The Determinants of Nurses' Competencies in the Prevention of Heart Failure Patient Readmissions: A Systematic Review

Abstract: *This structured, PRISMA-informed narrative review examines determinants of nurses' competencies relevant to preventing hospital readmissions among adults with heart failure (HF). Forty-nine distinct empirical journal reports published from 2016 to 2025 were synthesized. Eleven reports directly examined nursing knowledge, preparation or professional roles; the remaining thirty-eight principally evaluated nursing-related patient education, monitoring or transitional services. Evidence on competence antecedents emphasizes HF-specific knowledge, professional education, experience, continuing training and opportunities to coordinate care. Intervention studies suggest that structured teaching, caregiver participation and integrated follow-up can improve self-care and sometimes reduce rehospitalization; however, randomized comparisons also report no significant readmission benefit. Knowledge scores and intervention outcomes are not equivalent indicators, and few studies link measured competence of individual nurses with their patients' subsequent admissions. Differences in interventions, settings, control conditions and follow-up horizons preclude a defensible pooled effect estimate. The review proposes a three-level evidence framework and identifies gaps in competency measurement, implementation fidelity, and the linkage of nursing practice to patient outcomes.*

Keywords: heart failure; nursing competence; nurse knowledge; patient education; teach-back; transitional care; hospital readmission; systematic literature review.

1. Introduction

Heart failure (HF) creates continuing demands for symptom surveillance, medication adjustment, discharge preparation and timely clinical escalation. Nurses contribute by evaluating congestion, explaining treatment, assessing understanding and coordinating follow-up; these actions require more than factual recall. In a Lebanese randomized trial, involving family caregivers in HF self-care education was associated with fewer early readmissions than usual discharge care (Deek et al., 2017). A Turkish randomized nursing follow-up intervention improved self-care and quality of life, yet did not establish a significant six-month rehospitalization advantage (Sezgin et al., 2017). Such variation cautions against equating improved patient education with reliably prevented hospitalization. Competence encompasses knowledge, clinical judgment, communication and the ability to act within multidisciplinary systems. Patient factors, including cognition, support and competing illnesses, can alter the value of the same nursing intervention. A valid synthesis must therefore distinguish what nurses know, what they deliver and what happens to patients afterward.

Studies directly assessing nurses reveal important, but heterogeneous, preparation gaps. A Polish survey of 227 nurses identified incomplete knowledge of HF self-care education, with scores varying by practice setting (Jankowska-Polańska et al., 2017). Among 216 Spanish primary-care nurses, prior HF training was associated with more adequate knowledge, although the cross-sectional design does not prove a training effect (Dalfó-Pibernat et al., 2020). A US survey of 918 nurses also found differences between specialist and generalist practice and persistent uncertainty over particular assessment and medication-management decisions (Wang et al., 2023). These findings are not equivalent to demonstrating differences in readmission prevention: questionnaire scores do not

necessarily measure observed clinical performance. Likewise, the organizational context determines whether a nurse can obtain timely specialist advice, reconcile treatment or arrange follow-up. The literature therefore crosses two distinct units of analysis individual nurses and patients or services which must remain separate in conclusions about competency determinants.

This review asks four questions: which personal, educational and organizational characteristics are associated with HF nursing competence; how is competence enacted through discharge instruction, caregiver engagement and surveillance; what outcomes follow nurse-led or nurse-coordinated interventions; and which causal pathways remain untested? The review maps 49 unique reports, differentiating 11 direct nurse-knowledge, preparation or role investigations from 38 predominantly patient- or service-level studies. Its contribution is an evidence taxonomy connecting competence antecedents, care delivery and readmission-related outcomes without treating these levels as interchangeable. The literature matrix maps substantive domains, while the narrative synthesis compares study designs, clinical outcomes and their interpretive limitations. Narrative synthesis is appropriate because studies use incompatible exposure definitions and outcomes. The analysis emphasizes inconsistent results, small samples, active comparison care and uncontrolled service evaluations rather than assuming uniform effectiveness.

