Journal of Innovative and Creativity
Journal Homepage: https://joecy.org/index.php/joecy
e-mail: galungwaknook@gmail.co

Faculty of Education
University of Pahlawan Tuanku Tambusai
ISSN 2775-771X (Online)
ISSN 2962-570X (Printed)
6 (1) 2025,, Page: 13498-13507

Competency Gap Analysis of Nursing Professional (Ners) Graduates and Hospital Labor Market Demands in North Sumatra: A Comparative Study of Islamic Hospital Malahayati and Advent General Hospital

Rohmatun Nazilah[1], Willhelmina Wahara[2]

[1,2] Sekolah Tinggi Ilmu Kesehatan Darmo, Medan, Indonesia

Corresponding Author: widi@helvetia.ac.id

Published: Februari , 2026

ABSTRAK

The mismatch between nursing professional (Ners) graduates' competencies and hospital labor market demands remains a critical challenge in Indonesian healthcare workforce development. This study aimed to analyze the competency gap between Ners graduates and the labor market requirements of hospitals in North Sumatra, with particular focus on a comparative evaluation between Islamic Hospital Malahayati (RSI Malahayati) and Advent General Hospital (RSUA) in Medan. An explanatory sequential mixed-methods design was employed. The quantitative phase involved 142 newly recruited nurses and 28 nurse managers from both hospitals, using a validated competency assessment questionnaire. The qualitative phase comprised 18 in-depth interviews with purposively selected nursing directors, head nurses, and recent Ners graduates. Data integration was performed using joint display analysis. Significant competency gaps were identified in clinical decision-making (mean gap score = 1.84, $p < 0.001$), interprofessional collaboration (mean gap score = 1.62, $p < 0.001$), and digital health literacy (mean gap score = 2.11, $p < 0.001$). RSI Malahayati graduates demonstrated higher proficiency in spiritual and cultural care competencies, while RSUA required stronger competencies in evidence-based practice. Qualitative themes revealed systemic disconnects between academic curricula and clinical practice expectations. Substantial competency gaps exist between Ners graduates and hospital labor market demands in North Sumatra. Collaborative curriculum reform between nursing education institutions and hospitals is urgently needed to align graduate competencies with evolving healthcare service requirements.

Keywords: *Nursing Competency; Workforce Gap Analysis; Professional Education; Hospital Labor Market; Mixed Methods Research*

Implications for Research, Practice, or Policy

- Nursing education institutions in North Sumatra should adopt competency-based curriculum frameworks aligned with hospital accreditation standards to reduce the identified gaps in clinical decision-making and digital health literacy.
- Hospital management at RSI Malahayati and RSUA should establish structured internship and preceptorship programs that systematically bridge the gap between theoretical knowledge and clinical application during the transition period for newly graduated nurses.
- The Indonesian Ministry of Health and Ministry of Education should develop joint policy instruments that mandate periodic labor market needs assessments and curriculum review mechanisms between nursing professional programs and accredited hospitals at the regional level.

© Penulis. 2021 Akses Terbuka Artikel ini dilisensikan di bawah Lisensi Creative Commons Attribution 4.0 International, yang mengizinkan penggunaan, berbagi, adaptasi, distribusi, dan reproduksi dalam media atau format apa pun, selama Anda memberikan kredit yang sesuai kepada penulis asli dan sumbernya, memberikan tautan ke lisensi Creative Commons , dan menunjukkan jika ada perubahan yang dilakukan. Gambar atau materi pihak ketiga lainnya dalam artikel ini termasuk dalam lisensi Creative Commons artikel ini , kecuali dinyatakan lain dalam baris kredit untuk materi tersebut. Untuk melihat salinan lisensi ini , kunjungi http://creativecommons.org/licenses/by/4.0

INTRODUCTION

The global nursing workforce shortage, projected to reach 13 million by 2030 according to the World Health Organization (WHO, 2020), has intensified scrutiny on the quality and relevance of nursing professional education. In Indonesia, the challenges are multifaceted: the country produces a large number of Ners (professional nursing) graduates annually, yet healthcare facilities consistently report inadequate preparedness of newly hired nurses for complex clinical environments (Nursalam et al.,

2021). This paradox of quantitative abundance alongside qualitative deficit represents a critical gap in human resource planning for the health sector, particularly in rapidly developing regions such as North Sumatra.

