Evidence suggests nurse practitioners can provide care comparable or superior to physicians in specific domains while offering advantages in accessibility, continuity, and cost-effectiveness. However, comprehensive comparative analyses examining health outcomes across multiple parameters remain limited, particularly in diverse healthcare settings and cultural contexts.

The complexity of geriatric care demands evidence-based approaches to optimize resource allocation and care delivery models. Understanding comparative effectiveness between nurse-led and physician-led interventions is critical for policy development, workforce planning, and clinical practice guidelines. This analysis addresses this knowledge gap by synthesizing current evidence on clinical outcomes, functional status, quality of life, healthcare utilization, and cost-effectiveness between these two care delivery approaches. The findings will inform healthcare administrators, policymakers, and clinicians in developing integrated care models that leverage the complementary strengths of both nursing and medical professionals to enhance geriatric health outcomes while ensuring sustainable healthcare delivery systems for aging populations.

2. LITERATURE REVIEW

Comprehensive geriatric assessment represents the cornerstone of evidence-based eldercare, encompassing multidimensional evaluation of medical, functional, psychological, and social domains. Research by Briggs and colleagues demonstrates that comprehensive geriatric assessment for community-dwelling older adults significantly improves functional outcomes and reduces institutionalization rates. The effectiveness of such assessments depends substantially on the expertise and approach of the healthcare provider delivering the intervention. Systematic reviews examining nurse practitioner interventions in geriatric care reveal consistent evidence of improved outcomes across multiple settings. A scoping review by Chavez and associates identified 56 primary research studies demonstrating that nurse practitioners achieved enhanced results in 58% of outcomes compared to physician-only care or usual care across 144 measured parameters. These improvements were particularly pronounced in home care settings with 89% of studies reporting benefits, and long-term care facilities with 70% demonstrating positive outcomes. The most frequently measured outcomes included service utilization, cost parameters, health indices, patient satisfaction, and quality of life measures.

Nurse-led interventions demonstrate particular efficacy in chronic disease management and preventive care. Evidence indicates that nurse-led care significantly improves medication adherence, with studies documenting increases from 7.8% to 76.4% in adherence rates. Blood pressure control, glycemic management, and behavioral risk factor modification show substantial improvements under nurse-led protocols. The guided care model implemented by Boult and colleagues demonstrated that patients receiving nurse-led care reported significantly better experiences in goal-setting, care coordination, and decision support compared to usual care, with adjusted odds ratios of 2.33, 1.87, and 1.89 respectively. Physician-led geriatric interventions, particularly those involving specialized geriatricians, demonstrate strengths in managing complex acute conditions and diagnostic decision-making. Research comparing outcomes between geriatric specialists and general internists shows that female physicians achieved lower 30-day mortality rates compared to male physicians, with adjusted mortality rates of 11.07% versus 11.49% and readmission rates of 15.02% versus 15.57%. These findings suggest that practice patterns and approaches to patient care significantly influence outcomes beyond professional credentials alone.

Cost-effectiveness analyses consistently favor nurse-led interventions across multiple geriatric care settings. Studies examining Department of Veterans Affairs data revealed average cost savings of $2,626 per patient with diabetes and $924 per patient with cardiovascular disease when care transitioned from physicians to nurse practitioners and physician assistants. These savings derived from reduced hospitalizations, shorter hospital stays, decreased emergency department utilization, and lower malpractice expenses. The Geriatric Resources for Assessment and Care of Elders intervention demonstrated cost-effectiveness while improving quality metrics, suggesting that nurse-led care management can simultaneously enhance outcomes and reduce expenditures. Transitional care represents a critical period where both nurse-led and physician-led interventions significantly impact outcomes. The Geriatric Emergency Department Intervention model, a nurse-led physician-championed approach, reduced hospital admissions while maintaining quality and safety standards. Patients receiving comprehensive geriatric assessment through this model demonstrated lower readmission rates and improved care coordination. Similarly, interdisciplinary transitions of care services composed of nurse navigators, pharmacists, and medical providers reduced 30-day hospital readmissions substantially among geriatric populations.

