

Original Article

# Validation of Nurses' Attitudes Toward Sexual Health Care Scale: A Confirmatory Factor Analysis

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**Background:** Provision of sexual health care (SHC) is a highly complex task and validated structural scales of attitudes towards the provision of SHC are rare.

**Purpose:** To investigate and validate Nurses' Attitudes Toward Sexual Health Care (NASHC) scale by confirmatory factor analysis (CFA) and to test the hypothesized structure.

**Methods:** This is a descriptive study involving cross-sectional survey. One hundred and seventy-one practice nurses were recruited. The Permission, Limited Information, Specific Suggestions, and Intensive Therapy (PLISSIT) model-based NASHC scale was validated by CFA.

**Results:** The results illustrated the appropriateness of the hypothesized model for PLISSIT model-based scale. The data on practice nurses' attitudes fit the hypothesized four-factor model and the final model explained 56% of the variance in NASHC.

**Conclusion:** The NASHC scale is a valid and reliable tool for exploring practice nurses' attitudes toward providing SHC in clinical practice.

**Keywords:** attitude, PLISSIT, psychometric analysis, sexual health care

## Introduction

Sexual health care (SHC) is an important aspect of holistic health care, and providing counseling on sexual health is the responsibility of health care providers.<sup>[1]</sup> The proportion of patients with cancer or chronic disease who suffer sexual difficulties ranges from 30.1% to 78.7%,<sup>[2-3]</sup> and 29% to 74.4% accept surgical management.<sup>[4-5]</sup> Most patients are willing to talk about their sexual concerns with nurses or physicians.<sup>[6]</sup> Moreover, nurses have the obligation to initiate discussion of patients' sexual

health concerns in an informed and sensitive manner,<sup>[7]</sup> however, they often do not do so in practice.<sup>[8]</sup> In Asia, only 3.5% of nurses listen to patients' sexual concerns,<sup>[9]</sup> and SHC is seldom practiced in Taiwan.<sup>[10-11]</sup> Since executing gender mainstreaming policy in 2007,<sup>[12]</sup> sexual health education and gender equity consciousness have been integrated into the nursing curriculum in Taiwan. Whether there have been changes in the status of providing SHC by nurses, compared to 10 years ago, is worth exploring.

Attitude toward a behavior defined as a person's overall evaluation of performing the behavior in question.<sup>[13]</sup> In other words, the more positive the attitude toward SHC, the higher the frequency of providing SHC. From a review of the literature, the majority of studies on nurses' attitudes toward SHC refer to patients' sexuality from nurses' point

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of view<sup>[14]</sup>, or their opinions of sexual health of oncology patients.<sup>[15-16]</sup> As a result, the associations between attitudes and behaviors of SHC are inconsistent.<sup>[17-18]</sup> One significant drawback of these studies is that few scales that investigate attitudes toward SHC have sound psychometric properties.<sup>[14, 19-23]</sup>

Provision of SHC is a complex task in nursing practice, which incorporates different levels of care, and involves active assessment, education, and intensive consultation. Intervention based on guided model is required for SHC.<sup>[24]</sup> The Permission/Limited Information/Specific Suggestion/Intensive Therapy (PLISSIT) model provides a hierarchical SHC framework for clinical practice.

Holistic care is the strength of the nursing profession, in which gender awareness is essential. Unfortunately, gender blindness exists in the masculine medical culture and the medical-based nursing curriculum overlooks SHC and sexual adaptation concerns of females and their partners. In 2007, gender mainstreaming policy was implemented. Since then, gender awareness training and gender equality issues have been integrated into the health care system in Taiwan.<sup>[12]</sup> Moreover, most nursing schools have integrated gender awareness training into their curricula. However, the effects of gender awareness training on the attitudes toward SHC are unknown. The purpose of this study is to explore practice nurses' attitudes toward SHC following implementation of gender mainstreaming policy and to establish factorial validity by confirmatory factor analysis (CFA).

## Background

Sexuality has become a legitimate area of nursing since the World Health Organization (WHO) recommended that health professionals be prepared to discuss sexuality.<sup>[7]</sup> Nevertheless, it is still a difficult task in clinical practice. More than 90% of health practitioners do not initiate discussions on sexual concerns with patients.<sup>[25]</sup> Evidence supports a predictive role for positive attitude in the intention to perform behaviors.

<sup>[13]</sup> Assessing nurses' attitudes carefully is indispensable for helping nurses to overcome barriers to addressing patients' sexual concerns.<sup>[9]</sup> Many researchers have partially attributed the hesitation in addressing patients' sexual concerns to conservative attitudes.<sup>[9,16,26]</sup> Based on the theory of reasoned action proposed by Ajzen (1980)<sup>[27]</sup>, the intent to execute the behavior in question (i.e. provision of SHC) is related to attitudes toward SHC rather than attitudes toward sexuality or sexual health.<sup>[15]</sup>

Born between 1946 and 1964, baby boomers came of age in a world that was more tolerant of sexuality as the media espoused the joys of sexual activity, and sex was no longer limited to procreation<sup>[28]</sup>. As they have aged and entered the health care system, nurses have been confronted with a generation of patients tolerant of sexuality. Therefore, nurses' attitudes toward providing SHC are worth exploring.