2. Methodology

This systematic literature review (SLR) employed a structured narrative synthesis informed by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) to examine determinants of nurses' competencies relevant to preventing hospital readmissions among adults with heart failure (HF). The review considered English-language original empirical journal studies published between January 2015 and December 2025. Eligible studies investigated nurses' HF-specific knowledge, professional preparation, attitudes, clinical roles, or nursing interventions involving patient education, discharge planning, symptom monitoring, transitional care, and subsequent hospitalization outcomes. Randomized controlled trials, quasi-experimental investigations, cross-sectional surveys, and observational studies were considered, while protocols, reviews, commentaries, incomplete conference reports, and publications without substantive relevance to HF nursing practice were excluded. As presented in Figure 1, the identification process recorded 977 records from Scopus (n = 290), Web of Science (n = 245), ScienceDirect (n = 203), Emerald Insight (n = 157), and other sources (n = 82). After removal of 362 duplicates, 615 records proceeded to title and abstract screening, where 412 were excluded. Of the remaining 203 reports sought for retrieval, 57 were unavailable, leaving 146 full texts assessed for eligibility. A further 97 reports were excluded, resulting in 49 included empirical studies published between 2016 and 2025.

For each included study, information was extracted on authorship, publication year, setting, research objectives, study design, sample characteristics, nursing-related exposures or interventions, outcome measures, and principal findings. The evidence was organized into two complementary groups: 11 studies principally examining nurses' knowledge, educational preparation, or professional roles, and 38 studies primarily evaluating patient-focused education, follow-up, transitional care, or related clinical outcomes. A structured literature matrix mapped nine overlapping domains: nursing knowledge, professional preparation, attitudes, patient education, teach-back, discharge support, post-discharge follow-up, multidisciplinary coordination, and hospital readmission or hospitalization. These classifications indicated the topics addressed rather than evidence of intervention effectiveness or methodological quality. Narrative thematic synthesis was selected instead of meta-analysis because studies differed substantially in design, intervention content, patient characteristics, competency measures, definitions of readmission, comparison conditions, and follow-up duration. Interpretation

considered randomization, the presence of comparison groups, sample size, outcome ascertainment, and limitations affecting causal inference; methodological limitations were appraised narratively rather than with a standardized risk-of-bias instrument. Findings from nurse-level assessments were distinguished from patient- and service-level intervention outcomes, since improved knowledge or self-care does not necessarily establish reduced readmissions, and service outcomes cannot independently demonstrate individual nursing competence. This distinction supported synthesis across heterogeneous evidence without attributing observed clinical effects to unmeasured nurse competencies. The synthesis consequently emphasizes associations, contextual differences, and unresolved mechanisms over causal certainty.