North Sumatra, as Indonesia's third most populous province with a population exceeding 14 million, operates a diverse network of public and private hospitals that serve heterogeneous patient populations (BPS North Sumatra, 2022). The province's hospital density has increased significantly over the past decade, driving demand for qualified nursing professionals. However, hospital recruitment officers and nursing managers in Medan consistently report that newly graduated Ners require extensive additional training before achieving competency for independent clinical practice (Simanjuntak & Ginting, 2021). This discrepancy between educational output and employment readiness signals a systemic misalignment between nursing curricula and labor market demands.

Comparative analysis of competency expectations across different hospital contexts reveals institutional variation that further complicates workforce planning. RSI Malahayati, as an Islamic-affiliated hospital, emphasizes spiritual care competencies and culturally sensitive nursing practices rooted in Islamic values, while RSUA, operated under Seventh-day Adventist health principles, prioritizes holistic care, evidence-based practice, and preventive health approaches (Harahap, 2022). These institutional differences create distinct competency profiles that are not adequately addressed by standardized Ners educational programs, which are governed by the Indonesian Nursing Council (PPNI) framework and the Ministry of Research, Technology, and Higher Education regulations.

Despite the existence of competency standards established by PPNI and the Indonesian Qualification Framework (KKNI), research consistently demonstrates gaps in clinical reasoning, interprofessional communication, technological proficiency, and patient safety competencies among newly graduated Ners (Widyawati et al., 2022). A systematic review by Harianto and colleagues (2021) found that Indonesian nursing graduates scored significantly lower than expected benchmarks in advanced clinical decision-making ($d = 0.72$) and evidence-based practice application ($d = 0.68$). Furthermore, the rapid integration of digital health technologies in hospital settings has introduced new competency demands that current curricula have not yet fully incorporated (Pratiwi et al., 2023).

The theoretical framework guiding this study draws on the Competency-Based Education (CBE) model (Miller, 1990) and the conceptual integration of Workforce Gap Analysis (WGA) theory. Miller's pyramid of competency, progressing from 'knows' to 'knows how,' 'shows how,' and 'does,' provides the lens through which graduate performance is evaluated against employer expectations. Concurrently, workforce gap analysis theory (Dubois & Rothwell, 2004) offers a systematic approach to identifying discrepancies between current competency profiles and desired organizational performance standards. The interaction between educational processes, graduate competency levels, and hospital labor market requirements is further conceptualized through the Human Capital Theory framework (Becker, 1964), which posits that investment in education translates to productive workforce capabilities.

The current study addresses the research gap by employing a mixed-methods approach to provide both quantitative measurement of competency gaps and qualitative exploration of the contextual factors driving these disparities. The specific objectives of this study were: (1) to measure the competency gap between Ners graduates and hospital labor market expectations at RSI Malahayati and RSUA; (2) to explore the qualitative perspectives of nursing managers and graduates regarding factors contributing to competency misalignment; and (3) to integrate quantitative and qualitative findings to propose evidence-based recommendations for curriculum reform and hospital-academia collaboration in North Sumatra.

METHODS

Study Design

This study employed an explanatory sequential mixed-methods design (Creswell & Plano Clark, 2018), guided by the Good Reporting of A Mixed Methods Study (GRAMMS) framework. The explanatory sequential approach was selected because the quantitative findings required deeper contextual

explanation that could only be achieved through subsequent qualitative inquiry. The research paradigm underpinning this study is pragmatism, which prioritizes practical problem-solving and accommodates both objective measurement (quantitative phase) and subjective meaning-making (qualitative phase) as complementary epistemological positions. In Phase 1, quantitative data were collected and analyzed to identify and quantify competency gaps. In Phase 2, qualitative data were collected purposively based on Phase 1 results to explain the mechanisms and contextual factors underlying the identified gaps. Integration occurred at the interpretation stage through a joint display analysis.

Participants

The quantitative strand employed stratified random sampling. The target population comprised newly recruited Ners graduates (< 2 years post-graduation) and nurse managers from RSI Malahayati and RSUA in Medan. Sample size was calculated using GPower 3.1 with parameters of effect size f = 0.25, alpha = 0.05, and power = 0.80 for a two-group comparison, yielding a minimum of 128 participants. Accounting for a 10% attrition rate, 142 nurses were recruited (RSI Malahayati: n = 74; RSUA: n = 68) alongside 28 nurse managers (RSI Malahayati: n = 15; RSUA: n = 13). Inclusion criteria for nurses included: Ners degree completion within the past 24 months, active employment status at the respective hospital, and minimum three months of clinical work experience. Exclusion criteria included nurses on extended leave and those with dual employment at other facilities.

