VNU Journal of Science: Medical and Pharmaceutical Sciences

Journal homepage: https://js.vnu.edu.vn/MPS

Review Article

Measuring Satisfaction with Pharmacy Education Quality: A Systematic Review of Instruments

Tran Thi Thu Trang[1,2], Nguyen Thi Song Ha[1,*], Phan Thi Thanh Thao[2]

[1]*Hanoi University of Pharmacy, 13-15 Le Thanh Tong, Hoan Kiem, Hanoi, Vietnam*

[2]*Thanh Do University, Lai Xa Industrial Cluster, Hoai Duc, Hanoi, Vietnam*

Received 14th December 2024
Revised 18th October 2025; Accepted 22nd October 2025

Abstract: Background: Satisfaction with the quality of education is a crucial factor in enhancing training effectiveness to meet stakeholders' expectations. Objective: This study aims to synthesize and evaluate instruments used to measure satisfaction with the quality of pharmacy education, focusing on their structure, reliability, and validity. Methods: The study adhered to PRISMA guidelines, conducting searches in Scopus, PubMed, and ERIC databases up to July 2024, supplemented by a manual search of full-text articles not indexed in these databases. Inclusion criteria covered studies employing instruments to assess satisfaction in pharmacy education. Study quality was evaluated using the Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies. Results: Nine eligible studies were included in the analysis. The evaluation instruments comprised 4 to 8 key factors, with the most common being facilities, curriculum content, teaching staff, and administrative management. Cronbach's alpha values ranged from 0.532 to 0.93, indicating varied reliability across instruments. Student satisfaction levels differed by country and were influenced by factors such as infrastructure, teaching methods, and institutional support. Conclusion: This review provides an overview of instruments measuring satisfaction with the quality of pharmacy education. The findings can serve as a foundation for improving pharmacy education programs, emphasizing the balance between theory and practice, upgrading facilities, and enhancing academic support services.

Keywords: Satisfaction, pharmacy education quality, instruments.

* Corresponding author.
E-mail address: Songhaktd@gmail.com

https://doi.org/10.25073/2588-1132/vnumps.4738

1. Introduction

Satisfaction is defined as an individual's positive perception when their expectations for a product, service, or experience, such as an educational program, are met or exceeded, reflecting the alignment between what is provided and what is anticipated by the user [1]. It is a critical metric for evaluating effectiveness across various fields, particularly in higher education. However, the characteristics of educational services differ from those of other types of services. Educational quality is not solely perceived and evaluated immediately by students – the direct recipients of the service – but also assessed by other stakeholders, including parents, who finance the service; employers, who utilize the trained workforce for business and production purposes; and society at large, which ensures that educational outcomes contribute to socio-economic development.

In the field of pharmacy education, which demands a combination of specialized knowledge, practical skills, and professional ethics, stakeholder satisfaction, including that of students, alumni, teaching staff, and employers, plays a pivotal role. It not only reflects the quality of education but also contributes to continuous improvement and enhances the reputation of educational institutions. Previous studies have shown that the level of satisfaction among stakeholders is influenced by various factors, including their roles within the educational system, the societal context, and differing quality expectations. Students, as the direct beneficiaries of educational programs, often assess their satisfaction based on their learning experiences, the quality of teaching, and the level of institutional support [2,3]. Meanwhile, teaching staff members focus on their work environment, teaching resources, and opportunities for professional development, which can result in significantly different perspectives on satisfaction [4]. Alumni and employers often prioritize the practical applicability of educational programs, reflected in graduates' adaptability and professional competencies. These factors directly highlight the value of educational quality within the labor market context. [5]. The varying perspectives among stakeholder groups emphasize the importance of optimizing educational quality components to meet diverse expectations.

Numerous instruments have been developed to measure satisfaction, ranging from generic instruments applicable across disciplines [6-10] to specialized instruments for specific groups, such as nursing students [11, 12], international students [13], and medical students [14]. However, the inherently multidimensional nature of academic satisfaction means that many existing instruments fail to comprehensively capture all critical aspects. While research on student satisfaction with learning experiences is relatively abundant, comprehensive assessments involving all stakeholders in pharmacy education remain scarce. Notably, no systematic review has synthesized the instruments used to measure satisfaction in the field of pharmacy education.

This study aims to conduct a systematic review of instruments used to measure satisfaction with the quality of pharmacy education, focusing on their characteristics, validity, reliability, and constituent factors. Additionally, the research seeks to establish a scientific foundation for improving satisfaction assessment methods, ultimately enhancing educational quality and better aligning with stakeholder expectations in pharmacy education.

2. Method

The study was conducted from March 2024 to July 2024. The study included all reports, articles, and publications written or published up to 2024 that examined instruments for assessing factors affecting the quality of pharmacy education programs in English (hereinafter referred to as "the studies").

Inclusion criteria: Studies that utilized instruments to assess the quality of pharmacy education in English, with no restrictions on study design, and that were published up to July 1st, 2024.

Exclusion criteria: Studies were excluded if the full text was not accessible, if insufficient information on the instruments used was provided, or if the instruments were not developed or validated in English. Additionally, non-original studies such as reviews, systematic reviews, personal opinions, news articles, previews, research highlights, commentaries, and secondary research were excluded. Unpublished articles, qualitative studies, and studies not directly related to the assessment of pharmacy education quality were also excluded from the analysis.

Research Methods: The systematic review was conducted according to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [15]. This approach ensures a standardized and comprehensive methodology for identifying, selecting, and analyzing relevant studies.

