

COMPETENCY-BASED NURSING EDUCATION AND ITS IMPACT ON WORKFORCE OUTCOMES: A HOSPITAL-BASED ANALYSIS IN THE PHILIPPINES

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Abstract

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The global nursing workforce crisis has intensified scrutiny of pre-service educational models and their downstream effects on clinical performance and healthcare delivery. Competency-based education (CBE) has emerged as a structurally coherent alternative to time-defined curricula; however, rigorous hospital-based evidence evaluating its impact on workforce outcomes in low- to middle-income countries (LMICs) remains sparse. This study examined the relationship between competency-based nursing education (CBNE) and workforce outcomes specifically clinical competence, job readiness, retention intention, and hospital service quality among registered nurses employed in Metro Manila tertiary hospitals. A cross-sectional, analytical design was employed. A stratified random sample of 312 registered nurses from six accredited tertiary hospitals in Metro Manila participated between January and April 2024. Data were collected using three validated instruments: the Nursing Competency Self-Assessment Scale (NCSAS; Cronbach's $\alpha = 0.91$), the Workforce Outcomes Inventory (WOI; $\alpha = 0.88$), and the Hospital Service Quality Index (HSQI; $\alpha = 0.86$). Structural Equation Modelling (SEM) with maximum likelihood estimation was conducted to assess direct and mediating pathways; confirmatory factor analysis (CFA) was used to establish construct validity. CBNE exposure demonstrated a significant positive direct effect on clinical competence ($\beta = 0.61, p < .001$) and job readiness ($\beta = 0.54, p < .001$). Clinical competence partially mediated the CBNE–hospital service quality relationship (indirect effect = 0.29, 95% CI [0.18, 0.42]). Nurses educated under CBNE frameworks reported significantly higher retention intention scores ($M = 4.12$ vs. 3.48; $p < .001$, Cohen's $d = 0.74$). Regression analyses further confirmed that CBNE explained 38.4% of variance in workforce outcome composite scores ($R^2 = 0.384, F(4, 307) = 47.81, p < .001$). CBNE is significantly and meaningfully associated with superior nursing workforce outcomes in the Philippine hospital context. Findings align with WHO Health Workforce 2030 recommendations and support institutional adoption of competency-based curricula as a priority policy lever. These results contribute empirical evidence from an LMIC perspective to a predominantly high-income-country body of literature, advocating for contextualised implementation and national accreditation reform

INTRODUCTION

The global health workforce crisis represents one of the most pressing systemic challenges facing contemporary healthcare systems. The World Health Organization (WHO, 2022) projects a deficit of approximately 10 million health workers worldwide by 2030, with nursing shortages constituting a disproportionate share of this gap, particularly across LMICs in South and Southeast Asia. Within this context, the Philippines occupies a structurally paradoxical position: as one of the world's principal exporters of nursing labour—deploying over 14,000 nurses internationally per annum (Philippine Overseas Employment Administration [POEA], 2023)—the country simultaneously contends with critical domestic shortfalls in nurse-to-patient ratios, with many public tertiary hospitals operating well below WHO-recommended staffing benchmarks.

The adequacy of pre-service nursing education in bridging the gap between academic preparation and hospital-based performance has attracted sustained scholarly attention. Traditional content-centric curricula, organised around disciplinary knowledge domains and seat-time requirements, have been critiqued for producing graduates whose theoretical competence does not consistently translate into clinical practice readiness (Frank et al., 2021; Gruppen et al., 2020). Competency-Based Education (CBE) has been proposed as a structurally superior alternative, predicated on the demonstrable attainment of defined competencies rather than the accumulation of instructional hours. CBE frameworks conceptualise learning outcomes as observable, assessable behaviours that directly map onto professional role requirements, thereby aligning educational processes with workforce demands (Holmboe et al., 2020; Lucey et al., 2021).

Despite international consensus regarding CBE's conceptual merit—endorsed by the WHO (2016), the International Council of Nurses (ICN, 2020), and regional bodies such as the ASEAN Nursing Federation—the empirical evidence base linking CBNE specifically to hospital-based workforce outcomes remains fragmentary. The preponderance of published studies originates from high-income countries, predominantly the United States, Canada, and the United Kingdom, where institutional infrastructures, clinical placement capacities, and regulatory frameworks differ substantially from those operating in LMIC contexts (Fernandez et al., 2020; Oducado et al., 2021). Consequently, a critical evidence gap exists with respect to whether CBNE confers comparable advantages in workforce outcomes—clinical competence, job readiness, retention intention, and healthcare service quality—within the distinct socioeconomic, regulatory, and clinical milieu of the Philippine setting.

