

Analysis of Predictor Factors Affecting Nursing Students' Licensure Examination Achievement in Indonesia

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DOI: 10.18226/25253824.v10.n15.01

Submitted on: 10/22/2025 Reviewed on: 12/15/2025 Accepted on: 12/21/2025

Abstract: In Indonesia, nursing education is divided into two levels: a four-year academic program with a Bachelor of Nursing (BSN) degree and a one-year professional program with a Ners (NS) degree, both of which require students to pass a competency test. This study aimed to determine the key factors influencing nursing students' success in the Indonesian Nursing Licensure Examination. This study used a cross-sectional design. Data from 351 respondents were analyzed using logistic regression. Several factors, including gender, age, region of origin, high school of origin, Grade Point Average (GPA), and professional-level GPA, were analyzed. The total number of nursing students who passed the competency test was 94.4% on the first exam. This study found that age ($p = 0.854$), region of origin ($p = 0.377$), gender ($p = 0.084$), and previous education ($p = 0.850$) were not correlated with students' competency scores. A significant positive correlation was shown between GPA and Nursing Competency Test scores ($p = 0.000$). Professional education GPA is the most important factor influencing the performance and quality of institutions and students in the Indonesian Nursing Licensure Examination (INLE).

Keywords: Predictor factors, Indonesian Nursing Licensure Examination, Nursing students'

Resumo: Na Indonésia, a educação em enfermagem é dividida em dois níveis: um programa acadêmico de quatro anos com um diploma de Bacharel em Enfermagem (BSN) e um programa profissional de um ano com um diploma de Ners (NS), ambos os quais exigem que os alunos sejam aprovados em um teste de competência. Este estudo teve como objetivo determinar os principais fatores que influenciam o sucesso dos alunos de enfermagem no Exame de Licenciamento de Enfermagem da Indonésia. Este estudo utilizou um delineamento transversal. Dados de 351 entrevistados foram analisados usando regressão logística. Vários fatores, incluindo gênero, idade, região de origem, ensino médio de origem, Média de Pontos de Nota (GPA) e GPA de nível profissional, foram analisados. O número total de alunos de enfermagem que passaram no teste de competência foi de 94,4% no primeiro exame. Este estudo descobriu que idade ($p = 0,854$), região de origem ($p = 0,377$), gênero ($p = 0,084$) e educação anterior ($p = 0,850$) não foram correlacionados com as pontuações de competência dos alunos. Foi demonstrada uma correlação positiva significativa entre o GPA e as pontuações do Teste de Competência em Enfermagem ($p = 0,000$). O GPA da educação profissional é o fator mais importante que influencia o desempenho e a qualidade das instituições e dos alunos no Exame de Licenciamento em Enfermagem da Indonésia (INLE).

Keywords: Fatores preditores, Exame de Licenciamento de Enfermagem da Indonésia, Estudantes de Enfermagem

1. Introduction

Indonesia's Nursing Law Number 14 of 2014 requires competency assessments for nursing students. Therefore, educational institutions need to prepare their students for the national competency exam. The results of the competency exam reflect the quality of the nursing education institution. The Indonesian government has issued Minister of Health Regulation Number 1796 of 2011, which regulates the registration of healthcare workers to ensure that every nurse possesses the required competencies before practicing nursing services.

All healthcare workers, including nurses, are required to undergo a competency exam to obtain a registration certificate, according to the ministerial regulation. The competency exam is a procedure used to assess knowledge, skills, and attitudes in accordance with professional standards, ensuring that individuals can safely and effectively carry out their professional duties in the community. Competency testing is a procedure used to assess knowledge, skills and attitudes in accordance with professional standards, to ensure that individuals can carry out their professional duties in the community safely and effectively [1, 2].

Nurses and other healthcare professionals must pass a competency test and present their Certificate of Competency before they can work in healthcare. Statistics show that the national competency test results are still below 50 %. This is another problem faced by many nursing educational institutions in Indonesia, particularly in Yogyakarta. Various factors contribute to competency test success, such as the student, the institution, and the provider of the competency test. Educational institutions, both academic and clinical, must be able to estimate students' capacity to pass the competency test using characteristics such as student GPA components, student motivation, and learning models. Consequently, the purpose of this study was to identify key factors influencing nursing students' success in passing the Indonesian Nursing Licensure Examination (INLE). They identified the need to "collect more empirical data describing the variables contributing to the success or failure of the INLE and its implications for early intervention." The review indicated that grade point average (GPA) in nursing and science courses was the largest cognitive predictor of student success. The largest demographic predictors were age and parental education [3, 4].