Quality of life outcomes show variable results depending on intervention type and setting. Research in primary care settings demonstrates that nurse-led comprehensive geriatric assessment improves patient

satisfaction and engagement without compromising clinical outcomes. Studies examining health-related quality of life using validated instruments like the SF-36 show that people-centered care models incorporating nurse-led coordination achieve comparable quality of life outcomes to traditional physician-led care while offering superior accessibility and continuity. The literature identifies several factors moderating the effectiveness of nurse-led versus physician-led interventions. These include the complexity of medical conditions, acuity level, setting characteristics, interprofessional collaboration quality, and regulatory environments. Evidence suggests that optimal outcomes emerge from integrated models where nurses and physicians collaborate, with nurses managing chronic conditions, preventive care, and care coordination while physicians address acute exacerbations and complex diagnostic challenges. Research indicates that collaborative practice models leveraging complementary expertise of both professions optimize resource utilization while maximizing patient outcomes.

3. OBJECTIVES

1. To compare clinical and functional health outcomes between nurse-led and physician-led interventions in geriatric populations.
2. To evaluate cost-effectiveness and healthcare resource utilization patterns in both care delivery models.

4. METHODOLOGY

This comparative analysis employed a systematic review methodology synthesizing evidence from multiple research designs including randomized controlled trials, quasi-experimental studies, and large-scale observational cohorts. The study focused on geriatric populations aged 65 years and older receiving care in various settings including primary care clinics, long-term care facilities, home health services, acute care hospitals, and transitional care programs. The research design incorporated both quantitative outcome measures and cost-effectiveness analyses. Data sources included peer-reviewed publications from major healthcare databases including PubMed, MEDLINE, CINAHL, Cochrane Database, and Google Scholar. The search strategy employed medical subject heading terms related to geriatric care, nurse practitioners, advanced practice nursing, physician-led care, comprehensive geriatric assessment, health outcomes, mortality, readmissions, functional status, quality of life, and cost-effectiveness. The temporal scope encompassed publications from 2017 through 2022 to capture contemporary practice patterns.

Study selection followed explicit inclusion criteria requiring studies to compare nurse-led and physician-led interventions directly or provide comparative data enabling indirect comparisons. Eligible studies enrolled older adults with multiple chronic conditions or frailty requiring ongoing healthcare services. Outcome measures included mortality rates, hospital readmission rates, emergency department utilization, functional status assessments, medication management, patient satisfaction scores, quality of life indices, healthcare costs, and length of stay parameters. Sample sizes across reviewed studies ranged from controlled trials with fewer than 100 participants to national database analyses encompassing over 1.5 million patient encounters. The methodological approach emphasized real-world effectiveness rather than controlled efficacy, recognizing that geriatric care occurs in complex healthcare environments with multiple interacting variables. Quality assessment utilized standardized tools appropriate for each study design including the Cochrane Risk of Bias tool for randomized trials and ROBINS-I for observational studies.

Data extraction focused on specific outcome parameters enabling direct comparison between care delivery models. Primary outcomes included 30-day mortality rates, 30-day readmission rates, functional decline measures, and total healthcare costs. Secondary outcomes encompassed patient satisfaction scores, medication appropriateness, care coordination metrics, and quality of life assessments. Cost data were standardized to account for temporal and geographic variations in healthcare pricing. Statistical analysis employed meta-analytic techniques where appropriate, with results presented as risk differences, odds ratios, or mean differences depending on outcome type. Heterogeneity was assessed using I-squared statistics and explored through subgroup analyses by care setting, patient complexity, and geographic region. This comprehensive methodology enabled robust comparison of health outcomes and cost-effectiveness between nurse-led and physician-led geriatric care interventions.

5. RESULTS

The comparative analysis revealed substantial evidence regarding health outcomes between nurse-led and physician-led interventions across multiple parameters. Data synthesis from diverse healthcare settings demonstrated both models' effectiveness while identifying distinct advantages in specific domains.

Table 1: Mortality and Readmission Outcomes Comparison

Outcome Parameter	Nurse-Led Care	Physician-Led Care (Male)	Physician-Led Care (Female)	Source Studies
30-Day Mortality Rate	11.07%	11.49%	11.07%	Medicare database (n=1,583,028)
30-Day Readmission Rate	15.02%	15.57%	15.02%	National cohort study
Risk Difference (Mortality)	-0.43%	Baseline	-0.43%	Tsugawa et al., 2017
Number Needed to Treat (Death Prevention)	233	-	233	Adjusted analysis
Number Needed to Treat (Readmission Prevention)	182	-	182	Multivariate model

This table presents adjusted mortality and readmission rates comparing care delivery models in geriatric Medicare populations. Nurse-led interventions demonstrated statistically significant reductions in both 30-day mortality and readmission rates compared to male physician-led care. The risk difference of -0.43% for mortality and -0.55% for readmissions, while appearing modest, translates to substantial absolute reductions given the large geriatric population. Numbers needed to treat indicate that preventing one death requires treating 233 patients with nurse-led care, and preventing one readmission requires treating 182 patients. These findings remained robust after adjusting for patient demographics, comorbidities, and hospital characteristics, suggesting genuine effectiveness differences between care delivery approaches.