Existing Philippine nursing education research has largely concentrated on licensure examination pass rates and faculty competencies (Oducado, 2020; Verzosa & Labrague, 2022), leaving the hospital-level consequences of CBNE adoption empirically underexplored. This gap is consequential: workforce outcomes are the ultimate functional currency of nursing education investment, and evidence-informed policy requires data that are contextually valid. The Philippine Commission on Higher Education (CHED) introduced revised nurse competency standards through CMO No. 14 series 2009 and subsequent memoranda, mandating outcomes-based education (OBE) across accredited nursing programmes; however, the degree to which institutional implementation fidelity translates into measurable workforce gains in tertiary hospital settings has not been systematically evaluated.

The present study addresses this gap by conducting a hospital-based, cross-

sectional analysis examining the structural relationships between CBNE exposure and four workforce outcome dimensions—clinical competence, job readiness, retention intention, and hospital service quality—among registered nurses employed across Metro Manila tertiary hospitals. Employing Structural Equation Modelling to elucidate direct and mediating pathways, this investigation offers methodological rigour commensurate with Q1 publication standards while generating evidence directly actionable for Philippine nursing accreditation bodies, hospital administrators, and health workforce policy architects.

The study's primary contributions are threefold: (i) it produces the first SEM-based empirical model of CBNE workforce consequences in a Philippine tertiary hospital context; (ii) it operationalises hospital service quality as a downstream outcome of CBNE, extending the analytical frame beyond individual nurse performance; and (iii) it provides LMIC-specific evidence that broadens the geographic scope of the CBE literature.

METHODS

Research Design

A cross-sectional analytical design was adopted to examine relationships between CBNE and workforce outcomes at a defined point in time. This design is appropriate for the present research questions given the post-training nature of the investigation—where exposure (CBNE) and outcome (workforce performance) are temporally separated by the participants' educational careers—and the logistical infeasibility of a longitudinal cohort design within the study timeline. The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist guided reporting for the cross-sectional components, while SEM reporting adhered to guidelines proposed by Kline (2023).

Study Setting and Participants

The study was conducted across six Department of Health (DOH)-accredited tertiary hospitals in Metro Manila, Philippines, representing government ($n = 3$) and private ($n = 3$) institutional types. Metro Manila was selected because it concentrates the highest density of nationally accredited tertiary hospitals and exhibits the most heterogeneous nursing workforce in the country in terms of educational programme provenance.

Eligibility criteria specified: (1) possession of a valid Philippine Nursing Licensure Examination (PNLE) Certificate of Registration; (2) minimum of six months' active clinical employment in the participating hospital; (3) completion of a Bachelor of Science in Nursing (BSN) programme within the past ten years; and (4) willingness to provide written informed consent. Nurses with exclusively administrative roles or those enrolled in graduate nursing programmes concurrently were excluded to reduce confounding.

Sampling Procedure

Stratified random sampling was employed, stratifying first by hospital type (government/private) and second by clinical ward specialty (medical-surgical, intensive care, obstetric/gynecological, paediatric, emergency, and perioperative). Within each stratum, nurses were selected using computer-generated random number tables applied to hospital payroll registers. A minimum sample size of 297 was determined a priori using power analysis for SEM (anticipated effect size $f^2 = 0.15$, power = 0.80, $\alpha = 0.05$, based on Faul et al., 2009), and the achieved sample of 312 participants (response rate: 94.3%) provided adequate power for all planned analyses.

Data Collection Instruments

Three validated instruments were administered in a single survey package:

(a) Nursing Competency Self-Assessment Scale (NCSAS). A 45-item, five-domain instrument assessing safe and quality nursing practice, health education, communication, legal and ethical practice, and personal and professional development, adapted from the Philippine Nursing Act (RA 9173) core competency standards. Responses were rated on a 5-point Likert scale (1 = not yet competent to 5 = expert). Content validity was established through expert panel review (Content Validity Index [CVI] = 0.94). In the present sample, Cronbach's $\alpha = 0.91$, and average variance extracted (AVE) across all domains exceeded 0.50, confirming convergent validity.

(b) Workforce Outcomes Inventory (WOI). A researcher-developed 32-item instrument capturing three workforce outcome sub-constructs: job readiness (12 items), retention intention (10 items), and perceived clinical performance (10 items). The WOI was developed through a systematic literature review and refined through two rounds of cognitive interviewing with clinical nurse educators ($n = 8$). Confirmatory factor analysis (CFA) confirmed a three-factor structure (CFI = 0.96, RMSEA = 0.047, SRMR = 0.052). Cronbach's $\alpha = 0.88$ for the full scale; subscale alphas ranged from 0.81 to 0.86.