The Performance Nursing Licensure Examination (PNLE) reflects the state of nursing education in the country. Nursing

programs should strive to offer educational experiences that train graduates toward competency. Passing the INLE provides evidence that nursing graduates have learned the fundamental competencies and functions necessary to practice the nursing profession and be awarded the title of registered nurse nationally. This study concluded that students at risk of failing the INLE can be predicted, which should enable interventions to be implemented to minimize this risk. The earlier these students are identified, the more likely interventions will help them achieve success [3].

This study will examine the relationship between nursing training institution performance, prior education, and sociodemographic characteristics on performance on the licensure examination. Empirical evidence is needed to inform policies to address the current unacceptable failure rate on the licensure examination. We hypothesize that nursing training performance, prior education, and background characteristics of nursing students may influence their performance on the licensure examination. Prior education and sociodemographic factors are collectively referred to as entry characteristics for the purposes of this study [5, 6].

2. Material and Methods

2.1. Study Design

This study employed a cross-sectional method. A cross-sectional descriptive study was used to analyze factors affecting Nursing Students' Licensure Examination Achievement from August 2019 to September 2020 after obtaining informed consent from the students.

2.2. Participants and Sampling

Respondents in this study included all nursing students at Muhammadiyah University of Yogyakarta who took the competency test between 2019 and 2020, a total of 351 nursing students. The sampling technique used was total sampling.

2.3. Data Collection

The respondents who agreed to participate in this study's data entry were enrolled in Universitas Muhammadiyah Yogyakarta's nursing studies program. The data of cumulative value index were obtained from the academic teaching sections, while the professional GPA and competency test scores were taken from the profession level. Logistic regression was used to examine the data that were acquired.

2.4. Data Analysis

The data obtained were analyzed by correlation and regression (logistic regression) using statistical software. A logistic regression model was fitted to further look at the relationship between Academic and Clinical rotation GPA, sociodemographic characteristics, and previous education on the odds of passing the licensure examinations. The variables considered in the model

were gender, age, the origin, entry category into nursing (high school), academic GPA and GPA Clinical Rotation. All statistical significances were tested at p value of <0.05 .

3. Results

3.1. Characteristics of the respondents

This study included 351 students from classes 2019 to 2020 who had undergone a nursing competency test. Most respondents (78.9%) were female ($p = 0.06$), from Java (60.1%), and from public high schools (70.9%).

Table 1. Description of the background characteristics of the respondents

Variable	N = 351 (%)	INLE Performance		<i>p</i>
		Pass (%)	Fail (%)	
Gender				
Male	74 (21.1)	66 (91.2)	8 (10.8)	0.06
Female	277 (78.9)	254 (91.7)	23 (8.3)	
Origin				
Java Island	211 (60.1)	194 (91.9)	17 (8.1)	1
Not Java Island	140 (39.9)	130 (92.8)	10 (7.1)	
High School				
Public School	249 (70.9)	237 (95.2)	12 (4.8)	0.1
Private School	102 (29.1)	91 (89.2)	11 (10.8)	

Table 1 shows that the majority of respondents in this study were female (78.9%) and aged 20–25 years (98.3%). Furthermore, the majority came from public schools (70.9%). These findings indicate that the respondents' basic characteristics were relatively homogeneous, particularly in terms of age and gender.

3.2. Correlation Analysis

Table 2 shows that the correlation study between sociodemographic and age has a correlation value ($p = 0.64$), whereas sociodemographic and GPA at the academic and clinical stages is equal to the value ($p = 0.00$). The link between the nurse competency test scores and the predictor variables is shown in Table 4, with the results indicating that the Clinical GPA has a substantial positive value when compared to the other predictor variables.

Table 2. Correlation between sociodemographic (N = 351)

Variable	Mean (SD)		P
	Pass	Fail	
Age	23.52 ± 0.862	23.92 ± 1.294	0.64
Academic GPA	3.18 ± 0.27	2.79 ± 0.22	0.00
GPA Clinical Rotation	3.28 ± 0.22	2.95 ± 0.17	0.00

The analysis results showed that the average age was almost the same between those who passed (23.52 years) and those who failed (23.92 years), so that the age factor did not have a significant effect ($p = 0.64$) indicating that sociodemographic factors such as age do not have a significant influence on student success in the nursing licensure exam. The average age of students who passed (23.52 years) and failed (23.92 years) was almost the same, so it can be concluded that age is not a major predictor of graduation. In contrast, the average academic GPA and clinical GPA showed a significant difference between the passing and failing groups. Students who passed had an average academic GPA of 3.18 ± 0.27 and a clinical GPA of 3.28 ± 0.22 while those who failed only had 2.79 ± 0.22 and 2.95 ± 0.17 , respectively. This confirms that academic achievement, both at the academic and clinical stages, is an important factor related to student performance in the INLE.