Search Strategy for Identifying Relevant Studies: To identify relevant studies, the following databases were utilized: Scopus, Google Scholar, PubMed, and ERIC. These databases were selected to ensure a comprehensive search across both general and specialized academic literature in pharmacy education. A comprehensive keyword system was developed based on key themes related to the research objectives, including educational programs, pharmacy education, measurement instruments, education quality, and stakeholder groups. Educational programs were represented by terms such as "education program*," "training program*," "curriculum*," "degree program*," and "academic program*." For the pharmacy field, keywords like "pharm*," "pharmacy education," and "pharmaceutical education" were used. Measurement instruments were targeted with terms such as "instrument*," "tool*," "measure*," "evaluation tool*," "survey*," "questionnaire*," "scale*," and "framework*." Quality of education was captured using "quality," "education quality," "academic quality," and "education standard*." Keywords for stakeholder groups included "learner*," "student*," "matriculant*," "employer," "recruiter," "hiring manager," "HR professional," "alumni," "graduate*," "former student*," "faculty," "professor*," and "educator*." To focus on the context of higher education, terms like "higher education," "university," "college," "undergrad*," "postgrad*," and "tertiary education" were employed. Irrelevant terms such as "K-12," "primary school," or "corporate training" were excluded to avoid irrelevant search results. The search strategy was optimized using logical operators (AND, OR, NOT), quotation marks for exact phrases, and wildcard characters (*) to ensure the coverage of diverse research.

In addition to the database search, a manual search was conducted by actively searching, reviewing, and reading the full text of academic articles that were not indexed in the selected databases. This complementary method is crucial as it ensures that relevant studies, often overlooked by database algorithms or not indexed in specific databases, are included in the review process. The search process was conducted on July 1st, 2024.

Data Screening: Researchers uploaded articles from the databases to the Covidence platform to identify and eliminate duplicates based on author, publication year, and title. The screening process was conducted in two stages: i) Screening titles and abstracts; and ii) Reviewing full texts to finalize the eligible studies. An Excel sheet was prepared to document detailed information, including titles, abstracts, and exclusion criteria. Screening was performed independently by at least two researchers to minimize bias, with a third reviewer resolving any disagreements.

Data Extraction: Details from the selected studies were extracted into an Excel sheet, capturing information on study characteristics, measurement instruments used, and main findings.

Quality Assessment: The methodological quality of the studies was evaluated using the Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies (JBI). Studies with five or more "Yes" responses were classified as having

medium or high quality, while those scoring below five were excluded. Discrepancies in assessment were resolved through group discussion.

Data Analysis: The systematic review results were presented in summary tables that included detailed information on studies meeting the inclusion criteria. When data collection timelines were unavailable, the publication year was used as a proxy.

3. Results

The study selection process followed a comprehensive strategy, including database and manual searches. A total of 2,039 articles were initially identified from Scopus (1,096 articles), PubMed (730 articles), and ERIC (213 articles). After removing 631 duplicate studies, 1,408 articles were screened by title and abstract. From this step, 1,295 articles were excluded for not meeting the eligibility criteria. Among the 113 articles that underwent full-text screening, 104 articles were excluded for reasons such as a lack of detailed instruments in the full text (9 articles), inaccessible full text (4 articles), being qualitative studies (15 articles), irrelevance to the study population (6 articles), or containing irrelevant data (72 articles). Additionally, through manual searching, 2 additional articles were identified. Ultimately, a total of 9 studies met all inclusion criteria and were included in the final review.

All 9 studies met the quality criteria outlined in the Joanna Briggs Institute Checklist for Analytical Cross-Sectional Studies (JBI) and were included in the final analysis.

The studies included in the analysis were published between 2001 and 2023, with the first study published in 2001 and the most recent in 2023. These studies were carried out in various countries, including Vietnam (1 study), India (2 studies), Nigeria (1 study), Chile (1 study), Oman (1 study), South Korea (1 study), and the United States (2 studies). The research subjects included undergraduate students, postgraduate students, and pharmacy alumni, with sample sizes ranging from 85 to 372 participants. Most of the studies employed a cross-sectional descriptive design using both probability and non-probability sampling techniques. Data collection was primarily conducted through structured interviews using self-administered questionnaires. The Likert scale (ranging from 4 to 7 points) was commonly used to measure satisfaction levels.

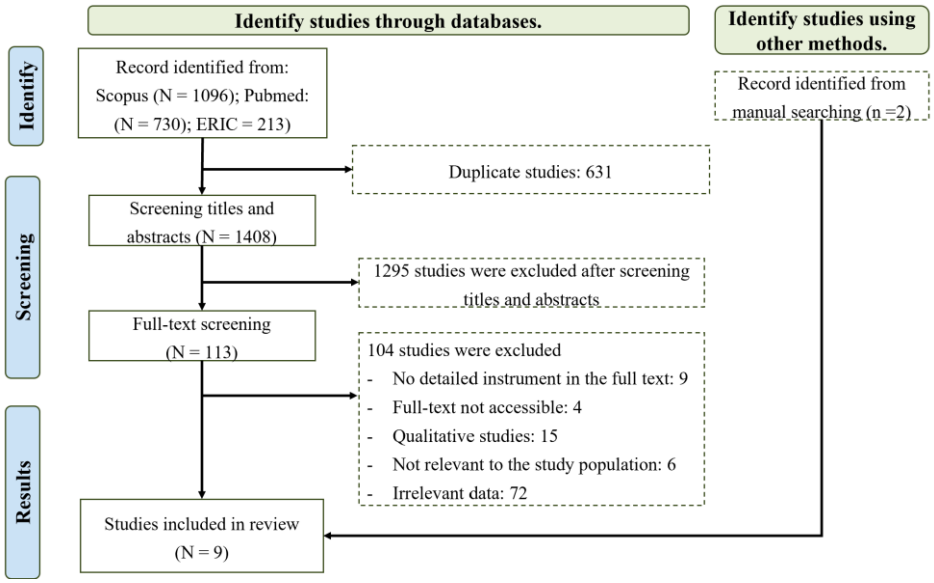

Figure 1. PRISMA Flow Diagram for the Research Process.

