

# Psychometric Testing of Instrument for Assessment of Nursing Students Professional Behavior in Indonesia

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**Abstract**—Professional behavior is a crucial aspect of nursing career success as professional nurses. Nursing education plays an essential role to educate the nursing student to manage the complex demand in health care environment accordingly. However, the instrument to measure professional behavior among nursing student remains scarce. The aim of research are to adapt and validate the Nursing Students Professional Behavior Scale (NSPBS) and measure professional behavior among Indonesian nursing students. The original instrument (27 items) was translated using the translation guideline by the World Health Organization (WHO) (2018). The total sample was 364 nursing students from Bachelor-level nursing school at the private university in Yogyakarta (Indonesia). The inclusion criteria were the students already been to clinical practice in the hospital. The data collected from August to September 2018. A Confirmatory Factor Analysis (CFA) using Partial Least Square (PLS)-Structural Equation Modelling (SEM) was conducted to evaluate the validity and reliability. The finding was fitted for the three-dimensions which were included in healthcare practice, activity practice, and reporting. The face validity and content validity was evaluated by six experts. The CFA showed the excellent result with factor-loadings varying from 0.70 to 0.96 for the constructs. While the composite reliability (CR) for all latent constructs ranged from 0.90 to 0.96, which means that the internal consistency reliability was high. The Indonesian version of NSPBS remained with 27 items and was tested to be a valid and reliable tool to measure the professional behavior of nursing students. The instrument will be useful for nurse educators to monitor the development of student nurses' professionalism in clinical practice.

**Keywords**—Assessment, nursing student, professional behavior, validation

## I. INTRODUCTION

There is a little consensus regarding the concepts of professionalism in nursing. Despite the improvement of demand for professional nurses and patient's expectations, the negative image of nurses has not changed. Also, the problem-related professionalism and professional behavior are increased [1,2,3]. Professionalism and professional behavior are the core competencies of healthcare professionals education [4]. However, professionalism is difficult to defined [5], taught and assessed [4,6,7]. The importance of teaching and measuring professionalism is undoubtedly in professional education of healthcare [4,6,8,9,10].

Assessing professionalism could be an evaluation to improve the behavior because people will respect what they inspect [11]. Besides, a real instrument is needed to answer the effectiveness of students' professional behavior [12]. Consequently, a lack of formal appraisal could directly impact on the teaching of professional behavior, so the assessment must be appropriate for the attributes of professionalism [13]. An assessment of professionalism required precise measuring tools that can be used to identify, counsel, and improve professional behaviors [14]. However, research in nursing and medical education related to the approaches of the development and professionalism assessment at the undergraduate level is still weak [4]. Thus, the challenges in proper assessing professional behavior need to be addressed.

A nurse is one of the health care professionals who has a social contract with society to provide excellent nursing care through their professionalism. Despite, it is challenging to define professionalism in nursing related to feat in quality of service and cost-effective care [15]. In nursing history, Florence Nightingale is recognized as a professional nurse who established nursing education, which focused on nurses' professional behavior [16]. Nursing education institution plays a vital role to educate the nursing student to handle the complex demand in health care environment accordingly. Also, nursing education could ensure the sustainability of professional behavior assessment [17].

Behavior is defined as a manner of behaving or acting that demonstrate ethical, moral, knowledge, skills, and responsibility for society [7]. Professionalism is the intention to place the patients' interest above their self-interest [7]. While, professional behavior is defined as the actions and skills that reflect their habit, attitudes, beliefs, and values identified by profession and required success as professional [7,15,18,19]. Besides, professional behavior in medical practice consists of five domains behavior including responsibility, relationship with and respect for patient, probity, honesty, self-awareness, and capacity for reflection, collaboration and working with colleagues [7]. Nursing education could develop a student's thinking, professional, and ethical values of nursing into their behavior. So, professional behavior has essential role in their development and awareness into the nursing profession [16].