The nursing curriculum was originally developed based on the need for medical education. Traditionally, medicine has been considered masculine. In the curriculum on sexuality, only topics regarding reproduction were addressed. Courses related to gender differences and SHC were scarce. Hence, gender blindness existed in medical education.<sup>[29]</sup> Therefore, it is not surprising that nurses' SHC interventions were rare in clinical practice.<sup>[10,11]</sup> The concept of gender mainstreaming was formally proposed in 1995, and the Taiwan government pushed forward gender mainstreaming policy in 2007, including sexual health.<sup>[12]</sup> Over the past 10 years, with the promotion of this policy, sexuality has been embraced in the nursing curriculum. It is imperative to explore the impact of sexuality courses on nursing students' attitudes toward providing SHC.

Sexuality is a multidimensional concept that includes the desire for sex, beliefs about sex, and the sexual act.<sup>[28]</sup> Sexual health is defined by the whole person and is an essential element of overall well-being, regardless of age, gender, or sexual orientation.<sup>[30]</sup> Therefore, SHC is a complex task in nursing practice, which incorporates different levels of care and involves active assessment, education, and intensive consultation. Thus, nurses'

attitudes may change at different levels of care.

A number of variables have been used to measure attitudes toward SHC, such as barriers to addressing patient sexual concerns, privacy, and comfort level in talking about sexual issues and providing SHC. It has been demonstrated that nurses are restrictive in their attitudes,<sup>[14,17]</sup> feel discomfort when providing SHC,<sup>[16]</sup> and are not confident in addressing patients' sexual concerns.<sup>[18]</sup> However, neither of the studied scales was validated by psychometric measures or addressed discrepancy in attitudes toward distinct levels of SHC.

There are a number of modern models that are based on a multidisciplinary approach to facilitate interventions in SHC (i.e., PLISSIT, Kaplan, and ALLOW)<sup>[31]</sup>. The PLISSIT model<sup>[32]</sup> consists of four levels for assessing and solving patients' sexual concerns<sup>[33]</sup> and is the most commonly used.<sup>[34]</sup>

The Nurses' Attitudes Toward Sexual Health Care (NASHC) scale was designed by one of the authors of this study, based on the PLISSIT model, to examine nursing students' attitudes toward SHC. The internal consistency of NASHC, as measured by Cronbach's  $\alpha$ , is 0.85 and test-retest reliability is 0.79.<sup>[19]</sup> Factor analysis is the best of all known statistical methods for investigating relations between sets of observed and latent variables. Factor analysis uses exploratory factor analysis (EFA) and CFA for exploring and modeling on multivariate analysis. CFA can be applied even when there is only partial knowledge of the underlying latent variable structure.<sup>[35]</sup> This scale has been used to explore attitudes toward and interventions in SHC. However, after a decade, whether nursing students' attitudes toward and interventions in SHC still fit the hypothesized model requires validation by CFA.

## Study Aims

This is the first study to validate PLISSIT model-based scale by CFA, and to examine the structural composition of correlated variables.

Understanding nursing students' attitudes toward SHC requires specific targeting of nursing

interventions in sexual issues.

## Methods

### Study Design

This is a descriptive, cross-sectional study. Data was collected from January 1, 2013 to August 31, 2013, using the NASHC scale, which was devised by one of the authors of this study, based on the PLISSIT model, to explore attitudes toward SHC in clinical practice.

### Data Collection

Data was collected using the NASHC scale. Research assistants explained the aims and procedure of the study to each potential participant. Then, research assistants distributed envelopes containing a cover letter, a questionnaire, and an informed consent form. To ensure anonymity, participants were instructed to return the completed questionnaire in the return envelope. Practice nurses spent approximately 15 minutes completing the questionnaire after work.

### Participants

Convenience sample of 171 practice nurses was recruited from two medical universities in Taiwan by invitation, and all participant responses were voluntary and anonymous. Each participant provided signed informed consent before filling out the questionnaire. The inclusion criteria were as follows: (1) at least 18 years of age; (2) able to speak and read Chinese; and (3) completion of core courses, including lectures and practice, on the fundamentals of nursing, medical-surgical, maternity, pediatric, psychiatric, and community nursing. The model used in this study contained 10 observed variables and 2 latent variables. The anticipated effect size was 0.1, the desired statistical power level was 0.8, and the desired probability was 0.05. Sample sizes were calculated using the online Statistics Calculator (<http://www.danielsoper.com/statcalc3/calc.aspx?id=89>). Minimum sample size of 152 was needed to detect the effect and minimum sample size of 100 was needed for the model's structure. Taking into consideration that a sample can lose 10%–15%

of participants, an initial sample size of 170 was required. A convenience sample of 171 practice nurses was taken from among students enrolled at two medical universities in Taiwan. Research assistants handed out 171 questionnaires and the final sample consisted of 160 participants (94.1%). All participants were asked to complete the paper and pencil scale.

