

Predicting Clinical Skills Development Among Nursing Students: The Role of Personal, Instructional, Academic, and Clinical Environment Factors

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ABSTRACT

Modern day healthcare systems require nursing graduates to possess quality clinical competence, critical thinking, and flexibility. One way to improve competency-based nursing education is to understand what factors predict the development of clinical skills and prepare students to enter the workforce. The study explored and identified the predictors of clinical skills development of nursing students in private higher education institutions. This study adopted a quantitative cross-sectional predictive correlational framework to a population of 598 Level III and IV nursing students in three private HEIs in Iligan City, Philippines. A validated questionnaire developed by the researchers was used to measure predictors related to the personal, instructional, academic, and clinical environments, as well

as the development of clinical skills. At a 0.05 level of significance, descriptive statistics, Pearson correlation, and multiple regression were performed. High perceptions of predictors and indicators of clinical skills development were shown by all the nursing students. All predictors included in the study were significantly related to the clinical skills development. The strongest predictor of clinical skills development in the study was assessment, followed by self-efficacy, digital literacy, simulation exposure, and quality of supervision. Preparation for clinical practice was shown to be the result of a combination of quality academic and instructional support, as well as personal and clinical readiness. Assessment of clinical skills development is a complex process that includes a number of inter-related educational and personal components.

Keywords: *Clinical skills development; Nursing education; Clinical competence; Competency-based education; Clinical learning environment; Self-efficacy; Simulation-based learning; Digital literacy*

INTRODUCTION

Development of clinical skills has become a major focus of nursing education globally, with good reason. Competent nurses help to keep patients safe, improve the quality of healthcare, and help build effective healthcare systems. The delivery of care continues to evolve and become more complicated, and faster developing technologies are coupled with a changing population and a persistent shortage of nurses. All of these factors contribute to the demand for graduates who not only have an understanding of healthcare theory, but have the competence, confidence, and critical thinking skills necessary to practice safely. Even with the focus and financial commitment made on improving nursing education, there are still concerns that newly graduated nurses are unprepared to practice in the challenging, complex clinical situations. This has

lead to greater focus on evidence based teaching practices and the reform of competency based nursing education.

The focus of nursing education internationally has moved away from the teaching of theory and toward the teaching practices and competencies that consider learning outcomes, real life experiences, and the ongoing assessment of professional competence. The reforms that have been introduced value the clinical learning of nursing students and the relationships of numerous components, such as the characteristics of the learner, the intentional design of the instructional strategies, the quality of the teaching and learning clinical environments, and more. There is a need for an integrated educational ecosystem to motivate the clinical learning of nursing students and to make possible the numerous instructional strategies, rather than the use of a single strategy in isolation. Evidence based instructional reforms have shown that the clinical learning environment, self-efficacy, and instructional and academic support are key components of clinical competence.

This study also focused on the achievement of the United Nations Sustainable Development Goals (SDGs), specifically SDG 3 (Good Health and Well-being) and the provision of safe, quality, and patient-centered nursing care, and SDG 4 (Quality Education) by offering evidence toward the establishment of nursing education that is truly competency-based through the enhancement of the curriculum, teaching, assessment practices, and clinical education. The study also addresses SDG 17 (Partnerships for the Goals) through the acknowledgment that the development of clinical competence of nursing personnel requires collaborative efforts among the various stakeholders and nursing workforce planning.

Numerous studies explored nursing students' clinical competence: a) self-efficacy b) simulation, c) supervision, d) clinical learning environment. Few explore the simultaneous, the instructional, personal, academic, and clinical environment, and the predictive contribution they hold. It is important to know the strongest factors associated with the clinical development skills to consider these factors when designing educational interventions to enhance the clinical readiness of students, and to improve the outcomes of the nursing education.

This study aimed to identify the critical factors of clinical skills development of nursing students in private higher education by exploring the predictive roles of personal, instructional, and clinical and academic environment factors. It is presumed that recognizing these predictors will provide a basis for relevant curriculum design, teaching, and instructional and clinical staff enhancement, and clinical collaboration to produce competent, confident, and practice-ready nursing graduates who will meet the nation's health care needs and those of the global context.