Table 1. Characteristics of Included Studies

No.	Author(s)	Data Collection Period	Study Location	Study Participants	Study Design	Sampling Technique	Data Collection Method
	Tran Ba Kien et al., (2023) [16]	11/2021 – 1/2022	Vietnam	282 Pharmacy Alumni	Cross-sectional	Non-probability (Purposive sampling)	Structured interviews (Phase 1: Online self-administered questionnaire via Google Form; Phase 2: Structured interviews via phone and Zalo)
	Hemant Gupta, Bhaveshkumar J Parmar (2021) [17]	NR	India	370 Postgraduate Pharmacy Students from 8 universities	Cross-sectional	Probability (Cluster-based random sampling)	Structured interviews (Self-administered questionnaires in classrooms)
	Onah, P. O., Abdulateef, S., & Abdulmalik, A. (2021) [18]	NR	Nigeria	285 Pharmacy Students (3rd to 5th year)	Cross-sectional	NR	Structured interviews (Self-administered questionnaires in classrooms)
	Ruiz G.; Ulloa A.; Díaz M.; Mora A.J. (2021) [19]	2011: Alumni who studied the drug-oriented curriculum (academic year 2003-2007). 2018: Alumni who studied the patient-oriented curriculum (academic year 2012-2016)	Chile	145 alumni of the drug-oriented curriculum; 155 alumni of the patient-oriented curriculum	Cross-sectional	Non-probability sampling (purposive sampling)	Structured interviews (conducted directly or via phone; if alumni refuse to participate in direct or phone interviews, the survey will be conducted via email).
	Er, H.M., Nadarajah, V.D., Ng, S.H., Wong, A.N. (2020) [20]	03/2016-06/2016	Oman	96 Pharmacy Students	Cross-sectional	Probability (Multistage simple random sampling)	NR

No.	Author(s)	Data Collection Period	Study Location	Study Participants	Study Design	Sampling Technique	Data Collection Method
	Ahmed A. Abusham, Nawras A. Al-Harthy (2018) [21]	NR	India	124 Pharmacy Students from 6 universities	Cross-sectional	NR	Structured interviews (Self-administered questionnaires in classrooms)
	Lee, Heejung et al., (2014) [22]	1/9/2014 – 20/9/2014	South Korea	207 Final-year Pharmacy Students from 4 universities	Cross-sectional	NR	Structured interviews (Self-administered questionnaires in schools)
	Holdford, David; Patkar, Anuprita (2003) [23]	1999-2002	USA	372 Final-year Pharmacy Students (4-year program)	Cross-sectional	NR	Structured interviews (Self-administered questionnaires in classrooms)
	Holdford David, Reinders Thomas (2001) [24]	(-)	USA	85 Final-year Pharmacy Students	Cross-sectional	NR	Structured interviews (Self-administered questionnaires in classrooms)

* NR: Not reported.

Table 2. Characteristics of the Instruments

No.	Author(s)	Instruments			Methods for Testing the Reliability and Validity of the Instrument
		Origin	Scale	Factors	
	Tran Ba Kien et al., (2023) [16]	Self-developed instrument	Likert 5	The instrument consists of 4 factors and 19 items: (1) Training Staff: 6 items; (2) Facilities and Environment Qualities (FE): 5 items; (3) Training Programmes: 4 items Administrative Formalities and Support; (4) Activities: 4 items.	*Content validity:* Developed from previous studies and pre-tested on 20 alumni. Structural validity: EFA *Reliability:* CA ranged from 0.84 to 0.93.

No.	Author(s)	Instruments			Methods for Testing the Reliability and Validity of the Instrument
		Origin	Scale	Factors	
	Hemant Gupta, Bhaveshkumar J Parmar (2021) [17]	Self-developed instrument based on the study by Gupta (2017)	Likert 5	The instrument consists of 4 factors and 14 items: (1) Modern Academic Facilities: 6 items; (2) Career Opportunities: 4 items; (3) Interdisciplinary Skills: 2 items; (4) Social Status: 2 items.	*Content validity:* The instrument was developed based on previous studies. Structural validity: PCA; CFA; OLS *Reliability:* CA ranged from 0.532 to 0.896, CR = 0.722 – 0.912.
	Onah, P. O., Abdulateef, S., & Abdulmalik, A. (2021) [18]	Self-developed based on the instrument by Holdford & Reinders (2001).	Likert 5	The instrument consists of 5 factors and 35 items: (1) Facilities: 6 items; (2) Interpersonal Relationships: 7 items; (3) Faculty Expertise: 3 items; (4) Communication System: 6 items; (5) General Administration: 13 items.	*Content validity:* Uses the instrument for evaluating educational service quality (ESQ), developed by Holdford and Reinders (2001). Structural validity: PCA Reliability: NR
	Ruiz G.; Ulloa A.; Díaz M.; Mora A.J. (2021) [19]	Self-developed instrument	Likert 5	The instrument consists of 6 factors and 34 items: (1) Design and Organisation 6 items; (2) Contents and Fulfillment: 6 items; (3) Physical Resources: 4 items; (4) Teachers: 5 items; (5) Professional Focus: 8 items; (6) Emotional Bonding with the Programme/ University: 5 items.	*Content validity:* Uses a self-developed instrument validated by 12 experts through the I-CVI index. Structural validity: NR *Reliability:* Cronbach's alpha for factors ≥ 0.70, ranging from 0.73 to 0.93.
	Ahmed A. Abusham and Nawras A. Al-Harthy (2018) [20]	Self-developed instrument	Likert 4	The instrument consists of 6 factors and 20 items: (1) Study plan: 3 items; (2) Instructors: 4 items; (3) Methods of teaching: 4 items; (4) Practicum courses and training: 4 items; (5) Online courses: 4 items; (6) Satisfaction with the overall Pharmacy Program at University of Nizwa: 1 item.	*Content validity:* Uses a self-developed instrument based on a literature review and information provided by faculty and students. The instrument was validated by an expert panel and pre-tested on 14 students. Structural validity: NR Reliability: NR