### **Ethical Considerations**

This study was approved by the Institutional Review Board of a medical university hospital. Course assessment for practice nurses was not influenced by whether they participated or not, and participants were aware that they could withdraw from the study at any time. The results are shown at group level only to guarantee anonymity.

### **Instrumentation**

Nurses' attitudes toward SHC in this study were measured on NASHC scale. The questionnaire was composed of two parts as explained below.

#### *Demographic information*

In the first part, data on age, gender, marital status, close stable relationships, religion, sexual activity, and family type was gathered.

#### *Nursing Attitudes toward Sexual Health Care (NASHC) Scale*

The NASHC consists of four factors based on the PLISSIT model,<sup>[32]</sup> which assesses attitudes toward permission, limited information, specific suggestion, and intensive therapy related to SHC. The scale is comprised of 15 items that require responses rated on a five-point Likert scale. A score of 1 represents "strongly disagree" and a score of 5 represents "strongly agree." The scores are computed by counting the response scores for all items on each scale. Higher scores indicate more positive attitudes toward the implementation of nursing interventions in SHC. The range of possible scores is from 15 to 75.

### **Reliability**

Participants' attitudes toward SHC were assessed using the NASHC scale. In the present

study, Cronbach's  $\alpha$  values were 0.77, 0.79, 0.80, and 0.79 for permission, limited information, specific suggestion and intensive therapy factors, respectively. The test-retest reliability was 0.80.

### **Construct Validity**

CFA can be applied when the researcher has little understanding of the underlying latent variable structure.<sup>[35]</sup> Based on the results of NASHC (four factors were extracted, item loading was  $>.50$ , and 60.63% of the variance was explained),<sup>[19]</sup> we postulated relations between the observed measures and the underlying factors and then tested the hypothesized PLISSIT model structure.

### **Statistical Analysis**

The software SPSS statistics 14.0 (SPSS, Inc., Chicago, IL, USA) was used to analyze the data. The hypothesized model structure of the NASHC was tested using maximum likelihood CFA. In the hypothesized CFA model estimated in the present study, the items used to examine permission, limited information, specific suggestion, and intensive therapy are indicators of the latent factors that represent the theoretical structure.

We applied AMOS 7.0 to test the goodness of fit of the hypothesized structural model. Before data analysis, Bartlett's test and Kaiser-Meyer-Olkin (KMO) test were conducted, data normality was checked and offending estimates were measured. The skewness and kurtosis of each variable were also checked. Skewness of less than 3 and kurtosis of less than 10 were considered normal distribution.<sup>[35]</sup> Negative error variance, excessive standardized coefficients ( $\geq 1$ ) and very large standardized errors are offending estimates of preliminary fit criteria of a model<sup>[36]</sup>. We examined the offending estimates before conducting CFA. For CFA, model fit was evaluated using the most common fit indices in the relevant literature. Three measures of data model fit have been suggested in an attempt to provide the criteria by which to judge whether or not data set is consistent with prior hypothesized model. The fit indices and descriptions of three model fit measures are as follows. (i) Absolute fit measure:

Table 1. Analysis of the characteristics of participants in the two university sample groups ( $n = 160$ )

	n/%	School A	School B	P
<b>Gender</b>				.868
Male	27 (16.9)	17	10	
Female	133 (83.1)	92	41	
<b>Stable intimate relationships<sup>a</sup></b>				.580
Yes	100 (62.5)	69	31	
No	31 (21.8)	40	20	
<b>Sexual experience</b>				.175
Never	64(40.0)	42	22	
Kissing or petting	52(32.5)	38	14	
Sexual intercourse	44(27.5)	29	15	
<b>Religion</b>				.107
No	59(36.8)	38	21	
Folk <sup>b</sup>	89(55.6)	62	25	
Western or other <sup>c</sup>	12(7.6)	9	5	
<b>Religion involved</b>				.157
Never	14(8.5)	6	8	
Seldom	115(71.8)	82	33	
Usually	31(29.7)	21	10	

$\chi^2$ (no significance is acceptable), Goodness-of-fit Index (GFI, which should be higher than 0.90 for a good fit), Adjusted Goodness of Fit Index (AGFI, for which a value of  $>0.8$  is acceptable), Root Mean Square Error of Approximation (RMSEA, for which a value of 0.08-0.1 is acceptable); (ii) Comparative fit measures: Non-Normed Fit Index (NNFI, which should be higher than 0.90 for a good fit), Comparative Fit Index (CFI, which should be higher than 0.90 for a good fit); (iii) Parsimonious fit measures: Parsimonious Goodness-of-Fit Index (PGFI, for which a value of  $>0.5$  is acceptable), Consistent Akaike Information Criterion (CAIC, for which a value of  $>0.5$  is acceptable). Normed Chi-square= $\chi^2$  /df (NC, for which a value of  $3 > NC > 1$  indicates reasonable fit)<sup>[37]</sup>.