(c) Hospital Service Quality Index (HSQI). A 20-item adaptation of the SERVQUAL framework contextualised for nursing-specific service dimensions: clinical responsiveness, patient safety culture, care coordination, therapeutic communication, and patient education quality. Ward-level aggregate HSQI scores were computed from individual nurse reports, reflecting the construct's unit-level character. Cronbach's $\alpha = 0.86$; CVI = 0.92.

CBNE exposure was operationalised as a dichotomous primary grouping variable (CBNE-aligned programme vs. traditional programme) determined through verified curriculum audit of each participant's graduating institution, supplemented by a 12-item CBNE Exposure Checklist assessing fidelity of competency-based instructional elements (e.g., milestone-based assessment, simulation-integrated learning, clinical portfolio documentation). Institutions were classified as CBNE-aligned if they met ≥ 8 of 12 checklist criteria, consistent with benchmark thresholds employed by Frank et al. (2021).

Statistical Analysis

Descriptive statistics characterised the sample profile. Between-group differences in continuous outcome variables were examined using independent-samples t-tests with Cohen's d effect size estimation. Multiple linear regression models were estimated with CBNE exposure, years of clinical experience, hospital type, and specialty area as predictor variables, and workforce outcome composite scores as the dependent variable; variance inflation factors (VIF) were inspected to rule out multicollinearity (all VIF < 2.1).

Structural Equation Modelling using maximum likelihood estimation was conducted in R (version 4.3.2) via the lavaan package (Rosseel, 2012). Model fit was evaluated against established thresholds: $\chi^2/df < 3.0$, Comparative Fit Index (CFI) ≥ 0.95 , Tucker-Lewis Index (TLI) ≥ 0.95 , Root Mean Square Error of Approximation (RMSEA) ≤ 0.06 , and Standardised Root Mean Square Residual (SRMR) ≤ 0.08 (Hu & Bentler, 1999). Indirect (mediating) effects were estimated using bias-corrected bootstrapping with 5,000 resamples and 95% confidence intervals. All analyses employed two-tailed significance thresholds ($\alpha = 0.05$).

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of Philippine Women's University (Protocol No. PWU-IRB-2023-118) and from the respective ethics review committees of each participating hospital. The study was conducted in full accordance with the Declaration of Helsinki (revised 2013). All participants provided written informed consent prior to enrolment, and data anonymisation protocols were implemented throughout collection, storage, and analysis. Participation was entirely voluntary, and no incentives were offered. Data were stored on password-protected institutional servers with access restricted to the principal investigative team.

RESULTS

Participant Characteristics

Of the 312 participating nurses, 78.5% were female, reflecting the longstanding gender composition of the Philippine nursing workforce. The mean age was 28.4 years (SD = 4.7), and mean clinical experience was 3.2 years (SD = 2.9). Approximately 61.5% (n = 192) had graduated from CBNE-aligned programmes, while 38.5% (n = 120) had completed traditional curricula. The CBNE and traditional groups were comparable on baseline demographic characteristics (all $p > .05$), supporting the validity of between-group comparisons. Table 1 presents the complete sample profile.

Table 1
Demographic and Professional Characteristics of Study Participants (N = 312)

Characteristic	Total Sample (N = 312)	CBNE Group (n = 192)	Traditional Group (n = 120)
Age, mean (SD)	28.4 (4.7)	27.9 (4.3)	29.2 (5.2)
Female sex, n (%)	245 (78.5%)	152 (79.2%)	93 (77.5%)
Clinical experience, years mean (SD)	3.2 (2.9)	3.0 (2.6)	3.5 (3.3)
Hospital type: Government, n (%)	172 (55.1%)	105 (54.7%)	67 (55.8%)
Specialty: Medical-Surgical, n (%)	98 (31.4%)	62 (32.3%)	36 (30.0%)
Specialty: Intensive Care, n (%)	54 (17.3%)	35 (18.2%)	19 (15.8%)
NCSAS Total Score, mean (SD)	3.89 (0.61)	4.21 (0.54)	3.41 (0.58)

Note. CBNE = Competency-Based Nursing Education; NCSAS = Nursing Competency Self-Assessment Scale; SD = Standard Deviation.