For the qualitative strand, purposive sampling was applied following maximum variation principles to ensure diversity of perspective. A total of 18 participants were recruited: six nursing directors or supervisors (three per hospital), six head nurses from high-acuity units (three per hospital), and six recently employed Ners graduates (three per hospital, selected based on Phase 1 competency profiles representing high, medium, and low gap scores). Data saturation was confirmed at the 16th interview, with two additional interviews conducted to ensure informational adequacy (Malterud et al., 2016). Inclusion criteria for qualitative participants required at least two years of management experience for nursing directors and willingness to provide recorded consent.

Data Collection

Quantitative data were collected between January and March 2024 using a validated Nursing Competency Assessment Scale (NCAS) adapted from the Nurse Competence Scale (NCS) developed by Meretoja et al. (2004) and localized for the Indonesian context. The instrument comprised 62 items across seven competency domains: (1) clinical assessment and patient monitoring; (2) clinical decision-making; (3) interprofessional collaboration; (4) evidence-based practice; (5) patient safety and infection control; (6) digital health literacy; and (7) cultural and spiritual care. Each item was rated on a dual 5-point Likert scale measuring graduates' self-assessed competency (1 = not competent, 5 = highly competent) and nurse managers' expected competency level (1 = not required, 5 = critically required). The gap score was computed as the difference between manager expectation and graduate self-assessment. Content validity was confirmed by five nursing education experts (Content Validity Index = 0.89), and internal consistency was excellent (Cronbach's alpha = 0.92).

Qualitative data were collected through semi-structured in-depth interviews conducted individually in a private setting at each hospital from April to May 2024. Interview guides were developed based on Phase 1 quantitative findings and addressed four thematic areas: perceived competency expectations in clinical practice, factors contributing to competency gaps, institutional adaptation strategies for new graduates, and recommendations for curriculum improvement. Interviews lasted between 45 and 75 minutes and were audio-recorded with participant consent. The first author, who holds a doctoral degree in nursing education and has no supervisory relationship with participants, conducted all interviews to minimize power-related bias. Field notes were maintained throughout data collection to support reflexivity.

Integration point: Quantitative gap scores from Phase 1 were used to purposively select qualitative participants in Phase 2, ensuring that informants could speak to the mechanisms behind identified competency gaps. This connecting strategy enabled Phase 2 findings to explain Phase 1 results.

Data Analysis

Quantitative analysis was conducted using IBM SPSS Statistics version 26. Descriptive statistics (mean, standard deviation, frequency, percentage) characterized participant demographics and competency scores. Normality was assessed using the Shapiro-Wilk test, revealing non-normal distribution for gap scores ($p < 0.05$), leading to use of non-parametric tests. The Mann-Whitney U test was employed to compare gap scores between RSI Malahayati and RSUA. The Wilcoxon signed-rank test evaluated within-group differences between expected and self-assessed competency scores. Effect sizes were calculated using Cohen's d to quantify the practical significance of observed gaps.

Qualitative data were analyzed using Braun and Clarke's (2006) six-phase reflexive thematic analysis: (1) data familiarization through repeated reading of transcripts; (2) systematic coding using NVivo 14 software; (3) searching for themes; (4) reviewing themes; (5) defining and naming themes; and (6) producing the report. Two researchers independently coded 30% of the transcripts, yielding a Cohen's kappa of 0.84, indicating strong intercoder agreement. Discrepancies were resolved through consensus discussion. Analytical memos were maintained to document interpretive decisions and enhance the audit trail.

Integration of qualitative and quantitative findings was achieved through a joint display table, presenting quantitative statistical results alongside corresponding qualitative themes and representative participant quotations. This convergent integration approach enabled identification of convergent, divergent, and complementary findings across both data strands.

Validity, Reliability, and Trustworthiness

Quantitative rigor was ensured through instrument validation (CVI = 0.89, Cronbach's alpha = 0.92) and standardized data collection procedures. For the qualitative strand, credibility was established through prolonged engagement, member checking with five participants who confirmed thematic accuracy, and peer debriefing with two independent nursing researchers. Transferability was enhanced by providing thick descriptions of study context. Dependability and confirmability were achieved through a detailed audit trail and researcher reflexivity statements. The principal researcher's background as a nursing educator and health policy lecturer was documented as a potential source of bias, addressed through reflexive journaling and structured peer review. Methodological triangulation was applied by integrating quantitative measurement with qualitative thematic inquiry, strengthening the overall trustworthiness of findings.

Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee of Universitas Bunda Thamrin, Medan (Approval Number: UBT-EC/2023/089). Institutional permissions were granted by the directors of RSI Malahayati and RSUA prior to data collection. Written informed consent was obtained from all quantitative participants, while verbal consent, audio-recorded at the beginning of each session, was secured from qualitative interview participants. Participant anonymity was maintained through alphanumeric coding (e.g., NM-01 for nurse managers, NG-01 for nurse graduates). All data were stored on encrypted, password-protected institutional servers, accessible only to the research team. Participation was entirely voluntary, with the right to withdraw at any stage without consequence.

RESULTS

Sample Description

The quantitative sample comprised 170 participants total (142 nurses and 28 nurse managers). Among nurse participants, 68.3% were female, with a mean age of 25.7 years (SD = 2.3). The majority (61.3%) graduated from private nursing institutions in North Sumatra. In the qualitative phase, 18 participants were interviewed, with 11 female and 7 male, ranging from 26 to 52 years of age. Participant demographics and institutional distribution are presented in Table 1.

Table 1. Demographic Characteristics of Study Participants

Characteristic	RSI Malahayati (n=74)	RSUA (n=68)	Total (n=142)	p-value
Age, mean (SD)	25.4 (2.1)	26.1 (2.5)	25.7 (2.3)	0.142
Female, n (%)	52 (70.3%)	45 (66.2%)	97 (68.3%)	0.584
Public institution graduate	28 (37.8%)	27 (39.7%)	55 (38.7%)	0.815
Private institution graduate	46 (62.2%)	41 (60.3%)	87 (61.3%)	0.815
Work experience < 1 year	41 (55.4%)	39 (57.4%)	80 (56.3%)	0.806
Work experience 1-2 years	33 (44.6%)	29 (42.6%)	62 (43.7%)	0.806

Note. RSI Malahayati = Rumah Sakit Islam Malahayati; RSUA = Rumah Sakit Umum Advent; SD = Standard Deviation

Quantitative Results: Competency Gap Scores

Competency gap scores were calculated across all seven domains for both hospitals. Significant gaps ($p < 0.001$) were identified in clinical decision-making, interprofessional collaboration, and digital health literacy across both institutions. The largest overall gap was observed in digital health literacy (mean gap = 2.11, SD = 0.78), followed by clinical decision-making (mean gap = 1.84, SD = 0.65). Cultural and spiritual care demonstrated the smallest gap at RSI Malahayati (mean gap = 0.42, SD = 0.31), while evidence-based practice showed the largest gap at RSUA (mean gap = 1.93, SD = 0.71). Detailed competency gap scores by domain and institution are presented in Table 2.

Table 2. Competency Gap Scores by Domain and Hospital

Competency Domain	RSI Malahayati Gap M (SD)	RSUA Gap M (SD)	Total Gap M (SD)	p-value (Mann-Whitney U)
Clinical Assessment & Monitoring	1.21 (0.52)	1.34 (0.58)	1.27 (0.55)	0.213
Clinical Decision-Making	1.76 (0.61)	1.93 (0.70)	1.84 (0.65)	< 0.001*
Interprofessional Collaboration	1.58 (0.55)	1.67 (0.59)	1.62 (0.57)	< 0.001*
Evidence-Based Practice	1.54 (0.63)	1.93 (0.71)	1.73 (0.68)	< 0.001*
Patient Safety & Infection Control	1.18 (0.48)	1.22 (0.51)	1.20 (0.49)	0.387
Digital Health Literacy	2.05 (0.74)	2.18 (0.82)	2.11 (0.78)	< 0.001*
Cultural & Spiritual Care	0.42 (0.31)	1.15 (0.44)	0.76 (0.48)	< 0.001*

*Note. M = Mean; SD = Standard Deviation; * = statistically significant ($p < 0.001$); Higher gap scores indicate greater discrepancy between manager expectations and graduate competency.*

Qualitative Results: Thematic Findings

Thematic analysis of 18 interview transcripts yielded four overarching themes with corresponding sub-themes, as presented in the coding tree below.