## Results

### Participants' Characteristics and Attitudes Toward SHC

Table 1 displays the demographic data of the 160 practice nurses from two universities. Average age was 22.10 years ( $SD = 0.917$ ) with a range of 21–23 years. The majority of the practice nurses (133, 83.1%) were female. Only 27 subjects (16.9%) were male. More than 60% (62.5%) reported having a stable intimate relationship and 60% reported having sexual experience. More than half of the practice nurses (55.6%) were adherents of Taiwanese folk religion. There were no significant differences between the two groups for any of the study variables.

The mean total score ranged from 15 to 75 (46.20 6.41). The item mean scores were permission 2.97 ( $SD = 0.50$ ) out of 5, limited information 3.19 ( $SD = 0.55$ ) out of 5, specific suggestion 3.15

**Table 2. Nursing attitudes in sexual health care (NASHC ; n = 160)**

Items	strongly disagree n (%)	disagree n (%)	neutral n (%)	agree n (%)	strongly agree n (%)	Mean score ± SD
<b>Permission</b>						
2. Encouraging patients to talk	3 (1.9)	23 (14.4)	101 (63.1)	29 (18.1)	4 (2.5)	3.05 ± 0.71
3. Initiating discussion	1 (.6)	31 (19.4)	93 (58.1)	30 (18.8)	5 (3.1)	3.04 ± 0.73
4. Feeling confident about communication	3 (1.9)	32 (20.0)	87 (54.4)	37 (23.1)	3 (.6)	3.01 ± 0.73
5. Accepting patient's expression of sexual concern	3 (1.9)	8 (5.0)	81 (50.6)	65 (40.6)	3 (1.9)	3.36 ± 0.70
8. Accepting patients' private behaviors	24 (15.0)	68 (42.5)	53 (33.1)	14 (8.8)	1 (.6)	2.91 ± 0.73
Mean of level scores <sup>a</sup>						2.97 ± 0.50
<b>Limited information</b>						
1. Offering reading material about resuming sexual activity.	0 (0)	10 (6.3)	111 (69.4)	36 (22.5)	3 (1.9)	3.20 ± 0.57
7. Encouraging alternative methods of lovemaking	4 (2.5)	38 (23.8)	87 (54.4)	31 (19.4)	0 (0)	2.91 ± 0.73
13. Clarifying misinformation	5 (3.1)	3 (1.9)	72 (45.0)	69 (43.1)	11 (6.9)	3.49 ± 0.79
14. Identifying impact of unfamiliar surroundings and partner	6 (3.8)	38 (23.8)	80 (50.0)	31 (19.4)	5 (3.1)	2.94 ± 0.84
15. Giving routine information <sup>1</sup> .	4 (2.5)	4 (2.5)	81 (50.6)	61 (38.1)	10 (6.3)	3.43 ± 0.76
Mean of level scores <sup>a</sup>						3.19 ± 0.55
<b>Specific Suggestion</b>						
9. Encouraging the partner to discuss feelings and perceptions	7 (4.4)	11 (6.9)	90 (56.3)	47 (29.4)	5 (3.1)	3.20 ± 0.79
10. Encouraging the partner to take a more active role	8 (5.0)	54 (33.8)	73 (45.6)	23 (14.4)	2 (1.3)	2.73 ± 0.81
Mean of level scores <sup>a</sup>						3.15 ± 0.60
<b>Intensive Therapy</b>						
6. Referring patient to professional evaluation	3	6	66	76	9	3.51 ± 0.74

and therapy	(1.9)	(3.8)	(41.3)	(47.5)	(5.6)	
11. Encouraging use of sexual fantasies	8	76	57	19	8	2.54 ± 0.77
	(5.0)	(47.5)	(35.6)	(11.9)	(5.0)	
12. Identifying psychosexual problems (such as feeling less masculine or less feminine), and referring patient to other service	1	13	72	66	8	3.42 ± 0.74
	(.6)	(8.1)	(45.0)	(41.3)	(5.0)	
Mean of level scores <sup>a</sup>						2.97 ± 0.70

<sup>a</sup> Mean of level scores : Total score at this level divided by the number of items.

(SD =0.60) out of 5, and intensive therapy 2.97 (SD =0.70) out of 5. All were near the middle of the range of scores, indicating neutral attitudes toward SHC (Table 2). The regression analysis results are presented in Table 3. As indicated, the results revealed no significant differences in the associations of total score with gender, religion and religious involvement, stable intimate relationship, or sexual experience.

