International Nurse Licensure: Predictor Factors Associated With Passing the Indonesian Nurse Competency Examination

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Background: The Indonesian Nurse Competency Examination (INCE) has been designed as a legally defensible, psychometrically sound examination to measure readiness for entry to practice in Indonesia. **Purpose:** This study aimed to explore the predictor factors associated with the nurses passing the INCE. **Methods:** In this cross-sectional study, 727 participants (estimated sample size was 720) were secured using consecutive sampling. The survey instrument, which collected participant demographics and characteristics of institutions, was developed by the research team and underwent testing for validity and reliability. **Results:** INCE pass rate was associated with age ($p = .00$), grade point average ($p = .00$), examination status ($p = .00$), region of the university ($p = .00$), completion of a standard internship program ($p = .001$), knowledge about the INCE blueprint ($p = .001$), preparation for the examination from the institution ($p = .011$), and taking the national predictor examination ($p = .002$). The most predictive factor for passing the INCE was the completion of a standard internship program ($p = .029$; $OR = 3.204$). **Conclusion:** Completion of a standard internship program was the main factor that predicted whether a participant passed the INCE. Thus, nursing universities need to provide internship programs based on the national standard. Additional research is needed related to other factors that were associated with passing the INCE.

Keywords: Competence examination, standard internship program, Association of Indonesian Nurse Education Center, examination preparation from the institution, national predictor examination, nurse licensure.

Nurses represent just one professional health service provider that must prove competency through competency test evaluation (Valizadeh et al., 2019). In Indonesia, the Association of Indonesian Nurse Education Center (AINEC) is charged with the maintenance of minimum practice standards for nurses entering the workforce. Like similar organizations in other countries, the AINEC is dedicated to developing psychometrically sound and legally defensible nurse licensure and certification examinations consistent with current practice (Kariasa et al., 2019). The Indonesian Nurse Competency Examination (INCE), which is a psychometrically sound standardized licensure examination to ensure the competence of entry-level nurses, is one part of that maintenance (Haryanti et al., 2016). Likewise, the purpose of competency examinations is to ensure graduate competency as evidenced by a registration certificate, which in this case is the competence of nurse generalists according to the regulation of the Ministry of Health of the Republic of Indonesia.

Like Indonesia, many other countries require competency examinations before healthcare workers can be licensed for professional practice, including the National Nursing Licensure Examination in China, the NCLEX-RN in the United States, and the Nursing Licensing Examination in Korea (Hou et al., 2019). Also similar to Indonesia, these countries use competency examination and accreditation status as parameters to determine the quality of nursing programs (Sears et al., 2015). INCE pass rates are a primary outcome metric for nursing education in Indonesia.

The INCE is computer based and is held three times per year (Kariasa et al., 2019). The passing score set by the national committee of the INCE is 47.8% (participants must provide the correct answer for at least 86 of 180 questions within 180 minutes). As a result, nursing programs are generally judged on their first-time INCE pass rate. According to data that were collected using the national data downloaded from the INCE website, 18,403 of 58,791 participants (31.3%) did not pass the INCE in 2017, 19,699 of 61,834 participants (31.9%) did not pass in 2018, and 20,691 of ~~59,796~~ participants (34.6%) did not pass in 2019. Several factors may have influenced this increased failure rate, including that many nursing schools do not hold exit examinations so that the institution does not feel it can be held responsible for whether their students pass the INCE. Also, several institutions have not implemented competency test–based questions during lectures, which means that students are not used to answering the type of questions

used in the INCE. Regardless of these factors, previously published studies have shown that until 2018, the low overall INCE pass rate of under 70% was still a problem (Masfuri, 2018).

Faculty are in the best position to prepare nurses for licensure examinations. Given the cost of higher education, it seems wise and ethical to provide every resource available to students to assist them with passing competency examinations (Smith Glasgow et al., 2019). The majority of students and faculty are concerned about student performance on the INCE. One of the ways to measure the quality or reputation of nursing institutions in Indonesia is through the institution's alumni who have passed the INCE. The low pass rate is caused by several factors, including examination readiness, use of national predictor examinations, and academic achievement (Hartina et al., 2017). Similar to Indonesia, in the United States, several factors were investigated to identify predictors of NCLEX-RN performance, including course grades, grade point average (GPA), and standardized tests (Daley et al., 2018). One study found that a transition course for senior-level nursing students that focused on standardized testing and test-taking strategies, remediation, faculty success, and student ownership of success improved the pass rate at a U.S. nursing school (Christensen, 2018). A review article reported several other strategies that were introduced to improve the pass rate of NCLEX-RN, including online coaching, remediation contract, exit examination review, problem-solving and clinical judgment courses, training and debriefing for a competency examination, adaptive quizzing system course and test, educational curriculum, learning method revision, and locus of control identification (Mushawwir et al., 2019).