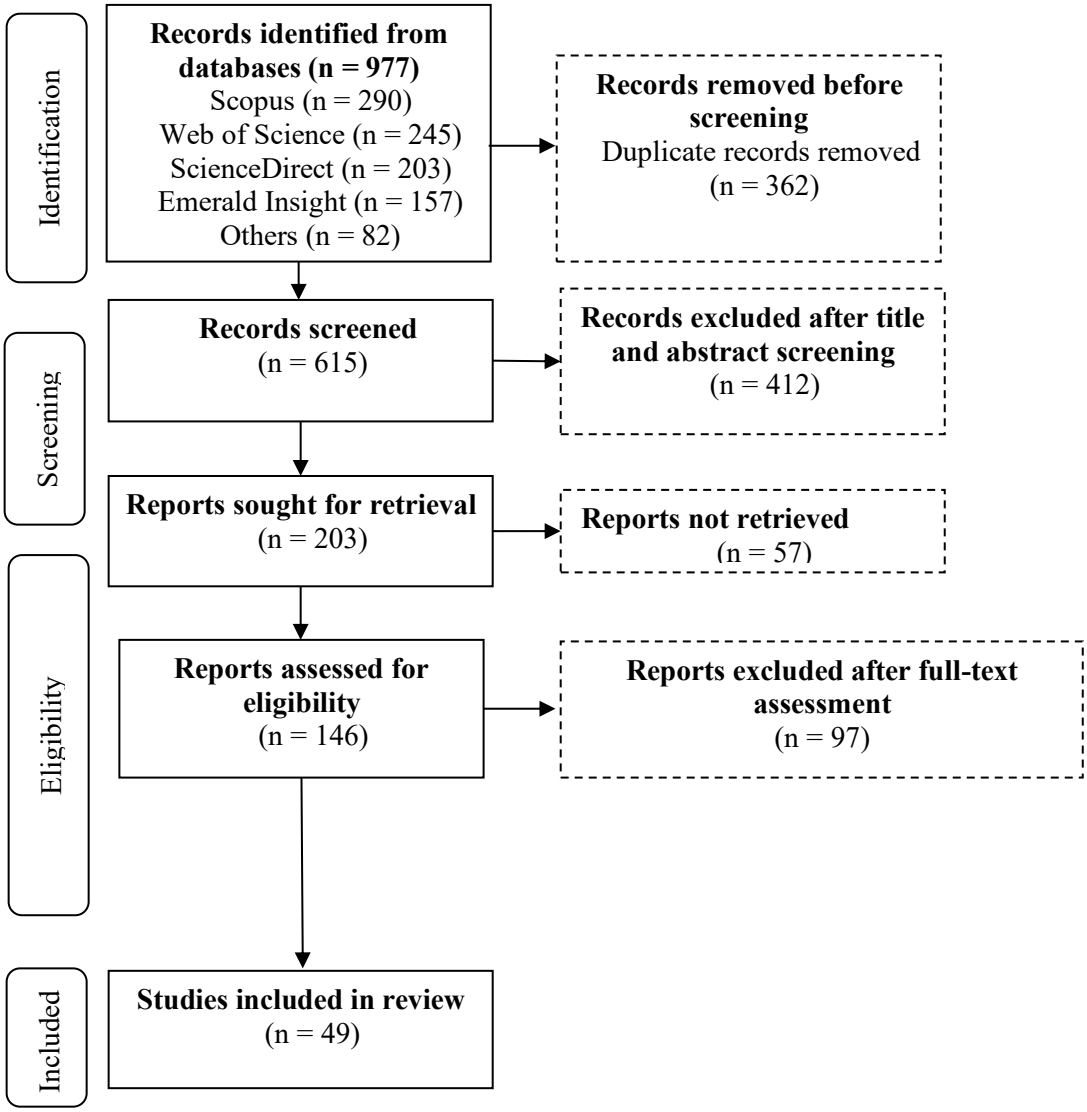


Figure 1: The Systematic Review Process

3. Conceptual and Analytical Innovation

The synthesis separates three levels: determinants of nursing competence, delivery of HF-related nursing actions and subsequent patient outcomes. At the first level, clinical understanding of symptoms, fluid status and treatment precautions differs from self-confidence, formal training and

permission to act. A Brazilian comparative survey of 74 nurses found knowledge weaknesses in both specialist and general hospitals, with no consistent specialist-setting advantage (Azevedo et al., 2018). In Ethiopia, good HF-management knowledge was reported for 55 of 180 cardiac nurses; prior training, education and experience were associated with better scores (Demissie et al., 2021). These observations support structured assessment of specific tasks rather than using job title as a proxy for competence. A professional survey also described unequal specialist nursing roles and access to services across European care settings (Hill et al., 2025). Accordingly, four related antecedent domains emerge: disease-specific clinical knowledge, educational and specialist preparation, professional attitudes or confidence, and organizational capacity to coordinate decisions. Their relationships are plausible but mainly observational. The most defensible interpretation is that preparation and systems provide opportunities for competent action, not that isolated credentials predict admission outcomes. This helps explain why knowledgeable nurses may still struggle to prevent admissions when clinical escalation is delayed, while team resources may offset individual experience differences.