A new scale had developed called the Nursing Student Professional Behavior (NSPBS) to eliminate the problem of professional nursing in Turkey [16]. Goz and Geckil pointed out that the development of professional behavior among nursing student begins their education, and it has differences depend on their years of study, knowledge, and experience. Therefore, they

developed a new study to validate the instrument of professional behavior among Turkish nursing student [16]. The professional behavior in the nursing student has limited studies in Indonesia, and it could reflect their professional identity as nurses. This study aimed to adapt and validate the NSPBS to Indonesian context. The NSPBS is a specific tool in assessing nursing students' behavior. Also, this study aimed to demonstrate that this scale has validity and reliability test, which can be used in a context different cultures from the original setting where this scale was developed.

## II. METHODOLOGY

A quantitative descriptive design was applied in this study. Confirmatory factor analysis (CFA) was used to estimate the internal consistency reliability and construct validity through Partial Least Square (PLS)-Structural Equation Modelling (SEM).

### PARTICIPANTS

The study population consisted of nursing students who registered in a School of Nursing at the private university in Yogyakarta (Indonesia). A purposive sampling method was used to recruit the sample. There were 371 nursing students enrolled in the School of Nursing, but only 364 students matched the inclusion criteria that the students should have exposure in clinical practice in the hospital.

### INSTRUMENT

The original version of NSPBS was developed in Turkey for nursing student related to professional behavior. It was used a 5-point Likert scale (i.e., 5. Absolutely sufficient, 4. Partially sufficient, 3. Undecided, 2. Insufficient, 1. Absolutely insufficient). While the Indonesian version of NSPBS only has a 4-point Likert scale (i.e., 4. Absolutely sufficient, 3. Partially sufficient, 2. Insufficient, 1. Absolutely insufficient). The scale of 3. Undecided was removed based on the experts' suggestion and interview from respondents during the pre-testing of the instrument. There were 27 items with three-dimensions, which include healthcare practice, activity practice, and reporting which were developed in the Indonesian version of NSPBS. In addition, the researcher got permission to use a 4-point Likert scale as a response choice from the original authors.

### THE TRANSLATION PROCESS

The scale was translated using the guideline of WHO [20] including forward and backward translation, expert panel, pre-testing, and cognitive interview before finalized the Indonesian version of NSPBS. The original inventory was translated independently by professional English translator and content expert to get equivalence in conceptual and linguistic of Indonesian context. The expert panel consisted of five nurse educators and one professor in human resources management whom expert in instrument development reviewed the inventory thoroughly. Each expert clarified and gave feedback for each items of the scale. They also were given the opportunity to provide comments and suggestion to modify the items. So, they were suggested using a 4-point scale because it is easy for the respondents to fill and comprehend. Then, they came to consensus and produced the final copy of the scale. Two other expert translators with a good command of both Indonesian and English translated the reconciled version from Indonesian back to English. Then, the pre-testing and cognitive interview process involved 12 nursing students, and the results showed that they prefer 4-point Likert scale as responses. Most of them said that it was easy to understand, simple, and related to the nursing practice in Indonesia. Furthermore, the original and the result of back translation and pre-testing were reevaluated. It was used to determine the differences that occur between the English and Indonesian inventories meaning and the coherence of the concepts. The scale assumed its final target-language version and confirmed the conceptual and literal

equivalence of the Indonesian version of the Nursing Student Professional Behavior Scale (I-NSPBS).

### DATA ANALYSIS

The original NSPBS version was equal with the Indonesian version. Kolmogorov Smirnov was used to examine the normality data and PLS-SEM. The questionnaire was evaluated for the quality of data and construct validity using CFA. The validity test included face validity, content validity, construct validity, convergent validity, and discriminant validity. Also, the reliability test was measured internal consistency using composite reliability, Fornell Lacker, and cross-loadings. The IBM SPSS statistics version 16.0 (SPSS Inc, an IBM company, Chicago, IL, USA) was used to analyze demographic characteristics and normality data. In addition, PLS-SEM version 3 was used to assess the confirmatory factor analysis.

### ETHICAL CONSIDERATION

The study was approved by the Ethical Committee at University Malaya and the Head of School of Nursing and also the Head of Nursing Profession Program in private University respectively conducted after obtaining permission. Nursing students were informed in writing, and orally that participation was voluntary, had no effect on their grade, and that answers were analyzed anonymously. Data collection began after obtaining writing consent from the nursing students.

