Original Article

Psychometric evaluation of the Persian academic major satisfaction scale (P-AMSS) in Iranian nursing students

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Abstract

Background & Objective: The aim of this study was to assess the validity of the Persian version of the Academic Major Satisfaction Scale (P-AMSS) among Iranian Nursing Students.

Material & Methods: A cross-sectional study was carried out from January to March 2023. A total of 231 undergraduate nursing students completed demographic information and the P-AMSS. The data were analyzed using exploratory (EFA) and confirmatory factor analysis (CFA).

Results: The mean (± SD) score of academic major satisfaction among nursing students was 25.47 ± 6.4. The EFA results revealed a single factor that accounted for 63% of the total variance. The CFA results indicated a good fit ($\chi^{2(6)}$ = 8.53, p = 0.202, CMIN/DF = 1.422, CFI = 0.99, NFI = 0.99, TLI = 0.99, RMSEA (90% CI) = 0.043 [0.00;0.1]). The P-AMSS demonstrated good internal consistency and reliability (α=0.907; ω=0.921). Measurement invariance was confirmed across gender.

Conclusion: The P-AMSS, consisting of 6 items, is a brief scale with strong psychometric properties suitable for evaluating academic major satisfaction among Iranian nursing students.

Keywords: psychometric, major satisfaction, nursing students, Iran

Introduction

Satisfaction with one's field of study, or academic major satisfaction, is a crucial factor that significantly impacts student success and should be a primary consideration in educational planning (1). Research indicates that satisfied students tend to have better attendance, higher levels of engagement, and are less likely to drop out of their studies (2-4). Additionally, they often achieve higher Grade Point Averages (GPAs) (5), display greater academic motivation (6), experience lower levels of academic burnout (7), possess higher professional self-esteem (8), and report lower rates of depression (9). Conversely, it is essential to understand the various factors that influence students' satisfaction with their academic major. These factors include positive interactions with faculty and peers (6, 10), environmental influences (11, 12), and future job prospects (13).

Given that the level of major satisfaction varies across different fields of study (14), it is crucial to examine this variable's level separately within each field. Among various fields of study, nursing stands out due to its unique characteristics, particularly its direct connection to patients' health (15). Consequently, students who lack satisfaction with the nursing major may not excel in their future nursing careers and could potentially leave the profession. According to Vijayan et al., more than half of the nursing students surveyed in their study expressed satisfaction with the nursing program. Additionally, they found that first-year undergraduate students exhibited

higher levels of satisfaction with academic teaching and interactions compared to students in other academic years (16). Similarly, the study by Tomas et al. revealed that nursing students reported greater satisfaction with the clinical teaching aspect of the nursing program, while the least satisfaction was observed with in-class teaching (17).

Several studies have explored the implications of academic major satisfaction among nursing students. Mohammadi and Khoskhoo (18) found that higher levels of satisfaction with the field of study were associated with increased clinical competence among nursing students. Additionally, Safiri and Khanjani (9) revealed that nursing students who reported satisfaction with their field of study were less likely to experience mental disorders, including depression, during their academic studies.

According to the findings of Maleki and Janatolmakan (19), nearly half of Iranian nurses express a desire to leave their jobs. Moreover, Iran is currently grappling with a shortage of nurses (20). Given these circumstances, if nursing students are dissatisfied with their field of study, they are more likely to refrain from working after graduation or leave the profession. This situation presents a significant concern for Iran's healthcare system. Therefore, policymakers should consider assessing the level of major satisfaction among nursing students as a predictive factor in order to gain a better understanding of the situation. Numerous studies have measured major satisfaction among nursing students, and the results of Iranian studies have indicated that satisfaction with the nursing major ranges from moderate (21) to low (1).

