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# Assessing the Validity and Reliability of a Questionnaire for Evaluating Pharmaceutical Services at a Hospital

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**A B S T R A C T**

Pharmaceutical services are vital components of the healthcare system that aim to ensure the appropriate, safe, and effective use of medicines. This study aims to develop and test the validity and reliability of a questionnaire for assessing the quality of pharmaceutical services at a hospital in Jakarta. The questionnaire was designed based on five service quality dimensions: tangibles, reliability, assurance, empathy, and responsiveness. An initial set of 23 statement items was tested for content validity by calculating the Content Validity Ratio (CVR) and Content Validity Index (CVI). Several items were eliminated for not meeting the validity threshold. Subsequently, construct validity was tested by calculating Pearson product-moment correlations on data from 100 respondents who met the inclusion criteria, resulting in 13 valid statement items with $r > 0.148$. Reliability tests indicated Cronbach's Alpha values above 0.6 for all dimensions, demonstrating good internal consistency of the questionnaire. Hypothesis testing results showed that all statement items had a significant relationship with the total questionnaire score ($p < 0.05$). Therefore, the questionnaire is valid and reliable for evaluating the quality of pharmaceutical services at a hospital in Jakarta.

## 1. Introduction

One of the leading private healthcare facilities in Jakarta is committed to providing high-quality healthcare with a holistic approach, combining the latest medical technology and a professional medical team. As a major healthcare center, it provides a variety of health services, including pharmaceutical services that are carried out based on the pharmaceutical service standards in the Regulation of the Minister of Health of the Republic of Indonesia Number 74 of 2016 [1].

Pharmaceutical services are vital components of the healthcare system that aim to ensure the appropriate, safe, and effective use of medicines. The quality of pharmaceutical services plays a crucial role in improving public health and meeting patient needs. Therefore, it is essential to assess and test the dimensions of pharmaceutical service quality regularly [2].

The quality of pharmaceutical services can be evaluated across various dimensions, including reliability, responsiveness, assurance, empathy, and tangibles [3]. Reliability encompasses consistency and accuracy in providing information and medication. Responsiveness refers to the pharmacist's readiness to respond to patient needs and complaints [4], [5]. Assurance involves the competence and credibility of pharmacy personnel in delivering services. Empathy reflects the attention and care provided to patients, while tangibles include the condition of facilities, cleanliness, and comfort of the pharmacy environment [6],[7]. Assessing the quality of pharmaceutical services aims to identify strengths and weaknesses in the services provided to facilitate continuous improvement. Assessment methods may include patient satisfaction surveys, direct observation,

interviews, and internal audits. Testing these dimensions of quality is crucial to ensure that pharmaceutical services not only meet established standards but also provide a positive patient experience [3]. In a broader context, enhancing the quality of pharmaceutical services can contribute to improving patient quality of life, reducing medication errors, and increasing the efficiency of the healthcare system [4], [5]. Therefore, efforts to improve the quality of pharmaceutical services should be based on comprehensive and evidence-based assessment and testing [8], [9].

The study by Chang (2023) titled "Development and Validation of a Pharmaceutical Assessment Screening Tool to Prioritize Patient Care in a Tertiary Care Hospital" highlights recent advances in the validation of pharmacy service assessment tools in hospitals. This study used confirmatory factor analysis (CFA) and expert judgment to assess the construct validity and content validity of the questionnaire. The CFA results showed an excellent model fit with the data, while expert input improved the content validity of the questionnaire. The results of this study suggest that a well-validated assessment tool can provide a more accurate and reliable evaluation of pharmacy services in hospitals, thereby aiding in the improvement of service quality [10].

Research by Manzoor et al. (2019) demonstrated a positive correlation between patient satisfaction and health services. Patient satisfaction is influenced by service quality measured using five dimensions: reliability, responsiveness, tangibles, assurance, and empathy [11].

Furthermore, research conducted by Luh Putu Febryana Larasanty et al. (2020), entitled "Development of the Udayana Questionnaire for Assessment of Patient Satisfaction with Pharmaceutical Services by Pharmacists at Community Health Centers," underscores the importance of developing valid and reliable instruments to measure patient satisfaction with pharmaceutical services. The study found that a valid questionnaire can provide a more accurate depiction of the quality of pharmaceutical services and assist in service improvement. However, this study was conducted in a community health center, so the results may not be fully generalizable to hospitals. The strength of Luh Putu Febryana Larasanty et al.'s study lies in its use of a proven effective method for measuring patient satisfaction in community health centers [12]. However, the study's limitation is that it does not cover hospitals. Therefore, this study aims to develop and test the validity and reliability of the questionnaire used at a hospital in Jakarta, to serve as a more appropriate evaluation tool for hospitals.

## 2. Research Method

This study aims to develop a valid and reliable questionnaire to assess patient satisfaction with pharmaceutical services at a hospital in Jakarta. This questionnaire is expected to be an effective evaluation tool to improve the quality of pharmaceutical services at the hospital. Thus, this study is anticipated to expand knowledge and contribute to enhancing the quality of pharmaceutical services in hospitals, as well as providing an evaluation tool that can be utilized by other hospitals with similar conditions [12] .

The study used a cross-sectional design involving 100 patients who had received pharmaceutical services at a hospital in Jakarta. The sample size was chosen based on the limited time and resources available, as well as methodological considerations to obtain data that is sufficiently representative in the context of this study. The research stages are illustrated in Figure 1[13].

