

Nurse Competencies in Achieving Hemodialysis Adequacy in a Tertiary Hospital in Metro Manila, Philippines

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ABSTRACT

Chronic Kidney Disease (CKD) remains a significant global and national health concern, with hemodialysis serving as the most common renal replacement therapy for patients with End-Stage Renal Disease (ESRD). The effectiveness of hemodialysis is highly dependent on dialysis adequacy, which may be influenced by the competence of the nurses providing care. This study determined the level of nursing competence among nurses working in a hemodialysis unit at a tertiary hospital in Metro Manila, Philippines, and examined whether significant differences existed across demographic profiles. A descriptive–correlational design was used involving 65 registered nurses selected through purposive sampling. Data were gathered using a validated Nursing Competency Assessment Questionnaire and analyzed using descriptive statistics and one-way ANOVA. Findings revealed that respondents demonstrated a generally competent level across all domains, with technical skills obtaining the highest mean score, followed by knowledge, critical thinking and decision-making, and professional attitude. No statistically significant differences were found in competence levels when grouped according to age, sex, and years of service. The study concludes that hemodialysis nurses possess adequate competencies for safe and effective dialysis care; however, continued professional development and competency-based training are recommended to further strengthen specialized nursing practice.

Keywords: Hemodialysis, nursing competence, dialysis adequacy, nephrology nursing, chronic kidney disease, Metro Manila

INTRODUCTION

Chronic Kidney Disease (CKD) is a growing global and local health burden, with hemodialysis remaining the most common renal replacement therapy for End-Stage Renal Disease (ESRD). The effectiveness of hemodialysis hinges on dialysis adequacy — measured through indices like Kt/V and URR — since inadequate dialysis is linked to higher morbidity, hospitalization, and mortality. While international guidelines (KDOQI) set clear adequacy benchmarks, many clinical settings still fall short because of shortened treatment time, vascular access issues, and patient non-adherence. Nurses play a central role in achieving adequacy — from machine setup and monitoring to complication management and patient education — making nursing competence (knowledge, skills, critical thinking, attitude) a key determinant of outcomes. However, local (Philippine, especially Metro Manila) research directly linking nursing competence to measurable adequacy outcomes remains scarce, which is the gap this study addresses.

Statement of the Problem

Chronic Kidney Disease (CKD) remains a major global and national health concern, with hemodialysis (HD) the most common modality for end-stage kidney disease, sustaining thousands of Filipino patients (KDOQI, 2020; Khan et al., 2023). HD effectiveness is defined by adequacy—quantified via spKt/V and URR—with guideline benchmarks ($\text{spKt/V} \geq 1.2$, $\text{URR} \geq 65\%$) linked to lower mortality and morbidity (KDOQI, 2020; Ok et al., 2023; Zhang et al., 2025). Nurses translate the dialysis prescription into practice through machine setup, flow-rate monitoring, complication response, and patient education (Causin et al., 2023), yet Philippine evidence linking nurse-level competence to adequacy outcomes remains limited (Delos Reyes et al., 2023).

This study examined nursing competence among hemodialysis nurses in Metro Manila: (1) demographic profile (age, sex, years of experience); (2) competence level in knowledge, technical skills, critical thinking/decision-making, and professional attitude; (3) significant differences in competence by demographic profile. H_0 : no significant difference by age, sex, or years of service; H_1 : a significant difference exists.

Scope and Delimitations

The study determined nursing competence levels among nurses in a hemodialysis unit at a selected Metro Manila tertiary hospital; it did not measure adequacy or patient outcomes directly. Participants were RNs with ≥ 6 months of direct HD patient-care experience; administrative/supervisory staff and peritoneal dialysis/transplant-unit nurses were excluded. Staffing ratios, organizational climate, and patient satisfaction were beyond scope.

Review of Related Literature

CKD affected an estimated 673.7 million people worldwide in 2021 (Zhang et al., 2025), with Philippine prevalence continuing to rise (Department of Health, 2024). Hemodialysis adequacy is the central quality indicator of dialysis care, and suboptimal adequacy has been linked to shortened treatment duration, vascular access dysfunction, and poor patient adherence (Dehvan et al., 2018; Aghsaeifard et al., 2022; KDOQI, 2020).

Nursing competence — knowledge, skills, critical thinking, and attitude — is a consistent determinant of dialysis quality (Causin et al., 2023). Nurses in Baghdad showed uniformly low Kt/V -related knowledge due to a lack of formal training, alongside bifurcated technical skills (Hadi & Abd Alreda, 2021). In Bandung, Indonesia, skills and — most strongly — professional attitude significantly predicted adequate hemodialysis (attitude OR = 7.235, $p < .001$; skills OR = 4.444, $p = .006$), while knowledge alone did not (Hermalia et al., 2021), suggesting attitudinal commitment and skills execution outweigh declarative knowledge alone.