There are various scales designed to measure students' satisfaction with their university experience, such as academic satisfaction (22, 23) and satisfaction with the services provided by the university (15). For instance, the Undergraduate Nursing Student Academic Satisfaction Scale (UNSASS) consists of 48 items and measures four factors: in-class teaching, clinical teaching, the program, and support and resources (24). Similarly, the postgraduate nursing student academic satisfaction scale (PNSASS) comprises 32 items and assesses four factors: nursing curriculum, academic interactions, teaching and learning, and educational facilities (22). Additionally, the Nursing Student Satisfaction Scale (NSSS) includes 31 items and measures four factors: curriculum, faculty, social interaction, and environment (25). These scales focus on various aspects of students' academic lives, not limited to the nursing program.

In contrast, the Academic Major Satisfaction Scale (AMSS) is a unidimensional scale developed by Nauta et al. Its validity and reliability have been evaluated in samples from the USA (26), Turkey (27), Korea (28), and Brazil (29).

Considering the significance of measuring the variable academic major satisfaction in nursing students, it is crucial to have a valid and reliable instrument. Therefore, this study aims to assess the construct validity and reliability of the Persian version of the Academic Major Satisfaction Scale (P-AMSS) among Iranian nursing students.

Material & Methods

Design and setting(s)

In this cross-sectional study, data was gathered from Iranian undergraduate nursing students online from January to March 2023.

Participants and sampling

Participants included undergraduate nursing students from two selected universities who were willing to take part in the study and had completed at least one semester. The study used convenience sampling and included 231 undergraduate nursing students, which is well above the minimum sample size recommended by Kellar et al (30). The dataset was divided in half, with one portion used for exploratory factor analysis as suggested by Chiappinotto and the other portion used for Confirmatory Factor Analysis (CFA). This approach allowed for a comprehensive analysis of the data and its underlying factors.

Tools/Instruments

The online questionnaire included demographic information and the P-AMSS, which is based on the original AMSS scale developed by Nauta et al (26) in the USA to measure college students' satisfaction with their academic majors. The P-AMSS consists of six items measured on a 5-point Likert scale, with four of the questions (1-3, 5) being negatively worded, and their scores were reversed. Higher scores indicated higher academic major satisfaction. The factor loadings for the items ranged from 0.51 to 0.88, and the Cronbach's alpha for the six items was high, ranging from 0.90 to 0.94. The model fit statistics indicated a good fit: $\chi^2(2) = 9.364$, TLI = 0.95, CFI = 0.99, RMSEA = 0.12, SRMR = 0.02.After obtaining permission from the developer of AMSS, Dr. Margie Nauta, the translation process of the AMSS into Persian involved forward–backward translation

techniques recommended by the World Health Organization (31). The scale was translated into Persian by two independent translators and then back-translated into English by a bilingual team. The face and content validity of the translated scale were evaluated by ten nursing students and ten faculty members of nursing, and no changes to the appearance or content of the scale were deemed necessary.

Data collection methods

An online survey was developed using Google Forms, and the survey link was distributed to students through social media platforms such as Telegram and WhatsApp. It was noted that all students in these faculties were part of the university's virtual education group following the COVID-19 pandemic. Therefore, it was confirmed that all students had seen the survey link. As a result, informed consent for participating in the study was obtained online.

Data analysis

Exploratory factor analysis (EFA) and CFA were used to assess the structural validity of P-AMSS. Factor extraction in EFA was done using maximum likelihood on the first dataset (n = 115). Also, to determine how suited data is for EFA, Kaiser–Meyer–Olkin (KMO) and Bartlett's test were calculated. Given the significance of accurately reporting psychometric indicators, it is essential to ensure that data is presented in a clear and concise manner (32). The data was analyzed to determine factorability using various criteria such as eigenvalues > 0.2, and factor loadings > 0.3. Parallel analysis was also conducted to extract the optimal number of factors (33). Next, a CFA was used to test the goodness-of-fit of P-AMSS on the second dataset (n = 116) based on the following criteria: the Chi-square (χ^2) test, Comparative Fit Index (CFI) > 0.90, Normed Fit Index (NFI) > 0.90, Tucker–Lewis Index (TLI) > 0.90, and Root Mean Square Error of Approximation (RMSEA) < 0.08 (34). The SPSS v.26 and AMOS v.27 software were used to analyze the data. Cronbach's alpha reliability coefficient (α) and omega coefficient (ω) were employed to assess the internal consistency of P-AMSS using the SemTools package (α and ω > 0.7 indicate acceptability) (35).