## III. RESULTS

More than two-third of nursing students (77.5%; n= 282) were female, and (22.5%; 82) were male students. The mean age was 20.71±1.8 years. The respondent had a median age of 20 (ranged from 17-32, mean 20.7) years. The response rate was 96.22 %. Data collection took place for four weeks in August and September 2018.

### FACE AND CONTENT VALIDITY

Six experts in nursing were invited to examine the content validity of the scale. We asked the experts to rate every item of the inventory on relevance and appropriateness as follows: 1= not relevant, 2=somewhat relevant; 3= quite relevant; and 4= highly relevant. We calculated the content validity index (CVI) of the scale based on the number of items that the experts rated over 3, divided by the total number of the expert [21,22]. CVI consisted of content validity of individual items (I-CVI) and the overall scale (S-CVI). I-CVI was calculated from the number of experts giving rating either 3 or 4 (relevant) divided by the total number of experts. In addition, the researchers mostly report S-CVI is divided into types; S-CVI/ UA that is proportion of items on a scale that achieves a relevance rating of 3 or 4 by all experts and S-CVI/ Ave that is average of the I-CVI's for all items on the scale [22]. The NSPBS resulted in I-CVI ranging from 0.83 to 1.00 and S-CVI/Ave =0.95.

All of the experts suggested using simple response with a 4-point Likert scale and using simple statement rather than a lengthy statement. They also agreed that I-NSPBS could assess nursing student professional behavior. Also, face validity was evaluated by asking four nursing students to respond for the items and critically review in terms of their understanding. All comments from the respondents were analyzed and resulted in minor linguistic adjustments to clarify a few questions. They also suggested that the questionnaire could be shortened and use simple choice response. The final version of I-NSPBS was linear with the Indonesian context, and it could measure student's professional behavior.

**CONFIRMATORY FACTOR ANALYSIS FOR I-NSPBS**

The finding of the study has demonstrated that the reflective outer model of the I-NSPBS was acceptable for all of the items of three latent constructs including activity practice, healthcare practice and reporting. The findings showed that all of the factor-loadings more than 0.70, composite reliability  $\geq 0.90$  and the AVE  $\geq 0.50$ . The lowest factor-loading is 0.70 from healthcare practice (HP) item 16 “Handle sensitive information correctly and carefully” while the highest factor loading is 0.96 from reporting (R) item 2 “Report illegal practices.” Thus, all of the items are significant to measure professional behavior among nursing students. The results of construct and items of I-NSPBS were examined detailed below (Table I).

**RELIABILITY AND VALIDITY**

The reliability was tested using Cronbach’s Alpha, and Composite Reliability (CR) for the three latent constructs which are fit with the recommendations of Hair et al. [23]. The Cronbach’s Alpha of all latent constructs were above 0.80. So, the findings revealed that the indicators of reliability and internal consistency reliability were adequate. Then, the validity was tested using convergent validity and discriminant validity. Average Variance Extracted (AVE) showed the convergent validity of the three latent constructs. Then, discriminant validity used Fornell-Larcker criterion and cross-loadings. The findings indicate that the discriminant validity were well established, as it fulfills the Fornell-Lacker criterion [24]. Furthermore, all correlations among the variables were significant. Besides, all of the latent constructs had higher square root of AVE compared to the correlation among the constructs. It means that the discriminant validity has achieved when the square root of AVE in the bold diagonal value is higher than the values of correlation in its row and column. Table II shows the reliability and validity of all latent constructs. Then, the cross-loadings found that all indicator’s loading which is associated with each latent construct is higher than its loadings with all the remaining construct [23]. The results showed well discriminant validity (Table III).