Previous research has reported that students find it easier to answer competency examination questions because students are active and diligent in following a whole series of theories and skills during lectures, which have an impact on increasing pass rates on competency examinations (Abdillah, 2019). Likewise, Wardani's research showed that training strategies and motivations, such as attending workshops or seminars that discuss tips and tricks for passing competency tests, provided by clinical instructors, predicted success on the competency examination in Yogyakarta, Indonesia (Wardani, 2019). In students at risk, success in competency examinations depends on a combination of mentoring and strategy teaching and learning that can help students become confident and critical thinkers. Mentoring for lecturers is a vital component of this transformative process (Corrigan-Magaldi et al., 2014). This study aimed to explore the predictors of the INCE pass rate. Understanding the predictors of INCE performance can then help guide initiatives to improve nurses' success in passing the INCE.

Methods

Study Design

A cross-sectional design was used to analyze factors that were associated with passing the INCE over three testing periods in 2019 in Indonesia. The INCE is administered throughout Indonesia, spread over 12 regions, but participants in this research study were from 5 regions: (a) Sulawesi and Gorontalo, (b) Java, (c) Sumatera, (d) Bali and Nusa Tenggara, and (e) Papua and Maluku.

Sample

A total of 49,979 nurses took the INCE during 2019 (first period, 16,417; second period, 13,058; third period, 20,504). The pass rate during those three periods ranged from 48% to 68%. The required sample size for the present study was calculated using sample size estimation for calculating population proportion.

In this study, the estimated proportion was 50%, the absolute level of proportion was 5%, and the confidence interval was 99%. The required sample size based on that formula was 655. To account for incomplete data and dropout, we sought an additional 65 participants (10%), leading to a total of 720 participants required.

$$n = deff \times \frac{N\hat{p}\hat{q}}{\frac{d^2}{1.96^2}(N-1) + \hat{p}\hat{q}}$$

where

n = sample size
$deff$ = design effort
N = population size
$\hat{p}$ = the estimated proportion
$\hat{q} = 1 - \hat{p}$
d = desired absolute precision or absolute level of precision

A link to the questionnaire was sent to the faculty and alumni coordinator or person in charge as assigned by the administrator at each of the nursing schools in Indonesia. The person in charge distributed the survey to alumni to recruit volunteer participants. Consecutive sampling was used. Participants were required to have graduated from a nursing school between 2012 and 2019. The study objectives, process, and confidentiality and the participants' right to withdraw from the study at any time were explained. All participants provided written informed consent before beginning the questionnaires. Ultimately, 727 responses were received and included in the study findings. These participants represented 34 nursing schools in 11 regions in Indonesia.

Survey Instrument

The instrument used in this study gathered information regarding nurses' socioeconomic characteristics, completion of a standard internship program, preparation for the examination from the institution, knowledge about the INCE blueprint, taking the national predictor examination, psychological health, and general health. Socioeconomic characteristics were assessed by a questionnaire consisting of age, gender, university funding status (public or private), grade point average, examination status (ie, number of times the INCE was taken), and region of the university. Questions regarding examination preparation from the institution, completion of a standard internship program, knowledge about the INCE blueprint,

taking the national predictor examination, psychological health, and general health were developed using a Guttman scale. Validity and reliability tests revealed a Pearson product-moment correlation coefficient of 0.83. The questionnaire regarding examination preparation from the institution consisted of 6 questions; completion of a standard internship program, 10 questions; knowledge about the INCE blueprint, 10 questions; taking the national predictor examination, 10 questions; psychological status, 5 questions; and general health status, 5 questions. The variables were divided into categories and means were calculated.

