

Research Article

Instrument for Measuring Perception of Healthcare Service Providers: Development and Validation

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A B S T R A C T

Introduction: The accessibility to healthcare services is an absolute necessity today. The purpose of this article is to create and validate an instrument for measuring healthcare service providers' perception which analyses their level of satisfaction with existing healthcare services' availability, infrastructure, burden, efficiency of the instruments, and work environment.

Method: The items were generated from a previous literature review and were also self-generated by the authors. Content and face validation were also done by a panel of experts to add/ delete/ modify items or constructs in the instrument. Statements for the constructs, i.e. Registration, Diagnosis, Emergency services, Infrastructure, and Government policies, were presented on a five-point scale.

Results: The instrument's face validity and content validity met the necessary criteria. Region-specific suggestions were taken from the healthcare service providers which would be a significant factor in improving the healthcare system of the state. It was further developed and validated in the native language, Punjabi.

Conclusion: The development of this instrument is the first of its kind to the best of the authors' knowledge and it consists of all aspects contributing to the perception of the doctors and nurses about the healthcare institutions. This instrument would be helpful in determining the perception of healthcare service providers, i.e., doctors and nursing staff from different regional areas regarding the healthcare services and infrastructure availability of the health institutions.

Keywords: Healthcare, Instrument, Service Providers, Content & Face Validity, Infrastructure

Introduction

Content and face validity are the two important criteria to validate an instrument developed for surveys. There are three types of validity: construct, content, and criterion. For developing a valid instrument, the first step that needs to be done is to conduct a content validation or definition validity or logical validity procedure. It is described as the ability of the included items to reflect the characteristics of a construct or domain of the instrument.¹ Content validity is made sure by the nature of items included in the instrument. For calculating the level of content validity, the Content Validity Ratios (CVR) and Content Validity Index (CVI) are calculated. CVI is the mean of the CVR values of the elements that are kept in the instrument.² In social sciences research, the assessments used should be content-validated but there is no consensus on the method adopted for content validation.³ Validity is exclusively dependent on the context interpretation of the instrument as there are varieties of cultures and resources across the world.⁴

There are 57 countries with critical shortages of healthcare providers which is equivalent to a global deficit of 2.4 million doctors, nurses and midwives and more than 4.3 million health workers overall.⁵ Nurses among the healthcare staff play a crucial role in the healthcare system, but their job satisfaction remains under-researched in India.⁶ Only the 'tangibles' dimension has been covered in previous study assessments which had a satisfactory internal quality level. These assessments showed a positive correlation between job satisfaction and quality dimensions.⁷

There is a lack of literature available on the topic of 'content validity' in areas of practical importance like healthcare studies in the context of service providers. There should be users' involvement in the development of an instrument which is rarely done and reported, which in turn, affects its content validity.⁸ Measuring the content and face validity of structured instruments is important as these would be helpful in providing a true understanding of the instrument to the readers as well as researchers.⁹

At present, these measures are based on the judgements or opinions of field experts, researchers or academicians only with a limited contribution of service users. Almost all the previous studies covered a single aspect to measure their satisfaction or perception, i.e., the working environment of institutions where the healthcare service providers are rendering their services. The other important aspects were completely ignored while developing the instrument for collecting responses. The complexity of aspects related to the measurement of perception of service providers regarding the healthcare system requires the development of a structured instrument which would be a validated one and can be employed with required modifications by the researchers in the related research studies.

This research study provides the development procedure of an administered survey instrument which could be used to assess the perception of service providers regarding the current situation of healthcare services. It presents the development process of the instrument as well as its content and face validation procedure in detail.

Material and Methods

This study was conducted in the year 2022 at Punjabi University, Patiala. An extensive literature review was done to collect the relevant items to be included in the instrument. A review was conducted by the experts before finally validating the items. The procedure followed for generation as well as the review of items by experts is discussed in detail ahead.

