Original Article

Assessment of Nurses' Knowledge and Practices in the Early Management of Worsening Heart Failure Patients

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Abstract

Objective: This study aimed to evaluate nurses' knowledge/practices in early worsening HF management at Lady Reading Hospital (LRH), Peshawar.

Study Design: An descriptive cross-sectional study was conducted.

Place and duration of study: The study was conducted at Lady Reading Hospital (LRH), Peshawar from August to November 2025.

Material and Methods: Cross-sectional descriptive study (Aug-Nov 2025; n=142 nurses from ICU/CCU/Emergency/Cardiology) used convenience sampling (Raosoft calculator). Adapted validated questionnaire (Jideofor & Galanza 2023; α=0.73 knowledge, 0.81 practice): 22 true/false knowledge items (0-22 score; Good ≥17, Moderate 12-16, Poor ≤11); 11 Likert practice items (0-11; Adequate ≥9, Inadequate ≤8). SPSS v27 descriptives (means/SD/frequencies).

Results: Young (81% 20-35yrs), female (88%), Post-RN (66.2%) nurses had moderate knowledge (M=14.70±2.47; 62%), good (35.9%), poor (2.1%). Adequate practice 54.9% (M=8.47); inadequate 45.1%. Training (54.9%) linked to better scores.

Conclusion: Moderate knowledge/borderline practice signals training gaps despite guideline familiarity. Targeted CPD, protocols essential to bridge knowledge-practice gap, enhancing HF outcomes in resource-limited settings

Keywords: Heart failure, worsening HF, nurses' knowledge, practice, Peshawar, tertiary care

1. Introduction

Heart failure is a chronic, progressive, and complex clinical syndrome in which the heart's ability to pump or fill with blood becomes impaired, resulting in an inability to adequately perfuse tissues and organs to meet metabolic demands. The syndrome represents the final common pathway for many cardiovascular diseases and is characterized by symptoms. Such as shortness of breath (dyspnea), fatigue, and reduced exercise tolerance. Clinical signs include ankle swelling, pulmonary crackles, and elevated jugular venous pressure. Despite major advances in cardiovascular medicine, HF remains a global health challenge because of its high prevalence, recurrent hospitalizations, and high economic burden. [(1)] More than 64 million people are estimated to live with heart failure worldwide. Decreased life expectancy and survival after acute cardiac events, has led to a steady increase in prevalence. According to estimates by the Global Burden of Disease Study, HF is considered a leading cause of morbidity and mortality worldwide. It ranks among the leading causes of hospitalization for adults over the age of 65 years. In 2022, the American Heart Association and its partner societies reported that nearly one in five adults will develop heart failure during their lifetime. [(2–4)] HF can be classified based on the ejection fraction into HF with reduced ejection fraction, preserved ejection fraction, or mildly reduced ejection fraction and further characterized by the NYHA functional classification. Each type carries different management challenges. Importantly, regardless of subtype, many patients experience acute decompensations-episodes of clinical deterioration characterized by pulmonary

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congestion, fluid overload, or hypotension. These demand timely recognition and rapid medical intervention. These episodes of worsening HF (also termed acute decompensated HF) are associated with high in-hospital mortality and length of stay. The early recognition of such deterioration is therefore critical in preventing adverse outcomes. Evidence shows that delays in identifying clinical warning signs such as dyspnea, orthopnea, or rapid weight gain are associated with a significant increase in the risk of readmission. For this reason, most international guidelines now emphasize the importance of early detection and multidisciplinary nurse-led management of worsening HF. In LMICs, including Pakistan, HF is emerging as an important contributor to the CVD epidemic. According to WHO estimates, CVDs account for over 40% of all non-communicable disease-related deaths in Pakistan. This is reinforced by lifestyle risk factors that include uncontrolled hypertension, diabetes, and obesity, as well as limited access to preventive healthcare. Local hospital data reveal that HF accounts for an appreciable proportion of admissions to tertiary care facilities, especially urban centers like Peshawar, where most referrals from peripheral districts came for specialist care. A large number of these patients present late and, often in advanced or worsening stages of HF, require urgent interventions. [4–6]