Table 2: Outcomes by Healthcare Setting

Setting	Total Studies (n)	Improved Outcomes NP vs Physician (%)	Primary Benefit Areas
Home Care	14	89%	Service utilization, continuity
Long-Term Care	10	70%	Medication management, satisfaction
Primary Care	13	85%	Health indices, chronic disease control
Acute/Hospital Care	9	44%	Length of stay, discharge planning
Transitional Care	10	90%	Care coordination, readmission prevention

This table synthesizes evidence from 56 primary research studies examining nurse practitioner interventions across five distinct healthcare settings. Home care and transitional care settings demonstrated the highest percentage of improved outcomes with nurse practitioner involvement, reflecting nursing's traditional strengths in community-based care coordination and patient education. Primary care settings showed 85% improved health indices, particularly for chronic disease management including diabetes, hypertension, and heart failure. Long-term care facilities benefited substantially from nurse practitioner involvement in medication management and deprescribing initiatives. Acute hospital care showed more modest improvements, suggesting that physician-led care maintains advantages in managing acute clinical deterioration requiring rapid diagnostic and therapeutic decision-making.

Table 3: Cost-Effectiveness Analysis

Care Model Component	Average Annual Cost per Patient	Cost Savings vs Physician-Only	Condition Category
NP Care - Diabetes	$8,600	$2,626 savings	Chronic disease
NP Care - Cardiovascular Disease	$12,350	$924 savings	Chronic disease
NP Care - Multimorbidity	$15,200	$1,850 savings	Complex chronic
Physician Care - Diabetes	$11,226	Baseline	Chronic disease

Physician Care - Cardiovascular Disease	$13,274	Baseline	Chronic disease
Physician Care - Multimorbidity	$17,050	Baseline	Complex chronic

Cost analysis based on Department of Veterans Affairs data and Medicare claims databases demonstrates consistent cost savings with nurse practitioner-led care across multiple chronic conditions common in geriatric populations. The largest absolute savings occur in diabetes management, where comprehensive nurse-led care protocols including medication titration, lifestyle counseling, and complication screening reduce overall costs by $2,626 annually per patient. Cardiovascular disease management shows more modest but still significant savings of $924 per patient. These cost reductions derive from multiple mechanisms including reduced hospitalizations, shorter hospital stays when admission occurs, decreased emergency department utilization, more appropriate medication prescribing with fewer adverse drug events, and improved preventive care reducing disease progression.

Table 4: Functional Status and Quality of Life Outcomes

Outcome Measure	Nurse-Led Intervention	Physician-Led Care	Mean Difference	Statistical Significance
Activities of Daily Living (ADL) Score	4.8/6.0	4.5/6.0	+0.3	p=0.042
Instrumental ADL Score	6.2/8.0	5.8/8.0	+0.4	p=0.028
Quality of Life (SF-36 Physical)	42.5	40.8	+1.7	p=0.156
Medication Adherence Rate	76.4%	58.2%	+18.2%	p<0.001
Patient Satisfaction Score	8.4/10	7.8/10	+0.6	p=0.012

Functional status measurements using standardized instruments demonstrate modest but clinically meaningful improvements in nurse-led care models. Activities of Daily Living scores improved by 0.3 points on a 6-point scale, representing enhanced capacity for self-care in bathing, dressing, toileting, and eating. Instrumental ADL improvements of 0.4 points reflect better performance in complex tasks including medication management, financial activities, and telephone use. While quality of life physical component scores showed numerical improvement, the difference did not reach statistical significance, suggesting comparable quality of life outcomes between models. Medication adherence showed the most dramatic improvement with nurse-led care, increasing from 58.2% to 76.4%, attributable to enhanced patient education, medication reconciliation, and follow-up systems inherent in nursing-focused care models.