To determine the suitability of P-AMSS for both genders, a multi-group confirmatory analysis was conducted using the lavaan package with robust maximum likelihood estimation. This involved tests for configural, metric, and scalar invariance. Non-significant $\Delta\chi^2$ and ΔCFI < 0.01 indicated invariance between nested models.

Normal distribution, outliers, and missing data

Skewness (±3) and kurtosis (±7) were employed to assess the univariate distribution of the data individually. In addition, the multivariate normality distribution was evaluated using the Mardia coefficient of multivariate kurtosis (< 8). The presence of multivariate outliers was determined using Mahalanobis d-squared ($p < 0.001$) (33). No missing data were observed in this study. Data collection was carried out through an online survey, where all items in the questionnaire were marked as mandatory, ensuring that participants could not submit the survey without answering all questions. Therefore, the analysis included complete responses for all participants, eliminating the need for multiple imputations or pairwise deletion methods.

Results

In this study, 231 undergraduate nursing students participated. Most of the students were female (n=165, 71.4%), with a mean age of 21.54 (SD = 2.5) years and a GPA of 17.56 (SD=1.1). Other demographic and educational information is provided in **Table 1**.

Table 1. Demographic characteristics of students (n = 231)

Variables	n (%)
Gender	
Female	165 (71.4)
Male	66 (28.6)
Academic year	
1st year	65 (28.1)
2nd year	56 (24.3)
3rd year	51 (22.1)
4th year	59 (25.5)
Age mean ± SD years (range)	21.54 ± 2.5(18-39)
GPA mean ± SD out of 20 points (range)	17.56 ± 1.1 (14.50-19.75)
AMS mean ± SD (range)	25.47 ± 6.4 (6-30)

Abbreviations: n, number of participants; SD, standard deviation; GPA, grade point average, AMS: academic major satisfaction.

The descriptive statistics, skewness, and kurtosis for the items indicated that none exhibited significant deviation from normality, which suggests that maximum likelihood estimation is appropriate. The exploratory factor analysis (EFA) revealed the extraction of a single factor that accounted for 63% of the total variance. After implementing three modifications (between items 1 & 6, 3 & 5, and 2 & 4), the goodness-of-fit statistics confirmed the structure of P-AMSS ($\chi^2(6) = 8.53$,

p = 0.202, CMIN/DF = 1.422, CFI = 0.99, NFI = 0.99, TLI = 0.99, RMSEA (90% CI) = 0.043 [0.00; 0.1]). The confirmatory factor analysis (CFA) model is presented in **Figure 1**. As indicated by the reliability values in **Table 2**, the P-AMSS exhibits good internal consistency and reliability.

The analysis of invariance for the P-AMSS showed metric invariance but not scalar invariance, as per the previously defined invariance criteria (**Table 3**). Furthermore, the predictive validity of GPA was examined using a structural equation model (SEM) with GPA regressed on AMSS through the lavaan package. The findings indicated that AMSS did not predict GPA (β = 0.087, p = 0.08).

Table 2. Descriptive properties and EFA results and Reliability of P-AMSS

Items	Descriptive				EFA				Reliability
	Mean	Std. Dev	Skew	Kurtosis	Factor loading	h^2	λ	Variance (%)	
MS1.I often wish I hadn't gotten into this course.	3.85	1.27	-0.89	-0.21	0.82	0.68	3.78	%63	Alpha=0.90 Alpha.ord=0.94 Omega=0.92 Avevar=0.75
MS3.I am strongly considering changing to another course	4.11	1.30	-1.34	0.52	0.82	0.67			
MS4. Overall, I am happy with the course I've chosen	3.72	1.25	-0.77	-0.40	0.82	0.67			
MS5. I would like to talk to someone about changing my course	4.17	1.21	-1.37	0.80	0.80	0.65			
MS6. I feel good about the course I've selected	3.79	1.18	-0.74	-0.29	0.80	0.64			
MS2. I wish I was happier with my choice of an academic course	3.79	1.18	-0.74	-0.29	0.67	0.45			