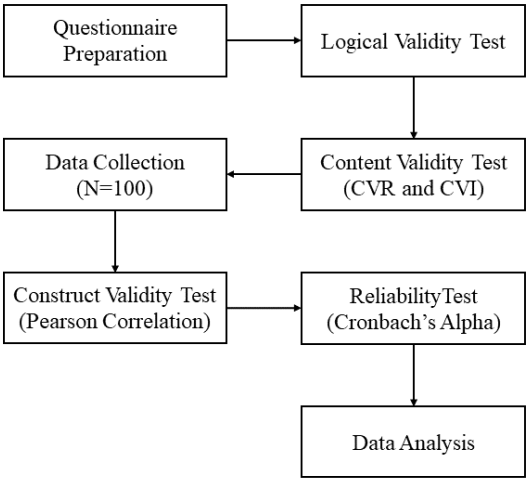


Figure 1: Research Stages

Data sources were obtained through a questionnaire survey filled out by patients. The initial questionnaire, as detailed in Table 1, consisted of 23 items covering various aspects of pharmaceutical services such as drug availability, communication with pharmacists, and facility convenience [14]. Numerical data obtained from the questionnaire were selected and normalized using StandardScaler from sci-kit-learn for analysis. Construct validity was tested using Pearson's correlation between each item and the total score, while reliability was tested using the Cronbach Alpha coefficient [15].

### 2.1 Questionnaire Preparation

The questionnaire was prepared based on Permenkes RI Number 74 of 2016 concerning Pharmaceutical Service Standards in Hospitals. Each statement item was described based on a review of each type of pharmaceutical service according to the pharmaceutical service standards in hospitals. Data was collected through a questionnaire distributed to patients who had received pharmaceutical services at a hospital in Jakarta. The questionnaire consisted of 23 questions covering five dimensions of service quality: reliability, responsiveness, tangibility, assurance, and empathy. [12].

2.2 Validity and Reliability Test of Questionnaire

The questionnaire that has been prepared is then tested for validity and reliability. The validity test includes the logical validity test, content validity test, and construct validity test.

Logical Validity Test: Aims to test the feasibility of item content based on a qualitative assessment by a panel of experts [16], [17]. The result of logical validity is an agreement among experts regarding the feasibility of the measurement scale [18]. Statements that are considered logical are then categorized into five dimensions of service quality (reliability, responsiveness, tangibles, assurance, and empathy) based on the guidelines for developing service quality items in the Servqual dimension by Parasuraman [18].

Content Validity Test: Indicates the extent to which the items in the questionnaire adequately represent the content domain of the questionnaire [19], [20]. The minimum number of experts used for the content validity test is five experts. The content validity test was conducted in two stages of assessment, namely the CVR and CVI. CVR is used to assess whether a statement in the questionnaire is important or useless, while CVI is used to assess whether the questionnaire statement is appropriate, requires revision, or needs to be eliminated [21], [22].

Statements that have been declared valid in the logical validity test and content validity test are then distributed to research respondents to conduct construct validity tests and reliability tests [12]. The construct validity test and reliability test assessed the entire questionnaire according to the dimensions of service quality with a score range of 1 to 5 based on a Likert scale (strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1) [12],[23].

Respondents were patients or families of patients who had received pharmaceutical services by pharmacists at a hospital in Jakarta, with the inclusion criteria of respondents aged 17-65 years (adults), able to communicate well, and willing to fill out questionnaires. The number of respondents is 100 respondents [12]. The sampling of respondents for construct validity and reliability tests was carried out by convenience sampling.

The convenience sampling method is a sampling method where respondents are selected based on their availability and willingness to participate in the study [12]. Every patient who was willing to fill out the questionnaire was included in the study without any special criteria other than the predetermined inclusion criteria [24], [25]. Questionnaires were completed using forms distributed to patients. Convenience sampling was chosen because it is practical and allows for quick data collection, although it has limitations in wider population representation [12], [26].

Data analysis for the construct validity test was carried out by statistical analysis using the product-moment correlation value from Pearson Correlation [12]. Product moment correlation is a type of statistical analysis that measures the strength and direction of a linear relationship between two variables. In the context of questionnaire validation, product-moment correlation is used to determine how well each item in the questionnaire measures the intended construct [12]. The questionnaire is said to be valid if the product-moment correlation coefficient exceeds 0.148, which indicates a significant positive relationship between the item and the overall construct while the reliability test is carried out by calculating Cronbach's Alpha value [27]–[29].

The Cronbach's Alpha value obtained is compared with the minimum acceptable reliability coefficient. If the Cronbach's Alpha value is> 0.6, then the research instrument is declared reliable. If the Cronbach's Alpha value <0.6, then the research instrument is declared unreliable [12], [30]–[32].

## 3. Results and Discussion

This study was conducted to obtain a valid and reliable questionnaire on the level of patient satisfaction with pharmaceutical services at a hospital in Jakarta, which can be used to evaluate the quality of pharmaceutical services. The respondents of the questionnaire consisted of 32 men and 68 women. The preparation of statement items in the questionnaire refers to Permenkes No. 72 of 2016 concerning pharmaceutical service standards in hospitals, with grouping using the five dimensions of service quality. The statements in the questionnaire relate to aspects of pharmaceutical services, namely prescription assessment, drug information services (PIO), and counselling [12].

3.1 Logical Validity Test

The logical validity test aims to assess whether the statement items in the questionnaire align with the concept to be measured, in this case, the quality of pharmaceutical services at a hospital in Jakarta. Logical validity ensures that each item in the questionnaire is relevant and representative of the construct being measured. The first stage in the logical validity test was the development of a questionnaire based on the five dimensions of service quality: tangible, reliability, assurance, empathy, and responsiveness. The initial questionnaire consisted of 23 items designed to cover various aspects of these dimensions [33], [34]. Table I details the design of the questionnaire statement items, which were structured based on these five dimensions of service quality, ensuring comprehensive coverage of the relevant aspects.

3.2 Content Validity Test

The content validity test is carried out to determine the extent to which the statements in the instrument are considered relevant and represent the construct of the

measuring instrument targeted for a specific purpose. The final result of content validity is an assessment of the appropriateness of the questionnaire content [35].

The content validity test was carried out by eight experts from members of the Indonesian Pharmacists Association Jakarta Regional Management, who are also practitioners with more than 5 years of practical experience [36].