We inspected the data for multivariate normal and confirmed the criteria for CFA. The KMO value was 0.81 and P-value was <0.01 for Bartlett's test, indicating sampling adequacy and appropriate factor analysis. Skewness absolute value ranged from 0.006 to 1.296 and kurtosis ranged from 0.050 to 2.922, which met the criteria for normality and CFA. There were no negative error variances. Error variances were 0.08 to 0.81. The standard coefficients were between 0.03 and 0.71, with all less than 1; and the standard error was between 0.02 and 0.05. Thus, the data met the estimate criteria and was adequate for CFA.

### Measurement Model of Attitudes Toward SHC

Table 4 presents the four underlying factors (factor 1: permission, factor 2: limited information, factor 3: specific suggestion, and factor 4: intensive therapy) and factor loadings of questionnaire items. The four factors are supported by high factor loadings (>0.30) except for item 1 (AT1). CFA results suggested that the NASHC has four distinct factors, with each factor containing at least 2 items. For factor 1, items 2, 3, 4, 5, and 8 had factor loadings of more than 0.30 with a range of

0.39–0.73. Items 1, 7, 13, 14, and 15 had acceptable factor loadings for factor 2, ranging from 0.29 to 0.85. Items 9, and 10 had high factor loadings of 0.90 and 0.60, respectively, for factor 3. Items 6, 11 and 10 had high factor loadings, of 0.79, 0.42, and 0.84, respectively, for factor 4.

Subsequently, the aforementioned four-factor model underwent CFA using AMOS. The results showed that the data does not fit the hypothesized four-factor model well. From a statistical perspective, the data fit the criteria (Table 5,  $\chi^2 = 192.9$ ,  $df = 84$ ,  $\chi^2/df = 1.92$ ), but not from a practical perspective (Table 5, RMSEA = 0.09, GFI = 0.83, PGFI = 0.63). According to the modification index (MI), the model deposited error terms were 3 (ATH 4), 10 (ATH15), 12 (ATH 10) and 14 (ATH 11). After reviewing the wording of ATH 4 and 15, ATH15, “giving routine information” conveys a confident attitude toward communication, which was similar to ATH4. ATH11, “encouraging the use of sexual fantasies,” could be considered a specific suggestion, which could correlate with “encouraging partner” (ATH10) in a monogamous society. The RMSEA value attained a mediocre fit after we adjusted for the inter-correlations between error terms. Results of this analysis yielded a statistically and substantially better fitting model (Table 5,  $\chi^2 = 161.6$ ,  $df = 82$ ,  $\chi^2/df = 1.97$ , RMSEA = 0.07, GFI = 0.90, PGFI = 0.59). The construct validity improved (see Figure 1), and the data fit the hypothesized four-factor model. The final model explained 56% of the variance in the NASHC. Four factors positively and directly influenced NASHC scores.

**Table 3. Individual item factor loading, component reliability, unique variance extracted from latent variables, and correlations among factors from CFA in PLISSIT model (n = 160)**

Questionnaire Items	Standardized loading				Unique Variances	Component reliability (CR)
	P	LI	SS	IT		
Factor 1					0.42	0.77
AT2	0.56					
AT3	0.73					
AT4	0.69					
AT5	0.68					
AT8	0.39					
Factor 2					0.46	0.79
AT1		0.29				
AT7		0.50				
AT13		0.85				
AT14		0.62				
AT15		0.82				
Factor 3					0.66	0.80
AT9			0.90			
AT10			0.60			
Factor 4					0.56	0.79
AT6				0.79		
AT11				0.42		
AT12				0.84		
<b>Correlations among Factors</b>						
<b>Factor</b>	1	2	3	4		
1	1.00					
2	0.24	1.00				
3	0.09	0.78	1.00			
4	0.25	0.96	0.85	1.00		

## Discussion

Nurses may be the first people that patients would like to approach about sexual concerns. Practice nurses' attitudes toward SHC play

a major role in dealing with patients' sexual concerns. Therefore, an assessment tool with appropriate reliability and validity is important for understanding practice nurses' real attitudes toward SHC. In our study, practice nurses held distinct

**Table 4. Fit Indices of modification and hypothesized models of NASHC**

Model	df	X <sup>2</sup>	absolute fit measures			Comparative fit measures		parsimonious fit measures		
			RMSEA <0.08	GFI >0.9	AGFI >0.8	NNFI >.90	CFI >.90	CAIC	PGFI >.50	X <sup>2</sup> /df <3
Hypothesized model	84	192.9	.092	.83	.76	.31	.45	410.185<724.434 410.185>393.021	.63	1.92
e3↔10	83	179.2	.087	.84	.77	.38	.51	402.557<724.434 402.557>393.021	.58	2.16
e12↔14	82	161.6	.078	.86	.80	.48	.60	390.987<724.434 390.987<393.021	.59	1.97

attitudes toward SHC.