The dependent variable (INCE pass status defined as "competent" for those who passed on their first attempt and "not competent" for those who did not pass on their first attempt) was collected using the national data downloaded from the INCE website. Using the Angoff method, the passing score for the INCE in 2019 was determined to be 47.8%.

Data Analyses

A Google form was used for data collection. The related factors of INCE pass status were performed using bivariate and multivariate analyses. Frequency distributions and descriptive statistics were conducted to describe participant characteristics. Chi-squared (χ^2) statistics were used to test associations between socioeconomic characteristics, examination preparation from the institution, completion of a standard internship program, knowledge about the INCE blueprint, participating in the national predictor examination, psychological health, and general health to INCE status. Multivariate analysis used logistic regression models to examine the factors that best predicted INCE status.

Ethical Statement

The informed consent form was collected electronically. The participants were required to fill out an informed consent form by clicking on the "agree" button on the screen after reading information regarding the research project and before being given full access to the survey instrument. Respondents' identities and responses were kept confidential. This research obtained ethical approval (No.60/H.4.8.4.5.31/PP36-KOMETIK/2019) from the Health Research Ethics Commission of Hasanuddin University.

Results

Association Between Participant Characteristic and INCE Status

A total of 727 bachelor nurse alumni participated in this study. Table 1 shows the respondent characteristic by INCE pass status. The majority of the respondents was female (n = 512, 70.4%), and the majority of male (n = 127, 59.1%) and female respondents (n = 275, 53.7%) were identified as not competent. Most participants (n = 433, 59.6%) were aged between 20 and 25 years, and most participants in this age range were competent (n = 232, 53.6%). Most participants attending private universities (n = 309, 56.4%) and public universities (n = 93, 52.0%) had an INCE status of not competent. The majority of participants who had a GPA higher than 3.50 were INCE competent (n = 473, 56%). All participants who had taken the examination two times (n = 50) or more than two times (n = 352) were considered not competent (100%). The regions with the largest proportions of participants who were considered INCE competent were Java (n = 83, 74.7%), Bali and Nusa Tenggara (n = 78,91%), and Papua and Maluku (n = 49, 77.6%). Table 1 shows the relationship of characteristics with INCE status. Age, GPA, examination status, and region of the university were significant factors ($p < .05$) related to INCE status.

Related Factors of INCE Status

The remaining factors investigated related to INCE status are shown in Table 2. Among the 727 participants who had good preparation for the examination from the institution (n = 601), 46.9% were INCE competent, whereas 34.1% of those with poor preparation for the examination from the institution were INCE competent. Participants who completed a standard internship program were more likely to be INCE competent than those who did not complete a standard internship program (46.0% vs. 15.6%, respectively). Most of the participants who participated in the national predictor examination more than once (52.2%) were competent. Participants with poor knowledge about the INCE blueprint were more likely to be competent (51.7%) than those with good knowledge (39.3%). Table 2 also shows the relationship of the related factor for INCE pass status. The internship program, knowledge about the INCE blueprint, examination preparation from the institution, and national predictor examination were statistically significant ($p < .05$) with INCE pass status.

Table 3 shows the predictive factors that qualified for logistic regression analysis. There are seven predictors (age, GPA, region of university, preparation for the examination from the institution, completion of a standard internship program, participation in the national predictor examination, and knowledge about the INCE blueprint) that had p values < .05. These predictor factors were analyzed using logistic regression as shown in Table 4. Model 2 shows that age, GPA, region of the university, completion of an internship program, and knowledge about the INCE blueprint were the significant independent variables associated with INCE pass status. Examination preparation from the institution and participating in the national predictor examination served as confounding factors that influenced the INCE pass status and independent variables (ie, age, GPA, region of university, completion of a standard internship program, and knowledge about the INCE blueprint). The dominant variable that influenced the INCE pass status was the completion of a standard internship program (OR = 3.204). Students at universities who completed a standard internship program were 3.204 times more likely than students without such access to pass the INCE.