No.	Author(s)	Instruments			Methods for Testing the Reliability and Validity of the Instrument
		Origin	Scale	Factors	
	Mandal Kaushik, Gupta Hemant (2018) [21]	Uses a pre-existing instrument by Guptamadam (2016).	Likert 5	The instrument consists of 6 factors and 26 items: (1) Scope for Career Development: 8 items; (2) Academic Program: 4 items; (3) Facilities: 6 items; (4) Transparent Administration: 4 items; (5) Alternative Opening in the Job Market: 2 items; (6) Value for Money: 2 items.	*Content validity:* Uses a pre-existing instrument by Guptamadam (2016), which has been validated for content validity. Structural validity: PCA *Reliability:* Cronbach's alpha for factors ranges from 0.563 to 0.911, and CR ranges from 0.682 to 0.895.
	Lee, Heejung et al. (2014) [22]	Modifies the content of the SERVQUAL instrument.	Likert 7	The instrument consists of 8 factors and 33 items: (1) Facilities: 6 items; (2) Standardized Education: 2 items; (3) Pharmacy Practice: 4 items; (4) Education Service: 8 items; (5) Administration: 2 items; (6) Image of the University: 3 items; (7) Interactions in Learning: 4 items; (8) Providing Information: 4 items; (9) Overall Satisfaction: 5 items.	*Content validity:* The instrument was developed by modifying the content of the SERVQUAL instrument and pre-tested on a group of students for standardization. Structural validity: PCA *Reliability:* CA > 0.8 for all factors.
	Holdford, David; Patkar, Anuprita (2003) [23]	SERVPERF	Likert 5	The instrument consists of 4 factors and 41 items: (1) Administration: 14 items; (2) Interpersonal Behavior of Faculty: 8 items (3) Faculty Communication: 6 items; (4) Resources: 6 items; (5) Faculty Expertise: 3 items;	Content validity: NR Structural validity: EFA, Regression *Reliability:* CA ≥ 0.7 for all factors.
	Holdford David, Reinders Thomas (2001) [24]	Self-developed instrument based on SERVPERF	Likert 5	The instrument consists of 4 factors and 19 items: (1) Learning Resources: 6 items; (2) Faculty: 17 items; (3) Administration: 14 items; (4) Outcome: 4 items.	*Content validity:* The instrument was self-developed by modifying the content of the SERVPERF scale. It was validated by 4 faculty members from the school's educational

No.	Author(s)	Instruments			Methods for Testing the Reliability and Validity of the Instrument
		Origin	Scale	Factors	
					assessment board and several pharmacy students. *Structural validity:* Correlation, regression analysis *Reliability:* CA ≥ 0.7 for all factors.

* EFA: Exploratory Factor Analysis, CA: Cronbach's alpha; OLS: Ordinary Least Squares; PCA: Principal Component Analysis; CFA: Confirmatory Factor Analysis; I-CVI: Item-Content Validity Index, NR: Not reported.

Table 3. Satisfaction Evaluation Results

No.	Author(s)	Study Location	Study Participants	Satisfaction Evaluation Results
	Tran Ba Kien et al. (2023) [16]	Vietnam	282 Pharmacy Alumni	Training Staff (TS): 3.97/5 ± 0.68; Facilities and Environment Qualities (FE): 3.85/5 ± 0.65; Training Programmes (TP): 3.66/5 ± 0.64; Administrative Formalities and Support Activities (AS): 3.48/5 ± 0.76; Overall Satisfaction: 3.90/5 ± 0.64.
	Hemant Gupta, Bhaveshkumar J Parmar (2021) [17]	India	370 Postgraduate Pharmacy Students from 8 universities	Modern Academic Facilities: Perception-Only Score: 0.782; Gap Score: 0.772; Career Opportunities: Perception-Only Score: 0.754; Gap Score: 0.759; Interdisciplinary Skills: Perception-Only Score: 0.776; Gap Score: 0.788; Social Status: Perception-Only Score: 0.806; Gap Score: 0.798.
	Onah, P. O., Abdulateef, S., & Abdulmalik, A. (2021) [18]	Nigeria	285 Pharmacy Students (3rd to 5th year)	Facilities: 44.5%; Interpersonal Relationships: 42.0%; Faculty Expertise: 31.9%; Communication System: 44.9%; General Administration: 49.7%; Conclusion: Students have below-average satisfaction levels across all factor groups.
	Ruiz G.; Ulloa A.; Díaz M.; Mora A.J. (2021) [19]	Chile	145 alumni of the drug-oriented curriculum; 155	Median (Interquartile Range - IQR); Design and Organisation: DOC: 3 (Q3-Q1: 4-2.5); POC: 4 (Q3-Q1: 4-3.5); $p < 0.001$ (statistically significant); Satisfaction increased from 64.4% (DOC) to 83.1% (POC).