This is the first study to use the NASHC instrument to measure attitudes toward SHC, to test the factorial validity of the NASHC using CFA, and to examine whether personal characteristics act as moderating mechanisms in this hypothesized relationship. High component reliability indicated

that the internal consistency of the scale is excellent.

In addition, the results indicated that practice nurses have neutral attitudes toward SHC, concordant with a report from Sweden in which two-thirds of nurses agreed that it was their responsibility to talk about sexual issues<sup>[18]</sup>, but different from studies in Korea and China<sup>[9,16]</sup> which share the same culture of conservative sexuality. We assume that Taiwan’s social taboos have changed in recent decades. The Taiwan government introduced liberalized media and sex education curricula from Western countries after the ending of martial law (1947–1988), promoted information and communications technology development, and encouraged use of holistic nursing assessment tools in clinical practice. In addition to progressive nursing education, this explains, in part, the willingness of Taiwan practice nurses to address these concerns.

In the present study, we found that the variables of religion and being in an intimate relationship do not have a significant association with attitudes toward SHC. This finding is consistent with that of a recent study<sup>[19]</sup>, but differs from that of another study which showed that religion and stable intimate relationships influence health professional student attitudes toward sexuality<sup>[38]</sup>. Marital status has also been shown to influence attitudes toward sexuality.<sup>[9]</sup> In the present study, religious

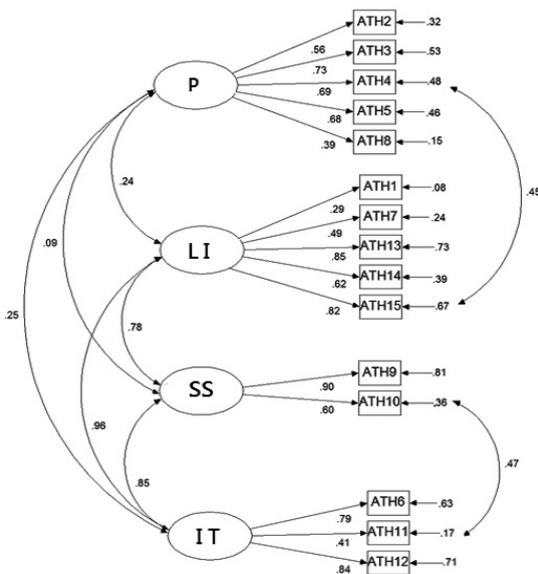


Figure.1. Structural Model of Nurses’ Attitudes Toward Sexual Health Care, RMSEA = 0.078, GFI = 0.86, AGFI = 0.80, CFI = 0.60, PGFI = 0.59, X<sup>2</sup>/df = 1.97. Values shown are standardized parameter estimates.

influence included different religious groups, as well as religiosity. The religious influence was not significant, which may be explained by professional nursing educational programs that assimilate the effect of religion on SHC. The variable of gender did not significantly correlate with total NASHC scores, which is consistent with the findings of a previous study.<sup>[19]</sup> A possible explanation is that gender equality in family and social education promotes gender equality in the community. This situation provides positive feedback for gender equality as promoted through government policy. Although our participants were uneven in terms of gender, the proportions of males and females were similar to the present gender distribution of nurses in Taiwan.

The results of reliability and factor analyses demonstrated that the item variables operationalize the respective elements of SHC. The factor loadings denoted the correlation between each questionnaire item and its underlying factor. Those greater than 0.30 were considered sufficient and suggested that the item adequately captured the underlying factor. The component reliability was adequate ( $\alpha = 0.77-0.80$ ) and the preliminary fit criteria and the fit of the internal structure of the model were acceptable. Thus, the PLISSIT model of the factors involved in practice nurses' attitudes toward SHC proposed in this study and our observed data were acceptable in terms of the model fit criteria.

Figure 1 shows inter-correlations between error terms in this model. It is not surprising that there is some overlap of item content across subscales. MI is a general sign of the need to revise the model and investigators should undertake MI carefully<sup>[40]</sup>. After the inter-correlations between error terms were amended, the RMSEA value represented mediocre fit. From CFA results, RMSEA was 0.078, which revealed a mediocre fit and supported the initial structural dimensions of the NASHC. RMSEA is an absolute index of fit, which determines how well the hypothesized model fits the sample data<sup>[35]</sup>. MacCallum et al. (1996), in elaborating on the values of cut-off points, noted that RMSEA values ranging from .08 to .10 indicate a mediocre fit.<sup>[41]</sup> The model estimation

confirmed the findings that attitudes toward SHC fit along a grade.<sup>[19]</sup> Our hypothesized model also suggested that the correlation between permission and specific-suggestion is close to zero ( $r = 0.09$ ,  $p = 0.2$ ). Therefore, we may try to discover some mediators between permission and specific-suggestion in future research using this model.

One limitation of this study concerns the sample. Although satisfying the minimal guidelines, the convenience sampling of and gathering of all materials from practice nurses restricted the generalization of results. Practice nurses are young and prone to presenting themselves as less conservative. This study was based on a cross-sectional design, which could not be used to describe causality.