A content validation form was provided in which the panellists had to score the items on a 4-point scale on the basis of the perceived relevance of each item in the instrument. The acceptable values of CVIs were mentioned according to the number of experts in the panel. The process of conducting content validation of an instrument and determining the CVI, both item- and scale-wise, has been covered in length here in this article.⁴ The method followed for the designing and composition of the instrument and its content and face validation have been discussed in detail here under sub-sections.

Item Generation from Previous Literature

First, a survey of reputable publications that attempted to contribute to the relevant field was conducted to build the instrument. The multidisciplinary databases including EBSCOhost, JSTOR, PubMed, ResearchGate, SCOPUS, MedLine, and Google Scholar were used to identify credible articles about instrument development. For the purpose of this study, the published government reports such as the Statistical Abstract of Punjab, Economic Survey of 2019–2020, Budget 2020–21, Punjab Human Development Report, Punjab Health Report by the Directorate of Health Services, International Healthcare System Profiles, National Health Profile, and other documents relating to healthcare policy were also taken into consideration. 'Healthcare', 'Infrastructure', 'Technology', 'Human Resource', 'Working Environment', 'Satisfaction', 'Questionnaire', and 'India' were used as search terms with Boolean characters. Further, the main constructs had were identified from selected studies/ questionnaires based on the relevance of items for our stated objectives. Then the sequence of items in the questionnaire was decided. At this stage, all the possible items had were included for the purpose of further review and finalised with a total of 5 constructs including 62 statements, questions for time and cost involved and general information about the patient.

Review of Items

After generating the first draft of the instrument, it was discussed with academicians and peer groups. Considering their feedback regarding the instrument, 4 items were merged with others in the instrument. Three more items were added as per the feedback of panel experts.

Content Validity

The assessment tool, construction of the instrument and its evaluation processes used in the social sciences research should be content-valid. Even though the measures cannot be validated by content validity only, it is still a fundamental requirement in assessment instruments. Content validity is the measurement of the representativeness of the scale content.^{9,10}

A panel of six experts was formed, in which four were medical practitioners who were regularly involved in

healthcare delivery and two were an academicians who were proficient in research and statistical data analysis. The feedback along with specific remarks of the medical practitioners as well as the academicians were taken with the help of a standardised form of content validity as suggested in a study by the Yusoff.¹¹

Face Validity

Face validity is important, but not enough, to check whether the items are relevant to the people who are regularly involved in that specific research area. It is suggested to conduct at least face validity when no other validity test has been done.^{8,12} For conducting face validity of the instrument, the feedback and remarks of the academicians and medical practitioners from the panel were taken in standardised form as suggested by the Patel and Desai.¹²