No.	Author(s)	Study Location	Study Participants	Satisfaction Evaluation Results
			alumni of the patient-oriented curriculum	Contents and Fulfillment: DOC: 4 (Q3-Q1: 4-3); POC: 4 (Q3-Q1: 4-3); p-value: n.s. (not statistically significant); Physical Resources: DOC: 3.5 (Q3-Q1: 4-3); POC: 3.5 (Q3-Q1: 4-3); p-value: n.s. (not statistically significant); Teachers: DOC: 4 (Q3-Q1: 4-3); POC: 4 (Q3-Q1: 5-4); p-value < 0.01 (statistically significant); Satisfaction increased from 79.8% to 83.1%; Professional Focus: DOC: 3 (Q3-Q1: 4-2.5); POC: 3.5 (Q3-Q1: 4-3); p-value: n.s. (not statistically significant); Emotional Bonding with the Programme/University: DOC: 4 (Q3-Q1: 4-3); POC: 4 (Q3-Q1: 5-4); p-value < 0.001 (statistically significant); Satisfaction increased from 74.4% to 83.1%. Conclusion: Alumni reported higher satisfaction with the patient-oriented curriculum (POC) compared to the drug-oriented curriculum (DOC) (p < 0.01).
	Ahmed A. Abusham and Nawras A. Al-Harthy (2018) [20]	Oman	96 Pharmacy Students	Study plan: 68.7%; Instructors: 68.7%; Methods of teaching: 67.7%; Online courses: 38.5%; Practicum courses and training: 51.0%; Overall satisfaction with the Pharmacy Program at the University of Nizwa: 65%.
	Mandal Kaushik, Gupta Hemant (2018) [21]	India	124 Pharmacy Students from 6 universities	Scope for Career Development: Expected score: 4.62/5; Actual score: 3.22/5 (Gap: 1.40); Academic Program: Expected score: 4.74/5; Actual score: 4.15/5 (Gap: 0.59); Facilities: Expected score: 4.60/5; Actual score: 3.46/5 (Gap: 1.13); Transparent Administration: Expected score: 4.73/5; Actual score: 3.75/5 (Gap: 0.98); Career Opportunities in the Job Market: Expected score: 4.57/5; Actual score: 2.78/5 (Gap: 1.79); Value for Money: Expected score: 4.66/5; Actual score: 3.12/5 (Gap: 1.53).
	Lee, Heejung et al. (2014) [22]	South Korea	207 Final-year Pharmacy Students from 4 universities	Top 10 items rated the highest: Faculty's knowledge on their subjects 5.69/7; Extra school activities at the school of pharmacy 5.15/7; Preceptor’s ability to perform teaching 5.06/7; Active participation of clerkship sites 5.04/7; Evaluation methods by preceptors 5.03/7; Faculty's interest and concerns for students 4.94/7; Using various teaching techniques (faculty) 4.81/7;

No.	Author(s)	Study Location	Study Participants	Satisfaction Evaluation Results
				Reliable faculties 4.69/7; Reliable faculties' evaluation methods 4.63/7; Contents of clerkship program 4.63/7. Top 10 items rated the lowest: 24. Promotional efforts for the successful management of pharmacy school (University) 3.51/7; 25. Reliable university 3.51/7; 26. Computer facilities 3.48/7; 27. Laboratory equipment 3.37/7; 28. School Cafeteria 3.28/7; 29. Student amenities 3.19/7; 30. Provide information promptly (faculty & staff) 3.13/7; 31. Standardization of training methods between schools 3.07/7; 32. Rapid processing of the requests (faculty & staff) 2.93/7; 33. Co-education with other universities 2.85/7.
	Holdford, David; Patkar, Anuprita (2003) [23]	USA	372 Final-year Pharmacy Students (4-year program)	Faculty Communication: 1999 (Mean = 1.10/5); 2000 (Mean = 1.20/5); 2001 (Mean = 1.25/5); 2002 (Mean = 1.30/5); Administration: 1999 (Mean = 1.16/5); 2000 (Mean = 1.19/5); 2001 (Mean = 1.21/5); 2002 (Mean = 1.23/5); Faculty Expertise: 1999 (Mean = 0.79/5); 2000 (Mean = 0.85/5); 2001 (Mean = 0.90/5); 2002 (Mean = 0.95/5); Faculty Communication: 1999 (Mean = 1.41/5); 2000 (Mean = 1.42/5); 2001 (Mean = 1.43/5); 2002 (Mean = 1.44/5); Resources: 1999 (Mean = 0.62/5); 2000 (Mean = 0.68/5); 2001 (Mean = 0.72/5); 2002 (Mean = 0.75/5). (Average scores are calculated using a 5-point Likert scale, where 0 = Strongly agree and 4 = Strongly disagree)

DOC: Drug-oriented curriculum; POC: Patient-oriented curriculum; n.s: not statistically significant.

4. Discussion

This study is the first systematic review focused on the instruments used to assess satisfaction with the quality of pharmacy education. The selected studies primarily employed a cross-sectional descriptive design, with most of the study participants being pharmacy students [18, 20-24] or pharmacy alumni [16, 19], including three studies targeting final-year students and one study focusing on postgraduate students [17]. The focus on students reflected the trend of exploring the learner's perspective on educational quality. However, it also highlighted the gap in collecting feedback from teaching staff members and employer stakeholders who could provide professional evaluations and labor market insights. The studies employed structured interviews, using self-administered questionnaires or direct interviews via phone, email, or mail. Sampling methods were typically either random or convenient, depending on the scope of the study. The studies were conducted at public universities [16, 18-20, 23, 24], private universities [21], or a combination of both [17] [22], with sample sizes and study scopes varying from third-year to fifth-year students or the entire student body of pharmacy education programs.