Theoretical Framework

This research utilized the Competency-Based Education (CBE) Framework, which emphasizes the need for learner-focused design, real-world assessment, and active learning for the development of measurable competencies in the context of practice-ready nurses (Ten Cate, 2022). In this context, clinical competence is the result of the combined knowledge, skills, attitudes, and professional judgment developed through the integration of the formal and experiential learning opportunities of the educator and the learner.

According to this framework, personal attributes (e.g., self-efficacy, motivation, coping, and emotional resilience) influence students' readiness to and capacity for attaining clinical competence. Recent studies show that students possessing self-efficacy and resilience have confidence and a higher degree of critical thinking and clinical performance (Arribas-Marín et al., 2024; Shen, 2024). As for clinical factors, quality feedback, supervision, and exposure to simulation enhance competency development through guided learning that improves clinical judgment and execution of skills to perfection (Liu et al., 2024; Mashayekh et al., 2024; Uppor et al., 2024).

Related to clinical factors, the alignment of the curriculum, the assessment methods, and the students' digital literacy foster the integration of theoretical and clinical skills, enabling the acquisition of competencies that are relevant to the healthcare context (Alharbi & Almutairi, 2022). The clinical learning

environment, the supportive clinical educator, a desirable workload, and the provision of sufficient and appropriate resources offer and won't opportunities for the practicing learner to develop and enhance clinical skills, thus significantly affecting clinical competency (Hu et al., 2022; Workneh et al., 2024).

Within the bounds of the Competency-Based Education framework, this research suggests that nursing students' development of clinical skills regarding competence, confidence, procedural accuracy, and critical thinking, is contingent upon personal, instructional, academic, and clinical environmental factors. Using this framework allows us to address the practical aspects of preparing nursing graduates who are competent and ready for practice.

Statement of the Problem

The main aim of this study was to identify the main predictors of clinical skills development of nursing students in private higher education institutions. This study specifically sought to answer the following questions:

1. What are the levels of the following predictor variables among nursing students in terms of:
 - **Personal factors** (self-efficacy, motivation, coping, and emotional resilience);
 - **Instructional factors** (feedback, supervision quality, and simulation exposure);
 - **Academic factors** (curriculum alignment, assessment, and digital literacy); and
 - **Clinical environment factors** (preceptor leadership, workload, and resource availability)?
2. What is the level of clinical skills development among nursing students in terms of:
 - competence;
 - confidence;
 - procedural accuracy; and
 - critical thinking?
3. Is there a significant relationship between the predictor variables (personal, instructional, academic, and clinical environment factors) and clinical skills development among nursing students?
4. Which personal, instructional, academic, and clinical environment factors significantly predict clinical skills development among nursing students?

METHODS

Research Design

To accomplish the aim of this study, a quantitative, cross-sectional, predictive-correlational design was used. The design facilitated the analysis of the relationship among factors (personal, instructional, academic, and from the clinical environment) and their predictive ability on clinical skills development. The analysis of regression was conducted to understand the significant predictors of the outcome variable.

Participants and Setting

The study was conducted in three private higher education institutions in the Philippines that provide the Bachelor of Science in Nursing program. The study participants were Level III and Level IV nursing students who had undertaken or were undergoing clinical placements. This ensured that participants had had sufficient clinical exposure to assess the learning experience. The sample for the study comprised nursing students, with a total of 598 participants, who were available at the time of data collection. Students yet to undertake clinical exposure were not included in the study.

Research Instrument

The researcher-designed questionnaire aligned with the study's objectives and comprised five sections. This included measurement of personal (self-efficacy, motivation, coping, and emotional resilience), instructional (feedback, quality of supervision, and exposure to simulation), and academic (curriculum, assessment, and digital literacy) factors. Added to these were factors from the clinical

environment (leadership of the preceptor, workload, and resources) and development of clinical skills, measured in terms of competence, confidence, accuracy in the performance of skills, and critical thinking. Items were rated on a five-point Likert scale, with higher scores representing a positive perception of the factors. The questionnaire was validated by experts, and a reliability test was done through a pilot study before the actual research commenced.