**Table I. Results summary for the reflective outer model of the Indonesian Nursing Student Professional Behavior Scale (n=364)**

Construct	Item	Factor loadings	CR > 0.70	AVE $\geq 0.50$
Activity Practice (AP)	Item 1	0.78	0.90	0.58
	Item 2	0.80		
	Item 3	0.72		
	Item 4	0.77		
	Item 5	0.79		
	Item 6	0.74		
	Item 7	0.72		
Healthcare Practice (HP)	Item 1	0.77	0.96	0.57
	Item 10	0.76		
	Item 11	0.74		
	Item 12	0.71		
	Item 13	0.80		
	Item 14	0.82		
	Item 15	0.80		
	Item 16	0.70		
	Item 17	0.72		
	Item 18	0.73		
	Item 2	0.73		
	Item 3	0.74		
	Item 4	0.75		
	Item 5	0.76		
	Item 6	0.74		
	Item 7	0.73		
Item 8	0.78			
Item 9	0.78			
Reporting (R)	Item 1	0.96	0.96	0.92
	Item 2	0.96		

Note: AP = Activity Practice; HP = Healthcare Practice; R = Reporting; CR = Composite Reliability; AVE = Average Variance Extracted

**IV. DISCUSSION**

In this study, CFA evaluated psychometric properties using PLS-SEM, including validity and reliability (convergent validity), average variance extracted, and discriminant validity. It was considered that normality data distribution not assumed, non-normal data could be conducted with a non-parametric method and a larger number of indicator variables [25]. The validity and reliability were tested using the reflective measurement model to achieve consistency. Then, the convergent validity and discriminant validity are the focus of the reflective measurement model [23,25]. The average variance extracted (AVE) for assessing convergent validity should have a value of 0.05 or higher to indicate a sufficient degree of convergent validity [23]. While Fornell-Larcker criterion and cross-loadings were used to determine the discriminant validity [23,26].

The square root of AVE should be higher than the correlation values of each construct to determine Fornell-Larcker criterion; while cross-loadings should be higher than its loadings with all remain to construct [23,24].

The finding from this showed that the I-NSPBS has excellent psychometric properties among nursing students in Indonesia. The outer loading of I-NSPBS was high across all of the items ranging from 0.70 to 0.96 for the constructs. The outer loadings could find the indicator value, which is preferred 0.70 or higher [27]. In this study, all of the items had achieved satisfactory loading factors. Then, the composite reliability (CR) of the I-NSPBS showed high internal consistency reliability for all latent constructs of an activity practice (AP), healthcare practice (HP), and reporting (R) ranging from 0.90 to 0.96. Also, the convergent validity had well established with AVE values  $\geq .50$  for all items of the I-NSPBS.

The discriminant validity had well established, which showed that the square root of AVE is higher compared to the correlation among the latent constructs. If the square root of AVE in the bold diagonal value is higher than the values of association in its row and column, discriminant validity has achieved [24,27]. Also, the discriminant validity was determined by cross-loadings, which found that all indicator’s loading with its associated latent construct of AP, HP, and R is higher than its loadings with all the remaining construct. Thus, discriminant validity of NSPBS was well established [24].

In this study, the sample size has fulfilled the requirement of a good number. It was suggested that 5 or 10 subjects per item are appropriate regardless of the number of items for the sample size. Comrey and Lee evaluated the sample size as very weak, 100 as weak, 200 as fair, 300 as good, 500 as very good and 1000 or more as excellent [28]. This study included 364 participants, so the sample size is “good.” The Kolmogorov-Smirnov test was used to analyze the normality data and revealed 0.01 ( $P < 0.05$ ). It means that the data was not normally distributed and it was considered to use PLS-SEM to conduct confirmatory factor analysis. The CFA data using PLS-SEM was applied to confirmatory factor analysis to ensure the validity and reliability of latent construct of the I-NSPBS [23].

The result was consistent with the previous literature by Goz and Geckil (2010) without any item required to remove. It also showed that the instrument had good validity and reliability as a tool to measure professional behavior among nursing student. Besides, NSPBS also can be used to evaluate the effectiveness of the educational program in nursing education [16].

In this study, the translation and adaptation of Indonesian NSPBS version revealed the alternative response of questions using the 4-point Likert scale. It was considered the comments of expert and respondents who suggested to reduce the answer “undecided”. The respondent also said that it is easy to answer the question and increased their intention to fill the questionnaire. In addition, the authors got permission to modify the item responses depend on the cultural context and situation.

As previously reported, the original NSPBS had been used to assess professional behavior among Turkish nursing students. In contrast, the professionalism of Turkish nurses was found lower compared to the other studies. In addition, the study related to professionalism among nursing student was limited [16]. Thus, it is

considered that nursing student faces the challenge of providing a high quality of care and ensure patient safety during their professional practice. Therefore it needed an instrument that could evaluate and assess their professional behavior.