Characteristics of the Instruments:

The instruments used to assess factors affecting the quality of pharmacy education programs have been applied in various countries, including Vietnam, India, Nigeria, Chile, Oman, South Korea, and the United States, reflecting the diversity and richness of the research scope.

Regarding the origin of the instruments, the instruments used in the studies had diverse origins. Some studies developed new instruments based on literature reviews from previous research on similar issues [16, 18-21]. Two studies were based on service quality evaluation models, such as SERVQUAL and SERVPERF, to develop their own instruments for the field of pharmacy education [22, 24]. One study chose to directly apply instruments that had been validated from previous research, such as SERVPERF [23]. These results showed that most of the developed instruments were based on solid theoretical foundations and adjusted to suit the specific characteristics and objectives of each study. This diversity reflected the efforts of researchers to find the most appropriate evaluation tool for their research context. Furthermore, all the instruments were validated through cross-sectional studies.

Regarding the structure of the instruments: There were differences in the structure of the instruments across the studies. Most of the instruments were developed based on a multidimensional model, with the number of factors in each instrument ranging from 4 to 8, with 5-6 factors being the most common. The number of items varied from 14 to 41. This diversity may stem from differences in research objectives, study populations, and the specific educational context of each country or educational institution. Each instrument had varying levels of detail and complexity, reflecting a focus on different aspects of pharmacy education quality in each study, while also helping to identify the key factors and their influences.

Evaluation Method: The instruments used Likert scales ranging from 4 to 7 points to assess participants' level of agreement or satisfaction with each item. This scale is easy to understand and use, helping to collect accurate and reliable data. Seven out of nine studies used a 5-point Likert scale [16-19, 21, 23, 24], one study used a 4-point Likert scale [20], and one study used a 7-point Likert scale [22]

Validity and Reliability of the Instruments Used in the Studies: All studies showed a strong focus on testing the validity and reliability of the instruments. Content validity is typically verified through expert evaluation or pre-testing. Exploratory Factor Analysis (EFA) or Principal Component Analysis (PCA) are commonly used methods to test structural validity. Some studies also employ advanced methods such as Confirmatory Factor Analysis (CFA) or regression analysis to assess the validity of the instruments. The reliability of the scales is

usually evaluated using Cronbach's alpha, with an acceptance threshold typically set at ≥ 0.7, indicating a good level of reliability.

Common factors in the Instruments: Despite the diversity in structure and certain differences between countries, reflecting cultural and educational system specifics, some core factor groups were consistently present. This consistency suggested that certain aspects were considered essential when evaluating the quality of pharmacy education programs. These commonly appearing factors included:

+ *Facilities:* This factor group was widely used in most of the instruments employed in the studies (8/9 studies) [16-19, 21-24], highlighting the critical role of this factor in the quality of pharmacy education programs. The criteria within this factor group typically included learning and research conditions and facilities, such as classrooms, laboratories, libraries, and other resources.

+ *Curriculum:* This factor appeared in 5/9 instruments [16, 19, 20-22], as the curriculum was considered the foundation for determining the knowledge and skills of learners. The factors commonly found within this group included aspects such as the content and structure of the curriculum, the balance between theory and practice, the relevance and up-to-date nature of the curriculum with respect to career needs, teaching methods, and assessment techniques.

+ *Teaching Staff:* This factor was mentioned in 6/9 instruments [16, 18-20, 23, 24], highlighting the central role of teaching staff in delivering knowledge and skills to students. Teaching staff were a direct influence on the quality of teaching and the learning experience of students. The quality of teaching staff was not only measured by their professional qualifications but also by their pedagogical skills, enthusiasm, and ability to stay updated with new knowledge. In pharmacy education, teaching staff need practical experience and the ability to connect theory with practice. The criteria within this factor group often relate to aspects such as evaluating professional expertise, teaching methods, and teaching staff attitudes.

+ *Administrative Management/Student Support Staff:* This factor appeared in 5/9 studies [16,18,22,23,24], emphasizing the importance of creating a positive learning environment. An effective management system and quality student support services can foster a conducive learning environment, allowing students to focus on their studies. This included simplifying administrative procedures and providing career counseling and psychological support services. The evaluation of the quality of administrative and support services focused on assessing the student support services, which were provided by the institution and administrative staff, including problem-solving, receiving feedback, providing information, and assisting with procedures.

In addition to the core factors, the instruments used to assess the quality of pharmacy education had specific characteristics that reflected the unique nature of the field, such as integrating the evaluation of clinical practice and internships in healthcare settings [19,22] and the connection between theory and practice [20]. This ensured that students developed practical professional skills aligned with the specific requirements of the pharmacy profession. These factors are often not found in evaluation instruments used in other fields, highlighting the distinctiveness of pharmacy education. Furthermore, the factors of professional ethics [19] and the ability to update specialized knowledge [23, 24] were also emphasized, reflecting the importance of comprehensive training for pharmacists with both strong expertise and professional ethics. Some instruments also focused on the reputation of the educational institution [22], holistic development through extracurricular activities [16], and support for students in entrepreneurship and career development [21]. Additionally, an emerging trend in evaluating pharmacy education quality was the integration of soft skills and professional competencies into the evaluation instruments [17, 19]. These skills,

along with the ability to adapt to new technologies, were seen as crucial factors that helped pharmacy students meet the increasing demands of the labor market and society.