Note: The table shows the descriptive statistics (mean, standard deviation, skewness, and kurtosis), exploratory factor analysis (EFA) results (factor loading and item communality), and reliability measures (Cronbach's alpha, ordinal alpha, omega, and average variance extracted).
Abbreviations: h^2, item communality; **λ, eigenvalue.

Table 3. Gender Invariance analysis of P-AMSS

Model Invariance	χ^2 (df)	$\Delta\chi^2$ (df)	*p*	CFI	ΔCFI	RMSEA	ΔRMSEA
Configural	112.776 (18)	-	-	0.89	-	0.214	-
Metric	116.826(23)	4.050 (5)	0.542	0.89	.000	0.188	-.002
Scalar	135.407 (28)	18.582 (5)	0.002	0.88	0.015	0.182	0.006

Note: $\Delta\chi^2$ = Change in Chi-square; ΔCFI = Change in Comparative Fit Index; ΔRMSEA = Change in Root Mean Square Error of Approximation.
Abbreviations: χ^2, chi-square test; df, degree of freedom; p, probability-value; CFI, comparative fit index; RMSEA, root mean square error of approximation.

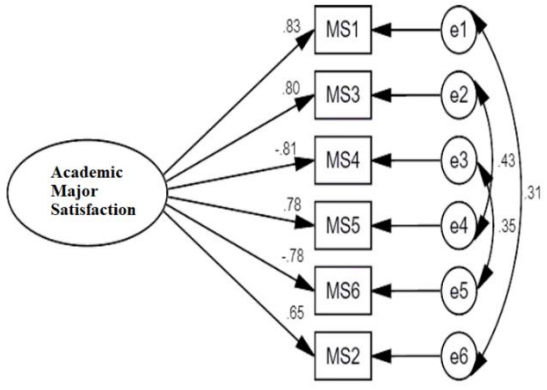

Figure 1. The CFA model of P-AMS

Discussion

In this study, the AMSS was initially translated into Persian and subsequently evaluated for construct validity and reliability among nursing students. The study findings indicated that this scale demonstrated acceptable goodness-of-fit indexes and reliability, making it a suitable scale for both male and female nursing students. The P-AMSS is a unidimensional factor comprising six items. Overall, the psychometric evaluation of this scale in the nursing student population did not significantly differ from that of Korean, Brazilian, and Turkish students (27-29).

The total explained variance in this study was 63%, whereas it was 74% in the Brazil study, 62% in the Korean version, and 57.5% in the Turkish version of the scale. It's important to note that the explained variance can vary depending on the factor extraction method; in this study, maximum likelihood was used.

Upon examining the findings of the standardized loadings in the confirmatory factor analysis, the items "I often wish I hadn't gotten into this course" and "I am strongly considering changing to another course" displayed higher coefficients, indicating their significance in influencing the overall satisfaction score. During the confirmatory factor analysis of the Academic Major Satisfaction Scale, several modifications were implemented between specific pairs of items to enhance the model fit and ensure the scale's reliability.