Clinical experience amplifies these domains: facilities with more experienced nurses show higher adequacy rates, though excessive workload attenuates this benefit (Kim et al., 2021; Park & Lee, 2022). Locally, nurse training and workload influence perceived care quality, though few Philippine studies link these to objective Kt/V/URR outcomes (Delos Reyes et al., 2023; Causin et al., 2023) — the gap this study addresses.

Theoretical and Conceptual Framework

This study is anchored in a triangulated framework: the Roy Adaptation Model (patients as biopsychosocial systems adapting to uremic stressors), Benner's Novice-to-Expert Theory (competence developing through experience and reflection), and Abdellah's Typology of 21 Nursing Problems (competence operationalized through patient-centered problem-solving, e.g., fluid balance, infection prevention, patient education).

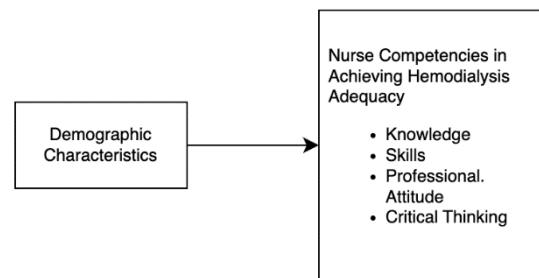


Figure 1. Conceptual Framework of Nursing Competency in Hemodialysis Adequacy
Nursing competence (knowledge, skills, critical thinking, attitude) is the independent variable influencing the HD care process, determining the outcome variable of hemodialysis adequacy (spKt/V, URR).

METHODOLOGY

This study employed a descriptive-correlational research design to determine the level of nursing competence in hemodialysis adequacy—covering knowledge, technical/procedural skills, critical thinking and decision-making, and professional attitude—among nurses and to examine whether this competence varies by demographic profile. It was conducted at a tertiary hospital's hemodialysis unit in Metro Manila, Philippines, involving 65 registered nurses selected through purposive sampling based on licensure, minimum clinical experience, and direct involvement in dialysis patient care.

Research Design

A descriptive–correlational design was used to determine the level of nursing competence among hemodialysis nurses and examine its relationship with demographic variables, consistent with Polit and Beck (2021).

Research Steps

The study was conducted in a hemodialysis unit of a DOH- and PhilHealth-accredited tertiary hospital in Metro Manila. Purposive sampling was used; all 65 eligible PRC-licensed nurses with at least six months of dialysis-unit experience and direct involvement in patient care participated. Nurses in purely administrative or educational roles were excluded.

Data Collection and Sample Selection

A structured Nursing Competency Assessment Questionnaire — four 12-item domains (Knowledge, Technical/Procedural Skills, Critical Thinking and Decision-Making,

Professional Attitude) on a five-point Likert scale — was validated by a three-expert panel ($CVI \geq 0.80$). Following IERB clearance, the validated online questionnaire was distributed via QR code over two weeks, with electronic informed consent obtained prior to completion (~20–30 minutes).

Data Analysis Methods

Data were analyzed in SPSS v26 using descriptive statistics (weighted mean, SD, frequency, percentage) and one-way ANOVA to test for differences in competence by age, sex, and years in service ($\alpha = 0.05$).

Research Hypotheses and Validation

H_0 : no significant difference in competence by age, sex, or years in service; H_1 : a significant difference exists. Tested via one-way ANOVA at $\alpha = 0.05$.

Study Limitations and Ethical Considerations

The study upheld respect for persons, beneficence, and justice per the National Ethical Guidelines for Health Research (2022) and RA 10173 (Data Privacy Act); participation was voluntary with no identifiers reported. As a single-site, self-report study, findings are limited by potential social desirability bias and restricted generalizability.

RESULTS AND DISCUSSION

SOP 1. What is the demographic profile of nurses working in hemodialysis units in Metro Manila?

Table 1

Demographic Profile of Respondents (N = 65)

Profile	f	%
Age: 20–30 years old	45	69.23
Age: 31–40 years old	19	29.23
Age: 41–50 years old	1	1.54
Sex: Female	54	83.08
Sex: Male	11	16.92
Service: Less than 1 year	9	13.85
Service: 1–5 years	38	58.46
Service: 6–10 years	15	23.08
Service: More than 10 years	3	4.62

Legend: f – frequency; % – percentage

Most respondents were 20–30 years old (69.23%), female (83.08%), and had 1–5 years of hemodialysis experience (58.46%) — a profile consistent with the broader Philippine nursing workforce entering specialized units amid growing dialysis demand (Andriani et al.,

2024). Per Benner (1982), nurses at this experience level are typically transitioning from competent to proficient practice.