## Conclusion

We statistically tested a hypothesized NASHC model based on PLISSIT hierarchical latent variable structure, and determined its goodness of fit with the sample data. In this study, the PLISSIT model was empirically tested using measurement and structural equation models. NASHC scale is a reliable tool for examining professionals' attitudes toward SHC in clinical practice.

## Relevance to clinical practice

One recommended area for improvement in understanding nurses' attitude toward SHC is to specifically target nursing interventions in sexual issues rather than personal attitudes. Further, it is essential to incorporate evidence-based phenomena of attitudes toward SHC in curriculum design before applying to clinical practice.

Future research should focus on utilization of the NASHC on different health care providers, such as physicians or nursing specialists, understanding the changes in attitudes based on number of working years in a longitudinal study design. In addition, changes after implementation of educational programs should be investigated.

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## References

- Steinke, E. E., Jaarsma, T. (2015). Sexual counseling and cardiovascular disease: Practical approaches. *Asian Journal of Andrology*, 17(1), 32-39. doi: 10.4103/1008-682x.135982
- Downing, A., Morris, E. J. A., Richards, M., Corner, J., Wright, P., Sebag-Montefiore, D. Glaser, A. W. (2015). Health-related quality of life after colorectal cancer in England: A patient-reported outcomes study of individuals 12 to 36 months after diagnosis. *Journal of Clinical Oncology*, 33(6), 616-624. doi: 10.1200/jco.2014.56.6539
- Elyasi, F., Kashi, Z., Tasfieh, B., Bahar, A., Khademloo, M. (2015). Sexual dysfunction in women with type 2 diabetes mellitus. *Iranian Journal of Medical Sciences*, 40(3), 206-213.
- Hendren, S. K., O'Connor, B. I., Liu, M., Asano, T., Cohen, Z., Swallow, C. J., McLeod, R. S. (2005). Prevalence of male and female sexual dysfunction is high following surgery for rectal cancer. *Annals of Surgery*, 242(2), 212-223.
- Karadag, A., Menten, B. B., Uner, A., Irkorucu, O., Ayaz, S., Ozkan, S., Ozkan, S. (2003). Impact of stomatherapy on quality of life in patients with permanent colostomies or ileostomies. *International Journal of Colorectal Disease*, 18(3), 234-238.
- Farrell, J., Belza, B. (2009). Are older patients comfortable discussing sexual health with nurses?. *Nursing Research*, 64(1), 51-57. Doi: 10.1079/NNR.0b013e31823a8600
- Higgins, A., Barker, P., Begley, C. M. (2006). Sexuality: the challenge to espoused *holistic care*. *International Journal of Nursing Practice*, 12(6), 345-351.
- Ayaz, S. (2013). Sexuality and nursing process: A literature review. *Sexuality and Disability*, 31(1). <https://doi.org/10.1007/s11195-012-9280-6>
- Zeng, Y. C., Li, Q., Wang, N., Ching, S. S. Y., Loke, A. Y. (2011). Chinese nurses' attitudes and beliefs toward sexuality care in cancer patients. *Cancer Nursing*, 34(2), E14-E20. doi: 10.1097/NCC.0b013e3181f04b02
- Huang, C. Y., Lee, S., Yen, W. J., Li, C. R., Tsai, L. Y. (2013). Nursing intervention on sexual health: A multilevel behavioral survey of senior nursing students in clinical practice. *International Journal of Sexual Health*, 25(4), 273-280. Retrieved from <http://www.scopus.com/inward/record.url?eid=2-s2.0-1784885993333&partnerID=40&md5=ba867800550ad3f81ae64fbfd1362577>
- Wu, H.-P. (2011). An exploratory study of nurses' providing of sexual health care to patients in Kaoshiung & Pindong Area of Taiwan. *Shu-Te Online Studies of Humanities and Social Sciences*, 7(1),34-57.
- Wang, H-H. (2011). Gender mainstreaming and nursing. *The Journal of Nursing*, 58(6). <https://doi.org/10.6224/JN.58.6.4>.
- Ajzen, I. (2001) Nature and operation of attitudes. *Annual Review of Psychology*, 52, 27-59.
- Magnan, M. A., Norris, D. M. (2008). Nursing students' perceptions of barriers to addressing patient sexuality concerns. *Journal of Nursing Education*, 47(6), 260-268.
- Gamel C, Davis BD, Hengeveld M(1993) Nurses' provision of teaching and counseling on sexuality: a review of the literature. *Journal of Advanced Nursing* 18, 1219-1227.
- Kim, S., Kang, H. S., Kim, J. H. (2011). A sexual health care attitude scale for nurses: Development and psychometric evaluation. *International Journal of Nursing Studies*, 48(12), 1522-1532. doi: 10.1016/j.ijnurstu.2011.06.008
- Magnan, M. A., Reynolds, K. (2006). Barriers to addressing patient sexuality concerns across five areas of specialization. *Clinical Nurse Specialist*, 20(6), 285-292.
- Saunamaki, N., Andersson, M., Engstrom, M. (2010). Discussing sexuality with patients: nurses' attitudes and beliefs. *Journal of Advanced Nursing*, 66(6), 1308-1316.
- Huang, C. Y., Tsai, L. Y., Tseng, T.-H., Li, C.-