3.2. Regression Analysis

Logistic regression analysis of all the main factors (predictors) showed that the GPA at the educational stage at the clinic had a value ($p = 0.000$) with an odds ratio of 2173.95 (Table 3).

Table 3. Correlations between Performance Nursing Licensure Examination (PNLE) and the factors associated PNLE (N = 351)

Variable	PNLE	Gender	Age	Previous School	Origin	GPA Academic
Gender	.123					
Age	-0.066	-0.125				
Previous school	-0.104	-0.036	.002			
Origin	-0.015	-0.007	.069	.017		
GPA academic	.307**	0.205**	*	-0.092	-0.036	
GPA clinic	.319**	0.196**	-0.148*	-0.100	-0.020	.948

Figure 1. Correlation of Factors with INLE Performance

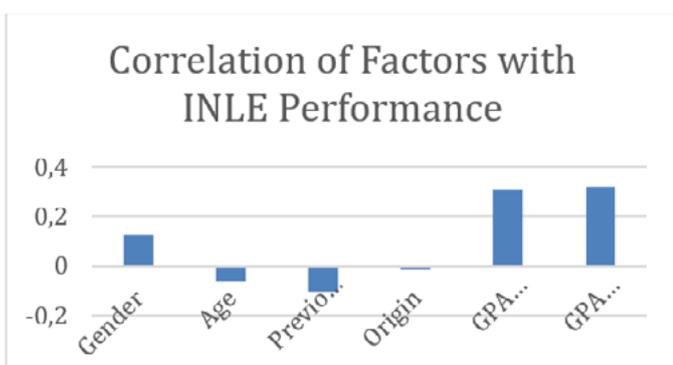


Figure 1 shows the strength of the relationship between various predictor factors and licensure exam results. The highest correlation values were demonstrated by clinical GPA (0.319) and academic GPA (0.307), indicating that the higher the GPA, the greater the student's chance of passing the competency exam. Conversely, sociodemographic factors such as gender (0.123), age (-0.066), school of origin (-0.104), and region of origin (-0.015) showed weak, even negative, correlations and were not statistically significant. These results indicate that academic factors play a greater role in determining graduation than personal background or previous education.

Table 4. Logistic regression analysis of predictor variable on the performance in nursing licensing examinations

Predictor Variable	Odds Ratio	95% CI for EXP(B)		P
		Lower	Higher	
Gender	0.308	0.081	1.173	0.084
Age	0.934	0.448	1.945	0.854
Origin	1.782	0.494	6.418	0.377
Previous School	0.884	0.247	3.160	0.850
Clinic GPA	2173.951	48.653	97137.483	0.000

Table 4 shows the relationship between nursing competency test scores and predictor variables. The analysis shows that clinical GPA has the strongest and most significant positive value compared to other predictor variables. Thus, clinical GPA can be considered a primary factor determining student success on the competency test.

Figure 2. Logistic Regression Analysis of Predictor Variables

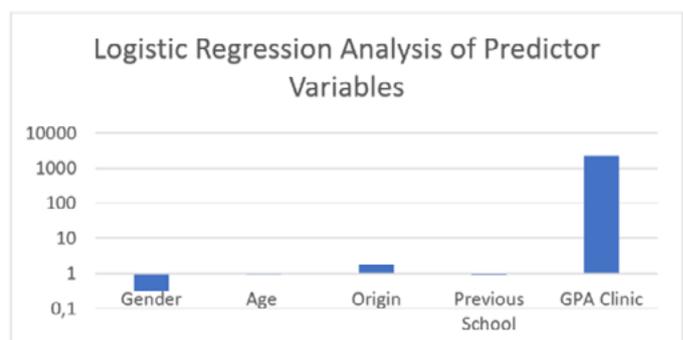


Figure 2 shows the results of logistic regression with Odds Ratio as an indicator of predictive strength. The analysis results show that clinical GPA is the most dominant factor in influencing graduation, with an Odds Ratio of 2173.95 and significant at $p < 0.001$. This means that a small increase in clinical GPA can drastically increase a student's chances of passing the nursing licensure exam. Meanwhile, other variables such as gender, age, school of origin, and region of origin did not have a significant influence, with Odds Ratio values approaching 1 and p values > 0.05 . This confirms the conclusion that Clinical GPA is the main determinant of student success in taking the exam.