SOP 2. What is the level of nursing competence in hemodialysis adequacy in terms of knowledge, technical skills, critical thinking and decision-making, and professional attitude?

Each domain was assessed using a 12-item Likert-scale questionnaire, interpreted as follows: 4.20–5.00 = Strongly Agree (SA); 3.40–4.19 = Agree (A); 2.60–3.39 = Neutral (N); 1.80–2.59 = Disagree (D); 1.00–1.79 = Strongly Disagree (SD).

Table 2.1

Summary of Nursing Competence — All Domains

Domain	WM	SD	VI	Rank
Knowledge	4.07	0.22	A	2
Technical and Procedural Skills	4.08	0.23	A	1
Critical Thinking and Decision-Making	4.07	0.20	A	2
Professional Attitude	4.00	0.25	A	4

Legend: WM – Weighted Mean; VI – Verbal Interpretation (A = Agree)

Highlights by Domain: Nurses were strongest in Kt/V familiarity (WM = 4.31) and machine priming/setup (WM = 4.35), but weakest in guideline familiarity (WM = 3.86; Hadi & Abd Alreda, 2021), aseptic technique (WM = 3.72; Flythe et al., 2022), multi-factorial clinical data analysis (WM = 3.91), and adaptive evaluation of patient responses and professionalism under stress (WM = 3.83–3.88; Asgari et al., 2021). Professional Attitude showed the widest variability (SD = 0.25), suggesting affective competencies are most sensitive to workload and support.

SOP 3. Is there a significant difference in nursing competence when respondents are grouped according to demographic profile?

Table 3

One-Way ANOVA — Nursing Competence by Demographic Profile

Grouping Variable	F value	F crit	p value	Decision	Remarks
Age	1.12	3.14	.33	Failed to Reject H_0	Not Significant
Sex	0.30	3.99	.58	Failed to Reject H_0	Not Significant
Years in Service	0.31	2.76	.82	Failed to Reject H_0	Not Significant

None of the three comparisons were significant ($\alpha = 0.05$); H_0 was retained in all cases. Weighted means were closely clustered across age (4.04–4.11), sex (4.05–4.07), and years of

service (4.04–4.09), suggesting training exposure and practice environment — not demographics — more proximally determine dialysis nursing competence (Park & Lee, 2022).

SUMMARY

This study assessed nursing competence among 65 hemodialysis nurses in a Metro Manila tertiary hospital. Respondents were predominantly young (69.23% aged 20–30), female (83.08%), and early-career (58.46% with 1–5 years of experience). All four domains rated at the Agree level, highest in technical skills (4.08) and lowest in professional attitude (4.00). Strengths clustered around Kt/V familiarity, machine setup, and safety communication; gaps persisted in guideline familiarity, aseptic technique, clinical reasoning, and conduct under stress. No significant differences emerged across age, sex, or years in service.

CONCLUSIONS

- The workforce is predominantly young, female, and early-career, underscoring the need for structured orientation, mentorship, and continuing education.
- Nurses were generally competent (Agree-level) across all domains, an adequate baseline for safe HD care, though room remains for growth toward expert-level (Strongly Agree) practice.
- Strengths clustered in Kt/V knowledge, machine setup, and recognition of inadequate-dialysis symptoms — core to adequacy monitoring and safety.
- Persistent gaps in guideline familiarity, aseptic technique, multi-factorial clinical reasoning, adaptive patient-response evaluation, and conduct under stress need targeted training.
- Demographic factors were not significant predictors, suggesting competence is shaped more by training quality and support than by demographics.

RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are offered:

For Hemodialysis Nurses

- Pursue continuing education in guideline literacy, aseptic technique, and clinical data analysis; adopt reflective practice after each session.

For Administrators and Unit Managers

- Develop competency-based orientation and mentorship programs targeting identified gaps; review nurse-to-patient ratios periodically.

For Nursing Educators

- Integrate nephrology nursing competencies and simulation-based learning (aseptic technique, alarm response, clinical reasoning) into curricula.

For Policy Makers

- Develop a formal nephrology/HD nursing competency and certification framework, linked to dialysis center accreditation standards.

For Future Researchers

- Use objective performance-based measures alongside self-report tools, and examine competency–adequacy (Kt/V, URR) links via multi-center studies.

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AI DECLARATION STATEMENT

AI-supported tools were used to help format this manuscript into the journal's IMRAD structure. No AI tools were used to collect, analyze, or interpret data; all authors are credited for their academic contributions and take full responsibility for the accuracy of the content.

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