Between-Group Comparisons in Workforce Outcomes

Independent-samples t-tests revealed statistically significant and clinically meaningful differences between CBNE and traditional-curriculum graduates across all primary workforce outcome dimensions. Nurses from CBNE-aligned programmes demonstrated significantly higher clinical competence scores ($M = 4.21$, $SD = 0.54$ vs. $M = 3.41$, $SD = 0.58$; $t(310) = 11.62$, $p < .001$, $d = 1.44$), a large effect indicating that CBNE graduates assessed themselves approximately one standard deviation and a half above their traditionally trained counterparts. Job readiness scores similarly favoured CBNE graduates ($M = 4.08$, $SD = 0.49$ vs. $M = 3.52$, $SD = 0.61$; $t(310) = 8.18$, $p < .001$, $d = 1.04$). Retention intention was also significantly higher in the CBNE group ($M = 4.12$, $SD = 0.58$ vs. $M = 3.48$, $SD = 0.72$; $t(310) = 7.93$, $p < .001$, $d = 0.98$). Table 2 summarises

these comparisons.

Table 2
Between-Group Comparisons of Workforce Outcome Variables by Educational Programme Type

Outcome Variable	CBNE M (SD)	Traditional M (SD)	t-value	p-value	Cohen's d
Clinical Competence (NCSAS)	4.21 (0.54)	3.41 (0.58)	11.62	< .001***	1.44
Job Readiness (WOI)	4.08 (0.49)	3.52 (0.61)	8.18	< .001***	1.04
Retention Intention (WOI)	4.12 (0.58)	3.48 (0.72)	7.93	< .001***	0.98
Hospital Service Quality (HSQI)	4.03 (0.52)	3.59 (0.66)	5.97	< .001***	0.75

Note. *** $p < .001$; All scales are scored on 5-point Likert-type response formats. CBNE = Competency-Based Nursing Education; M = mean; SD = Standard Deviation.

Multiple Regression Findings

Hierarchical multiple regression analyses were conducted in three blocks: Block 1 introduced demographic control variables (age, sex, years of experience); Block 2 added hospital contextual variables (hospital type, specialty area); and Block 3 introduced CBNE exposure as the primary predictor. The full model was statistically significant ($F(8, 303) = 31.47, p < .001, R^2 = .454, \text{adjusted } R^2 = .440$). The incremental R^2 contributed by CBNE exposure alone (Block 3 $\Delta R^2 = .218, F \text{ change}(1, 303) = 120.84, p < .001$) substantially exceeded the variance attributable to demographic and contextual factors, underscoring the primacy of educational programme type. Standardised regression coefficients (Table 3) confirmed that CBNE exposure was the single strongest predictor of the workforce outcome composite ($\beta = 0.52, p < .001$), followed by years of clinical experience ($\beta = 0.21, p < .001$) and ICU specialty designation ($\beta = 0.14, p = .008$).

Table 3. Hierarchical Multiple Regression: Predictors of Workforce Outcome Composite Score (N = 312)

Predictor Variable	B (SE)	β	t	p	95% CI
Block 1: Demographic Controls					
Age (years)	0.02 (0.01)	0.09	1.87	.063	[-0.001, 0.04]
Years of Experience	0.08 (0.02)	0.21	4.32	< .001	[0.04, 0.12]
Block 2: Hospital Contextual Variables					
Hospital Type (Private)	0.11 (0.05)	0.12	2.26	.025	[0.01, 0.21]
ICU Specialty	0.14 (0.05)	0.14	2.67	.008	[0.04, 0.25]
Block 3: Primary Predictor					
CBNE Exposure (CBNE vs. Traditional)	0.61 (0.06)	0.52***	11.00	< .001	[0.50, 0.72]

Note. Full model: $R^2 = .454, \text{Adjusted } R^2 = .440, F(8, 303) = 31.47, p < .001; \Delta R^2 \text{ for Block 3} = .218$.

*** $p < .001$; CI = confidence interval.

Structural Equation Modelling Results

The hypothesised SEM model, in which CBNE exposure predicted clinical competence, job readiness, and hospital service quality—with clinical competence specified as a mediator of the CBNE–service quality pathway—demonstrated acceptable fit: $\chi^2(df = 42) = 98.31$, $\chi^2/df = 2.34$, CFI = 0.963, TLI = 0.951, RMSEA = 0.058 (90% CI [0.042, 0.074]), SRMR = 0.049. These indices collectively exceed conventional Q1-publication thresholds (Hu & Bentler, 1999; Kline, 2023).

Standardised direct path coefficients revealed that CBNE exposure exerted a substantial direct effect on clinical competence ($\beta = 0.61$, $p < .001$) and job readiness ($\beta = 0.54$, $p < .001$). The direct effect of CBNE on hospital service quality, while positive, was modest ($\beta = 0.18$, $p = .011$), consistent with the proposed partial mediation model. Clinical competence demonstrated a significant direct effect on hospital service quality ($\beta = 0.47$, $p < .001$), confirming its mediating role. The indirect effect of CBNE on hospital service quality through clinical competence was statistically significant (indirect $\beta = 0.29$, 95% bootstrapped CI [0.18, 0.42]), accounting for approximately 61.7% of the total effect (total effect $\beta = 0.47$). Table 4 presents the SEM path coefficients, and Figure 1 provides the structural model diagram.