Data Collection

After approval from the university's ethics review board and the management of the concerned institutions, eligible nursing students were invited to take part in the study. The purpose of the study was explained, and participants provided informed consent prior to the administration of the questionnaire. Participation was voluntary. Respondents were assured of the confidentiality of all information, which would be used solely for the purpose of the study.

Data Analysis

To analyze the perception of respondents toward the variables of the study, descriptive statistics such as frequency, percentage, weighted mean, and standard deviation were employed. Relationships between the predictor variables and clinical skills development were examined using Pearson product-moment correlation analysis. Thereafter, the personal, instructional, academic, and clinical environment factors that would be most likely related to clinical skills development were examined using multiple linear regression analysis. The significance level for all statistical computations was set at 0.05.

Ethical Considerations

This study was designed with full regard to the ethical standards of research involving human subjects. Approval from the university's Institutional Research Ethics Committee was sought prior to data collection. The research was based on voluntary participation, and both the consent and the data were anonymous and confidential. Participants' autonomy was safeguarded via an explanation of right to refuse to participate and right to withdrawal. Data were retained for the purpose of this research only, and it was kept in a secure location. AI tools were also utilized to polish the grammar and to validated citation references.

RESULTS

What is the level of students' Personal Factors in terms of:

Table 1. *Summary of the Level of students' Personal Factors*

Sub-variables	Mean	SD	Description	Interpretation
Self-efficacy	4.03	0.84	Agree	High
Motivation	4.26	0.63	Agree	High
Coping	4.28	0.65	Agree	High
Emotional Resilience	4.12	0.63	Agree	High
Overall	4.15	0.52	Agree	High

Legend:

Scale	Range	Description	Interpretation
5	4.51-5.00	Strongly Agree	Very High
4	3.51-4.50	Agree	High
3	2.51-3.50	Neutral	Moderately High
2	1.51-2.50	Disagree	Low
1	1.00-1.50	Strongly Disagree	Very Low

Table 1 summarizes how the personal factor of nursing students was gauged, providing a high average rating of personal factors (composite mean score $M = 4.15$, $SD = 0.52$). The highest ratings were given to coping ($M = 4.28$, $SD = 0.65$) and motivation ($M = 4.26$, $SD = 0.63$), which suggest that the stress students encounter related to clinical learning may be successfully coped with and that they remain dedicated to and involved with the clinical learning process. Self-efficacy ($M = 4.03$, $SD = 0.84$), and what was described as emotional resilience ($M = 4.12$, $SD = 0.63$) were also rated positively, but lower. This may imply that confidence and emotional recovery related to difficult clinical situations need to be further developed and will result in higher ratings of these constructs.

The personal attributes of nursing students were described as an important element concerning the development of the clinical learning process and adaptability. Earlier research revealed that coping, motivation, and developed emotional resilience are important for learning and clinical performance, while self-efficacy and emotional resilience contributed to persistence and the ability to face clinical challenges (Alharbi, 2020; Berdida & Grande, 2022; Choi et al., 2023; Ortiz et al., 2024; Shen, 2024). Providing an overall rating, the personal attributes of nursing students demonstrate a strong basis for the attainment of clinical competence.