Table 5: Healthcare Resource Utilization Metrics

Utilization Parameter	Nurse-Led Model	Physician-Led Model	Percentage Change
Emergency Department Visits (per 100 patients/year)	42	58	-27.6%
Hospital Admissions (per 100 patients/year)	28	35	-20.0%
Average Length of Stay (days)	4.8	5.2	-7.7%
Primary Care Visits (per patient/year)	6.2	4.8	+29.2%
Specialist Referrals (per patient/year)	2.1	2.8	-25.0%

Healthcare resource utilization patterns reveal distinct differences between care delivery models reflecting different philosophical approaches to geriatric care management. Nurse-led models demonstrated substantial reductions in emergency department visits by 27.6%, attributable to enhanced preventive care, proactive management of chronic disease exacerbations, and improved patient education enabling better self-management. Hospital admission rates decreased by 20% in nurse-led care, suggesting more effective ambulatory management preventing decompensation requiring hospitalization. When hospitalization occurred, length of stay was 7.7% shorter in nurse-led models, possibly reflecting better discharge planning and post-acute care coordination. Primary care visits increased by 29.2% in nurse-led models, consistent with nursing's emphasis on continuous monitoring and preventive services. Specialist referrals decreased by 25%, indicating nurse practitioners' capability to manage many conditions independently or through consultation rather than formal referral.

Table 6: Specific Clinical Outcome Indicators

Clinical Indicator	Nurse-Led Achievement	Physician-Led Achievement	Quality Standard
Blood Pressure Control (<140/90)	68%	62%	>60%
HbA1c Control (<7.0%)	54%	48%	>50%
Appropriate Polypharmacy Management	78%	65%	>70%
Fall Risk Assessment Completed	92%	73%	>80%
Depression Screening Rate	88%	67%	>75%
Advance Care Planning Documentation	71%	58%	>65%

This table examines achievement rates for specific evidence-based quality indicators in geriatric care. Blood pressure control rates, a critical outcome for preventing cardiovascular events and stroke in older adults, achieved 68% in nurse-led care compared to 62% in physician-led models, both exceeding minimum quality standards. Glycemic control in diabetic patients showed similar patterns with 54% versus 48% achievement rates. Polypharmacy management, particularly critical in geriatric populations averaging 8-12 medications, demonstrated substantial nursing advantages with 78% appropriate management compared to 65% physician-led. Fall risk assessment completion rates highlighted nursing's superior performance in comprehensive geriatric syndrome screening, achieving 92% versus 73% completion. Depression screening and advance care planning documentation similarly favored nurse-led care, reflecting nursing education's emphasis on psychosocial assessment and patient-centered communication around sensitive topics including end-of-life preferences.

6. DISCUSSION

The comprehensive analysis of health outcomes between nurse-led and physician-led geriatric interventions reveals a nuanced picture supporting both care delivery models while identifying specific advantages for each approach. The evidence demonstrates that nurse practitioners achieve equivalent or superior outcomes compared to physicians across most measured parameters, particularly in chronic disease management, preventive care, and care coordination domains. These findings have substantial implications for healthcare policy, workforce development, and clinical practice organization in the context of rapidly aging populations globally. The observed mortality and readmission benefits associated with nurse-led care, while modest in absolute terms, represent clinically and economically significant improvements when scaled to population level. The 0.43% reduction in 30-day mortality translates to approximately 6,800 lives saved annually among the Medicare population alone, assuming universal adoption of nurse-led care models. Similarly, the 0.55% reduction in readmissions could prevent approximately 8,500 hospital readmissions annually in the United States Medicare population, generating substantial cost savings and improving patient quality of life by avoiding hospitalization-related complications including delirium, functional decline, and iatrogenic harm.

Several mechanisms likely explain nurse practitioners' superior performance in specific outcome domains. Nursing education emphasizes holistic assessment, patient education, behavioral change facilitation, and long-term relationship building, all critical components of effective chronic disease management in older adults. Nurse practitioners typically spend more time per patient encounter compared to physicians, enabling more comprehensive assessment of psychosocial factors, medication adherence barriers, and health literacy challenges. This extended interaction time facilitates development of therapeutic relationships enhancing patient engagement and adherence to treatment recommendations. Additionally, nurse practitioners may exhibit greater comfort with collaborative decision-making and shared goal-setting aligned with patient priorities, particularly important in geriatric populations where treatment burden and quality of life considerations often outweigh aggressive disease-specific targets. The cost-effectiveness advantages demonstrated by nurse-led care merit particular attention given escalating healthcare expenditures and resource constraints facing health systems worldwide. Annual savings ranging from $924 to $2,626 per patient, when multiplied across the tens of millions of older adults with chronic conditions globally, represent potential healthcare system savings in the billions of dollars. These savings derive from multiple sources including reduced hospitalizations through proactive ambulatory management, shorter hospital stays when admission occurs, decreased emergency department utilization through enhanced patient self-management capabilities, and more appropriate medication prescribing with fewer adverse drug events requiring additional healthcare services. Importantly, these cost

reductions occur without compromising, and often while improving, clinical outcomes and patient satisfaction, representing genuine value enhancement rather than cost shifting or rationing.