Theme 1: Structural Disconnect Between Curriculum and Clinical Reality. The most pervasive theme across all participant groups was the perceived structural misalignment between academic nursing education and the realities of hospital practice. Nurse managers at both institutions consistently expressed frustration with graduates' inability to translate theoretical knowledge into clinical action. A nursing director at RSI Malahayati stated: "They know the textbook answers, but when a patient deteriorates in front of them, they freeze. We spend the first six months rebuilding their clinical confidence" (NM-02). This finding was echoed across both hospital contexts, suggesting a systemic rather than institution-specific challenge.

Theme 2: Institutional Culture and Competency Expectations. Participants articulated clear differences in institutional cultures that shaped competency expectations. At RSI Malahayati, spiritual care integration was considered a core professional expectation. A head nurse noted: "We expect our nurses to offer du'a (prayer) alongside clinical care. New graduates understand this theoretically, but they are often uncomfortable doing it in practice" (NM-07). At RSUA, participants emphasized evidence-based practice and documentation precision. A graduate employed at RSUA reflected: "I was not prepared for the level of critical appraisal of research they expected here. My program taught us about evidence-based practice but never made us actually apply it daily" (NG-04).

Theme 3: Technology Proficiency Gap as an Emerging Crisis. Digital health literacy emerged as a critical and growing gap, particularly related to hospital information systems, electronic health records, and telehealth platforms. A nursing supervisor at RSUA observed: "The hospital upgraded to a fully electronic system two years ago, and every new graduate struggles. It takes three months minimum before they are proficient enough not to create errors" (NM-11). Graduates themselves acknowledged this gap, with one stating: "We used paper-based documentation throughout our clinical placement. Digital systems were completely foreign when I started working" (NG-06).

Theme 4: Collaborative Aspirations for Curriculum Reform. Despite their critiques, participants expressed strong optimism about the potential for hospital-academia collaboration to address identified gaps. Nursing directors from both hospitals indicated willingness to participate in joint curriculum review committees. A graduate expressed hope for structural change: "If the hospitals and universities worked together on what we actually need to learn, I think we would come out much more prepared. Right now it feels like they are two separate worlds" (NG-02).

Integration of Findings: Joint Display Analysis

Table 3 presents the joint display integrating quantitative competency gap findings with corresponding qualitative themes and participant quotations. The integration reveals predominantly convergent findings, where qualitative data confirm and contextually enrich the quantitative gap measurements. One area of divergence was observed in spiritual care competency: quantitative data indicated a minimal gap at RSI Malahayati, while qualitative data revealed a more nuanced practical performance gap not captured by the Likert-scale instrument.

Table 3. Joint Display: Integration of Quantitative and Qualitative Findings

Quantitative Finding	Statistical Result	Qualitative Theme	Participant Quotation	Integrated Interpretation
Largest overall gap: Digital Health Literacy	M gap = 2.11 (SD = 0.78), $p < 0.001$	Technology Proficiency Gap as Emerging Crisis	"Digital systems were completely foreign when I started working." (NG-06)	Quantitative severity confirmed by qualitative accounts of unpreparedness; gap driven by absence of digital tools in clinical training

Quantitative Finding	Statistical Result	Qualitative Theme	Participant Quotation	Integrated Interpretation
Clinical Decision-Making gap significant at both hospitals	M gap = 1.84, p < 0.001; RSI M: 1.76, RSUA: 1.93	Structural Disconnect Between Curriculum and Clinical Reality	"When a patient deteriorates, they freeze." (NM-02)	Statistical gap converges with qualitative theme of theory-practice disconnect; RSUA gap slightly higher reflecting greater clinical acuity demands
Evidence-Based Practice gap larger at RSUA	RSUA gap M = 1.93 vs RSI M = 1.54; p < 0.001	Institutional Culture and Competency Expectations	"My program taught EBP but never made us apply it daily." (NG-04)	Institutional mission difference explains divergence; RSUA's research-oriented culture creates higher EBP expectations not met by standard curricula
Spiritual Care: minimal gap at RSI Malahayati	RSI M gap = 0.42, vs RSUA = 1.15; p < 0.001	Institutional Culture: divergent finding	"They are uncomfortable doing it in practice." (NM-07)	Divergent finding: quantitative gap small but qualitative reveals practical performance gap; instrument may not capture applied spiritual care behavior

Note. EBP = Evidence-Based Practice; RSI M = RSI Malahayati; RSUA = Rumah Sakit Umum Advent. Integration strategy: connecting (Phase 1 results informed Phase 2 sampling); joint display reveals predominantly convergent findings with one divergent case in spiritual care.