TABLE 1

Relationship Between Participant Characteristic and INCE Status (*N* = 727)

		INCE Status	
	Total *N* = 727	Competent	Not Competent
Characteristic	***n* (%)**	***n* (%)**	***n* (%)**	***p*[a]**
Gender				.213
Male	215 (29.6)	88 (40.9)	127 (59.1)	
Female	512 (70.4)	237 (46.3)	275 (53.7)	
Age (years)				.000*
20–25	433 (59.6)	232 (53.6)	201 (46.4)	
26–45	286 (39.3)	87 (30.4)	199 (69.6)	
46–65	8 (1.1)	6 (75.0)	2 (25.0)	
University Funding Status				.343
Public	179 (24.6)	86 (48.0)	93 (52.0)	
Private	548 (75.4)	239 (43.6)	309 (56.4)	
Grade Point Average				.000*
3.00–3.50	254 (34.9)	60 (23.6)	194 (76.4)	
3.50–4.00	473 (65.1)	265 (56.0)	208 (44.0)	
Examination Status				.000*
First examination	325 (44.7)	325 (100.0)	0 (0.0)	
Second examination	50 (6.9)	0 (0.0)	50 (100.0)	
> 2 examinations	352 (48.4)	0 (0.0)	352 (100.0)	
Region of University				.000*
Sulawesi and Gorontalo	442 (60.8)	136 (30.8)	306 (69.2)	
Java	83 (11.4)	62 (74.7)	21 (25.3)	
Sumatra	75 (10.3)	18 (24.0)	57 (76.0)	
Bali and Nusa Tenggara	78 (10.7)	71 (91.0)	7 (9.0)	
Papua and Maluku	49 (6.7)	38 (77.6)	11 (22.4)	

Note. INCE = Indonesian Nurse Competency Examination.

[a] Chi-square test

* $p < .05$

Discussion

Association Between GPA and INCE Pass Status

The results of this study show that GPA is one of the independent variables associated with INCE status. Previous studies have reported that there is a relationship between a nurse's GPA and passing the competency test (Hartina et al., 2017; Lukmanulhakim & Pusporini, 2018). In the United States, students who had a GPA of 3.80 or higher had an 11% greater chance of passing the competency test than students with a GPA of less than 3.80 (Wambuguh et al., 2016). In Indonesia, nurses with high academic ability that was assessed based on GPA generally passed the competency examination (Syah, 2017). Students with a high GPA at academic and professional stages tend to have high motivation, study diligently, and have good intellectual and technical analysis skills (Kim et al., 2019).

The academic GPA referred to in this study is the cumulative value obtained by respondents during their undergraduate program. Students who achieve an academic GPA equal to or above 3.00 are assumed to have a good understanding of the subjects that have been learned. They will likely be able to understand the concepts and theories obtained during the lecture process, so they have better analytical skills that make it easier for these students to answer questions on the INCE (Hartina et al., 2017).

Association Between Completion of Standard Internship Program and INCE Pass Status

The dominant variable in the present study that influenced INCE pass status was the completion of a standard internship program at the university (*OR* = 3.204). When a nurse fails the INCE, it can affect the student, the university where the student attended, and, in some cases, the employer. Thus, the integrated curriculum must

TABLE 2

Related Factors for INCE Status (*N* = 727)

Characteristic	Total *N* = 727	INCE Status		*p*[a]
		Competent	Not Competent	
	n (%)	*n* (%)	*n* (%)	
Examination Preparation From the Institution				.011*
Good	601 (82.7)	282 (46.9)	319 (53.1)	
Poor	126 (17.3)	43 (34.1)	83 (65.9)	
Completion of Internship Program				.001*
Standard	695 (95.6)	320 (46.0)	375 (54.0)	
Not standard	32 (4.4)	5 (15.6)	27 (84.4)	
National Predictor Examination				.002*
Never participated	106 (14.6)	33 (31.1)	73 (68.9)	
Completed once	435 (59.8)	195 (44.8)	240 (55.2)	
Completed more than once	186 (25.6)	97 (52.2)	89 (47.8)	
Knowledge About the INCE Blueprint				.001*
Good	412 (56.7)	162 (39.3)	250 (60.7)	
Poor	315 (43.3)	163 (51.7)	152 (48.3)	
Psychological Status				.121
Anxiety	644 (88.6)	295 (45.8)	349 (54.2)	
No anxiety	83 (11.4)	30 (36.1)	53 (63.9)	
Health Status				.608
Healthy	703 (96.7)	316 (45.0)	387 (55.0)	
Sick	24 (3.3)	9 (37.5)	15 (62.5)	

Note. INCE = Indonesia Nurse Competency Examination.