At this stage, out of 23 questionnaire statement items, 22 were declared valid by the practitioners and 1 statement item was eliminated. The raters were asked to rate each item from 1 to 3, with 1 indicating that the statement was unnecessary, 2 indicating that the statement in the questionnaire was useful but not important, and 3 indicating that the statement was important [12]. The CVI assessment is conducted to determine whether the questionnaire items are appropriate, require revision, or need to be eliminated [37].

Raters can select a score from 1 to 4 for each item in the questionnaire. A score of 1 indicates that the statement is not relevant, a score of 2 indicates somewhat relevant, a score of 3 indicates moderately relevant, and a score of 4 indicates highly relevant [38],[39]. Based on the CVI assessment, 1 statement item was eliminated because it did not meet the validity criteria, leaving 22 valid statements [40].
Furthermore, logical validity was evaluated by eight experts consisting of members of the Indonesian Pharmacists Association Jakarta Regional Board. These experts are practitioners with more than five years of practical experience. The experts were asked to assess the suitability and relevance of each statement item in the questionnaire [35].

Table I. Design of Questionnaire Statement Items Based on 5 Dimensions of Service Quality

| No | Service Quality Dimensions | Statement Item |
|---|---|---|
| 1 | *Tangible* [12] | 1. Hospital has a pharmacy room to serve doctor's prescriptions.<br>2. There is clear information about the drug reception and delivery counters in the pharmacy room.<br>3. Prescription drugs and health supply services use clear and organized queue numbers.<br>4. There is a drug label on each drug package.<br>5. The usage instructions for the drug are clearly stated on the label of the drug package.<br>6. The pharmacist wears a mask when handing over the drug to the patient. |
| 2 | *Reliability* [12] | 7. The pharmacist provides drug information services in easily understood language.<br>8. The pharmacist takes an active role in educating patients about drug use.<br>9. The pharmacist provides information on activities that should be avoided about drug use. |
| 3 | *Assurance* [12] | 10. The pharmacist first asks for my name and date of birth to match it with the name listed on the drug to be delivered.<br>11. The obtained drug is still in good packaging.<br>12. The pharmacist hands over the drug along with providing information on the usage instructions, for example, the drug should be taken every 12 hours at 7 AM and 7 PM after meals.<br>13. The pharmacist hands over the drug along with providing information on how to use the drug, for example, taken with water, and applied thinly on the wound.<br>14. The drug delivery is always accompanied by information on how to store the drug, for example, stored in a cool place.<br>15. The drug delivery is always accompanied by additional information, such as possible side effects, foods to avoid while taking the drug, etc. |
| 4 | *Empathy* [12] | 16. The pharmacist provides information about the drug I received clearly and without haste.<br>17. The pharmacist allows patients to ask questions about the given drug.<br>18. The pharmacist provides service to me regardless of social status.<br>19. Drug information is provided without the patient having to ask first. |
| 5 | *Responsiveness* [12] | 20. Drug services are carried out by the pharmacist related to prescription drug delivery, drug information provision, and counselling.<br>21. The pharmacist accepts questions related to drug information and provides answers.<br>22. The pharmacist provides drug information to patients, accurately, and responsibly.<br>23. Communication between the pharmacist and the patient is two-way. |

Table II shows the results of the logical validity test, where statement items with a CVR value <0.75 are considered invalid [36]. The results show that 10 items scored 1 which means valid, 5 items scored 0.5 which means invalid and 1 item scored -1 which is also invalid.

Table II. Results of CVR Measurement

| No | CVI Value | Statement Item | Remarks |
|---|---|---|---|
| 1 | 1 | no : 1; 2; 3; 4; 5; 6; 7; 8; 9;10 | Valid |
| 2 | 0.5 | no: 11; 12; 13; 14; 15 | Invalid |
| 3 | 0.75 | no: 16; 18; 18; 20; 21; 22; 23 | Valid |
| 4 | -1 | no: 17 | Invalid |

Figure 2 illustrates the CVR values per item, providing a visual representation of the validity of each [37].

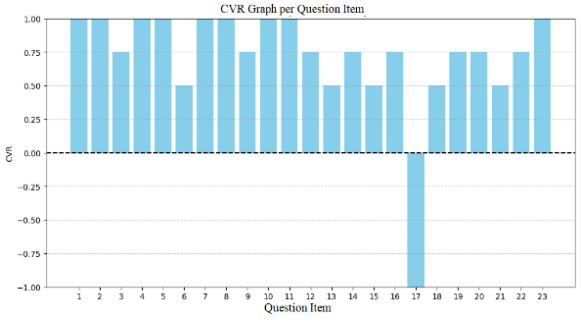


Figure 2. CVR Chart per Question Item

A CVI assessment was conducted to determine whether each item in the questionnaire was appropriate, required revision, or needed to be eliminated. The raters were given a rating scale from 1 to 3 to evaluate each item: 1 means 'Not necessary', 2 means 'Useful but not important', and 3 means 'Important'. The results of the CVI assessment are presented in Table III, which indicates that one item was eliminated as it had a CVI value below 0.78, while the remaining 22 items were retained as they met the established CVI threshold.

Table III. Results of CVI Measurement

| No | CVI Value | Statement Item | Remarks |
|---|---|---|---|
| 1 | 100% | no: 1;2;4;5;7;8;10;11;23 | Appropriate |
| 2 | 95,83% | no: 3;9;12;14;16;19;20;22 | Appropriate |
| 3 | 91,67% | no: 6;13;15;18;21 | Appropriate |
| 4 | 33,33% | no: 17 | Eliminate |

Statement items with a CVI value below 70% were eliminated. From the CVI measurement results, one statement item was eliminated because it only had a CVI value of 33.33%. Figure 3 shows a visualization of the CVI results per item, providing additional insight into the overall validity assessment of the items.