4. Discussion

The purpose of this study was to identify predictors of success on the PNLE for baccalaureate nursing graduates. With 351 subjects, this is one of the largest studies of NLE performance by baccalaureate graduates taking the post-2019 to 2020. The results indicate that data collected before admission to the upper-division major and data obtained during the junior and senior years of study can be used to predict performance on the PNLE. Because many programs select their students for the upper-division major during the sophomore year, identifying predictors at this level helps admission committees select students who will be successful in the program and will also pass the PNLE. Also, identifying at-risk students as early as possible gives faculty the opportunity to implement remediation sooner

Table 1 shows the students' demographics. The majority, 78.9% of all respondents were female, and 98.3% were between the ages of 20 and 25 years. Most children (70.9%) attended public school. Of the participants, 94.4% passed certain assessments (academic GPA) and clinic, students were highly satisfied with the result (71.1% and 79.7%, respectively). Non-academic or demographic characteristics of students have been cited as important variables in predicting academic performance of the students, Majority of the respondents were females and were between the ages of 25 and 31 years [7, 8].

There were 320 graduate students who passed the Nursing Licensure Examination (NLE) on the first attempt (94%). Women made up the majority of the graduate students (91.7%) and 60.1% came from Java Island. The average age of the graduate students who passed the exam is 23.52 years, with a standard deviation of 0.862. The average age of graduate students who failed the exam showed no significant variation (mean, 23.92; standard deviation 1.29). We also looked at past graduate schools, whether they were public or private. Nearly 70.9% of all the graduate students came from public schools, with the remaining coming from private institutions; nonetheless, there was no distinctive difference between the two groups. The univariable analysis of the students' previous education also showed no influence on students' performance in the licensure examinations. Similar to the influence of sociodemographic characteristics, the differences in percentage of students who passed the licensure examination between the various categories of previous education variables studied could not reach significant levels. With respect to CGPAs of the students, the type of former school attended had significant influence on the CGPA with mean CGPA being highest among those who attended government schools followed by mission schools [9]. Students in all three ethnic groups with a Mosby Assess Test percentile rank below 21 and a D or F in a nursing course were more likely to fail the NCLEX-RN than those with a higher percentile rank and no Ds or Fs [10].

Table 2 displays the correlation of NLE with all factors. The outcomes of NLE were substantially correlated with: (1)

academic phase GPA ($p = 0.05$. 0.000) and (2) clinical rotation phase GPA ($p = 0.05$. 0.000). In the stepwise regression analysis, the following factors were included in the final model, accounting for approximately 95% of the adjusted variance in the model ($p = 0.05$). There was a strong link between academic GPA and clinical rotation GPA ($r = 0.948$). According to the findings of the logistic regression analysis, the success of NLE was significantly influenced by the clinical rotation GPA. The NLE results and clinical rotation GPA were found to interact most significantly in logistic regression ($p = 0.000$). A GPA earned in a composite didactic or theory-oriented course seem to offer the greatest promise in identifying those students most likely to succeed in the NCLEX [11]. Also, individual programs should determine the predictors and interventions that work best for their student populations [12].

The regression analysis was applied to all variables. The Nurses Competency Test outcomes are not significantly impacted by any of these factors. Data analysis must be done using logistic regression. This study examines the previous academic and internship performance of the participants. The results of this study suggest that prior academic and internship performance had a small but considerable impact on the Nurses competency test exam. Gender, age, and country of origin did not appear to have a significant impact on the Nurses Competency Test scores. On the other hand, the faculty in this community-college-based nursing program examined their admission criteria and identified reading comprehension as a key contributor to program success [13, 14].

The potential predictors used included nursing theory course grades, nursing clinical course grades, and NLN Achievement Test scores. Students who passed the NCLEX-RN had significantly higher biology and sophomore nursing GPAs than students who failed. Students who received even one C in a nursing course by the end of the sophomore year were more likely to fail the examination [15]. There for 21 predictors were included in the discriminant analysis, those that played the greatest role in classifying graduates were grades in the Nursing Foundations, Pathophysiology II, Wellness Nursing, and Restorative Nursing Interventions (I and II) courses, and the number of C or lower nursing theory grades. Number of theory C or lower grades had the highest loading on the discriminant function followed by Restorative Nursing Interventions II grades [16, 17]. The other study examined six academic and non-academic variables. Study variables included: pre-admission GPA, failing a clinical nursing course, two NLN test scores, age, and race. These variables have been explored in numerous past studies to predict success on the NCLEX-RN. And the study indicated that four of the variables had significant relationships with NCLEX-RN success [18]. GPA in pharmacy school was identified as an important factor in predicting success on the examination [19, 20].