The present study has the strength to evaluate the construct validity and reliability through CFA. The AVE and factor-loadings of items have achieved high. In addition, the I-NSPBS has been tested, including new context-appropriate with the culture and population of nursing students in Indonesia. Furthermore, this instrument has been adapted suitably for Indonesian nursing practice and education.

**Table II. Reliability and Validity among three latent constructs of the Indonesian version of Nursing Student Professional Behavior Scale (n=364)**

Construct	AVE	CR	Cronbach Alpha	R <sup>2</sup>	Fornell-Larcker		
					1	2	3
Activity Practice	0.58	0.90	0.88	0.32	<b>0.76</b>		
Healthcare Practice	0.57	0.96	0.95	0.08	0.34	<b>0.76</b>	
Reporting	0.92	0.96	0.91	0.80	0.40	0.27	<b>0.96</b>

Note: AVE = Average Variance Extracted CR = Composite Reliability

**Table III. Cross-loadings for the latent construct of the Indonesian version of Nursing Student Professional Behavior Scale (n=364)**

Items (n=27)	AP	HP	R
<b>Activity Practice, 7 items</b>			
Generate ideas on healthcare social matters	<b>0.78</b>	0.23	0.31
Generate ideas on healthcare and nursing development	<b>0.80</b>	0.26	0.31
Arrange the comfortable environment for patient	<b>0.72</b>	0.26	0.27
Establish an environment to discuss the problems	<b>0.77</b>	0.25	0.34
Determine the problems of patient	<b>0.79</b>	0.30	0.33
Decide knowledge, skills and experiences on patient’s healthcare	<b>0.74</b>	0.23	0.29
Practice the patient’s plan of care	<b>0.72</b>	0.27	0.27
<b>Healthcare Practice, 18 items</b>			
Focus all attention for patient’s while caring them	0.27	<b>0.79</b>	0.24
Protect confidentiality patient’s related information	0.32	<b>0.76</b>	0.23
Provide service with respectful manner	0.28	<b>0.74</b>	0.19
Show empathy	0.25	<b>0.71</b>	0.19
Serve out the resources equally	0.35	<b>0.80</b>	0.24
Do not act against the ethics	0.27	<b>0.82</b>	0.26
Do not act against the laws	0.28	<b>0.80</b>	0.23
Handle sensitive information correctly and carefully	0.29	<b>0.70</b>	0.18
Decide the facts professional practices adequately and correctly	0.26	<b>0.72</b>	0.21
Protect society from false information regarding the profession and professional practices	0.21	<b>0.73</b>	0.18
Cooperate with health team members	0.17	<b>0.73</b>	0.19
Provide service for patient’s needs regardless their personal attributes	0.17	<b>0.74</b>	0.16
Establish relations with health team members without any discrimination	0.23	<b>0.75</b>	0.21
Create positive profession image with my personality and behaviors	0.25	<b>0.76</b>	0.19
Establish harmonious environment for myself and others	0.18	<b>0.74</b>	0.14
Respect patient’s right to refuse treatment and care	0.19	<b>0.73</b>	0.15
Observe patient’s problems	0.28	<b>0.78</b>	0.21
Respect and protect patient’s privacy	0.26	<b>0.78</b>	0.19
<b>Reporting, 2 items</b>			
Report unethical practices	0.37	0.26	<b>0.96</b>
Report illegal practices	0.39	0.26	<b>0.96</b>

Note: AP = Activity Practice; HP = Healthcare Practice; R = Reporting

**STUDY LIMITATION**

This study was limited by the representative of population. This study was conducted in only one Indonesian school of nursing; therefore it might not be generalizable to other nursing institution across Indonesia.

**V. CONCLUSION**

The original version of NSPBS was translated into the Indonesian language, and pre-tested the instrument among nursing students. The findings revealed that the Indonesian version of NSPBS is a valid and reliable tool to measure professional behavior among nursing students. It can be used to promote professionalism in nursing education. It could also monitor the development of student’s professional behavior in clinical practice.

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