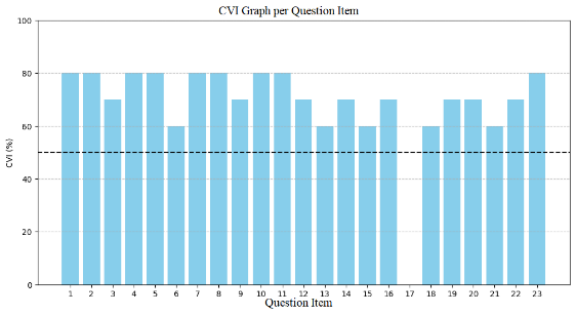


Figure 3. CVI Chart per Question Item

The logical Validity Test is an important initial step in the development of a questionnaire to ensure that each statement item in the questionnaire is appropriate and relevant to the service quality dimensions being measured. The results of this logical validity test the form the basis for proceeding to the construct validity and reliability testing stages.

## 3.3 Construct Validity Test

The construct validity test was conducted by calculating the product-moment correlation values from the questionnaire responses distributed to 100 respondents at a Hospital in Jakarta. As shown in Table IV, 13 statement items have a calculated R-value greater than 0.148 (r-table), thus deemed valid. Construct validity is a test performed to ensure that an instrument can measure the intended construct. In this study, the measured construct is the pharmaceutical services provided by pharmacists at a Hospital in Jakarta. The Pearson product-moment correlation value ranges between -1 and +1. If the correlation coefficient is +1, it indicates a perfect positive linear relationship between the two variables being studied. The correlation coefficients of the statements in the questionnaire are positive, meaning that each statement item in the questionnaire has a positive linear relationship with the pharmaceutical services. As illustrated in Figure 4, the graph shows the item-total correlation for the construct validity test, providing a visual representation of the validity of each statement item in relation to the overall construct.

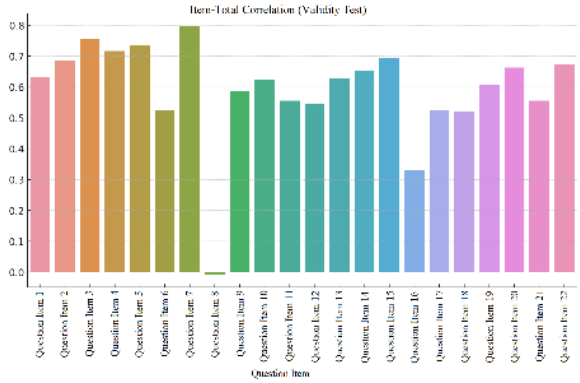


Figure 4. Item-Total Correlation for Construct Validity Test

This graph shows the correlation value between each statement item and the total score of the questionnaire, where a correlation value above 0.148 indicates good construct validity.

The results of the construct validity test are considered valid if the calculated R-value (r count) is greater than 0.148 (r table). The reliability test results are considered reliable if the Cronbach's Alpha value is greater than 0.6.

## 3.4 Reliability Testing

Reliability testing is a measure indicating the extent to which a measurement tool can be trusted or relied upon. Reliability testing demonstrates the degree to which measurement results remain consistent when conducted two or more times on the same subject using the same measurement instrument. The Cronbach's Alpha values for the questionnaire items can be seen in Table IV. The Cronbach's Alpha values for all service dimensions are > 0.6, indicating reliability. Reliable statements show that the items within each service quality dimension in this questionnaire can consistently and stably measure pharmaceutical services by pharmacists at a Hospital in Jakarta. Repeated measurements with a reliable questionnaire under constant conditions will yield the same results.

## 3.5 Elimination of Question Items:

Based on the results of the construct validity test, question items with a calculated r value below the threshold of 0.6 were eliminated. This was done to ensure that each question item used has a strong correlation with the measured construct. The eliminated question items are as follows: Nos. 6, 8, 9, 11, 12, 16, 17, 18, and 21.

### 3.6 Recalculation for Hypothesis Testing:

After eliminating the invalid items, recalculation was conducted to obtain the hypothesis test results. This recalculation involves analyzing the items that meet the construct validity threshold. This recalculation process is carried out to ensure that the hypothesis test results are based on valid and reliable data.

### 3.7 Reliability Test Results II:

After eliminating invalid items, the Cronbach's Alpha value was recalculated to ensure the internal consistency of the questionnaire.The reliability test results indicate that Cronbach's Alpha values for all service quality dimensions exceed 0.6, demonstrating good internal consistency of the questionnaire.

Table IV. Construct Validity and Reliability Test of Questionnaire Statements

| No | Service Quality Dimensions | Question Item | R-value | Cronbach's Alpha |
|---|---|---|---|---|
| 1 | *Tangible* [12] | 1. Hospital has a pharmacy room to serve doctor's prescriptions. | 0.63 | 0.9 |
| | | 2. There is clear information about the drug reception and delivery counters in the pharmacy room. | 0.69 | |
| | | 3. Prescription drug and health supply services use clear and organized queue numbers. | 0.76 | |
| | | 4. There is a drug label on each drug package. | 0.72 | |
| | | 5. The usage instructions for the drug are clearly stated on the label of the drug package. | 0.74 | |
| | | 6. The pharmacist wears a mask when handing over the drug to the patient. | 0.52 | |
| 2 | *Reliability* [12] | 7. The pharmacist provides drug information services in easily understood language. | 0.8 | |
| | | 8. The pharmacist takes an active role in educating patients about drug use. | -0.01 | |
| | | 9. The pharmacist provides information on activities that should be avoided in relation to drug use. | 0.59 | |
| 3 | *Assurance* [12] | 10. The pharmacist first asks for my name and date of birth to match it with the name listed on the drug to be delivered. | 0.62 | |
| | | 11. The obtained drug is still in good packaging. | 0.56 | |
| | | 12. The pharmacist hands over the drug along with providing information on the usage instructions, for example, the drug should be taken every 12 hours at 7 AM and 7 PM after meals. | 0.55 | |
| | | 13. The pharmacist hands over the drug along with providing information on how to use the drug, for example, taken with water, applied thinly on the wound. | 0.63 | |
| | | 14. The drug delivery is always accompanied by information on how to store the drug, for example, stored in a cool place. | 0.65 | |
| | | 15. The drug delivery is always accompanied by additional information, such as possible side effects, foods to avoid while taking the drug, etc. | 0.69 | |
| 4 | *Empathy* [12] | 16. The pharmacist provides information about the drug I received clearly and without haste. | 0.33 | |
| | | 17. The pharmacist provides service to me regardless of social status. | 0.53 | |
| | | 18. Drug information is provided without the patient having to ask first. | 0.52 | |
| | | 19. Drug services are carried out by the pharmacist related to prescription drug delivery, drug information provision, and counseling. | 0.61 | |
| 5 | *Responsiveness* [12] | 20. The pharmacist accepts questions related to drug information and provides answers. | 0.66 | |
| | | 21. The pharmacist provides drug information to patients clearly, accurately, and responsibly. | 0.56 | |
| | | 22. Communication between the pharmacist and the patient is two-way. | 0.67 | |