At the second level, competence is enacted through explanation, teach-back, personalized discharge plans, caregiver engagement and timely follow-up. A nurse-led structured education trial in rural China reported improvements in self-management and lower HF readmission compared with standard care (Cui et al., 2019). A smaller Taiwanese non-equivalent intervention found selective self-care gains without a statistically convincing difference in readmission (Chen et al., 2020). Patient characteristics and comparator care differ between these studies, making a common effect estimate unwarranted. Caregiver inclusion offers another pathway: an educational intervention in an older-adult inpatient programme associated caregiver involvement with fewer early readmissions among cognitively impaired patients (Agarwal et al., 2020). In a Korean randomized trial, HF education plus telephone follow-up improved knowledge and self-care and was associated with better survival, but the reported benefit should not be reinterpreted as a demonstrated reduction in readmissions (Hwang et al., 2022). The evidence thus favors a distinction between communication quality, comprehension and hospitalization rather than treating them as equivalent endpoints. Future trials should observe teaching fidelity and measure nurse-specific capability before attributing outcome changes to competence.

The third level involves surveillance, escalation and coordinated delivery within constrained health services. A Polish haemodynamic-assessment programme associated nurse-managed visits with improved functional status and well-being, but lacked the control arm required for readmission attribution (Krzesiński et al., 2021). Scheduled nurse-linked post-discharge visits in Japan were associated with reduced subsequent HF readmission in an observational cohort, leaving residual confounding possible (Yasuda et al., 2022). By contrast, a pragmatic randomized trial of early post-discharge follow-up improved appointment completion without showing a significant reduction in thirty-day HF readmission (Lee et al., 2020). These contrasts suggest that identifying deterioration is useful only when assessment can trigger appropriate treatment, prescribing review or specialist escalation. Services differ in staffing, clinical authority and baseline follow-up access, all of which may modify the effects of nursing interventions. A review of competence determinants must therefore examine organizational authorization and integration alongside individual training. In this evidence framework, care delivery may connect competence to outcomes, but mediation is not empirically established simply because a nurse-led programme succeeds. Causal claims require joint measurement of the nurse, delivered practices and risk-adjusted patient outcomes. Research must measure competence, care fidelity and access to escalation as separate constructs.

Table 1. Literature Review Matrix: Nursing Competence, Clinical Delivery and Readmission Domains (n = 49)

#	Author(s), year	Know	Prep	Att	Educ	TB	Disch	Follow	Team	Readm
1	Baptiste et al. (2016)				✓		✓	✓		✓
2	Moore (2016)						✓	✓	✓	✓
3	Deek et al. (2017)				✓		✓	✓		✓
4	Jankowska-Polańska et al. (2017)	✓	✓							
5	Murtaugh et al. (2017)						✓	✓	✓	✓
6	Sezgin et al. (2017)				✓		✓	✓		✓
7	Azevedo et al. (2018)	✓								
8	Boyde et al. (2018)				✓	✓	✓			✓
9	Sundel & Ea (2018)	✓	✓							
10	Awoke et al. (2019)				✓			✓		✓
11	Cui et al. (2019)				✓		✓	✓		✓
12	Dinh et al. (2019)				✓	✓	✓	✓		✓
13	Ortiz-Bautista et al. (2019)				✓			✓	✓	✓
14	Oscalices et al. (2019)				✓		✓	✓		✓
15	Strano et al. (2019)						✓	✓		✓
16	Van Spall et al. (2019)				✓		✓	✓	✓	✓
17	Agarwal et al. (2020)				✓		✓		✓	✓
18	Baecker et al. (2020)						✓	✓	✓	✓
19	Chen et al. (2020)				✓		✓	✓		✓
20	Dalfó-Pibernat et al. (2020)	✓	✓							
21	Iqbal et al. (2020)				✓		✓	✓		
22	Leavitt et al. (2020)		✓		✓		✓	✓		✓
23	Lee et al. (2020)						✓	✓	✓	✓
24	You et al. (2020)				✓		✓	✓		✓
25	Chestnut et al. (2021)						✓	✓	✓	✓
26	Demissie et al. (2021)	✓	✓	✓						
27	Huesken et al. (2021)				✓					
28	İlaslan & Özer (2021)				✓			✓		
29	Krzesiński et al. (2021)							✓	✓	
30	Hwang et al. (2022)				✓		✓	✓		
31	Kolasa et al. (2022)				✓		✓	✓		
32	Krówczyńska & Jankowska-Polańska (2022)	✓	✓							
33	Yasuda et al. (2022)				✓			✓	✓	✓
34	Alcoberro et al. (2023)						✓	✓	✓	✓
35	Clements et al. (2023)				✓			✓		✓