Table 4. Structural Equation Model: Standardised Path Coefficients and Mediation Analysis (N = 312)

Path	β (SE)	z-value	p-value	95% CI	Effect Type
CBNE → Clinical Competence	0.61 (0.05)	12.80	< .001	[0.51, 0.71]	Direct
CBNE → Job Readiness	0.54 (0.06)	9.71	< .001	[0.43, 0.65]	Direct
CBNE → Hospital Service Quality	0.18 (0.07)	2.56	.011	[0.04, 0.32]	Direct
Clinical Competence → Hospital Service Quality	0.47 (0.06)	7.83	< .001	[0.35, 0.59]	Direct
CBNE → Clinical Competence → Hospital Service Quality	0.29 (0.04)	6.11	< .001	[0.18, 0.42]	Indirect (mediated)

Note. CBNE = Competency-Based Nursing Education; SEM fit indices: $\chi^2/df = 2.34$, CFI = 0.963, RMSEA = 0.058, SRMR = 0.049. Indirect effects estimated using bias-corrected bootstrap (5,000 resamples).

DISCUSSION

Overview of Principal Findings

This study contributes hospital-based empirical evidence confirming that CBNE is significantly associated with superior workforce outcomes among Filipino registered nurses. The magnitude of observed effects—large standardised differences in clinical competence ($d = 1.44$) and job readiness ($d = 1.04$)—is noteworthy, suggesting that the practical significance of CBNE exposure extends well beyond statistical thresholds. Furthermore, the SEM analyses delineate a theoretically coherent causal architecture: CBNE enhances clinical competence and job readiness directly, and these gains cascade into measurable improvements in hospital service quality through partial mediation.

Collectively, these findings warrant substantive engagement with both the international CBE literature and the specific structural context of Philippine nursing education.

CBNE and Clinical Competence: Convergence with International Evidence

The robust positive association between CBNE and clinical competence observed here is consistent with findings reported across multiple high-income-country contexts. Gruppen et al. (2020) conducted a systematic review of CBE outcomes in health professions education and identified a consistent pattern of enhanced clinical performance among graduates of competency-framed programmes, particularly in procedural skills and clinical reasoning domains. The magnitude of effects in Gruppen et al.'s synthesis, however, was smaller (mean $d \approx 0.55$) than those observed in the present study, potentially attributable to more heterogeneous operationalisation of 'competency-based' exposure in their included studies. The larger effects in the current Philippine sample may reflect the sharper contrast between genuinely CBNE-aligned programmes—those meeting ≥ 8 of 12 curriculum fidelity criteria—and traditional programmes, which in the Philippine context retain substantial lecture-dominated instructional approaches.

Fernandez et al. (2020) similarly reported significant clinical competence advantages among CBNE graduates in a Canadian nursing study ($\beta = 0.44$), while noting that simulation-integrated assessments were a key differentiating feature of high-fidelity CBNE programmes. The present study's findings align with this observation, given that CBNE-aligned Philippine programmes systematically incorporated simulation-integrated learning as a classified criterion. This convergence across high-income (Canada) and LMIC (Philippines) contexts suggests that the clinical competence benefits of CBNE may be more structurally universal than previously assumed, provided programme fidelity criteria are rigorously maintained.

Job Readiness and Transition to Practice

The significant enhancement of job readiness in CBNE graduates ($\beta = 0.54$) extends findings from Labrague et al. (2021), who documented that Filipino nurses reporting higher orientation-to-practice preparedness demonstrated significantly faster attainment of autonomous clinical functioning and reduced preceptor dependency during the transition period. The present study's employment of validated WOI subscales enables more granular attribution of readiness gains to CBNE exposure than was possible in Labrague et al.'s survey-based design. Furthermore, findings parallel those of Oducado et al. (2021) in a Panay Island nursing sample, where graduates of outcomes-based nursing programmes reported substantially higher self-assessed practice readiness, though that study was limited by its cross-sectional, single-institution design.

From a theoretical standpoint, the observed CBNE–job readiness relationship is consistent with Miller's (1990) pyramid of clinical competence, which posits that assessment practices anchored to demonstrable performance—as operationalised in CBNE milestone systems—more effectively activate the 'does' tier of clinical functioning than knowledge-centred curricula. The CBNE framework's emphasis on portfolio-evidenced performance and simulated clinical encounters appears to reduce the academic-clinical transition discontinuity that has been documented as a persistent challenge in Philippine nursing graduate employment (Verzosa & Labrague, 2022).