Designing the Instrument

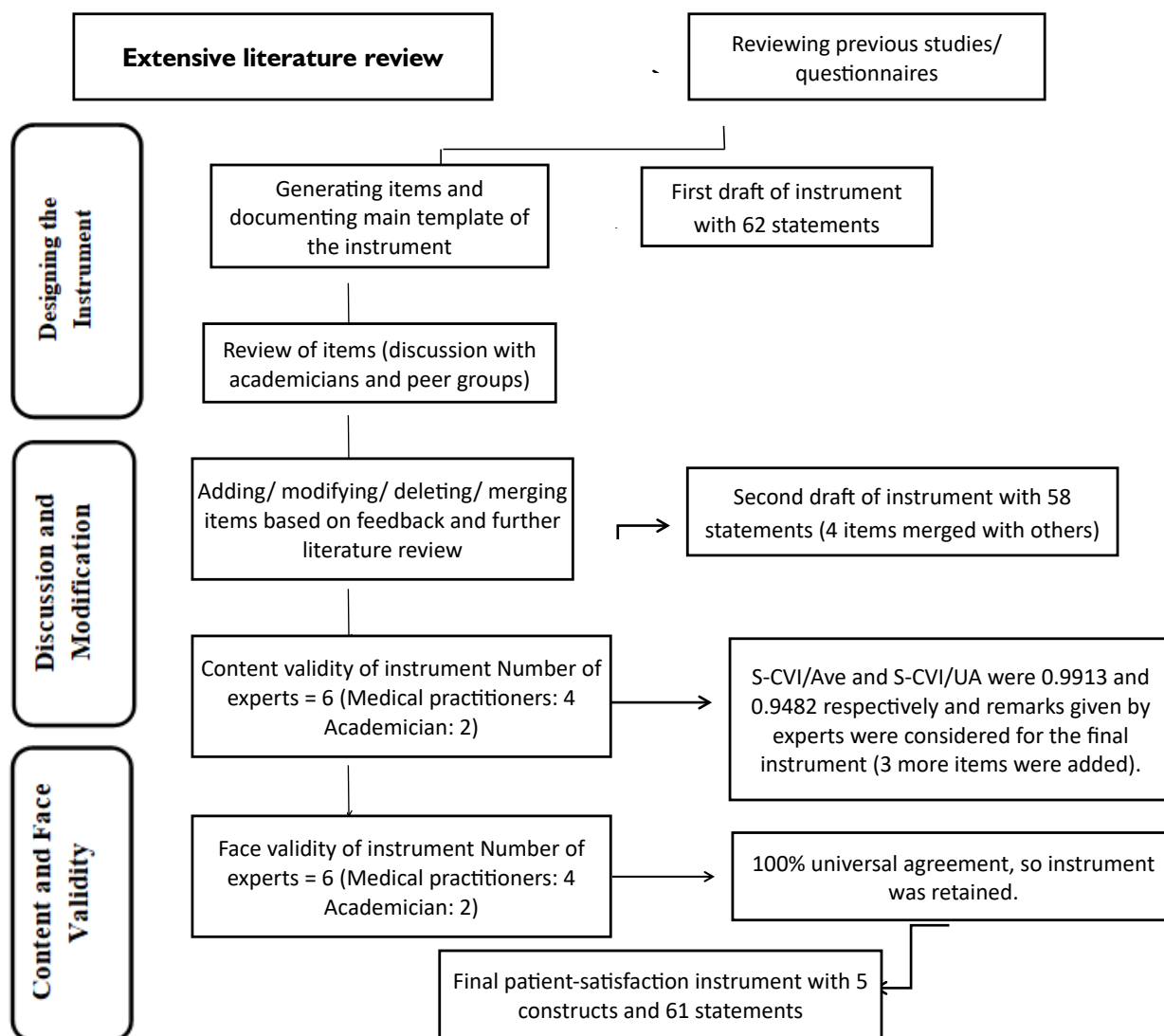


Figure I. Flowchart for Designing the Instrument

Figure 1 presents a flowchart depicting the process of designing the instrument.

Results

Development of Constructs

After the finalisation of individual items, their sequence of appearing in the instrument was set. In total, the instrument consisted of five parts (Table 1).

Part A was related to the general information about the hospital to be asked from the respondents. It included the district in which the hospital was located; name and type of hospital; empanelment, area of hospital, area to which majority of the patients belonged, service accessed most by the patients, and information regarding their attendants.

Table 1. Constructs with Number of Statements in Each Construct

Construct	No. of Statements
Infrastructure/ facilities	16
Human resource	6
Patient dealing	13
Work environment	15
Role of government	11
Total	61

Part B had five components with 61 statements on a five-point Likert scale (Strongly Agree to Strongly Disagree) (formerly there were 62, but 4 were combined with others following peer discussion and 3 more were added after content validity).

At the end of this section, participants are asked to rate their overall agreement with how well the relevant hospital was providing services, on a seven-point Likert scale (from Strongly Disagree to Strongly Agree). Additionally, recommendations were requested to enhance Punjab's healthcare system.

Sociodemographic Questions

At the end of the questionnaire, in Part C, the sociodemographic and general questions about the respondents, i.e. doctors and nurses, were included. The open-ended questions such as their category (doctor or nurse), age, gender, marital status, professional designation, professional qualification, and work experience were asked.