#	Author(s), year	Know	Prep	Att	Educ	TB	Disch	Follow	Team	Readm
36	Oh et al. (2023)				✓	✓	✓			✓
37	Wang et al. (2023)	✓	✓							
38	Zisis et al. (2024)						✓	✓	✓	✓
39	Alshammari et al. (2025)	✓	✓	✓						
40	Bohdan et al. (2025)	✓	✓		✓					
41	Chan et al. (2025)				✓		✓	✓	✓	✓
42	Chi et al. (2025)	✓	✓							
43	Hill et al. (2025)		✓		✓			✓	✓	
44	Lambrinou et al. (2025)				✓			✓		
45	Masterson Creber et al. (2025)							✓	✓	✓
46	Okwueze & Brownell (2025)		✓		✓		✓	✓	✓	✓
47	Ribeiro et al. (2025)				✓		✓	✓	✓	✓
48	Shan et al. (2025)				✓		✓			✓
49	Xie et al. (2025)				✓		✓	✓		✓

Know = nursing knowledge of heart failure; Prep = professional preparation or specialty training; Att = nursing attitudes; Educ = patient or caregiver education; TB = teach-back technique; Disch = structured discharge support; Follow = planned post-discharge follow-up; Team = coordinated team-based care; Readm = readmission or hospitalization outcome. Table 1 maps 49 empirical reports across nine substantive domains. Ten studies explicitly assessed nurse knowledge, twelve examined professional preparation, two covered attitudes and thirty-one included readmission or hospitalization outcomes. These domain counts overlap and must not be added together. The wider corpus comprises 11 reports primarily assessing nurses' knowledge, preparation or professional roles and 38 principally evaluating patient-level nursing interventions or care services. Knowledge-test evidence and patient intervention outcomes address different questions; a tick in the readmission column never indicates that the intervention reduced readmission. The comparative synthesis interprets these patterns in light of study designs, outcomes, follow-up periods and methodological limitations.

4. Discussion: Comparative Synthesis of Nursing Competence Determinants

Direct nursing studies demonstrate that professional labels are unreliable measures of HF competency. A Brazilian survey of 74 nurses detected weaknesses in both general and specialist hospitals, contradicting an automatic specialty-setting advantage (Azevedo et al., 2018). In an Ethiopian cardiac-nurse sample, only 30.56% met the study's criterion for good HF knowledge, despite generally favorable reported attitudes (Demissie et al., 2021). Among Spanish primary-care nurses, previous HF-focused training corresponded to a higher probability of adequate educational knowledge (Dalfó-Pibernat et al., 2020). A larger US survey showed persistent uncertainty in symptom assessment and therapeutic counseling despite differences between specialist and general nurses (Wang et al., 2023). These findings collectively support specific training and structured observation, but their associations cannot separate education from motivation, clinical exposure or selection into specialist roles. Similar concepts were measured using non-equivalent tests and thresholds, weakening comparisons of absolute competency prevalence. Surveys of professional roles

add important contextual information but do not directly measure bedside teaching or readmission outcomes. A useful competence assessment should therefore include standardized HF knowledge items, observed communication, clinical response to deterioration and documented opportunity to coordinate treatment. Longitudinal linkage to patient outcomes, with adjustment for illness severity and social context, is required before a workforce characteristic can be called a determinant of readmission prevention. Assessment should also establish whether continuing education changes clinical practice or merely raises short-term scores, allowing clearer comparisons across care settings.