Item MS1 ("I often wish I hadn't gotten into this course") conveys a negative sentiment about the academic choice, whereas Item MS6 ("I feel good about the course I've selected") expresses a positive sentiment. The modification between these items was deemed necessary to address the potential overlap in the constructs they measure. Although both items pertain to overall satisfaction with the course, they capture different emotional responses. Allowing for a correlation between their errors enables a more accurate representation of the dual nature of student sentiments regarding their academic choices. Item MS3 ("I am strongly considering changing to another course") reflects a desire for change, whereas Item MS5 ("I would like to talk to someone about changing my course") indicates a proactive step toward that change. The modification between these items was deemed justified due to their conceptual linkage; students contemplating a course change are likely to seek advice. This correlation helps to elucidate the relationship between indecision and the desire for support, thereby enhancing the model's explanatory power.Item MS2 ("I wish I was happier with my choice of an academic course") and Item MS4 ("Overall, I am happy with the course I've chosen") both evaluate satisfaction levels but from different perspectives. The modification was necessary to address the shared variance in students' responses, as those who express dissatisfaction (MS2) may also express nuanced satisfaction (MS4). Allowing for a correlation between these items acknowledges the complexity of students' feelings toward their academic choices.

The P-AMSS demonstrated acceptable internal consistency and reliability. The internal consistency of P-AMSS was assessed using Cronbach's alpha (α) and omega coefficient (ω). The Cronbach's alpha value for P-AMSS was 0.907, which was slightly lower than the original scale (α=0.95) (26) but higher than the reported values in other studies. Specifically, this index was reported as 0.85 and 0.88 among male and female Korean students, 0.87 among Brazilian students, and 0.83 among Turkish students (27-29). Based on the analysis of configural, metric, and scalar levels of gender invariance, the P-AMSS exhibited an equivalent structure across genders, consistent with the findings of the Sovet and Park (28) as well as Silva and Kamazaki (29) studies. Additionally, no gender differences were observed in the original scale (26).

It's important to note that the scales used in Iranian studies were mostly single-item and researcher-made, lacking in psychometric evaluations. Furthermore, psychometric scales in the field of academic satisfaction primarily focused on aspects such as satisfaction with university services, professors' teaching, and so on. As a result, there was no existing scale available to measure students' satisfaction with their major of study. Consequently, researchers were unable to compare the P-AMSS with the scales used in previous studies in this context.

Considering that these students represent the future of nursing in the country's health system, it is crucial to take into account their concerns and satisfaction. Addressing their needs and ensuring their satisfaction can contribute to their motivation and the overall quality of their education. One of the limitations of this study was the use of the convenience sampling method. While the results of this study demonstrated that the P-AMSS scale possesses good psychometric properties, it is important to note that its validity and reliability may vary in other fields of study and different settings. This underscores the need for further research to confirm its robustness.

To the best of our knowledge, the previous scales used by researchers on this topic were self-made and had not been assessed for construct validity. This study represents the first psychometric investigation conducted in the field of major satisfaction among students, particularly nursing students. The psychometric scale developed in this study will be valuable for evaluating major satisfaction among nursing students, informing university management, facilitating research, and predicting the outcomes associated with major satisfaction.

Conclusion

In this study, the validity and reliability of the P-AMSS were assessed. The findings indicate that the 6-item P-AMSS is a suitable scale for evaluating the academic major satisfaction of Iranian nursing students. Given the future responsibilities of nursing students in sensitive roles, it is important to measure their level of major satisfaction. Therefore, university managers should prioritize identifying the causes of dissatisfaction, evaluating student satisfaction levels, providing appropriate facilities, addressing shortcomings, and creating a positive atmosphere to enhance nursing students' satisfaction.

Ethical considerations

This study is a part of a larger study, and the study protocol was approved by the ethics committee of the Alborz University of Medical Sciences (ethics code: IR.ABZUMS.REC.1401.290). The study objectives, voluntary participation, the option to withdraw from the study at any time, and the assurance of confidentiality and anonymity of information were provided on the first page of the online questionnaire. Online informed consent was obtained from all participants.

Artificial intelligence utilization for article writing

None

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Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author contributions

Performance of data gathering: E.H & P.R; Planning and supervision of the work: HSH and P.R; Performance of the analysis: J.M; Manuscript draft: all authors; Comment on the final manuscript: All authors.

Supporting resources

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Data availability statement

Due to the privacy of the research participants, the data generated during the current study are not publicly available but can be obtained from the corresponding author upon reasonable request.

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