What is the level of students' Instructional Factors in terms of :

Table 2. *Summary of the Level of students' of Instructional Factors*

Sub-variables	Mean	SD	Description	Interpretation
Feedback	4.30	0.69	Agree	High
Supervision Quality	4.33	0.58	Agree	High
Simulation Exposure	4.26	0.68	Agree	High
Overall	4.29	0.54	Agree	High

Legend:

Scale	Range	Description	Interpretation
5	4.51-5.00	Strongly Agree	Very High
4	3.51-4.50	Agree	High
3	2.51-3.50	Neutral	Moderately High
2	1.51-2.50	Disagree	Low
1	1.00-1.50	Strongly Disagree	Very Low

Overall, the instructional factors were assessed at a high level, as shown in Table 2, with a composite mean of 4.29 ($SD = 0.54$). This indicated that students generally perceived their learning environment as supportive, structured, and effective in facilitating their clinical development. Such a learning environment plays a crucial role in bridging the gap between theory and practice, allowing students to translate knowledge into clinical competence. This finding is consistent with previous studies which emphasized that well-organized instructional strategies enhance student engagement, confidence, and performance in clinical settings (Cant & Cooper, 2020). Similarly, Forbes et al. (2022) highlighted that effective instructional design, particularly when combined with feedback and supervision, promotes self-regulated learning and continuous improvement.

Among the three components, supervision quality obtained the highest mean score ($M = 4.33$), indicating that students greatly benefited from the presence of clinical instructors who provided consistent guidance, clear direction, and meaningful feedback. This suggests that supervision is a central element in clinical education, as it offers students the necessary support when performing unfamiliar or complex procedures. Supportive supervision helps reduce anxiety, strengthen confidence, and encourage active participation in clinical tasks. This finding aligns with Zhang et al. (2022), who emphasized that effective supervision enhances clinical performance and builds students' confidence. In a similar context, Shahzeydi et al. (2024) reported that structured supervision improves students' ability to apply the nursing process and

make sound clinical decisions. Moreover, Brown et al. (2021) found that approachable and supportive instructors create a positive learning atmosphere, enabling students to engage more actively and confidently in clinical practice. Mathisen et al. (2025) further highlighted that trained facilitators and preceptors play a vital role in guiding students and ensuring that learning experiences are meaningful and aligned with professional standards.

In contrast, simulation exposure recorded the lowest mean ($M = 4.26$), although it still fell within the high category. This implies that while simulation activities were beneficial, there remains room for further enhancement. Simulation is widely recognized as an essential instructional strategy that allows students to practice skills, make decisions, and experience clinical scenarios in a safe and controlled environment. McGaghie et al. (2022) emphasized that simulation-based education improves clinical competence through repeated and deliberate practice. Likewise, Nguyen et al. (2023) highlighted the importance of simulation combined with debriefing in strengthening critical thinking and reflective learning. Tseng et al. (2021) further noted that extended and repeated simulation exposure leads to improved skill mastery and confidence among students. These findings suggest that increasing the frequency, duration, and realism of simulation activities can further enhance students' preparedness for real clinical situations.

The overall high ratings across all instructional dimensions indicated that students experienced a positive and effective instructional environment. Consistent supervision, timely and constructive feedback, and engaging learning strategies all contribute to deeper understanding, improved performance, and stronger clinical judgment. Research has shown that when these instructional elements are combined, students demonstrate higher levels of confidence, competence, and readiness for professional practice (Cant & Cooper, 2020; Forbes et al., 2022).

In summary, while the current instructional practices were already strong, there remained opportunities for further refinement, particularly in enhancing simulation exposure. Maintaining high-quality supervision and feedback while expanding and improving simulation-based learning can provide a more comprehensive and balanced clinical education. Strengthening these areas will not only improve students' competence and confidence but also better prepare them to respond effectively to the complex and dynamic demands of healthcare practice.

What is the level of students' Academic Factors in terms of:

Table 3. *Summary of the Level of students' Academic Factors*

Sub-variables	Mean	SD	Description	Interpretation
Curriculum Alignment	4.33	0.67	Agree	High
Assessment	4.27	0.63	Agree	High
Digital Accuracy	4.20	0.67	Agree	High
Overall	4.27	0.56	Agree	High

Legend:

Scale	Range	Description	Interpretation
5	4.51-5.00	Strongly Agree	Very High
4	3.51-4.50	Agree	High
3	2.51-3.50	Neutral	Moderately High
2	1.51-2.50	Disagree	Low
1	1.00-1.50	Strongly Disagree	Very Low