Table V. Results of Construct Validity and Reliability Test II

| No | Service Quality Dimensions | Question Item | R-value | Cronbach's Alpha |
|---|---|---|---|---|
| 1 | *Tangible* [12] | 1. Hospital has a pharmacy room to serve doctor's prescriptions. | 0.63 | 0.91 |
| | | 2. There is clear information about the drug receipt and delivery counters in the pharmacy room. | 0.69 | |
| | | 3. Prescription drugs and medical supplies services use clear and organized queue numbers. | 0.76 | |
| | | 4. Each drug package has a drug label. | 0.72 | |
| | | 5. Drug usage instructions are clearly stated on the labels of the drug packages. | 0.74 | |
| 2 | *Reliability* [12] | 6. Pharmacists provide drug information services in easy-to-understand language. | 0.8 | |
| 3 | *Assurance* [12] | 7. Pharmacists first ask for my name and date of birth to match it with the name on the drugs to be handed over. | 0.62 | |
| | | 8. Pharmacists hand over the drugs along with information on how to use them, such as drinking with water or applying thinly on wounds. | 0.63 | |

| No | Service Quality Dimensions | Question Item | R-value | Cronbach's Alpha |
|---|---|---|---|---|
| | | 9. Drug delivery is always accompanied by information on how to store the drugs, such as storing them in a cool place. | 0.65 | |
| | | 10. Drug delivery is always accompanied by additional information, such as possible side effects and foods to avoid while taking the drugs. | 0.69 | |
| 4 | *Empathy* [12] | 11. Drug services are carried out by pharmacists related to prescription drug delivery, drug information provision, and counselling. | 0.61 | |
| 5 | *Responsiveness* [12] | 12. Pharmacists receive questions related to drug information and provide answers. | 0.66 | |
| | | 13. Communication between pharmacists and patients is two-way. | 0.67 | |

As shown in Table V, the results of the second construct validity and reliability test provide a detailed overview of the recalculated values.

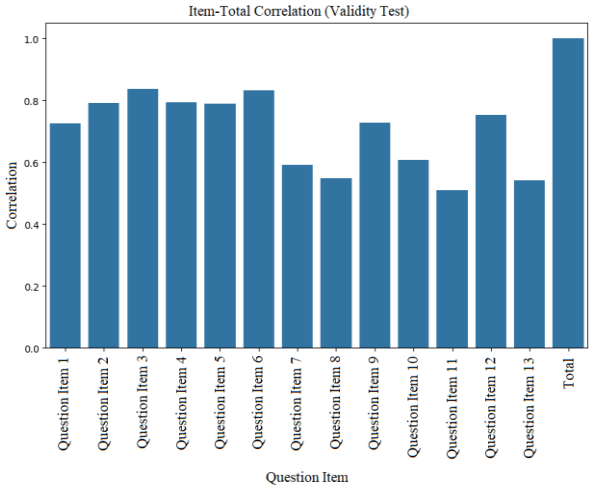


Figure 5. Chart diagram of r count from construct validity test II

Figure 5 presents a graphical depiction of the calculated R-values from the construct validity test, while Figure 6 illustrates the reliability test results, specifically the Cronbach's Alpha value for each statement item.

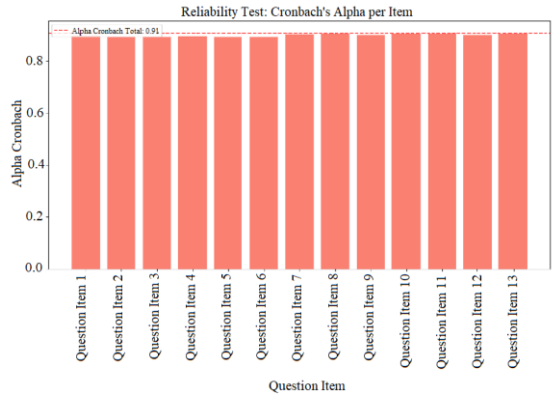


Figure 6. Chart diagram of reliability test results

## 3.8 Hypothesis Test

In this study, hypothesis testing was used to determine whether the statements in the questionnaire have a significant relationship with the construct being measured, namely the quality of pharmaceutical services. The hypotheses tested are as follows:

Null Hypothesis (H0): There is no significant relationship between the statements in the questionnaire and the quality of pharmaceutical services. Alternative Hypothesis (H1): There is a significant relationship between the statements in the questionnaire and the quality of pharmaceutical services.

This implies that the statements in the questionnaire significantly reflect or relate to the quality of pharmaceutical services provided. In other words, these statements are able to accurately measure the quality of pharmaceutical services at this hospital.