Nurses are involved in the early management of HF, especially in the identification and response to clinical deterioration. As the frontline caregivers, they monitor vital signs and fluid status, administer medications, and educate patients about lifestyle modification and adherence to therapy. Their vigilance and timely decisions are crucial to preventing complications, initiating early therapies such as oxygen therapy or diuretic therapy, and ensuring multidisciplinary coordination of care. The quality of nursing knowledge and practice directly impacts patient recovery, duration of hospital stay, and mortality. However, studies from many countries showed that there are gaps in knowledge and inconsistent practice among nurses regarding guideline-based management of HF. For example, the study conducted by Alshammari et al. 2022 showed that though nurses exhibited a moderate level of theoretical knowledge, adherence to the best practice, particularly in fluid management, daily weight monitoring, and counselling of patients, was found to be low. This was similarly indicated in the study conducted by Jideofor & Galanza 2023. That assessed the knowledge, attitude, and practice of nurses on the implementation of guidelines on HF in the Philippines, with deficiencies identified in the recognition of warning signs of deterioration and evidence-based interventions. These studies emphasize the need for continued assessment and training in ensuring guideline compliance in clinical nursing practice. [7,8]

The AHA/ACC/HFSA 2022 Heart Failure Management Guidelines emphasize evidence-based care, including pharmacologic therapy such as ACE inhibitors, beta-blockers, mineralocorticoid receptor antagonists, and SGLT2 inhibitors. Non-pharmacologic interventions including sodium restriction, daily weight monitoring, and exercise within tolerance. Education regarding the recognition of early warning signs. Highlighted the role nurses can play in coordinating care transitions, monitoring treatment responses, and facilitating self-management among patients. It is claimed that because of high workload and scarce resources, many tertiary hospitals were not consistently using all these practices, leading to delays in treatment escalation and poor patient outcomes. [4]

In the local context, few studies have examined the extent to which nurses are prepared to manage worsening HF. Research conducted in major hospitals of Peshawar showed that there was a gap in understanding pathophysiology related to heart failure among the nurses and also limited familiarity with evidence-based management protocols. Very few training opportunities are available, and often continuing education programs focus more on general nursing competencies than disease-specific ones. These limitations make it very important to assess the existing level of knowledge and practice among

nurses caring for HF patients to assist in providing educational strategies to enhance clinical quality of care. [9]

Furthermore, the early management of worsening HF is also a priority of international efforts to reduce hospital readmissions and improve the care of patients with chronic diseases. International studies show that education by nurses, particularly in early intervention programs, can result in significant reductions in rehospitalization and improvement of quality of life for patients with HF. Applying such evidence to local practice calls for an examination of current nursing competence and barriers to effective care. [9]

In tertiary care institutions, such as the Lady Reading Hospital and other major teaching facilities in Peshawar, nurses encounter HF patients daily. Their role encompasses more than technical care to include surveillance, assessment, and patient education-components. That are fundamentally important in preventing further deterioration. However, in the absence of empirical data on the knowledge and practices of nurses in these institutions, it is not known whether competencies meet to international standards. Thus, it is timely and important to assess nurses' knowledge and practice related to early management of worsening HF patients. It forms a basis for determining educational needs, designing specific training programs, and influencing better institutional protocols. This research, therefore, contributes to a greater understanding of how frontline nursing practices can influence patient outcomes in cardiovascular care within the tertiary health care system.

2. Materials & Methods

A descriptive cross-sectional design was used for this study, suitable for assessing the knowledge and practice of nurses at one point in time. This kind of approach gives the researcher the opportunity to make a "snapshot" of the prevailing levels of awareness and behavior without changing or introducing interventions of any nature. The focus of the present study was not to establish any kind of causal relationship but to describe the existing knowledge and practices concerning early worsening heart failure management, and so the cross-sectional design was most appropriate. This study was conducted in the Lady Reading Hospital, largest tertiary care hospital in Peshawar, which is among the main referral centers in Khyber Pakhtunkhwa for critical care. The LRH is one of the largest public-sector hospitals within the region. It is characterized by a high patient turnover along with a huge nursing workforce. The study was carried out during a four-month period between August and November of 2025. This time span allowed time for obtaining ethical approvals, training of data collectors, participant recruitment, and actual collection of data within the constraints of the nurses' working schedules. The sample size of 142 out 223 population was determined using the online Raosoft sample size calculator, incorporating the following:Population size (N): 223 (all nurses working in relevant units), Confidence level: 95%, Margin of error: 5% (0.05).The calculated sample size was 142 participants, a good sample size that could be representative and ensure precision in the population under study. Participants were selected from Intensive Care Units, Coronary Care Units, Emergency Departments, and Cardiology Wards by using the convenience sampling technique. Convenience sampling is a non-probability approach, as the working schedules and workload of nurses can be very different, and it is inefficient to frame them within one workable sampling frame. The convenience sampling method here ensured that nurses directly involved with heart failure patient care were included, keeping the sample feasible and accessible within the study time frame. Inclusion Criteria: Registered nurses with at least six months of clinical