Overall, academic factors were rated at a high level, with a composite mean of 4.27 ($SD = 0.56$), as presented in Table 3. This indicates that students generally viewed their academic preparation as

organized, relevant, and supportive of their clinical learning. Among the indicators, curriculum alignment obtained the highest mean ($M = 4.33$), suggesting that the structure and content of the curriculum were clearly connected to the competencies required in actual clinical practice. This strong alignment likely helped students understand how theoretical concepts are translated into real patient care, making learning more meaningful and easier to apply. Literature supports this observation, emphasizing that when curriculum design, teaching strategies, and assessments are aligned, students demonstrate better integration of knowledge and improved clinical performance (Biggs & Tang, 2021; Chang et al., 2022). In addition, assessment strategies that are aligned with learning outcomes—such as competency-based evaluations and structured clinical assessments help students refine their skills, recognize areas for improvement, and build confidence in their performance (Arribas-Marín et al., 2024; Azad et al., 2025).

On the other hand, digital literacy received the lowest mean ($M = 4.20$), although it still fell within the high range. This suggests that while students are capable of using technology in their academic work, their skills may not yet be fully developed for the demands of modern healthcare settings. Current studies highlight that digital literacy extends beyond basic computer use and includes the ability to navigate electronic health records, utilize simulation technologies, and access evidence-based information effectively. Students with stronger digital competence are more confident and efficient in performing clinical tasks, particularly in technology-driven environments (Alharbi & Almutairi, 2022; Nguyen et al., 2023). Integrating digital tools into teaching and learning processes, as well as providing opportunities for hands-on practice with healthcare technologies, can strengthen students' readiness for clinical practice (Henderson et al., 2021; O'Connor et al., 2021).

What is the level of students' Clinical Environment Factors in terms of:

Table 4. *Summary of the Level of students' Clinical Environment*

Sub-variables	Mean	SD	Description	Interpretation
Preceptor leadership	4.26	0.65	Agree	High
Workload	4.20	0.61	Agree	High
Resource availability	4.18	0.60	Agree	High
Overall	4.21	0.55	Agree	High

Legend:

Scale	Range	Description	Interpretation
5	4.51-5.00	Strongly Agree	Very High
4	3.51-4.50	Agree	High
3	2.51-3.50	Neutral	Moderately High
2	1.51-2.50	Disagree	Low
1	1.00-1.50	Strongly Disagree	Very Low

Overall, clinical environment factors were rated at a high level, with a composite mean of 4.21 ($SD = 0.55$), indicating that students generally experienced a supportive and conducive setting for clinical learning. This suggests that the clinical environment provided opportunities for students to practice skills, receive guidance, and engage meaningfully in patient care. Among the components, preceptor leadership ranked highest ($M = 4.26$), showing that students greatly benefited from clear direction, consistent supervision, and supportive mentorship. This implies that the presence of competent and approachable preceptors played a significant role in helping students feel confident, guided, and capable when performing clinical tasks. This finding is supported by Zhang et al. (2022), who emphasized that effective preceptor leadership enhances students' clinical competence and confidence. Similarly, Levett-Jones et al. (2022) highlighted that strong mentorship improves clinical decision-making and supports the integration of theory into practice. In addition, Mathisen et al. (2025) noted that trained preceptors act as facilitators of learning

by bridging academic knowledge and clinical application, while Forbes et al. (2022) emphasized that supervision and mentorship contribute to skill development and professional growth. These studies collectively reinforce the importance of leadership and guidance in shaping students' clinical competence .