When comparing the instruments used to assess pharmacy education quality with similar studies in the field of higher education in general [25], the instruments in pharmacy shared many similarities in core factors such as facilities, curriculum, and teaching staff. However, a notable difference was the focus on practical skills and specialized knowledge, reflecting the complexity and high demands of the pharmacy profession to ensure that the educational program met the strict requirements of the field.

Satisfaction Evaluation Results

The results synthesized from studies across various countries show significant differences in satisfaction with education quality, reflecting the educational, economic, and social contexts of each country. Studies from Vietnam [16], South Korea [22], and the United States [23] indicated that teaching staff were highly valued, particularly for their expertise, teaching ability, and concern for students. This reflected the central role of teaching staff in enhancing educational quality. However, studies in India [17] and Nigeria [18] revealed a significant gap between expectations and reality, emphasizing the need to improve teaching skills and expertise in certain countries. In Chile, the transition from a drug-oriented to a patient-oriented curriculum significantly enhanced alumni satisfaction, highlighting the importance of aligning pharmacy education with professional practice demands [19]. This was practical evidence that updating and optimizing the curriculum could enhance the learning experience and students' loyalty.

The factors related to facilities were evaluated differently across countries. In Vietnam and India, although satisfaction levels were relatively good, there remained a significant gap between expectations and reality (India: the gap score ranges from 1.13 to 1.53) [16, 17]. In Nigeria, facilities received low satisfaction scores (44.5%), indicating uneven investment in infrastructure [18]. Meanwhile, in Oman, dissatisfaction with online courses (38.5%) highlighted the need to improve remote learning instruments and methods [20].

Additionally, studies in India and Oman also highlighted the lack of alignment between theory and practice, particularly in internship opportunities and career development [17, 20]. In India, the expectation-reality gap in professional capabilities was quite large (1.40-1.79) [17]. This underscored the need to strengthen the link between educational institutions and the labor market to ensure that students were prepared for employment after graduation.

Additionally, studies in Vietnam and South Korea showed that administrative procedures and support services remained weak points (Vietnam: 3.48/5; South Korea: below 3.5/7) [16, 22]. This suggested the need to improve internal processes and student support services to create a more conducive learning environment.

Thus, the research findings from various countries highlighted the importance of teaching staff, the quality of facilities, and the relevance of the curriculum in enhancing satisfaction with pharmacy education quality. Factors such as administrative management, career opportunities, and online learning still require attention and improvement. Balancing expectations with reality, along with investing in facilities and support services, are keys to enhancing the quality of pharmacy education globally.

5. Limitations

This study had several notable limitations. The focus on searching only a few key databases and selecting studies written in English may have led to the omission of important research from non-English-speaking regions. This reduced the representativeness and comprehensiveness of the review's findings. Additionally, the study did not include data from unpublished sources or non-research articles,

limiting the coverage of the review. The quality assessment using the JBI checklist may also lack sufficient detail, which could affect the depth of the analysis.

6. Conclusion

This review synthesized evidence on instruments used to measure satisfaction with pharmacy education quality, identifying key factors such as teaching staff, facilities, and administrative support. The findings provided a foundation for developing more comprehensive satisfaction assessment instruments and improving pharmacy education quality. However, the study also highlighted some limitations, including the lack of alignment between theory and practice, issues related to administrative procedures, and the gap between students' expectations and reality, particularly regarding career opportunities and online courses.

References

[1] S. F. D. Oliveira et al., Student Satisfaction in Higher Education: A Meta-Analytic Study, Journal of Marketing for Higher Education, Vol. 27, No. 1, 2017, pp. 1-18, https://doi.org/10.1080/08841241.2017.1311980.

[2] P. Rahmatpour et al., Evaluation of Psychometric Properties of Scales Measuring Student Academic Satisfaction: A Systematic Review, Journal of Education and Health Promotion, Vol. 8, No. 1, 2019, pp. 256, https://doi.org/10.4103/jehp.jehp_466_19.

[3] R. Silvia et al., Nursing Students' Satisfaction with the Curriculum: An Integrative Review, Journal of Professional Nursing, Vol. 37, No. 3, 2021, pp. 648-661, https://doi.org/10.1016/j.profnurs.2021.02.00

[4] S. Rossini et al., Measuring Academic Satisfaction in Nursing Students: A Systematic Review of the Instruments, International Journal of Nursing Education Scholarship, Vol. 19, No. 1, 2022, pp. 20210159, https://doi.org/10.1016/j.profnurs.2021.02.003.

[5] S. Dhawan, Higher Education Quality and Student Satisfaction: Meta-Analysis, Subgroup Analysis and Meta-Regression, Metamorphosis, Vol. 21, No. 1, 2022, pp. 48-66, https://doi.org/10.1177/0972622522108237.

[6] A. Kanwar, M. Sanjeeva, Student Satisfaction Survey: A Key for Quality Improvement in the Higher Education Institution, Journal of Innovation and Entrepreneurship, Vol. 11, No. 1, 2022, pp. 1-10, https://doi.org/10.1186/s13731-022-00196-6.

[7] H. Nasreen, B. Shelina, Development of the Student University Satisfaction Scale: Reliability and Validity, Interdisciplinary Journal of Contemporary Research in Business, Vol. 4, No. 3, 2012, pp. 332-341, Retrieved from: https://www.researchgate.net/publication/256197526_development_of_the_student_university_satisfaction_scale_reliability_and_validity.

[8] J. Torkzadeh, M. Mohtram, The Validation of Students' Academic Satisfaction Scale, Higher Education Letter, Vol. 7, No. 26, 2014, pp. 155-176, Retrieved from: https://journal.sanjesh.org/article_20796.htmlhttp:/journal.sanjesh.org/article_14882.html?lang=en (accessed on: November 1st, 2024).