DISCUSSION

This mixed-methods study provides robust evidence of significant competency gaps between Ners graduates and hospital labor market demands in North Sumatra, with digital health literacy, clinical decision-making, and evidence-based practice emerging as the most critical areas of deficit. These findings align with and extend the existing literature. Widyawati et al. (2022) similarly documented gaps in clinical reasoning among Indonesian Ners graduates, with their study reporting a mean gap score of 1.72, comparable to the present study's finding of 1.84. The slightly larger gap observed in this study may reflect the increasing complexity of clinical environments in tertiary hospitals following post-pandemic restructuring. Internationally, studies from Malaysia (Ahmad et al., 2021) and the Philippines (Reyes & Santos, 2022) report analogous challenges, suggesting that the theory-practice gap in nursing education is a pan-ASEAN phenomenon rooted in shared pedagogical traditions rather than country-specific deficits.

The significant institutional variation in competency expectations identified between RSI Malahayati and RSUA represents a novel finding with important practical implications. The pronounced gap in evidence-based practice at RSUA (M gap = 1.93) compared to RSI Malahayati (M gap = 1.54), confirmed through qualitative accounts of institutional culture, reflects the distinct mission-driven care philosophies of these hospitals. This finding challenges the assumption that competency frameworks can be uniformly applied across diverse hospital contexts. Harianto et al. (2021) noted that hospital-specific accreditation demands create differentiated competency profiles, a phenomenon this study has empirically demonstrated through integrated mixed-methods evidence. The relatively small gap in cultural and spiritual care at RSI Malahayati (M = 0.42) is encouraging, yet the divergent qualitative finding that practical application remains insufficient reveals an important limitation of self-report instruments in capturing behavioral competency.

The emergence of digital health literacy as the largest overall competency gap (M = 2.11) is particularly significant in the context of Indonesia's accelerating health system digitalization. The Ministry of Health's national health transformation agenda, launched in 2022, mandates full electronic health record adoption across hospital levels by 2026 (Ministry of Health of Indonesia, 2022). The current findings suggest that nursing education programs are critically behind this trajectory. Comparable findings from Vietnam (Nguyen et al., 2023) and Thailand (Srisuphan et al., 2022) indicate that digital health competency gaps among new nurses represent a regional healthcare quality risk that demands coordinated policy responses. The qualitative finding that graduates had no exposure to digital documentation systems during clinical placements represents a fundamental curriculum delivery failure that warrants immediate attention from nursing program accreditation bodies.

Practical Applications of the Findings

The findings of this study carry direct and actionable implications for nursing education, hospital human resource management, and health policy in North Sumatra. Nursing professional programs should immediately integrate structured digital health literacy modules into their core curricula, including hands-on simulation with hospital information systems used by accredited clinical placement partners. RSI Malahayati and RSUA should formalize structured preceptorship programs with competency milestone checkpoints at three, six, and twelve months post-employment, targeting the specific domains where gaps were largest. Hospital-academia partnership committees should be institutionalized through memoranda of understanding that mandate annual curriculum review sessions attended by clinical nursing supervisors from both hospitals. At the regional level, LLDIKTI Region I (the regional coordinator for private higher education in North Sumatra) should develop a standardized competency gap monitoring framework applicable across all nursing professional programs in the region, aligned with the national PPNI competency standards.

Limitations

This study has several limitations that should be considered when interpreting findings. First, the study was conducted at two hospitals in Medan city; while RSI Malahayati and RSUA represent institutionally diverse contexts, findings may not be fully generalizable to rural or remote hospital settings in North Sumatra where resource constraints create different competency demand profiles. Second, the use of self-reported competency assessments from nurses may introduce social desirability bias, potentially leading to underestimation of actual competency gaps. Third, the cross-sectional quantitative design captures competency gaps at a single time point and cannot determine whether gaps narrow over time with work experience. Fourth, the study did not include direct performance observation, limiting the ecological validity of competency gap measurements. Future research should employ longitudinal designs with objective performance assessments to track competency development trajectories and validate the findings of this study.

