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# Review Article

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

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**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.

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### 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 employersplays 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 1, 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 selected databases were to ensure 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 1, 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 such as 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: 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.

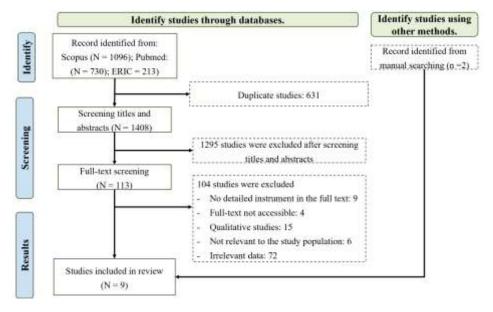


Figure 1. PRISMA Flow Diagram for the Research Process.

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

No.	Author(s)			Instruments	Methods for Testing the Reliability
NO.	Author(8)	Origin	Scale	Factors	and Validity of the Instrument
	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* và 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 items.	Content validity: Uses a self-developed instrument based on 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(a)			Instruments	Methods for Testing the Reliability
NO.	Author(s)	Origin	Scale	Factors	and Validity of the Instrument
	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: Phân tích 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 và cộng sự (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 pretested 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: $CA \ge 0.7$ 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) Out come: 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(a)			Methods for Testing the Reliability	
NO.	Author(s)	Origin	Scale	Factors	and Validity of the Instrument
					assessment board and several
					pharmacy students.
					Structural validity: Correlation,
					regression analysis
					<i>Reliability:</i> $CA \ge 0.7$ for all factors.

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

		.1	C. 4. 4 LE JEH 4. DOC 4 (02.01.4.2). DOC 4 (02.01.4.2).
		alumni of the	Contents and Fulfillment: DOC: 4 (Q3-Q1: 4-3); POC: 4 (Q3-Q1: 4-3); p-value: n.s. (not
		patient-oriented	statistically significant);
		curriculum	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.	Oman	96 Pharmacy	Study plan: 68.7%;
Abusham* và		Students	Instructors: 68.7%;
Nawras A Al-			Methods of teaching: 67.7%;
Harthy (2018)			Online courses: 38.5%;
[20]			Practicum courses and training: 51.0%;
			Overall satisfaction with the Pharmacy Program at University of Nizwa: 65%.
Mandal	India	124 Pharmacy	Scope for Career Development: Expected score: 4.62/5; Actual score: 3.22/5 (Gap: 1.40);
Kaushik		Students from 6	Academic Program: Expected score: 4.74/5; Actual score: 4.15/5 (Gap: 0.59);
,Gupta		universities	Facilities: Expected score: 4.60/5; Actual score: 3.46/5 (Gap: 1.13);
Hemant			Transparent Administration: Expected score: 4.73/5; Actual score: 3.75/5 (Gap: 0.98);
(2018)[21]			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	South	207 Final-year	Top 10 items rated the highest:
et al.	Korea	Pharmacy	Faculty's knowledge on their subjects 5.69/7;
(2014)[22]	Horeu	Students from 4	Extra school activities at the school of pharmacy 5.15/7;
(2011)[22]		universities	Preceptor's ability to perform teaching 5.06/7;
		universities	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;
			Reliable faculties 4.69/7;
			· · · · · · · · · · · · · · · · · · ·
			Reliable faculties' evaluation methods 4.63/7;

	Holdford, David; Patkar, Anuprita (2003) [23]	USA	372 Final-year Pharmacy Students (4-year program)	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 in a timely manner (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 university 2.85/7.  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 = 0.79/5); 2000 (Mean = 0.85/5); 2001 (Mean = 0.90/5); 2002 (Mean = 0.95/5);  Faculty Expertise: 1999 (Mean = 0.79/5); 2000 (Mean = 0.85/5); 2001 (Mean = 0.90/5); 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)
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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 [16, 19], including three studies targeting final-year students and one study focusing on postgraduate students [17]. The focus on students reflects the trend of exploring the learner's perspective on educational quality, but it also highlights the gap in collecting feedback from teaching staff members and employers - 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 have 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]. This shows that most of the developed instruments are based on solid theoretical foundations and adjusted to suit the specific characteristics and objectives of each study. This diversity reflects 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 are 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 varies from 14 to 41. This diversity may stem from differences in research objectives, study populations, as well as the specific educational context of each country or educational institution. Each instrument has 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 use 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: The studies all show 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  $\geq 0.7$ , indicating a good level of reliability.

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

- + Facilities: This factor group is 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 include learning and research conditions, facilities such as classrooms, laboratories, libraries, and other resources.
- + Curriculum: This factor appears in 5/9 instruments [16, 19, 20-22], as the curriculum is considered the foundation for determining the knowledge and skills of learners. The factors commonly found within this group include 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 is 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 are a direct influence on the quality of teaching and the learning experience of students. The quality of teaching staff is 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 appears 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 includes simplifying administrative procedures and providing career counseling and psychological support services. The evaluation of the quality of administrative and support services focuses on assessing the student support services provided by the institution and administrative staff, such as 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 have specific characteristics that reflect 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 ensures that students develop 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] are also emphasized, reflecting the importance of comprehensive training for pharmacists with both strong expertise and professional ethics. Some instruments also focus 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 is 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, are seen as crucial factors that help pharmacy students meet the increasing demands of the labor market and

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 share many similarities in core factors such as facilities, curriculum, and teaching staff. However, a notable difference is the focus on practical skills and specialized knowledge, reflecting the complexity and high demands of the pharmacy

profession to ensure that the educational program meets 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] all indicate that teaching staff is highly valued, particularly for their expertise, teaching ability, and concern for students. This reflects the central role of teaching staff in enhancing educational quality. However, studies in India [17] and Nigeria [18] reveal 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 patient-oriented curriculum significantly enhanced alumni satisfaction, highlighting the importance of aligning pharmacy education with professional practice demands [19]. This is practical evidence that updating and optimizing the curriculum can enhance the learning experience and students' lovalty.

The factors related to facilities are evaluated differently across countries. In Vietnam and India, although satisfaction levels are relatively good, there remains 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%) highlights the need to improve remote learning instruments and methods [20].

Additionally, studies in India and Oman also highlight 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 is quite large (1.40-1.79) [17]. This underscores the need to strengthen the link between educational institutions and the labor market to ensure that

students are prepared for employment after graduation.

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

Thus, the research findings from various countries highlight 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 improvement. Balancing attention and expectations with reality, along with investing in facilities and support services, is key to enhancing the quality of pharmacy education globally.

## 5. Limitations

This study has 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 non-English-speaking regions. from reduces the representativeness and comprehensiveness of the review's findings. Additionally, the study does 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 provide a foundation for developing more comprehensive

satisfaction assessment instruments and improving pharmacy education quality However, the study also highlights 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.

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