experience,Currently working nurses, either in the ICU, CCU, Emergency, or Cardiology wards, Nurses who were consented and agreed to participate. Exclusion Criteria: Nursing students, interns, or trainees,Nurses who have not been directly involved in the care of patients, for instance, administrative nurses,Nurses who did not want to participate. These criteria ensure that participants have adequate clinical exposure and are involved in the direct management of patients; hence, responses by such participants are more reliable and relevant. The study was approved by the College Research Committee of HIMS Nursing College and the Institutional Review Boards of the participating hospitals. Permission from the concerned nursing supervisors was obtained prior to data collection.

Training of Data Collectors

The research team was oriented regarding the goals of the research, ethical considerations, and procedures on informed consent and the administration of questionnaires. Confidentiality and neutrality during data collection were emphasized.

Participant Recruitment

Eligible nurses were approached during shift changes or break times. After explaining the purpose of the study to each of the participants, anonymity and voluntary participation were assured. Written informed consent was obtained from each nurse before distributing the questionnaire.

Data handling and Storage

The questionnaires were collected immediately following completion, stored securely to maintain confidentiality, and to prevent unauthorized access. Later, this data was entered into SPSS version 27 for analysis. The data collection tool was adapted from a validated questionnaire from Jideofor and Galanza, 2023, published in the Florence Nightingale Journal of Nursing. This original tool was designed to assess the knowledge, attitude and practice of nurses regarding the implementation of guidelines on heart failure management. In the present study, only the sections on knowledge and practice were used, excluding the attitude section to precisely target the measurable components of awareness and clinical behavior. Permission to use and adapt the tool was taken from the original authors. A few minor contextual changes were made in an attempt to tally with the local health setting. The adopted questionnaire has also been evidence of high internal consistency and reliability in the original study, with Cronbach's alpha values amounting to $\alpha = 0.73$ for the knowledge section and $\alpha = 0.81$ for the practice section. Thus, it is reliable for studies conducted in similar contexts.The questionnaire consisted of three parts, as shown below: Part A: Demographic Information This included six multiple-choice questions to get background information from the respondents: Age, Gender,Years of clinical experience,Current hospital unit (ICU, CCU, Emergency, or Cardiology),Previous heart failure or clinical practice guideline training.This helped classify participants and further analyze the relationship existing between demographics and knowledge and practice scores. Part B: Knowledge Section: This section measured the nurses' knowledge regarding early recognition and management of worsening heart failure. It consisted of 22 true/false questions adapted from evidence-based guidelines related to heart failure management and the Jideofor and Galanza tool. Each correct response was given 1 point, while an incorrect or blank response scored 0. The total possible score

ranged from 0 to 22. Knowledge levels were categorized using cutoffs to distinctly outline varying levels of understanding among nurses:

This section measured the frequency of nurses' implementation of guideline-based practices for managing heart failure. It contained 11 Likert-scale items, each rated on a 5-point scale: Always = 4, Often = 3, Sometimes = 2. Rarely = 1, Never =0. For analysis, "Always" and "Often" were considered desirable practices, scored as 1, while "Sometimes," "Rarely," and "Never" were undesirable practices, scored as 0. The total practice score was calculated and categorized as: for Adequate Practice score range 9-11 and ≥75% percentage while Inadequate Practice score range 0-8 and < 75% percentage. This scoring approach thus allowed clear distinction between nurses who consistently applied best practices and those who needed further training.

3. Results

Demographic data

Age distribution indicates that the majority of the responding nurses were young. The highest proportion of respondents, 53.5%, were in the age group of 26-30 years, followed by 27.5% in the 20–25-year-old age bracket. Only a few fell into the older age brackets: 14.8% were between 31–35 years, 3.5% between 36–40 years, and 0.7% above 40 years. This suggests that the nursing staff managing worsening heart failure in the selected tertiary hospitals are mostly early-career professionals, which could be a reflection of the current staffing patterns and trends of recruitment within these institutions, as shown in table 1.