CONCLUSION

This explanatory sequential mixed-methods study has demonstrated that meaningful and statistically significant competency gaps exist between nursing professional graduates and the labor market demands of hospitals in North Sumatra. Digital health literacy, clinical decision-making, and interprofessional collaboration represent the most critical areas of deficit, while institutional

differences between RSI Malahayati and RSUA reveal that competency expectations are not uniform across hospital contexts. The integration of quantitative measurement with qualitative thematic exploration has produced a richer, more actionable understanding of the gap's origins and nature than either method could have achieved alone. Bridging these gaps requires urgent, collaborative action between nursing education institutions and hospital partners, supported by enabling policy frameworks at the regional and national levels, to ensure that Ners graduates are fully prepared to deliver safe, effective, and compassionate nursing care in North Sumatra's evolving healthcare landscape.

REFERENCES

Ahmad, Z., Rashid, A., & Karim, M. H. A. (2021). Competency gaps between nursing education and clinical practice in Malaysian hospitals: A cross-sectional study. BMC Nursing, 20(1), 134. https://doi.org/10.1186/s12912-021-00648-6

Becker, G. S. (1964). Human capital: A theoretical and empirical analysis, with special reference to education. National Bureau of Economic Research.

BPS North Sumatra. (2022). North Sumatra in figures 2022. Badan Pusat Statistik Provinsi Sumatera Utara.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.

Dubois, D. D., & Rothwell, W. J. (2004). Competency-based human resource management. Davies-Black Publishing.

Harahap, R. A. (2022). Institutional culture and nursing practice in faith-based hospitals of North Sumatra: An ethnographic perspective. Journal of Indonesian Health Sciences, 14(3), 215-228. https://doi.org/10.21109/jihs.v14i3.4821

Harianto, A., Nursalam, N., & Sukartini, T. (2021). Clinical reasoning and evidence-based practice competencies among Indonesian nursing graduates: A systematic review. Jurnal Ners, 16(2), 89-101. https://doi.org/10.20473/jn.v16i2.27491

Malterud, K., Siersma, V. D., & Guassora, A. D. (2016). Sample size in qualitative interview studies: Guided by information power. Qualitative Health Research, 26(13), 1753-1760. https://doi.org/10.1177/1049732315617444

Meretoja, R., Isoaho, H., & Leino-Kilpi, H. (2004). Nurse competence scale: Development and psychometric testing. Journal of Advanced Nursing, 47(2), 124-133. https://doi.org/10.1111/j.1365-2648.2004.03071.x

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

Ministry of Health of Indonesia. (2022). National health transformation agenda 2022-2026: Digital health transformation roadmap. Ministry of Health Republic of Indonesia.

Nguyen, T. T., Le, A. V., & Pham, H. T. (2023). Digital health competency gaps among newly graduated nurses in Vietnam: Implications for nursing education reform. Nurse Education Today, 121, 105703. https://doi.org/10.1016/j.nedt.2022.105703

Nursalam, N., Fibriansari, R. D., Yuwono, S. R., Hadi, M., Efendi, F., & Bushy, A. (2021). Development of an empowerment model for burnout syndrome and quality of nursing work life in Indonesia. International Journal of Nursing Sciences, 8(2), 149-155. https://doi.org/10.1016/j.ijnss.2021.01.007

Pratiwi, H., Efendi, F., & Haryanto, J. (2023). Digital health literacy and competency readiness among Ners graduates in Indonesia: A mixed-methods study. Jurnal Pendidikan Keperawatan Indonesia, 9(1), 11-24. https://doi.org/10.17509/jpki.v9i1.45021

Reyes, J. M., & Santos, C. A. (2022). Theory-practice gap in nursing education in the Philippines: Perceptions of nurse educators and clinical supervisors. Asia Pacific Journal of Multidisciplinary Research, 10(2), 55-63.

Simanjuntak, D. H., & Ginting, M. L. (2021). Hospital managers' perceptions of newly graduated nurse competencies in Medan: A qualitative study. Jurnal Keperawatan Sumatera Utara, 5(2), 45-58.

Srisuphan, W., Kunaviktikul, W., & Junprasert, S. (2022). Digital technology competency gap in nursing graduates: Evidence from Thai tertiary hospitals. Thai Journal of Nursing Research, 26(3), 178-191.

Widyawati, W., Nugroho, H. A., & Istanti, Y. P. (2022). Competency gap of nursing professional graduates in Indonesian hospitals: A quantitative study. Nurse Media Journal of Nursing, 12(1), 1-12. https://doi.org/10.14710/nmjn.v12i1.39562

World Health Organization. (2020). State of the world's nursing 2020: Investing in education, jobs and leadership. WHO Press. https://www.who.int/publications/i/item/9789240003279