On the other hand, resource availability obtained the lowest mean ($M = 4.18$), although it still fell within the high category. This suggests that while essential materials were generally accessible, there may be inconsistencies in access to more advanced tools and equipment. Adequate resources are crucial in enabling students to practice safely, repeat procedures, and gain exposure to real clinical tools and technologies. This finding aligns with Shahzeydi et al. (2024), who emphasized that sufficient resources enhance both learning outcomes and patient safety. Similarly, Workneh et al. (2024) highlighted that access to modern equipment and technology improves students' competence and readiness for contemporary healthcare settings. Alharbi and Almutairi (2022) further noted that exposure to digital and technological resources strengthens students' engagement and ability to adapt to evolving healthcare systems. These findings suggest that while foundational resources are present, enhancing access to advanced tools can further improve clinical learning experiences .

The findings also indicated that the clinical environment played a significant role in shaping students' competence, as both preceptor support and resource availability directly influenced learning outcomes. A supportive and well-structured clinical setting allows students to apply knowledge, develop skills, and build confidence through guided practice. This is consistent with Hu et al. (2022), who reported that positive clinical environments significantly improve students' confidence, engagement, and overall performance.

Overall, the findings confirmed that clinical environment factors were rated high, indicating that students experienced a generally supportive setting for clinical learning. Preceptor leadership emerged as the strongest component, underscoring the importance of guidance, mentorship, and supervision in building students' confidence and competence. In contrast, resource availability, although still high, was relatively lower, suggesting the need to improve access to advanced tools and equipment. These results highlight that while the clinical environment is already effective, further strengthening resource availability alongside sustained high-quality supervision can enhance clinical learning outcomes.

What is the level of students' perceived Clinical Skills Development in terms of:

Table 5. *Summary of the Level of students' Clinical Skills*

Sub-variables	Mean	SD	Description	Interpretation
Competence	4.23	0.63	Agree	High
Confidence	4.23	0.63	Agree	High
Procedural Accuracy	4.18	0.70	Agree	High
Critical Thinking	4.13	0.62	Agree	High
Overall	4.19	0.57	Agree	High

Legend:

Scale	Range	Description	Interpretation
5	4.51-5.00	Strongly Agree	Very High
4	3.51-4.50	Agree	High
3	2.51-3.50	Neutral	Moderately High
2	1.51-2.50	Disagree	Low
1	1.00-1.50	Strongly Disagree	Very Low

Overall, clinical skills development was rated at a high level, with a composite mean of 4.19 ($SD = 0.57$), as shown in Table 5. This indicated that students were generally well-prepared to perform clinical tasks and demonstrated a satisfactory level of readiness for practice. Competence and confidence obtained

the highest means ($M = 4.23$), suggesting that students were able to carry out procedures effectively while maintaining a strong sense of self-assurance in clinical settings. This implies that students have developed a solid foundation in technical skills and are capable of applying learned procedures with accuracy and consistency. Their confidence further supports active engagement in clinical tasks, enabling them to participate more fully in patient care and respond appropriately in routine situations. This finding aligns with Koukourikos et al. (2021), who reported that simulation-based learning enhances both competence and confidence by providing a safe space for practice and skill refinement. Similarly, Uppor et al. (2024) emphasized that repeated exposure and guided practice improve students' technical proficiency and confidence in performing procedures. In addition, Cant and Cooper (2020) highlighted that simulation and structured clinical experiences strengthen skill mastery and performance, while Forbes et al. (2022) noted that feedback and supervision reinforce students' abilities and self-assurance. These studies suggest that competence and confidence develop through continuous practice, guided learning, and supportive clinical environments .

Moreover, competence and confidence are closely interconnected, as students who are skilled in performing procedures are more likely to feel confident in their abilities. Research has shown that students who receive consistent supervision, feedback, and opportunities for hands-on practice tend to demonstrate higher levels of engagement, improved performance, and greater readiness for professional roles (Cant & Cooper, 2020; Forbes et al., 2022). This reinforces the importance of integrating experiential learning and supportive instruction in developing clinical skills .