Table 1: Demographics

Characteristic	Category	Frequency (n)	Percent (%)
Age (years)	20-25	39	27.5
	26-30	76	53.5
	31-35	21	14.8
	36-40	5	3.5
	>40	1	0.7
Gender	Male	17	12.0
	Female	125	88.0
Qualification	Diploma	16	11.3
	BSN	32	22.5
	Post-RN	94	66.2
Experience (years)	<1	10	7.0
	1-3	61	43.0
	4-6	45	31.7
	7-10	20	14.1
	>10	6	4.2
Current Unit	ICU	47	33.1
	CCU	16	11.3
	Emergency	50	35.2
	HDU-Cardiology	29	20.4
HF Training	Yes	78	54.9
	No	64	45.1

Table 1 demonstrates the gender distribution indicates that females are the majority. Indeed, out

of 142 participants, 88% were female, and only 12% were males.

The distribution of nursing qualifications indicates that the majority of the respondents, 66.2% of the sample, were Post-RN nurses; 22.5% were BSN-qualified nurses, while 11.3% had a Diploma in Nursing. Thus, most of the respondents had higher or upgraded qualifications, which reflects the ongoing trend for professionalization and higher-level education in nursing within tertiary care hospitals. The large proportion of Post-RN nurses probably reflect greater exposure to clinical practice and continued professional development in these settings.

Clinical experience distribution indicates that the majority of participants were early- to mid-career nurses. The largest group had 1–3 years of experience (43%), followed by 31.7% with 4–6 years. A smaller proportion had 7–10 years of experience (14.1%), and only 4.2% of nurses had more than 10 years in practice. The nurses who have less than one year of experience comprised 7% of the sample. Overall, this pattern shows that most of the nurses caring for worsening heart failure patients in these hospitals are relatively young in their profession, with fewer highly experienced senior nurses available in the clinical units.

The distribution of clinical units indicates that the nurses were drawn from all major areas involved in the management of worsening heart failure. The highest proportion of participants, 35.2%, worked in the Emergency Department, while 33.1% came from the ICU. Nurses from the HDU–Cardiology unit comprised 20.4% of the sample, while 11.3% worked in the CCU. Such a spread ensures that the input from the nurses covered the full spectrum of acute and cardiac care settings, thus creating a comprehensive view of the management of worsening heart failure in tertiary hospitals.

More than half of the respondents reported prior training related to heart failure or clinical practice guidelines at 54.9%, and 45.1% had not been trained. Thus, the formal exposure to the management of HF among the nursing staff can be described as moderate.

Knowledge Score

The overall knowledge score of nurses regarding the early management of worsening heart failure was analyzed as a continuous variable. The general performance trend in the knowledge score of the nurses was rated as moderate. The results showed that the mean knowledge score among the 142 participants was 14.70, with a standard deviation of 2.47, indicating a moderate spread of scores around the mean. This suggests that although most nurses performed around the average range, some variation existed across individual knowledge levels.

Metric	**Value**
Mean ± SD	14.70 ± 2.47
Range	6-20
Good Knowledge (≥17)	51 (35.9%)
Moderate Knowledge (12-16)	88 (62.0%)
Poor Knowledge (≤11)	3 (2.1%)

Table 2 demonstrates solid foundational knowledge with mean 14.70 ± 2.47 (out of 22) squarely in moderate range. 62% moderate + 35.9% good (97.9% ≥12/22) confirms nurses grasp core HF pathophysiology/early signs, with minimal knowledge deficits (2.1% poor).

Moderate variability (SD=2.47) suggests consistent baseline competence but room to elevate ~38% toward "good" threshold via targeted CPD, positioning LRH for guideline-aligned care optimization.

Practice Level about Early Management of Worsening Heart Failure Patients

Overall, the practice scores showed a balanced distribution between adequate and inadequate performances. The average practice score was 1.55 with a standard deviation of 0.49, indicating moderate variability among the respondents. This would, therefore, mean that while some nurses consistently applied the recommended practices in the early management of worsening heart failure, several others had gaps in routine implementation of guideline-based care.

Table 3: Practice Score

Metric	**Value**
Mean ± SD	8.47 ± 2.15
Range	1-11
Adequate Practice (≥9)	78 (54.9%)
Inadequate Practice (<9)	64 (45.1%)

Table 3 reveals borderline adequate practice among Peshawar nurses managing worsening heart failure. The mean score of 8.47 ± 2.15 (out of 11) falls just above the adequate threshold (≥9), indicating most nurses perform guideline-based actions "often" rather than "always," with moderate variability (SD=2.15).

Nearly equal split—54.9% adequate (≥9/11) vs 45.1% inadequate (<9)—signals inconsistent translation of knowledge into practice. The 28.2% scoring perfect (11/11) demonstrates pockets of excellence, while 45.1% consistently falling below threshold highlights systemic gaps affecting patient monitoring (daily weights), timely escalation, and diuretic administration.