[a] Chi-square test.

* $p < .05$

include training at the professional level (Haryanti et al., 2016). Nursing professional practice is a practical activity in hospitals with the implementation of nursing theory during academic learning (Lestari, 2014). Additionally, professional practice in a hospital internship setting can provide professional development, improve patient care skills, and hone analytical skills in solving various real cases both in the hospital and community (Haryanti et al., 2016).

Institutions must prepare students to take competency examinations. Preparation can be done through academic stages and nursing professional practice systems in a hospital or community. An online study by Czekanski et al. (2018) showed that gaining competence, theory, and learning experience in practical fields that support the growth and development of professional abilities is needed by every student. Integrating academic education and a nursing professional practice system is a standard curriculum between nursing theory in the academic stage and clinical experience in the professional practice stage (Czekanski et al., 2018).

Nursing professional practice plays an important role in increasing graduation because INCE questions are based on real patient cases (the patient's illness, medical history, etc.) and the care that is provided until the patient's condition is resolved. After the nursing professional practice stage, students will be accustomed to dealing with real patient cases, thus making it easier for students to answer competency examination questions and improving the likelihood of passing.

Educational curriculum development is a strategy that strengthens student knowledge by constructing curriculum contents that reflect the essence of education of professional nurses and other professional standards (Shoemaker et al., 2017). In addition to an integrated curriculum, professional education can enhance student skills in critical thinking and reflection, such as concept mapping, case reflection, disease history data, analysis, nursing problem determination, and nursing care management (Corrigan-Magaldi et al., 2014). It may also help prepare students to answer competency test questions.

For example, the NCLEX-RN preparation strategy implemented at Alabama University includes the application of a clinical nursing course, which is a combination of clinical and theoretical activities at one time, classroom lectures, and discussion of case studies, simulations, and other interactive learning strategies. Students are also assigned to conduct case studies outside the classroom, which allow students to gain clinical reasoning based on

TABLE 3

Predictive Factors Selected for Logistic Regression Analysis

Variables	*p*
Age	.000
Grade point average	.000
Region of university	.000
Examination preparation from the institution	.009
Completion of standard internship program	.002
Participation in national predictor examination	.001
Knowledge about the INCE blueprint	.001

Note. INCE = Indonesia Nursing Competency Examination.

existing theoretical concepts. At the end of the program, students take an exit examination to assess their ability, and the passing grade scores are adjusted to the passing grade competency examination scores (Mager et al., 2017).

Association Between National Predictor Examination and INCE Pass Status

The national predictor examination is a practice examination for nurses before they take the INCE (Haryanti et al., 2016). The most valuable component of a predictor examination is the use of good quality test questions that reflect the actual test implementation (Kariasa et al., 2019). In Indonesia, before the INCE is held, most nursing institutions conduct preparation sessions, such as providing debriefing or theoretical review during lectures for approximately 2 weeks, and most institutions giving students practice answering questions that resemble INCE questions. In addition, the national committee of the INCE also provides opportunities for all institutions to include their students in the national predictor examination, which is held three times before each INCE. The results of each predictor examination are announced on the INCE website, and each participating institution provides assistance to those students who did not pass by reviewing the obstacles those students faced.

A previous study revealed that 85% of participants who had taken the predictor examination were more ready to take the INCE than those who received only an explanation of INCE implementation. Furthermore, the results of the predictor examination evaluation can be used as a predictor for passing the INCE (Krisdianto & Kusumawati, 2019). Better predictor examination results indicate a greater chance of passing the INCE, and worse results likewise may mean a greater chance of failure (Abdillah, 2019). These results agree with a previous study that revealed that 86.4% of participants who passed the INCE had an INCE predictor examination score greater than or equal to the INCE passing score and had a 3.4 times greater chance of passing the INCE than those whose predictor examination value was lower than the INCE passing score (Nuryati et al., 2020). Respondents who took the national predictor examination had a 20.7% chance of passing, whereas those who took it more than once had a 37.5% chance of passing (Hartina et al., 2017). Students who have participated in the predictor examination tend to be more prepared for the INCE than students who have not taken the predictor examination (Serembus, 2016).