In contrast, critical thinking obtained the lowest mean ($M = 4.13$), although it still remained within the high range. This indicates that while students were competent and confident in performing tasks, higher-order cognitive skills such as analyzing complex situations, making clinical judgments, and responding to unpredictable scenarios were still developing. This finding supports Nguyen et al. (2023) who highlighted that simulation combined with debriefing enhances students' ability to think critically by allowing them to reflect on their decisions and improve their responses in future scenarios. Choi et al. (2023) also found that repeated exposure to varied clinical situations enhances decision-making and adaptability, which are essential components of critical thinking. These studies suggest that higher-level cognitive skills develop progressively through continuous practice, reflection, and engagement in complex clinical experiences .

Overall, the findings indicated that students demonstrated a high level of clinical skills development, particularly in competence and confidence, which are essential for safe and effective patient care. However, the relatively lower level of critical thinking suggested that there is still a need to strengthen students' ability to analyze, adapt, and make decisions in complex and unpredictable situations. Providing more opportunities for case-based learning, simulation of complex scenarios, and guided reflection can further enhance clinical reasoning and decision-making skills. By integrating these strategies, educational institutions can support the development of well-rounded, competent, and critically thinking nursing professionals.

Is there a significant relationship between Clinical Skills Development and;

- 6.1. Personal Factors;
- 6.2. Instructional Factors;
- 6.3. Academic Factors; and
- 6.4. Clinical Environment Factors?

There is no significant relationship between Clinical Skills Development and Personal Factors, Instructional Factors, Academic Factors, and Clinical Environment. Factors.

Table 6. *Correlations Among Personal, Instructional, Academic, and Clinical Environment Factors and Clinical Skills Development*

Variable	R-Value	p-Value	Interpretation
Personal	0.668	0.000**	Significant
Feedback	0.581	0.000**	Significant
Supervision quality	0.596	0.000**	Significant
Simulation exposure	0.544	0.000**	Significant
Instructional	0.654	0.000**	Significant
Curriculum alignment	0.510	0.000**	Significant
Assessment	0.609	0.000**	Significant
Digital literacy	0.566	0.000**	Significant
Academics	0.657	0.000**	Significant
Preceptor leadership	0.621	0.000**	Significant
Workload	0.712	0.000**	Significant
Clinical environment	0.747	0.000**	Significant

Legend: * Significant at $p < .05$; ** Significant at $p < .01$

According to Table 23, nursing students were positive about their opportunities for the development of clinical skills ($M = 4.19$, $SD = 0.57$). This positive feedback shows that students were likely to be ready to undertake clinical duties. Within the domains, the highest average ratings were for competence and confidence ($M = 4.23$), which show that students believed that they were able to undertake clinical functions and clinical tasks with confidence. On the other hand, the lowest average score was for critical thinking ($M = 4.13$), which was still rated as high. This indicates that higher-order clinical thinking and clinical judgment will continue to grow with more exposure to clinical practice.

The results show that there are numerous opportunities for students to gain practice in clinical skills, including clinical practice, simulations, and organized clinical teaching. Previous research has demonstrated that practice-based learning, guided practice, and purposeful feedback improve competence, confidence, and ability to perform clinical procedures (Cant & Cooper, 2020; Koukourikos et al., 2021; Uppor et al., 2024). The relative lower score for critical thinking is affirmed by research that clinical judgment and clinical reasoning are developed by the integration of reflective practice, clinical practice of varying degrees of complexity and oversight (Choi et al., 2023; Nguyen et al., 2023; Sweet & Broadbent, 2017). These findings indicate that while nursing students display confidence and high clinical skills, there is a need to focus on developing critical thinking.

What variable singly or in combination, best predict Clinical Skills Development of nursing students?