The results of this study show that the students' demographic and prior educational background had no impact on how well they performed on the Nurses competency test. This further shows



that the differences in performance on the Nurses Competency Test may be better explained by other academic levels, tutoring factors, and program-related issues. However, studies indicate that students' academic success is a reliable indicator of how well they will score on the Nurses competency test. It is important to support initiatives aimed at enhancing student learning and results at the school level. However, students who are aware in advance that their academic achievement will be considered as a factor in their selection for the Nurses Competency Test can be inspired to work extremely hard in their classes. Only two program variables were consistently associated with success on the NCLEX-RN-final course grade for a didactic, senior-level medical-surgical nursing course and cumulative program grade point average. Scores on both standardized tests were significantly different in students who were successful on the NCLEX-RN and those who were not. The HESI Exit Examination demonstrated greater sensitivity, specificity, positive and negative predictive value, and test efficiency, compared with the Mosby Assess Test. Use of program variables and students' standardized test scores may allow faculty to identify students at risk for failing the NCLEX-RN and to provide structured remediation so these students may be successful on the licensing examination and begin their nursing careers [21]. The integrative review showed grade point averages in nursing and science courses as the greatest cognitive predictors of student success and parental education and age as the greatest demographic predictors.

Future research should include ongoing monitoring of variables that might predict success on the NLE. Student populations are becoming increasingly diverse throughout the country. As student populations become more diverse, predictors might change or previously unidentified variables may become important in predicting successful completion of a nursing program and NLE success. Also, studies should be undertaken in an effort to identify which interventions are most effective in helping students succeed. There are no studies that look at whether specific activities helped at-risk students achieve a higher success rate on the PNLE. Nurse educators need to have a clearer idea of exactly how to most profitably spend their time with students in remedial activities.

Identifying students who are at risk for failing the PNLE is only the first step in helping them to achieve success. Clearly, the earlier that interventions can be initiated, the better the chances of success. Perhaps remediation should be required rather than voluntary because poor study habits and problems with punctuality and attendance may be part of the student's problem. At the university where this study was conducted, remediation sessions include development of test-taking skills and good study habits. Individual counseling sessions are arranged to help students identify and cope with immediate stressors that might interfere with their ability to focus on academic demands. Computer-assisted PNLE review programs are made available to students in an effort to accommodate their schedules. Senior clinical placements are carefully selected to broaden and deepen

the student's knowledge base. The school at which this study was conducted also has a capstone course that places senior students in a clinical setting of their choice, where they work one-on-one with a baccalaureate-prepared preceptor delivering care to several patients for an average of 40 hours a week over a 6-week period. For students who are at risk, these clinical placements are carefully chosen in an effort to strengthen identified areas of weakness and expose the student to as much variety as possible.

Because each program is unique and has its own special student population mix, nurse educators should continue to study variables that predict success on the PNLE. The efforts made by nurse educators to assist students in performing to the best of their ability will not only help the graduate pass the PNLE, but, more importantly, will produce nurses who are critical thinkers who can deliver patient care at the very highest level.

5. Conclusions

GPA Professional education is the most important factor influencing institutional and student performance and quality in the Indonesian Nurses Competency Test for nursing students at the Universitas Muhammadiyah Yogyakarta. This is critical to improving clinical education learning at the professional level.

5.1. Ethical consideration

The rules and regulations established by the UMY Department of Nursing Ethics Committee were adhered to throughout the study. All information and data collection were kept confidential. Participants remained anonymous throughout the study. Subjects were informed that the study would not cause any harm.

5.2. Conflicts of Interest

The authors declare no conflict of interest.

5.3. Acknowledgments

This research was supported by the school of Nursing, Faculties of Medicine, and Health Sciences. This publication is supported by the Visiting Academics at the Universitas Muhammadiyah Yogyakarta international program. We are grateful to everyone who helped us collect the data.

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RICA – v. 10, n. 15, 2026
Revista Interdisciplinar de Ciência Aplicada
ISSN: 2525-3824

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