Association Between Knowledge About the INCE Blueprint and INCE Pass Status

The INCE blueprint is a basic framework or guideline used to design the development of the examination questions. Blueprints can provide information on the topic area, a description of the material being tested, an overview of the test methods to be used, and references (Kariasa et al., 2019). Understanding the blueprint as a predictive factor becomes an important tool in determining one's readiness in taking the INCE (Krisdianto & Kusumawati, 2019). These and other studies found that the readiness of participants is directly proportional to the INCE results. Thus, better examination preparation could provide a greater chance of passing the INCE. Some aspects that become the core of readiness include cognitive maturity and physical and psychological readiness (Wardani, 2019).

A literature review found cognitive readiness to be an important factor in passing the INCE (Krisdianto & Kusumawati, 2019). Cognitive readiness requires an understanding of a given blueprint that contains the scope of the competency test questions and strategies to answer each question (Kariasa et al., 2019). Knowledge related to blueprints is obtained through training courses for dealing with the INCE. At one U.S. nursing school, students were required to take a competency examination training course to assess their knowledge. Strategies such as reviewing the blueprint for the examination were implemented to correct knowledge gaps, and the authors reported improved grades and pass rates on the NCLEX (Cole & Adams, 2014).

A study about students who took the NCLEX-RN revealed that failure was often caused by a lack of optimal preparation in terms of cognitive abilities such as a blueprint of competency examination and nursing material. Students who failed were confused and doubtful that they were answering the questions correctly (Monroe, 2019). Another study supported the understanding of the examination blueprint: a nursing program reported NCLEX-RN national pass rates from 83.8% to 87.0%, which were achieved through an understanding of the blueprint, understanding the NCLEX-RN implementation process, and answering each review question (Frith et al., 2008).

Association Between Examination Preparation From the Institution and INCE Pass Status

Based on the results of this study, the institution's role is correlated with the INCE pass status. A previous study identified extrinsic factors that contributed to the success of the competency examination, including the ability of the institution's faculty to prepare students from the first to the final semesters and to strengthen learning strategies (Wardani, 2019). A previous study also revealed

TABLE 4

Logistic Regression Result of Predictors of INCE Status

Variables	INCE Status							
	Model 1				Model 2			
	p	*OR*	95% *CI*		*p*	*OR*	95% *CI*	
			Lower	Upper			Lower	Upper
Age	.000	2.731	1.934	3.856	.000	2.715	1.925	3.830
Grade point average	.000	0.217	0.148	0.319	.000	0.218	0.149	0.319
Region of university	.000	0.516	0.439	0.607	.000	0.515	0.443	0.598
Completion of a standard internship program	.028	3.303	1.137	9.596	.029	3.204	1.124	9.135
Knowledge about the INCE blueprint	.03	0.683	0.484	0.965	.029	0.682	0.484	0.962
Examination preparation from the institution	.365	1.240	0.779	1.973				
Participation in national predictor examination	.693	1.065	0.778	1.458				

Note. INCE = Indonesia Nursing Competency Examination.

that nursing faculty must be advanced in terms of providing the best facilities and infrastructure in the learning process by using the latest information technology and updating learning resources (Corrigan-Magaldi et al., 2014). In addition, using computer-adaptive quizzing in nurse training was associated with passing the NCLEX (Pence & Wood, 2018).

The results of previous studies agree with the results of this study that the success of a competency examination depends on a combination of mentoring and teaching-learning strategies conducted by the institution to help students be confident and critical thinkers. Student involvement, a supportive learning environment, and weekly follow-up by the faculty were beneficial for the development, retention, and achievement of students in competency examinations (Corrigan-Magaldi et al., 2014).

Limitations

The primary limitation in this study is that the participants do not represent all regions that are members of AINEC who participated in the INCE in 2019. Another limitation is that participants who failed the INCE were overrepresented in this study, as 55% of respondents included in this study failed the first attempt at the INCE but approximately 35% overall failed in 2019. Additionally, participants were volunteers, and it is possible self-selection bias occurred.

Conclusion

Overall, several predictor factors that contribute to the success of the INCE are age, GPA, region of university, knowledge about the INCE blueprint, examination preparation from the institution, participation in the national predictor examination, and access to a standard internship program, which had the greatest influence. The results of this study are expected to become supporting data for system improvement in institutions to better prepare students for the INCE. Also, these findings can be put to use by students to better prepare themselves before taking the INCE.

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