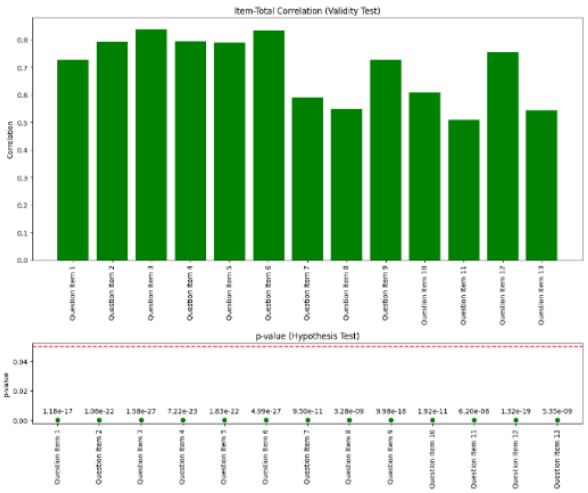


Figure 7: Correlation graph and p-value of hypothesis test

As illustrated in Figure 7, the correlation graph and p-value of the hypothesis test demonstrate the relationship between each questionnaire item and the construct. Hypothesis testing was conducted using Pearson correlation for each item in the questionnaire. The p-value obtained from the correlation test was used to determine whether the relationship between the statement items and the construct was significant. If the p-value < 0.05, then H0 is rejected and H1 is accepted, indicating a significant relationship between the statements in the questionnaire and the quality of pharmaceutical services. The results of hypothesis testing, detailed in Table VI, show that all statement items have a significant correlation value with the total score of the questionnaire ($p < 0.05$). No item showed an insignificant relationship. The analysis results show that all statement items have a significant correlation value with the total score of the questionnaire ($p < 0.05$). The

validity results indicated that most of the items had strong correlations with the total score. Items 3, 6, and 12 displayed the highest correlations, approaching or exceeding 0.8, indicating a significant contribution to the overall scale. In contrast, item 11 had the lowest correlation, around 0.51, which may require further revision or evaluation to improve the internal consistency of the scale. All items had a significant p-value (below 0.05), indicating a statistically significant contribution to the total score. Thus, all items are statistically valid and contribute to the reliability of the scale used

Table VI. Correlation and p-value

| No | Question Item | Correlation | p-value |
|---|---|---|---|
| 1 | Hospital has a pharmacy room to serve doctor's prescriptions. | 0.72 | 1.18E-17 |
| 2 | There is clear information about the drug receipt and delivery counters in the pharmacy room. | 0.79 | 1.08E-22 |
| 3 | Prescription drugs and medical supplies services use clear and organized queue numbers. | 0.83 | 1.58E-27 |
| 4 | Each drug package has a drug label. | 0.79 | 7.22E-23 |
| 5 | Drug usage instructions are clearly stated on the labels of the drug packages. | 0.78 | 1.83E-22 |
| 6 | Pharmacists provide drug information services in easy-to-understand language. | 0.83 | 4.99E-27 |
| 7 | Pharmacists first ask for my name and date of birth to match it with the name on the drugs to be handed over. | 0.59 | 9.50E-11 |
| 8 | Pharmacists hand over the drugs along with information on how to use them, such as drinking with water or applying thinly on wounds. | 0.54 | 3.28E-09 |
| 9 | Drug delivery is always accompanied by information on how to store the drugs, such as storing them in a cool place. | 0.72 | 9.98E-18 |
| 10 | Drug delivery is always accompanied by additional information, such as possible side effects and foods to avoid while taking the drugs. | 0.6 | 1.92E-11 |
| 11 | Drug services are carried out by pharmacists related to prescription drug delivery, drug information provision, and counselling. | 0.5 | 6.20E-08 |
| 12 | Pharmacists receive questions related to drug information and provide answers. | 0.75 | 1.32E-19 |
| 13 | Communication between pharmacists and patients is two-way. | 0.54 | 5.35E-09 |

## 4. Conclusions

The development of a questionnaire at a hospital in Jakarta to assess patient satisfaction with pharmaceutical services provided by pharmacists resulted in 13 statement items distributed across five dimensions: tangible (6 items), reliability (3 items), assurance (6 items), empathy (4 items), and responsiveness (3 items). Of the initial 23 questions, all were declared valid except for one, resulting in 22 questions that were re-evaluated. The analysis revealed that most items demonstrated good validity, with 13 items showing significant correlations ($r > 0.60$) and a Cronbach's Alpha value of 0.91, indicating strong internal consistency. For example, the service of clear and organized queue numbers showed a correlation of 0.830 (p-value 1.58E-27), indicating a strong relationship with patient satisfaction. Overall, the analysis indicated that most items in the questionnaire are valid and reliable for measuring the quality of pharmaceutical services. Further research is recommended to test this questionnaire on a larger population and to employ more comprehensive validation methods, such as the Delphi method or factor analysis, to enhance validity. External validity testing is also needed to ensure that this questionnaire is widely applicable and reliable.

## References

[1] D. N. R. Mastuti, T. Irawan, and M. Marfuatun, "KualitasPelayanan Kesehatan pada Masa Pandemi Covid-19 di Puskesmas Tondano Kota Pekalongan," *Pena Med. J. Kesehat.*, vol. 12, no. 2, p. 266, 2023, doi: 10.31941/pmjk.v12i2.2684.

[2] A. P. Sulaeman, H. Fajarini, and R. F. Balfas, "Evaluasi Pelayanan Informasi Obat di Apotek Berdasarkan Peraturan Menteri Kesehatan Republik Indonesia Nomor 73 Tahun 2016," *MOTEKAR J. Multidisiplin Teknol. dan Arsit.*, vol. 1, no. 2, pp. 116–125, 2023, doi: 10.57235/motekar.v1i2.1168.

[3] M. A. Abbasi-Moghaddam, E. Zarei, R. Bagherzadeh, H. Dargahi, and P. Farrokhi, "Evaluation of service quality from patients' viewpoint," *BMC Health Serv. Res.*, vol. 19, no. 1, pp. 1–7, 2019, doi: 10.1186/s12913-019-3998-0.

[4] N. Amara, A. Y. Naser, and E. O. Taybeh, "Patient Satisfaction with Pharmaceutical Services in Jordan: A Cross-Sectional Study," *Jordan J. Pharm. Sci.*, vol. 16, no. 1, pp. 1–10, 2023, doi: 10.35516/jjps.v16i1.1030.