Content Validity

There was no statistical tool to predict the content validation and the exclusion or inclusion of the items in the instrument, so it had to be conducted by recording the judgement of panel members in the content-validation form as given by the Amponsah et al.⁴

The form was presented to them by meeting face-to-face

and they were asked to review each section. The items from each section of the instrument were then ranked on a four-point scale (1 - not at all relevant, 2 - somewhat relevant, 3 - quite relevant, and 4 - highly relevant). The statements were coded as S1, S2, S3..... S58, forming a total of 58 items (Table 32 mentioned in Annexure 1). Then, the Content Validation Index (CVI) was calculated, which had two forms: Item level CVI (I-CVI) and Scale level CVI (S-CVI). In the response compilation sheet, the items which secured a relevance score of 3 or 4 were taken as "1" and those which were ranked as 1 or 2, were considered as "0" (Annexure 1).

Calculation of I-CVI

'Experts in Agreement' is calculated by adding up the responses of all experts.

Experts in Agreement = Responses given by X1 + X2 + X3 + X4 + X5 + X6 (where X1, X2.....denote experts in the panel)

In our analysis, 5 (out of 6) experts gave a score of 3 or 4 to all the items except one expert who gave a score of 1 to three items i.e., S33, S34 and S39. So, 0 was put for these items and by adding the values, our Experts in Agreement value was 5 for all these three items, and for the remaining items, this value was 6.

Then I-CVI was calculated by dividing the score of 'Experts in Agreement' by the number of experts in the panel.

$$I-CVI = \frac{\text{Experts in Agreement}}{\text{Number of Experts in Panel}} = \frac{6}{6} = 1 \text{ (100\% agreement)}$$

For S33, S34 and S39, I-CVI was 5/6 = 0.833.

At last, the Universal Agreement (UA) was calculated. UA is "1" if I-CVI is 1 (which means that all the experts are in 100% agreement); if any of the items in the instrument has an I-CVI of less than one, then the UA value is zero. In our analysis, the I-CVI values of three items were less than 1, so we took the value for their UA as 0.

Calculation of S-CVI

The S-CVI can be calculated in two forms: Average S-CVI and CVI according to UA. The average S-CVI is calculated by dividing the sum of all I-CVIs for each item by the total

$$\text{Average S-CVI (S-CVI/ Ave)} = \frac{\text{Sum of all I-CVIs}}{\text{Number of items in instrument}}$$

$$= \frac{55 + 0.833 + 0.833 + 0.833}{58} = 0.9913$$

S-CVI according to UA is calculated by dividing the sum of all UAs for each item by the total number of items.

$$UA \text{ S-CVI/ UA} = \frac{\text{Sum of all UAs}}{\text{Number of items in instrument}} = \frac{55}{58} = 0.9482$$

The acceptable values for content validation, as prescribed mentioned by different authors, are shown in Table 3. As per six experts, the value should be at least 0.83, and

in our analysis, both the S-CVI/Ave and S-CVI/UA were greater than 0.83.

A panel expert suggested adding a statement: "Adequate security personnel is readily available on the hospital premises.", which was added under the second construct 'Human Resource', thus making the number of statements under this construct 6.

Another expert suggested adding two more statements: "1. Advanced or up-to-date instruments (machines & equipment) are available in each ward. 2. Separate male and female nursing staff are there in the hospital". The first statement was added under the construct 'Infrastructure' and the second one was added under the construct 'Human Resource'. By adding these, the total statements became 61 under 5 constructs.

Table 3. Acceptable Values for CVIs¹²

Number of Experts	Acceptable CVI Values
At least nine experts	≥ 0.78
Six to eight experts	≥ 0.83
At least six experts	≥ 0.83
Three to five experts	1.00
Two experts	≥ 0.80

Further, the instrument was considered final for face validity.

Face Validity

For conducting face validity of the instrument, a standardised form given by authors Connell et al.⁸ was employed.⁸ There were ten statements for which the panel members had to give their feedback in 'Yes' or 'No' along with their remarks, if any.