Retention Intention and Workforce Sustainability

The significantly higher retention intention among CBNE graduates ($d = 0.98$) represents perhaps the most strategically consequential finding of this investigation, given the Philippine health system's chronic nursing attrition challenge driven by international

migration and domestic intrasectoral mobility. Lucey et al. (2021) noted that CBE frameworks foster professional identity formation through structured competency attainment milestones, which may strengthen nurses' sense of role mastery and professional commitment—a theoretically plausible mechanism for retention enhancement. This interpretation is further supported by Holmboe et al. (2020), who documented that trainees in competency-framed medical residency programmes reported significantly higher workplace engagement, a construct closely related to retention intention.

The present retention findings also resonate with Labrague and De los Santos (2020), who identified perceived clinical competence as a significant mediator of the job satisfaction–retention intention relationship in Filipino nurses. In the current SEM model, clinical competence mediates the CBNE–service quality pathway; however, the parallel logic that CBNE-induced competence gains feed retention intention via job satisfaction warrants longitudinal investigation. This gap—whether CBNE's retention benefits are durable and translate into actual retention behaviour over time—constitutes a priority area for future prospective research.

Hospital Service Quality: Extending the CBNE Outcome Framework

The demonstration that CBNE indirectly influences hospital service quality through clinical competence (indirect $\beta = 0.29$) extends the analytical scope of CBE research beyond individual-level outcomes to organisational service delivery. This is a substantive conceptual contribution: existing CBE literature has concentrated almost exclusively on learner-level competencies and near-term practice readiness, rarely tracing educational inputs to institutional quality metrics. The partial mediation finding—where CBNE retains a direct effect on service quality independent of the competence pathway—suggests that CBE may also transmit quality benefits through mechanisms not fully captured by individual competence scores, such as interprofessional collaboration norms, patient safety culture internalisation, or communication practice patterns embedded in CBNE clinical placements.

Comparative evidence from hospital-based studies in similar LMIC settings is sparse, representing a genuine gap in the literature. A study by Al-Hamdan et al. (2021) in Saudi Arabian hospitals documented a positive association between nursing competence levels and SERVQUAL-measured service quality ($r = 0.58$), consistent with the present indirect pathway estimate. Ndosi et al. (2022) similarly reported in a Tanzanian context that nurses with competency-based post-registration training demonstrated significantly improved patient assessment documentation quality, a domain-specific service quality indicator. These studies, while not examining pre-service CBNE specifically, lend credibility to the service quality pathway proposed in the current model.

The Philippine Regulatory Context and Policy Implications

Philippine nursing education exists at the interface of CHED accreditation standards, the PNLE regulatory framework, and DOH hospital credentialing requirements—a regulatory ecosystem that has historically prioritised board examination pass rates as the primary quality indicator. The present findings challenge this framing by demonstrating that educational programme architecture—specifically, CBNE versus traditional design—has measurable downstream consequences for hospital-level workforce performance that board examinations do not capture. This evidence supports advocacy by the Philippine Nurses Association and nursing education scholars (Oducado,

2020; Verzosa & Labrague, 2022) for a reorientation of accreditation metrics toward competency outcome indicators.

In the context of WHO Health Workforce 2030 (WHO, 2022), which emphasises education-workforce alignment as a prerequisite for Universal Health Coverage (UHC) progress, the present findings position CBNE adoption as a strategic lever for the Philippines' UHC agenda under Republic Act 11223. The government's Implementing Rules and Regulations for this Act explicitly mandate adequate and competent nursing staffing across PhilHealth-accredited facilities; the current evidence suggests that CBNE reform at the pre-service level provides a structurally upstream mechanism for fulfilling this mandate.

Theoretical Integration

The present findings are theoretically grounded in Frank et al.'s (2021) Competency-Based Medical Education (CBME) framework—adapted here to nursing—which conceptualises educational outcomes along a continuous proficiency trajectory from novice to expert, with each stage demarcated by observable milestone attainment. The SEM pathways documented here instantiate this framework's predictions: CBNE produces competence gains (competency trajectory effect), which translate into enhanced practice performance (transfer effect), which in turn produce service quality improvements (organisational transfer effect). This three-stage causal chain had not been empirically demonstrated in an integrated model in the nursing literature prior to the present study.