There is no single or combined variables that best predicts Clinical Skills Development of nursing students

Table 7. *Summary of Multiple Regression Analysis for Clinical Skills Development*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Interpretation
	B	Std. Error	Beta			
(Constant)	0.226	0.13		1.739	0.083	Not Significant
Assessment	0.329	0.035	0.35	9.281	0	Significant

Digital Literacy	0.128	0.036	0.134	3.54	0	Significant
Self Efficacy	0.308	0.034	0.28	8.951	0	Significant
Simulation Exposure	0.094	0.028	0.111	3.323	0.001	Significant
Supervision Quality	0.098	0.037	0.099	2.632	0.009	Significant
a. Dependent Variable: Clinical Skills Development						

Statistic	Value
R	0.796
R Square (R ²)	0.634
F-value	204.682
Significance (p-value)	0.000

Results of the multiple regression analysis can be found in Table 25. The model showed a significant prediction of clinical skills development and explained 63.4% of the variance ($R^2 = 0.634$). Among the predictors, the remaining order of importance included self-efficacy, digital literacy, simulation exposure, and the quality of supervision. These results suggest that academic, personal, and instructional factors all affect the clinical competency of nursing students.

This study reinforces the critical role of competent, criterion-referenced assessment of clinical performance along with supportive instructional guidance in the development of nursing students' clinical skills (Arribas-Marín et al., 2024; Biggs & Tang, 2021; Cant & Cooper, 2020). The role of self-efficacy, digital literacy, and exposure to simulation also add to the supportive instructional guidance along with the experiential learning of nursing students (Alharbi & Almutairi, 2022; McGaghie et al., 2022; Shen, 2024). While the quality of supervision had the smallest predictive effect, its role along with the other instructional factors was important in providing constructive guidance and confidence to nursing students (Mashayekh et al., 2024; Zhang et al., 2022).

The results further justify the rejection of the null hypothesis. The outcome of the study suggests the need to reframe the instructional design of nursing education to integrate assessment and instructional factors to transform unprepared graduates to fully competent nursing practitioners.

DISCUSSION

The study illustrates that the development of clinical skills is a product of personal, instructional, academic, and clinical environment factors, with the regression model capturing 63.4% of the variation in clinical skills development. It is evident from the study, that the development of nursing skills and competencies is the best achieved using an integrated educational model and approach, rather than having stand-alone or fragmented educational activities.

Assessment, among the contributors, was the strongest predictor. This finding points to the necessity for learning, assessment of competencies, and assessment for improvement to be framed within the context of genuine, authentic, and performance-oriented assessments. The study findings advocate for the inclusion of objective structured clinical examinations (OSCE), simulation-based assessments, and reflective-based assessments in the nursing curriculum.

Development of clinical skills was also predicted by self-efficacy. This indicates that the possession of self-efficacy by students influences the degree to which students participate in the practice of clinical work. Consequently, the role of the nursing educator is to promote the self-efficacy of the students by the design of learning activities of appropriate difficulty, provision of feedback, and practice of clinical work.

While the quality of supervision represented the weakest predictor, its predictive significance was not negligible. This reinforces the critical importance of mentorship, feedback, and clinical instruction. The primary focus should be directed toward the sustained professional development of faculty and clinical preceptors as end result of strong and effective partnerships between the academics and the clinicians.

From the perspective of educational management, these findings encourage investing in competency-based assessment systems, the development of faculty, simulation, and digital-based learning resources. Quality assurance frameworks should examine assessment practices and check the efficacy of teaching, the quality of supervision, and the adequacy of clinical learning resources. This ensures the systematic preparation of nursing graduates who are competent, confident, practice-ready, and equipped to meet the changing healthcare requirements.

Recommendation

Based on the findings of the study, the following recommendations are proposed:

1. Nursing schools should strengthen competency-based assessment through performance-based evaluations, OSCEs, and formative feedback to enhance clinical skills development.
2. Faculty members and clinical instructors should implement strategies that improve students' self-efficacy by providing constructive feedback, guided practice, and reflective learning experiences.
3. Higher education institutions should expand simulation-based learning and digital learning resources to improve students' clinical competence and technology readiness.
4. Academic administrators should provide continuous training for clinical instructors and preceptors to strengthen supervision, mentoring, and clinical teaching practices.
5. Nursing programs should regularly review and align the curriculum, assessment, and clinical learning experiences with competency-based education and current healthcare standards.
6. Future studies should validate the identified predictors in other institutions and examine additional variables that may influence clinical skills development among nursing students

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