[5] M. Kayyali, "An Overview of Quality Assurance in Higher Education: Concepts and Frameworks Manager of Higher Education Quality and Assessment Council HEQAC," *Sci. Innov. Technol. IJMSIT Rev. Pap.*, vol. 4, no. 2, pp. 1–04, 2023, [Online]. Available: https://ijmsit.com/volume-4-issue-2/

[6] A. Mungmode *et al.*, "Making Diabetes Electronic Medical Record Data Actionable: Promoting Benchmarking and Population Health Improvement Using the T1D Exchange Quality Improvement Portal," *Clin. Diabetes*, vol. 41, no. 1, pp. 45–55, 2023, doi: 10.2337/cd22-0072.

[7] A. Chowdhury, M. A. Ali, M. M. Hossain, M. M. Uddin, S. H. Naqib, and A. K. M. A. Islam, "Predicted MAX phase Sc 2 InC : Dynamical stability , vibrational and optical properties The structure of ternary layered carbide , Sc 2 InC , is shown in Fig . 1 . This MAX phase crystallizes with space group P63 / mmc ( 194 ) belonging to the hexagonal s".

[8] S. H. Sharkiya, "Quality communication can improve patient-centred health outcomes among older patients: a rapid review," *BMC Health Serv. Res.*, vol. 23, no. 1, pp. 1–15, 2023, doi: 10.1186/s12913-023-09869-8.

[9] J. Alves and W. Yang, "Cognitive Mechanisms in Entrepreneurship Competence: Its Implication for Open Innovation," *J. Open Innov. Technol. Mark. Complex.*, vol. 8, no. 2, 2022, doi: 10.3390/joitmc8020065.

[10] C. E. Chang *et al.*, "Development and validation of a pharmaceutical assessment screening tool to prioritise patient

care in a tertiary care hospital," *PLoS One*, vol. 18, no. 3 March, pp. 1–15, 2023, doi: 10.1371/journal.pone.0282342.

[11] A. ur Rahman, W. Manzoor, N. Yasmin, R. M. S. Yaqub, and M. S. Ali, "From Service Quality to Brand Loyalty: The Mediating Effect of Student Satisfaction in Public Sector Universities," *Pakistan J. Humanit. Soc. Sci.*, vol. 12, no. 2, pp. 1225–1240, 2024, doi: 10.52131/pjhss.2024.v12i2.2215.

[12] L. P. F. Larasanty, M. K. A. Jaya, K. W. Astuti, and I. W. M. Santika, "Pengembangan Kuisioner Udayana untuk Penilaian Kepuasan Pasien terhadap Pelayanan Kefarmasian oleh Apoteker di Pusat Kesehatan Masyarakat," *J. Manaj. DAN PELAYANAN Farm. (Journal Manag. Pharm. Pract.*, vol. 11, no. 1, p. 62, 2021, doi: 10.22146/jmpf.60998.

[13] S. Lee, O. P. Godwin, K. Kim, and E. Lee, "Predictive factors of patient satisfaction with pharmacy services in South Korea: A cross-sectional study of national level data," *PLoS One*, vol. 10, no. 11, pp. 1–9, 2015, doi: 10.1371/journal.pone.0142269.

[14] A. Ismail, Y. N. Gan, and N. Ahmad, "Factors associated with patient satisfaction towards pharmacy services among outpatients attending public health clinics: Questionnaire development and its application," *PLoS One*, vol. 15, no. 11 November, pp. 1–12, 2020, doi: 10.1371/journal.pone.0241082.

[15] W. Ayenew *et al.*, "Assessment of community pharmacy professionals' willingness, involvement, beliefs, and barriers to offer health promotion services: a cross-sectional study," *BMC Health Serv. Res.*, vol. 22, no. 1, pp. 1–9, 2022, doi: 10.1186/s12913-022-08944-w.

[16] L. Soubra and G. Elba, "Pharmacist Role in Hypertension Management in the Community Setting: Questionnaire Development, Validation, and Application," *Patient Prefer. Adherence*, vol. 17, no. February, pp. 351–367, 2023, doi: 10.2147/PPA.S394855.

[17] H. Maulana, "Analisis Kualitas Instrumen Evaluasi Pembelajaran Menggunakan Media Digitalisasi Untuk Memotivasi Hasil Belajar Peserta Didik," *J. Pendidik. Bhinneka Tunggal Ika*, vol. 1, no. 4, pp. 1–12, 2023, [Online]. Available: https://doi.org/10.51903/bersatu.v1i4.255

[18] M. Bîrsan *et al.*, "Healthcare Service Quality Evaluated Using the Degree of Satisfaction of Patients in Romanian Community Pharmacies," *Healthc.*, vol. 11, no. 23, pp. 1–16, 2023, doi: 10.3390/healthcare11233038.

[19] M. Newman, E. Pherson, B. Burton, and E. Nemec, "Establishing the Content Validity of a Student Pharmacist Patient Counseling Competency Assessment in Oncology," *Am. J. Pharm. Educ.*, vol. 86, no. 6, pp. 679–684, 2022, doi: 10.5688/ajpe8708.

[20] M. Guillot-Valdés, A. Guillén-Riquelme, and G. Buela-Casal, "Content Validity through Expert Judgment for the Depression Clinical Evaluation Test," *Int. J. Clin. Heal. Psychol.*, vol. 22, no. 2, 2022, doi: 10.1016/j.ijchp.2022.100292.

[21] S. Desai and N. Patel, "Development and Validity of Questionnaire for Healthy Adult Human Participants of Early Phase Bioequivalence Pharmacokinetic Endpoint Study," *Res. J. Pharmacol. Pharmacodyn.*, vol. 13, no. 4, pp. 111–117, 2021, doi: 10.52711/2321-5836.2021.00023.

[22] P. B. Tchounwou, "Environmental Research and Public Health," *Int. J. Environ. Res. Public Health*, vol. 1, no. 1, pp. 1–2, 2004, doi: 10.3390/ijerph2004010001.