- R., Lee, S. (2013). Nursing students' attitudes towards provision of sexual health care in clinical practice. *Journal of Clinical Nursing*, 22(23-24), 3577-3586.
20. Judith K. Lamp, R. R. A., Carrie Lee. (2000). Nurses' knowledge, attitudes, and skills related to sexuality. *Journal of Nursing Scholarship*, 32(4), 1.
  21. Kong SK, Wu LH, Loke AY (2009) Nursing students' knowledge, attitude and readiness to work for clients with sexual health concerns. *Journal of Clinical Nursing* 18, 2372-2382.
  22. Kotronoulas, G., Papadopoulou, C., Patiraki, E. (2009). Nurses' knowledge, attitudes, and practices regarding provision of sexual health care in patients with cancer: critical review of the evidence. *Supportive Care in Cancer*, 17(5), 479-501.18
  23. Tsai, Y.-F. (2004). Nurses' facilitators and barriers for taking a sexual history in Taiwan. [Research Support, Non-U.S. Gov't]. *Applied Nursing Research*, 17(4), 257-264.
  24. Ayaz, S., Kubilay, G. (2008), Effectiveness of the PLISSIT model for solving the sexual problems of patients with stoma. *Journal of Clinical Nursing*, 18, 89-88.
  25. Ho, T. M., Fernández, M. (2006). Patient's sexual health: do we care enough? *Journal of Renal Care*, 32(4), 183-186.
  26. Akinci, A. (2011). The comfort levels of nurses during clinical experiences which include sexual topics. *Sexuality & Disability*, 29(3), 239-250. doi: 10.1007/s11195-011-9208-6
  27. Ajzen, I., Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall, Englewood Cliffs, NJ.
  28. Doll, G. Appel. (2012). *Sexuality and Long-Term Care*. Maryland: Health Professions.
  29. Tzeng, Y.L., Shih, H.H., Yang, Y. L. (2011). Nursing education: Integrating gender equity consciousness. *The Journal of Nursing*, 58(6), 26-32. <https://doi.org/10.6224/JN.58.6.26>
  30. Dixon, K. D., Dixon, P. N. (2006). The PLISSIT Model: care and management of patients' psychosexual needs following radical surgery. [Review]. *Lippincott's Case Management*, 11(2), 101-106.
  31. Dune, T. M. (2012). Sexuality and physical disability: Exploring the barriers and solutions in healthcare. *Sexuality and Disability*, 30(2), 247-255. doi: 10.1007/s11195-012-9262-8
  32. Annon, J. (1976). The PLISSIT model. *Journal of Sex Education Therapy*, 2, 15.
  33. Katz, A. (2006). What have my kidneys got to do with my sex life?: The impact of late-stage chronic kidney disease on sexual function. *American Journal of Nursing*, 106(9), 81-83. Retrieved from <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=med4&AN=16954775>
  34. Krebs, L.U. (2008). Sexual assessment in cancer care: concepts, methods, and strategies for success. *Seminars in Oncology Nursing*, 24(2), 80-90. Doi:10.1016/j.soncn.2008.02.002.
  35. Byrne, B.J. (2012). *Structural Equation Modeling with Mplus: Basic concepts, Applications, and programming*. New York: Routledge, Taylor & Francis.
  36. Hair, J. F., Anderson, R. E., Tatham, R. L., Black, W. C. (1998). *Multivariate data analysis (5th ed.)*. Harlow, UK: Prentice Hall International.
  37. Wu, M. L. (2007). *Structural equation modeling-AMOS operation and application*. Taipei, Taiwan: Wunan.
  38. Papaharitou, S., Nakopoulou, E., Moraitou, M., Tsimtsiou, Z., Konstantinidou, E., Hatzichristou, D. (2008). Exploring sexual attitudes of students in health professions. *The Journal of Sexual Medicine*, 5(6), 1308-1316.
  39. Streiner D.L., Norman G.R. (2008). *Health measurement scales. A practical guide to their development and use (4th ed.)* Oxford: Oxford University Press, Chapter 8.
  40. Hoyle, R. H. (1995). *Structural equation modeling: Concepts, issues, and application*. Thousand Oaks, CA: Sage.
  41. MacCallum, R.C., Browne, M.W., and Sugawara, H., M. (1996), *Power Analysis and Determination of Sample Size for Covariance Structure Modeling*, *Psychological Methods*, 1 (2), 130-49.