[9] L. Zhai, Validation of an Instrument to Measure Community College Student Satisfaction, Community College Journal of Research and Practice, Vol. 36, No. 1, 2012, pp. 47-58, https://doi.org/10.1080/10668920802648916.

[10] Z. Keith et al., Validation of the Brief Multidimensional Students' Life Satisfaction Scale Among College Students", American Journal of Health Behavior, Vol. 29, No. 3, 2005, pp. 206-214, https://doi.org/10.5993/AJHB.29.3.2.

[11] C. H. Chin, L. H. Sheng, Nursing Student Satisfaction With an Associate Nursing Program, Nursing Education Perspectives, Vol. 36, No. 1, 2015, pp. 27-33, https://doi.org/10.5480/13-1268.

[12] N. Quan et al., Nursing Students' Satisfaction with the Training Program at Pham Ngoc Thach University of Medicine", Journal of Nursing Science, Vol. 6, No. 05, 2023, pp. 34-47, https://doi.org/10.54436/jns.2023.05.657 (in Vietnamese).

[13] K. Nadia, A Comparative Study of Student Engagement, Satisfaction, and Academic Success Among International and American Students, Doctoral Dissertation, Iowa State University, 2012, Retrieved from: https://www.proquest.com/openview/d799fc1f80aaf72bf2d890a4ce02c802/1?pq-origsite=gscholar&cbl=18750 (accessed on: November 1st, 2024).

[14] X. Jie et al., The Impact of Student Engagement on Satisfaction with Medical Education in China: A Supplementary Perspective, Advances in Health Sciences Education, Vol. 28, No. 4, pp. 1265-1288, Retrieved from: https://link.springer.com/article/10.1007/s10459-023-10219-w

[15] J. Matthew et al., The PRISMA 2020 Statement: An Updated Guideline for Reporting Systematic Reviews, BMJ, Vol. 372, No. 71, 2021, pp. 1-9, https://doi.org/10.1136/bmj.n71.

[16] T. B. Kien et al., Satisfaction on Educational Training Quality amongst College Pharmacist Alumni in Vietnam, Journal of Pharmaceutical Health Services Research, Vol. 14, No. 3, 2023, pp. 299-305, https://doi.org/10.1093/jphsr/rmad036.

[17] H. Gupta, B. J. Parmar, The Measurement Model of the Pharmacy Education Service Quality: An Empirical Quest Based on Two Approaches, Indian Journal of Pharmaceutical Education and Research, Vol. 55, No. 4, 2021, pp. 947-956, https://doi.org/10.5530/ijper.55.4.195.

[18] P. O. Onah et al., Satisfaction with Teaching and Learning Quality Among Undergraduate Pharmacy Students in a Nigerian University, International Journal of Research in Medical Sciences, Vol. 9, No. 8, 2021, pp. 2210, https://doi.org/10.18203/23206012.ijrms20213062.

[19] G. Ruiz et al., From Drug-Oriented Curriculum to Patient-Oriented Curriculum in Chile: Alumni Satisfaction as a Quality Indicator for a Pharmacy Programme, Pharmacy Education, Vol. 21, 2021, pp. 817-825, https://doi.org/10.46542/pe.2021.211.817825.

[20] A. A. Abusham, N. A. A. Harthy, Omani Students' Involvement in Evaluating Their Pharmacy Program, International Journal of Clinical Pharmacology & Pharmacotherapy, Vol. 3, No. 136, 2018, pp. 1-5, https://doi.org/10.15344/2456-3501/2018/136.

[21] K. Mandal, H. Gupta, Service Quality Gap Measurement in Pharmaceutical Educational Institutes: An Empirical Analysis for Model Development, Indian Journal of Pharmaceutical Education and Research, Vol. 52, No. 3, 2018, pp. 351-362, https://doi.org/10.5530/ijper.52.3.41.

[22] L. Heejung et al., Analysis of Factors Related to the Students' Satisfaction on 6-Year Pharmacy Program and Strategic Planning, Korean Journal of Clinical Pharmacy, Vol. 24, No. 4, 2014, pp. 288-295, Retrieved from: https://www.ekjcp.org/journal/view.html?spage=288&volume=24&number=4 (accessed on: November 1st, 2024).

[23] H. David, P. Anuprita, Identification of the Service Quality Dimensions of Pharmaceutical Education, American Journal of Pharmaceutical Education, Vol. 67, No. 1/4, 2003, pp. 849, Retrieved from: https://www.proquest.com/openview/3cd6ae4db2dc8bada9e01bd6763f3183/1?pq-origsite=gscholar&cbl=41120 (accessed on: November 1st, 2024).

[24] H. David, P. R. Thomas, Development of an Instrument to Assess Student Perceptions of the Quality of Pharmaceutical Education, American Journal of Pharmaceutical Education, Vol. 65, No. 2, 2001, pp. 125-131, Retrieved from: https://eric.ed.gov/?id=EJ632951 (accessed on: November 1st, 2024).

[25] T. W. Wai, K. N. Nu, A Meta-Analysis on Factors Influencing Student Satisfaction in Higher Education, Journal of the Myanmar Academy of Arts and Science, Vol. 18, No. 9B, 2020, pp. 393-404, Retrieved from: https://www.researchgate.net/profile/nu-khaing-2/publication/352441674_a_meta-analysis_on_factors_influencing_student_satisfaction_in_higher_education/links/60c9e43f299bf1cd71d15dac/a-meta-analysis-on-factors-influencing-student-satisfaction-in-higher-education.pdf (accessed on: November 1st, 2024).