Patient and caregiver education provides a plausible mechanism connecting nursing practice to improved self-care, but readmission effects are inconsistent. A Lebanese randomized family-education trial reported a favorable short-term readmission contrast, supporting involvement of people who assist with medication and symptom monitoring (Deek et al., 2017). A rural Chinese randomized trial likewise reported better self-management and fewer HF admissions during follow-up after structured nurse-led teaching (Cui et al., 2019). In contrast, the Turkish nursing follow-up trial improved self-care and quality of life without a significant six-month rehospitalization benefit (Sezgin et al., 2017). A Taiwanese non-equivalent education programme also showed selected self-care gains, while the numerical readmission contrast was not statistically significant (Chen et al., 2020). Education programmes differ in setting, intensity, caregiver participation, usual-care quality and duration, preventing simple generalization. Teach-back may reveal misunderstanding during discharge counseling, yet studies often evaluate composite nursing packages rather than the independent fidelity of teach-back. Positive changes in knowledge and confidence should thus be treated as intermediate outcomes; readmission remains a distinct clinical endpoint shaped by disease severity and service access. Interventions that teach patients without creating a reliable route for medication review or escalation may have limited effects on hospital use. Reporting ought to distinguish HF-specific readmission, all-cause readmission, emergency attendance and mortality, and to preserve null results rather than selecting only favorable endpoints. Evidence from nurse-led teaching is promising, but it is not a direct experiment on individual nurses' measured skills. Replication requires specifying who delivered instruction, how comprehension was tested and how long knowledge persisted after discharge.

Discharge planning and care transitions show further variation when tested against active usual care. A Chinese randomized nurse-led management programme reported better medication continuation and fewer subsequent hospitalizations, but its components cannot identify the contribution of any single nursing ability (You et al., 2020). An older-adult trial grounded in Orem's self-care framework also reported improved self-care and fewer later admissions without independently measuring the participating nurses' competence (Xie et al., 2025). These findings need to be weighed against trials where additional services did not outperform an organized comparator. In the PACT-HF trial, enhanced transitional care did not demonstrate a decisive reduction in its prespecified primary outcome, indicating that implementation complexity and background care matter (Van Spall et al., 2019). An eleven-hospital trial likewise found comparable thirty-day readmission outcomes for mobile integrated care and nurse-coordinator transitional support (Masterson Creber et al., 2025). Some programs may offer genuine educational or patient-experience benefits while lacking a detectable effect on admissions. Trials with active comparators, adequate power and prespecified endpoints merit greater inferential weight than service reports without controls. A retrospective advanced-practice-nurse clinic described a decline in recorded readmission cases across calendar years, but absent contemporary denominators and comparison groups prevent causal interpretation of that trend (Okwueze & Brownell, 2025). The correct conclusion is not that nursing transitions fail, but that effects are context-dependent and cannot be attributed to staff competence unless competence, implementation and patient outcomes are directly linked. Reporting absolute events,

intention-to-treat analyses and confidence intervals would strengthen interpretation, particularly when apparent benefits are small or uncertain.

Monitoring and multidisciplinary coordination illustrate why intervention design extends beyond the number of nursing contacts. An observational national home-health analysis suggested that intensive early nursing combined with timely physician review was associated with reduced readmission, whereas either element in isolation was less informative (Murtaugh et al., 2017). In a pragmatic randomized comparison, early nurse- or pharmacist-led telephone outreach improved seven-day follow-up completion but did not significantly reduce thirty-day HF readmission (Lee et al., 2020). An observational US analysis similarly associated early clinical appointments, rather than home or telephone contact alone, with lower subsequent admission (Baecker et al., 2020). These results imply that reliable access to diagnostic and treatment decisions may determine whether surveillance changes utilization. A Japanese follow-up cohort associated post-discharge visits with fewer HF admissions but remains vulnerable to nonrandom participation (Yasuda et al., 2022). A multicentre randomized evaluation of lung-ultrasound-guided decongestion did not significantly improve its primary clinical endpoint, despite highlighting residual congestion as a prognostic marker (Zisis et al., 2024). Likewise, uncontrolled nurse-led haemodynamic surveillance may improve functional measures without demonstrating reduced readmission (Krzesiński et al., 2021). A recent telemonitoring trial adds evidence on protocol-driven escalation and the difficulty of separating nursing contact from broader team capabilities (Ribeiro et al., 2025). These findings support integrated surveillance models only provisionally. Important modifiers include patient risk, available specialists, titration authority, intervention fidelity and timely follow-up slots. Stronger studies should measure these mechanisms directly, report both positive and null results, and avoid inferring an individual nurse's competence from the performance of an entire service. This would clarify whether missed prevention opportunities arise from nursing knowledge, patient barriers, treatment authority or organizational delay, and would support actionable decisions about training and staffing.