These statements were about the appropriateness of sentence formation, grammar, clarity in all the items, correct spelling, appropriate font size and space, legible printout, adequacy of given instructions, format of instrument, difficulty level for the respondents and reasonableness of the items. At last, they were asked to give their specific remarks, if any, along with their qualification, total experience and their profession, in the form.

In the Response Compilation Sheet, 'with' for Yes and 'N' for 'No' (from the response sheet) were recorded and first of all, the percentage of per question agreement was calculated by dividing the total agreed experts (in Yes) per question by the total number of experts.

$$\text{Per question agreement (\%)} = \frac{\text{Total agreed experts (Yes) per question}}{\text{Number of experts}}$$

$$= \frac{4}{4} * 100 = 100\%$$

Further, the percentage of overall agreement was calculated by dividing the sum of percentages of all per question

agreements (calculated previously) by the total number

$$\text{Overall agreement (\%)} = \frac{\text{Sum of \% of all questions}}{\text{Number of questions}}$$

$$= \frac{1000\%}{10} = 100\%$$

The percentage of overall agreement calculated in our analysis was 100% (Table 4 mentioned in Annexure 2). According to authors Connell et al.,⁸ if the percentage of overall agreement was is less than 80%, the strength of agreement per question or overall was is poor and it needed to be restructured; if the percentage of overall agreement was between 80 and 90, then the strength was substantial and there was just a need to revise some of the items, and if the percentage of agreement was 90–100, the strength was is full and we could retain the instrument as it is.

Discussion

The items were generated from studying the previous literature that was available. Most of them were PhD theses and a few were research articles. The objective of our study was kept in mind continuously for considering the item's relevance. In content validation, S-CVI/Ave and S-CVI/UA values were 0.9913 and 0.9482, respectively, in our analysis. The suggestion for adding 3 statements was considered too. Also, in the face validity analysis, the percentage of overall agreement was 100, so it was decided to retain the instrument and finalise it for the pilot survey. The finalised instrument was divided into three parts i.e., General Information, Construct with statements on a five -point scale and Demographics as discussed above. It was translated later in the native language, i.e. Punjabi.

At the beginning of the instrument, details were given regarding the purpose of the research instrument and the objectives to be achieved. The consent of the respondents was also sought to record their responses.

Practical Implications

This instrument will be beneficial in measuring the perception of service providers in healthcare settings of a district, state or country as well by modifying it accordingly. Further, statements in the concerned construct would give an idea about the significant factors which affect the perception of the respondents of the concerned area, hospital or any other related demographic variable. In addition, the suggestions asked from the respondents can be analysed separately, i.e., region, gender or district-wise to fill out the discrepancies found in the existing healthcare system. This can be done by applying the crosstabs in any statistical software. Further, the researcher can use these discrepancies to formulate and recommend a policy or revival plan for the improvement of the healthcare sector.

Limitations of the Study

The present study has some limitations. Attention was given only to the development and validation of the instrument. It can be further extended to a pilot survey and its analysis. Further, it was developed in two languages only, English and the native language Punjabi, but this limitation can be removed by translating and validating the instrument in other native languages, Hindi etc.

Conclusion

The development of this instrument is the first of its kind to the best of the authors' knowledge and it consists of all aspects contributing to the perception of the doctors and nurses about the healthcare institutions. This instrument would be helpful in determining the perception of healthcare service providers, i.e., doctors and nursing staff from different regional areas regarding the healthcare services and infrastructure availability of the health institutions.

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Conflict of Interest: None

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Annexure I
Content Validation Analysis

Table 32. Experts' Response Compilation for the Content Validity of the Questionnaire for Service Providers