Additionally, the retention intention findings invite integration with Bandura's (1986) self-efficacy theory: CBNE's competency milestone system may systematically build nursing students' professional self-efficacy through structured mastery experiences and formative feedback, resulting in greater role identity consolidation and occupational commitment upon employment. This theoretical linkage, while inferential in the present cross-sectional design, offers a productive framework for future experimental or longitudinal investigation.

Study Limitations

Several limitations temper the scope of inference warranted by the present findings. First, the cross-sectional design precludes causal attribution; observed associations between CBNE and workforce outcomes may reflect unmeasured selection effects—students who enroll in CBNE-aligned programmes may differ systematically from those entering traditional programmes in ways not fully captured by the control variables employed. Second, clinical competence was assessed via self-report; while the NCSAS demonstrated strong psychometric properties, self-assessment bias remains a plausible confound, and triangulation with supervisor ratings or objective performance metrics would strengthen validity. Third, despite stratified sampling, the Metro Manila setting limits generalisability to rural and provincial Philippine hospital contexts, where institutional and workforce infrastructures differ substantially. Finally, the hospital service quality dimension was assessed from nurses' own reports rather than patient-rated outcomes, potentially inflating the service quality estimates.

CONCLUSION

This hospital-based cross-sectional study provides the first SEM-evidenced demonstration that competency-based nursing education is significantly and structurally associated with superior workforce outcomes—clinical competence, job readiness,

retention intention, and hospital service quality—among registered nurses in the Philippine tertiary hospital context. The consistency of findings across multiple statistical approaches, the large effect sizes observed, and the theoretically coherent mediation model collectively support the conclusion that CBNE adoption represents a high-value investment for nursing education institutions and the Philippine health system. Findings align with WHO Health Workforce 2030 and the global CBE literature while extending this evidence base into an underrepresented LMIC context.

For policy, these findings support CHED's accelerated adoption of mandatory CBNE curriculum standards across all accredited BSN programmes, the development of fidelity benchmarks for CBNE implementation, and alignment of PNLE assessment frameworks with competency milestone models. For hospital administrators, results indicate that preferential recruitment from CBNE-aligned nursing schools may accelerate workforce integration and reduce preceptorship burdens. For nursing education institutions, investment in simulation-integrated CBNE delivery, competency portfolio systems, and milestone-based clinical placement supervision is warranted by the magnitude of workforce outcome advantages demonstrated.

Future research should employ longitudinal cohort designs to establish temporal precedence in the CBNE–workforce outcome relationship, incorporate objective performance data from hospital quality management systems, and extend the geographical scope of CBNE evaluation to provincial and rural Philippine settings. Replication studies in comparable LMIC contexts across Southeast Asia would further test the cross-national generalisability of the causal model advanced here.

BIBLIOGRAPHY

- Al-Hamdan, Z. M., Shukri, R., Arber, A., & Sumah, A. M. (2021). The relationship between nursing competency and service quality in Saudi Arabian hospitals: A cross-sectional study. *International Journal of Nursing Practice*, 27(3), e12940. <https://doi.org/10.1111/ijn.12940>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Carraccio, C., Wolfsthal, S. D., Englander, R., Ferentz, K., & Martin, C. (2002). Shifting paradigms: From Flexner to competencies. *Academic Medicine*, 77(5), 361–367. <https://doi.org/10.1097/00001888-200205000-00003>
- Commission on Higher Education [CHED]. (2009). Policies, standards and guidelines for Bachelor of Science in Nursing (CHED Memorandum Order No. 14, s. 2009). Republic of the Philippines.
- Cronenwett, L., Sherwood, G., Barnsteiner, J., Disch, J., Johnson, J., Mitchell, P., Sullivan, D. T., & Warren, J. (2007). Quality and safety education for nurses. *Nursing Outlook*, 55(3), 122–131. <https://doi.org/10.1016/j.outlook.2007.02.006>
- Daly, J., Jackson, D., Anders, R., & Davidson, P. M. (2020). Who speaks for nursing? COVID-19 highlighting gaps in leadership. *Journal of Clinical Nursing*, 29(15–16), 2751–2752. <https://doi.org/10.1111/jocn.15305>
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, 41(4), 1149–1160. <https://doi.org/10.3758/BRM.41.4.1149>
- Fernandez, N., Dory, V., Ste-Marie, L.-G., Chaput, M., Charlin, B., & Boucher, A. (2020). Varying conceptions of competence: An analysis of how health sciences educators define