[23] H. Alhamad and P. Donyai, "The Validity of the Theory of Planned Behaviour for Understanding People's Beliefs and Intentions toward Reusing Medicines," *Pharmacy*, vol. 9, no. 1, p. 58, 2021, doi: 10.3390/pharmacy9010058.

[24] S. R. Carter, R. Ng, S. El-Den, and C. R. Schneider, "A patient-reported experience measure for community pharmacy including development of a short-form: The perceived service quality scale," *Res. Soc. Adm. Pharm.*, vol. 18, no. 8, pp. 3369–3378, 2022, doi: 10.1016/j.sapharm.2021.11.011.

[25] T. Gizaw, M. Bogale, and T. Gudeta, "Investigating the effect of pharmaceutical logistics service performance on customer satisfaction: a two-step approach with structural equation modeling," *J. Pharm. Policy Pract.*, vol. 14, no. 1, pp. 1–12, 2021, doi: 10.1186/s40545-021-00351-6.

[26] Agustien, G. Septiani, E. Suhardina, and F. Sidik, "Analisis Tingkat Kepuasan Pasien Rawat Jalan terhadap Pelayanan Farmasi Klinis di Puskesmas Bungursari Tasikmalaya," *Poltekkes Kemenkes Tasikmalaya*, pp. 104–112, 2022.

[27] J. Davda, H. Kibet, E. Achieng, L. Atundo, and T. Komen, "Assessing the acceptability, reliability, and validity of the EORTC Quality of Life Questionnaire (QLQ-C30) in Kenyan cancer patients: a cross-sectional study," *J. Patient-Reported Outcomes*, vol. 5, no. 1, 2021, doi: 10.1186/s41687-020-00275-w.

[28] K. Jokiniemi, A. M. Pietilä, and S. Mikkonen, "Construct validity of clinical nurse specialist core competency scale: An exploratory factor analysis," *J. Clin. Nurs.*, vol. 30, no. 13–14, pp. 1863–1873, 2021, doi: 10.1111/jocn.15587.

[29] H. Taherdoost, "Validity and Reliability of the Research Instrument; How to Test the Validation of a Questionnaire/Survey in a Research," *SSRN Electron. J.*, vol. 5, no. 3, pp. 28–36, 2018, doi: 10.2139/ssrn.3205040.

[30] Y. F. Zakariya, "Cronbach's alpha in mathematics education research: Its appropriateness, overuse, and alternatives in estimating scale reliability," *Front. Psychol.*, vol. 13, no. December, pp. 1–6, 2022, doi: 10.3389/fpsyg.2022.1074430.

[31] I. Kusmaryono, D. Wijayanti, and H. R. Maharani, "Number of Response Options, Reliability, Validity, and Potential Bias in the Use of the Likert Scale Education and Social Science Research: A Literature Review," *Int. J. Educ. Methodol.*, vol. 8, no. 4, pp. 625–637, 2022, doi: 10.12973/ijem.8.4.625.

[32] M. Amirrudin, K. Nasution, and S. Supahar, "Effect of Variability on Cronbach Alpha Reliability in Research Practice," *J. Mat. Stat. dan Komputasi*, vol. 17, no. 2, pp. 223–230, 2020, doi: 10.20956/jmsk.v17i2.11655.

[33] E. Druică, R. Ianole-Călin, C. Băicuș, and R. Dinescu, "Determinants of satisfaction with services, and trust in the information received in community pharmacies: A comparative analysis to foster pharmaceutical care adoption," *Healthc.*, vol. 9, no. 5, 2021, doi: 10.3390/healthcare9050562.

[34] O. NNEOMA and E. OBINNA, "Development of Quality Indicators for Pharmaceutical Care Performance Assessment in Nigerian Community Pharmacies: a Delphi Panel," *Int. J. Pharm. Pharm. Sci.*, vol. 13, no. 2, pp. 50–55, 2021, doi: 10.22159/ijpps.2021v13i2.39179.

[35] D. A. Juwita, N. Q. Desri, and D. Permatasari, "Patient Satisfaction with Pharmaceutical Services at a Hospital Outpatient Pharmacy in West Sumatra, Indonesia," *J. Farm. Dan Ilmu Kefarmasian Indones.*, vol. 10, no. 3, pp. 324–330, 2023, doi: 10.20473/jfiki.v10i32023.324-330.

[36] R. Harrison, B. Jones, P. Gardner, and R. Lawton, "Correction to: Quality assessment with diverse studies (QuADS): an appraisal tool for methodological and reporting quality in systematic reviews of mixed- or multimethod studies (BMC Health Services Research, (2021), 21, 1, (144), 10.1186/s12913-021-06122-y)," *BMC Health Serv. Res.*, vol. 21, no. 1, pp. 1–20, 2021, doi: 10.1186/s12913-021-06261-2.

[37] R. Roy, G. M. Sukumar, M. Philip, and G. Gopalakrishna, "Face, content, criterion and construct validity assessment of a newly developed tool to assess and classify work–related stress

(TAWS– 16)," *PLoS One*, vol. 18, no. 1 January, pp. 1–11, 2023, doi: 10.1371/journal.pone.0280189.

[38] S. Park *et al.*, "Validation of a questionnaire for patient awareness and the need for a community-based outpatient antimicrobial stewardship program (O-asp): A pilot study," *Antibiotics*, vol. 10, no. 4, pp. 1–13, 2021, doi: 10.3390/antibiotics10040441.

[39] J. C. Fernández-Domínguez, A. Sesé-Abad, J. M. Morales-Asencio, P. Sastre-Fullana, S. Pol-Castañeda, and J. E. De Pedro-Gómez, "Content validity of a health science evidencebased practice questionnaire (HS-EBP) with a web-based modified Delphi approach," *Int. J. Qual. Heal. Care*, vol. 28, no. 6, pp. 764–773, 2016, doi: 10.1093/intqhc/mzw106.

[40] M. S. B. Yusoff, "ABC of Content Validation and Content Validity Index Calculation," *Educ. Med. J.*, vol. 11, no. 2, pp. 49–54, 2019, doi: 10.21315/eimj2019.11.2.6.