Statements	X1	X2	X3	X4	X5	X6	Experts in Agreement	I-CVI	UA (100% Agreement)
S1	1	1	1	1	1	1	6	1	1
S2	1	1	1	1	1	1	6	1	1
S3	1	1	1	1	1	1	6	1	1
S4	1	1	1	1	1	1	6	1	1
S5	1	1	1	1	1	1	6	1	1
S6	1	1	1	1	1	1	6	1	1
S7	1	1	1	1	1	1	6	1	1
S8	1	1	1	1	1	1	6	1	1
S9	1	1	1	1	1	1	6	1	1
S10	1	1	1	1	1	1	6	1	1
S11	1	1	1	1	1	1	6	1	1
S12	1	1	1	1	1	1	6	1	1
S13	1	1	1	1	1	1	6	1	1
S14	1	1	1	1	1	1	6	1	1
S15	1	1	1	1	1	1	6	1	1
S16	1	1	1	1	1	1	6	1	1
S17	1	1	1	1	1	1	6	1	1
S18	1	1	1	1	1	1	6	1	1
S19	1	1	1	1	1	1	6	1	1
S20	1	1	1	1	1	1	6	1	1
S21	1	1	1	1	1	1	6	1	1
S22	1	1	1	1	1	1	6	1	1
S23	1	1	1	1	1	1	6	1	1
S24	1	1	1	1	1	1	6	1	1
S25	1	1	1	1	1	1	6	1	1
S26	1	1	1	1	1	1	6	1	1
S27	1	1	1	1	1	1	6	1	1
S28	1	1	1	1	1	1	6	1	1
S29	1	1	1	1	1	1	6	1	1
S30	1	1	1	1	1	1	6	1	1
S31	1	1	1	1	1	1	6	1	1
S32	1	1	1	1	1	1	6	1	1
S33	0	1	1	1	1	1	5	0.833333	0
S34	0	1	1	1	1	1	5	0.833333	0
S35	1	1	1	1	1	1	6	1	1
S36	1	1	1	1	1	1	6	1	1
S37	1	1	1	1	1	1	6	1	1
S38	1	1	1	1	1	1	6	1	1
S39	0	1	1	1	1	1	5	0.833333	0
S40	1	1	1	1	1	1	6	1	1
S41	1	1	1	1	1	1	6	1	1

S42	1	1	1	1	1	1	6	1	1
S43	1	1	1	1	1	1	6	1	1
S44	1	1	1	1	1	1	6	1	1
S45	1	1	1	1	1	1	6	1	1
S46	1	1	1	1	1	1	6	1	1
S47	1	1	1	1	1	1	6	1	1
S48	1	1	1	1	1	1	6	1	1
S49	1	1	1	1	1	1	6	1	1
S50	1	1	1	1	1	1	6	1	1
S51	1	1	1	1	1	1	6	1	1
S52	1	1	1	1	1	1	6	1	1
S53	1	1	1	1	1	1	6	1	1
S54	1	1	1	1	1	1	6	1	1
S55	1	1	1	1	1	1	6	1	1
S56	1	1	1	1	1	1	6	1	1
S57	1	1	1	1	1	1	6	1	1
S58	1	1	1	1	1	1	6	1	1
Remarks	X1: Add the statement - 1. Adequate security personnel is readily available on the hospital premises. Remove the statements - 2. Discrimination in the hospital on the basis of caste, creed, religion and gender, and 3. Long working hours in hospital X4: Add the statement - 1. Advanced or up-to-date instruments (machines & equipment) are available in each ward. 2. Separate male and female nursing staff are there in the hospital.								
Proportion Relevance	0.948276	1	1	1	-S-CVI/Ave		0.99137931		
Average proportion of items judged as relevant by the 10 experts	1		S-CVI/UA		0.948275862				

Annexure 2 Face Validity Analysis

Table 4. Response Compilation of Face Validity of the Questionnaire for Service Providers

S. No.	Expert's Name	Expert's Answer										Expert's Remarks	Action Taken for Remarks
		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10		
1	Dr Manpreet Kaur	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Well-structured	-
2	Dr Amritpal Kaur	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-
3	Dr Sukhjeet Singh	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-
4	Dr Megha Sharma	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	-	-
Per question agreement (%) = Total agreed experts (Yes) per question/ Total number of experts		100	100	100	100	100	100	100	100	100	100	-	-
Overall agreement (%) = Sum of % of all questions/Total number of questions											1000/10 = 100		