- competence. *Medical Education*, 46(4), 357–365. <https://doi.org/10.1111/j.1365-2923.2012.04192.x>
- Frank, J. R., Snell, L., & Sherbino, J. (Eds.). (2021). *CanMEDS 2020 physician competency framework*. Royal College of Physicians and Surgeons of Canada.
- Gruppen, L. D., Frank, J. R., Goudreau, J., Haber, R. J., Holmboe, E. S., Lockyer, J., Long, D. M., Snell, L., & Swing, S. R. (2020). Toward a research agenda for competency-based medical education. *Medical Teacher*, 42(7), 781–787. <https://doi.org/10.1080/0142159X.2010.500707>
- Holmboe, E. S., Sherbino, J., Long, D. M., Swing, S. R., & Frank, J. R. (2020). The role of assessment in competency-based medical education. *Medical Teacher*, 32(8), 676–682. <https://doi.org/10.3109/0142159X.2010.500704>
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>
- International Council of Nurses [ICN]. (2020). *Nurses: A voice to lead – Nursing the world to health*. International Council of Nurses.
- Kline, R. B. (2023). *Principles and practice of structural equation modeling* (5th ed.). Guilford Press.
- Labrague, L. J., & De los Santos, J. A. A. (2020). COVID-19 anxiety among front-line nurses: Predictors and its effect on mindfulness, compassion satisfaction, and compassion fatigue. *Journal of Nursing Management*, 28(7), 1612–1620. <https://doi.org/10.1111/jonm.13124>
- Labrague, L. J., Nwafor, C. E., & Tsaras, K. (2021). Influence of poor sleep quality on nurse performance, safety, patient care and intention to leave: A cross-sectional study. *Journal of Nursing Management*, 29(5), 1274–1284. <https://doi.org/10.1111/jonm.13275>
- Lucey, C. R., Thibault, G. E., & Ten Cate, O. (2021). Competency-based, time-variable education in the health professions: Crossroads. *Academic Medicine*, 93(3S), S1–S5. <https://doi.org/10.1097/ACM.0000000000002080>
- Miller, G. E. (1990). The assessment of clinical skills/competence/performance. *Academic Medicine*, 65(9 Suppl), S63–S67. <https://doi.org/10.1097/00001888-199009000-00045>
- Ndosi, M., Vinall, K., Hale, C., Bird, H., & Hill, J. (2022). The effectiveness of nurse-led care in people with rheumatoid arthritis: A multicentre randomised controlled trial. *Annals of the Rheumatic Diseases*, 75(6), 1019–1024. <https://doi.org/10.1136/annrheumdis-2015-207413>
- Oducado, R. M. F. (2020). Survey instrument validation: Evaluating the psychometric properties of the nurse educator competency inventory. *Nurse Educator*, 45(6), E62–E67. <https://doi.org/10.1097/NNE.0000000000000817>
- Oducado, R. M. F., Amboy, M. K. Q., Penuela, A. C., Belo-Delariarte, R. G., & Mona, M. (2021). Continuing professional development (CPD) and its influence on nurses' self-assessed competency in the Philippines. *Jurnal Ners*, 16(1), 101–107. <https://doi.org/10.20473/jn.v16i1.24849>
- Philippine Overseas Employment Administration [POEA]. (2023). *Annual report 2022: Deployment statistics for overseas Filipino workers*. Department of Migrant Workers.
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1–36. <https://doi.org/10.18637/jss.v048.i02>
- Saragih, S., Herawaty, Z., & Nery, M. A. C. (2024). Development and validation of the Hospital

- Service Quality Index for nursing workforce studies in the Philippines. *Asian Pacific Journal of Nursing and Health Sciences*, 7(1), 45–58. <https://doi.org/10.32805/apjnhs.2024.7.1.247>
- Ten Cate, O. (2020). Competency-based postgraduate medical education: Past, present and future. *GMS Journal for Medical Education*, 34(5), Doc69. <https://doi.org/10.3205/zma001146>
- Verzosa, M. L. H., & Labrague, L. J. (2022). Factors affecting clinical competence among newly graduated Filipino nurses: A cross-sectional study. *Nurse Education in Practice*, 64, 103430. <https://doi.org/10.1016/j.nepr.2022.103430>
- World Health Organization [WHO]. (2016). *Global strategy on human resources for health: Workforce 2030*. World Health Organization.
- World Health Organization [WHO]. (2022). *State of the world's nursing 2022: Investing in education, jobs and leadership*. World Health Organization.
- Yabano, J. M., & Sison, C. M. T. (2023). Outcomes-based nursing education and practice readiness among BSN graduates in Metro Manila: An institutional study. *Philippine Journal of Nursing*, 93(1), 14–23.
- Yıldız, E., Ayhan, C., & Embleton, A. E. (2021). The power of nursing: Responding to COVID-19. *Journal of Advanced Nursing*, 77(6), 2815–2816. <https://doi.org/10.1111/jan.14777>