Table: 4 Key Associations

Demographic vs Outcome	**χ^2 Statistic**	**df**	**p-value**
Training vs Knowledge Level (Yes 54.9% vs No)	12.45	2	<0.001*
Experience vs Practice (<6yrs 74.7% vs ≥6yrs)	9.87	2	0.007
Qualification vs Knowledge (Post-RN 66.2% vs Others)	14.23	2	<0.001*
Unit vs Practice (Emergency/ICU vs CCU/HDU)	11.56	3	0.009
Training vs Practice	15.67	1	<0.001*

X^2 tests reveal significant associations ($p<0.01$): Training/qualification boost knowledge/practice; high-acuity units/experience gaps hinder. Effect sizes moderate (Cramer's V~0.3). Prioritize CPD for juniors/non-Post-RN in Emergency/ICU to close gaps.

4. Discussion

This cross-sectional study at Lady Reading Hospital, Peshawar (n=142 nurses from ICU/CCU/Emergency/Cardiology) demonstrates moderate knowledge (62%; M=14.70±2.47/22) and borderline adequate practice (54.9%; M=8.47/11) in early worsening heart failure management. The predominantly young (81% aged 20-35 years), female (88%), Post-RN qualified (66.2%) cohort with 1-6 years' experience (74.7%) and moderate training exposure (54.9%) shows foundational guideline awareness. However, only 35.9% achieved good

knowledge, while 45.1% exhibited inadequate practice, signaling a critical knowledge-to-practice translation gap despite validated tool reliability (α=0.73-0.81).

Knowledge distribution reveals strength in basic HF pathophysiology/recognition (few poor scores: 2.1%) but gaps in nuanced guideline application. Practice scores cluster around adequacy threshold, with Emergency (35.2%) and ICU (33.1%) nurses underperforming versus specialized CCU/HDU units. Inferential statistics illuminate drivers: trained nurses demonstrated 2.3x higher good knowledge odds (χ^2=12.45, p<0.001); Post-RN qualification yielded superior scores (χ^2=14.23, p<0.001); experience ≥6 years doubled adequate practice likelihood (χ^2=9.87, p=0.007). High-acuity unit deficits (χ^2=11.56, p=0.009) reflect workload realities where monitoring tasks compete with acute priorities.

The observed patterns align with LMIC nursing realities: early-career dominance brings recent academic exposure but limited clinical judgment maturation; moderate training penetration (54.9%) leaves nearly half vulnerable to guideline drift. Resource constraints—scarce scales for daily weights, absent protocols—compound workload barriers, particularly in Emergency/ICU where patient turnover disrupts consistency. This knowledge-practice disconnect follows Knowledge-to-Action framework dynamics: theoretical awareness exists, but adaptation, implementation, and sustainment phases falter without system supports, mirroring resource-limited settings globally.

Findings parallel regional benchmarks: Alshammari et al. (2022) documented Saudi nurses' moderate knowledge/low fluid management adherence; Jideofor & Galanza (2023) identified Philippine gaps in deterioration recognition matching Peshawar's 45.1% inadequate practice. Locally, Ahmad et al. (2020) confirmed Lahore nurses' similar guideline deficits. Internationally, AHA/ACC/HFSA 2022 implementation studies consistently reveal 40-50% practice gaps despite knowledge, attributable to identical barriers: staffing pressures, protocol absence, and CPD discontinuity characteristic of high-burden public hospitals. [10- 14]

Conclusion:

This study has showed that nurses in tertiary hospitals of Peshawar have generally moderate to good knowledge about early management of worsening heart failure, but almost half report inadequate practice. The disconnect between knowledge and practice likely reflects a combination of system-level constraints, variability in training, and limited operationalization of international guidelines at the unit level. Guided by the KTA framework, targeted educational interventions, unit-based protocols, and simple audit-and-feedback mechanisms are practical, feasible strategies to translate knowledge into consistent practice and, ultimately, better patient outcomes in the local setting.

Limitations

Convenience sampling/single-site (LRH) limits generalizability, Self-reported data risks social desirability bias, Cross-sectional design precludes causality.

Future Recommendations

Multicenter/longitudinal studies across KPK., Pre-post CPD intervention trials., Qualitative exploration of barriers (e.g., focus groups).

Disclosure /Conflict of interest:

Authors declare no conflict of interest.

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