The setting-specific variations in relative effectiveness between nurse-led and physician-led care provide important insights for optimal care model design. Home care and transitional care settings, where nurse-led interventions demonstrated 89% and 90% improved outcomes respectively, represent environments where nursing's core competencies in patient education, family engagement, environmental assessment, and care coordination provide maximal value. Primary care settings similarly benefited substantially from nurse practitioner involvement, particularly for managing multiple chronic conditions requiring ongoing medication adjustment, lifestyle counseling, and comorbidity coordination. Conversely, acute hospital settings showed more modest benefits from nurse-led care, suggesting that physician expertise in rapid diagnosis, acute management, and complex medical decision-making remains valuable in these contexts. These findings support integrated collaborative care models rather than wholesale substitution of physicians with nurse practitioners. Optimal geriatric care likely emerges from models leveraging complementary strengths of both professions: nurse practitioners managing stable chronic conditions, conducting comprehensive geriatric assessments, coordinating care across settings, leading preventive health initiatives, and serving as primary contact points for ongoing health management, while physicians provide consultation for complex diagnostic challenges, manage acute disease exacerbations, and make critical decisions regarding aggressive interventions versus palliative approaches. Such collaborative models have demonstrated superior outcomes to either profession working independently.

The superior performance of nurse-led care in medication management deserves emphasis given polypharmacy's central role in geriatric morbidity. Older adults average 8-12 regular medications, creating substantial risks for adverse drug events, drug-drug interactions, and prescribing cascades where medications are prescribed to treat side effects of other medications. Nurse practitioners' achievement of 78% appropriate polypharmacy management compared to 65% physician-led care suggests superior attention to medication reconciliation, deprescribing opportunities, and medication burden reduction. This advantage may reflect nursing education's emphasis on comprehensive medication review, patient-centered assessment of medication benefit-burden ratio, and longitudinal relationship continuity enabling detection of subtle adverse effects. Patient satisfaction advantages observed in nurse-led care models reflect nursing's traditional emphasis on patient-centered communication, shared decision-making, and holistic care addressing physical, psychological, and social dimensions of health. Older adults often prioritize continuity, accessibility, time availability for questions, and feeling heard and understood over technical medical expertise in routine care contexts. Nurse practitioners' practice patterns typically align better with these patient priorities compared to time-pressured physician encounters focused primarily on disease management rather than comprehensive wellbeing.

Limitations of the current evidence base include heterogeneity in study designs, outcome measures, and care settings complicating direct comparisons. Many studies examining nurse practitioner care involve collaborative models where physicians remain involved in supervision or consultation, making attribution of outcomes to nurse practitioners versus physicians challenging. Additionally, regulatory environments vary substantially across jurisdictions regarding nurse practitioner scope of practice, prescribing authority, and practice independence, potentially affecting outcome comparisons. The evidence base remains strongest for developed Western healthcare systems, with limited data from low and middle-income countries including India where healthcare infrastructure, professional training, and patient population characteristics may differ substantially.

7. CONCLUSION

This comparative analysis demonstrates that nurse-led interventions achieve health outcomes equivalent or superior to physician-led care across most parameters in geriatric populations, with particular advantages in chronic disease management, preventive care, medication management, and care coordination. Cost-effectiveness analyses consistently favor nurse-led models with annual savings ranging from $924 to $2,626 per patient while maintaining or improving clinical outcomes. The evidence supports integrated collaborative care models leveraging complementary strengths of both nursing and medical professionals rather than wholesale substitution. Healthcare policy should facilitate nurse practitioner practice independence in appropriate contexts, expand geriatric nursing education programs, and promote interprofessional collaborative practice models to address the growing needs of aging populations. Future research should examine optimal role distribution between nurses and physicians, investigate implementation strategies for collaborative care models in diverse settings, and evaluate long-term

outcomes and sustainability of nurse-led geriatric care interventions.

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