5. Research Gaps and Future Research Directions

The principal gap is the absence of a directly tested nurse-to-patient competence pathway. Eleven reports concern nursing knowledge, professional preparation or roles, while most other reports study interventions offered to patients. Direct surveys identify weaknesses and training associations but cannot show that a particular nurse's scores predict avoidable readmissions. Studies in Brazil and Ethiopia demonstrate why location and professional confidence should not substitute for objective assessment (Azevedo et al., 2018). Future multisite research should link validated nurse-level measures symptom assessment, medication counseling, teach-back and escalation skills with observed care fidelity and auditable patient assignments. Outcomes should include prespecified thirty- and ninety-day HF-specific and all-cause readmissions, adjusted for disease severity, cognitive impairment, social support and case mix. Nurse-level and organizational predictors should be modeled separately, with clustering by hospital or care team. Prospective designs could then test whether competence is associated with clinical actions and whether those actions mediate patient outcomes. Such evidence would prevent conflation of a trained workforce with effective care delivery. Validated measures should report their reliability and observer agreement and define specialist roles in operational terms.

A second gap concerns inconsistent intervention definitions and insufficient reporting of service context. The included trials and observational programmes differ in sample size, comparator care, follow-up interval and what counts as hospitalization, limiting synthesis across settings. For example, a nurse-led haemodynamic monitoring programme reported clinical improvements without a

concurrent control group (Krzesiński et al., 2021). A randomized education intervention improved survival and self-care, but the reported benefits should not be reclassified as a readmission effect (Hwang et al., 2022). Future research should record baseline service availability, nurse caseloads, specialist access, treatment authority and fidelity to monitoring protocols. Pragmatic factorial trials could isolate discharge instruction, caregiver engagement, teach-back and prompt clinical escalation instead of evaluating them only as inseparable packages. Systematic review replication also requires the full database search strategies, deduplicated result exports, independently documented selection decisions, full-text exclusion reasons and design-appropriate risk-of-bias judgments. Better evidence would identify which competencies matter, in which settings, and under what resources they reduce admissions rather than merely improve intermediate educational outcomes.

6. Conclusion

This evidence synthesis considered 49 distinct original empirical reports relevant to nursing competencies and prevention of readmission among adults with HF. It distinguishes competence antecedents, their delivery through clinical and educational actions, and patient outcomes instead of treating them as a single construct. Eleven reports focused primarily on nurses' knowledge, preparation or professional roles; 38 principally evaluated patient-facing educational interventions, follow-up or transitional care services. Direct nurse samples indicate that HF-specific training, education, experience, role expectations and workplace conditions are associated with knowledge or opportunities for competent practice. However, these relationships are mostly observational and do not establish effects on patient readmissions. Patient-focused trials provide a complementary, not interchangeable, evidence stream. Structured teaching, family engagement and ongoing follow-up sometimes improved self-care, adherence or hospitalization outcomes, while other interventions failed to show statistically significant reductions in readmissions. The heterogeneous outcomes are clinically plausible because follow-up duration, illness severity, care comparators, nurse authority and access to multidisciplinary adjustment vary substantially. Positive education scores cannot replace hospitalization outcomes; equally, a service-level reduction in admissions cannot establish that individual nurse competence caused it. The most useful conceptual contribution is therefore a three-level pathway: knowledge and preparation enable nursing actions, which operate through patient comprehension, deterioration recognition and timely clinical escalation within organizational constraints. Its causal links require direct testing. Healthcare organizations should favor targeted skill assessment, credible ongoing education, caregiver-sensitive discharge preparation and reliable escalation pathways over counting contacts as an end in themselves. Research should prioritize multisite prospective studies that connect independently assessed nurse competence to observed practice, patients' risk profiles and standardized readmission outcomes. Interpretation should account for heterogeneity in study designs, comparison care, outcome definitions, and follow-up intervals, alongside variation in the methodological robustness of included reports. Workforce education is valuable but cannot guarantee fewer admissions without reliable clinical implementation, escalation pathways and transparent patient outcome assessment.

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