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Analysis of the Relationship Between Factors of the Health Belief Model (Perceived Benefit and Perceived Barrier) and Service Quality (Reliability and Responsiveness) on Outpatient Satisfaction, Controlling for Sociodemographic Characteristics, at the Cardiology Clinic of Hospital X in Indonesia

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Abstract

Patient satisfaction is a critical measure of healthcare quality, particularly in cardiac outpatient services where cardiovascular disease constitutes a major global health burden. In Indonesia, stroke and ischemic heart disease represent the leading causes of mortality, emphasizing the need for effective and responsive cardiac care. Despite a national hospital satisfaction rate of 82.7%, this figure remains below the government target of 90–95%, highlighting gaps in service delivery, especially in responsiveness and reliability. This study aims to examine the influence of Health Belief Model dimensions (perceived benefits and perceived barriers) and SERVQUAL service quality attributes (reliability and responsiveness) on outpatient satisfaction at a cardiac polyclinic, while controlling for sociodemographic factors such as age, gender, education, and marital status. A quantitative cross-sectional design was employed, collecting data from 146 adult patients using structured questionnaires. Data were analyzed through hierarchical multiple regression to determine the partial and combined effects of the independent variables. The findings indicate that responsiveness is the most dominant predictor of patient satisfaction, followed by reliability and perceived barriers, whereas perceived benefits and sociodemographic factors showed no significant influence. These results suggest that operational efficiency and barrier mitigation are more impactful than inherent medical benefits in determining patient satisfaction. The study concludes that prioritizing responsiveness, reliability, and the reduction of procedural barriers can substantially improve patient satisfaction, providing actionable insights for healthcare management and policy optimization.

INTRODUCTION

Quality health services are a key pillar in improving public health, where patient satisfaction is a crucial indicator for measuring the effectiveness of these services (Thuy et al., 2021). Globally, the strengthening of health services is driven by the high burden of cardiovascular disease. Heart disease is currently the leading cause of death worldwide, accounting for around 31% to 32% of total global deaths (Lina & Saraswati, 2019; Muharram et al., 2024). In Indonesia, this burden is particularly significant, with stroke and ischemic heart disease as the main causes of death, accounting for 36.33% of total national deaths (Wahyuni et al., 2022; Zakaria et al., 2022).

Although the hospital satisfaction rate in Indonesia nationally reaches 82.7% (Ivany et

al., 2023; Ramadia et al., 2022), this figure remains below the government's target of 90–95% (Ivany et al., 2023). In cardiac polyclinics, the high complexity of cardiovascular care — such as delays in diagnosis and complicated procedures — is often a major challenge (Lina & Saraswati, 2019; Wahyuni et al., 2022), especially in the responsiveness dimension, which nationally shows the largest gap in the SERVQUAL survey on government health services such as BPJS and requires significant improvement (Faeni, 2023).

There are important research gaps underlying this study. Many previous studies have treated patient characteristics as the main independent variable, whereas the literature has consistently shown that sociodemographic factors such as age, gender, and education level serve as confounding variables that can obscure the causal relationship between service quality and patient satisfaction (Aljarallah et al., 2023; Chenhui et al., 2022; Crow et al., 2002; McFarland et al., 2015). For example, older patients tend to have lower expectations and are therefore more easily satisfied, while patients with higher education provide more critical assessments due to a better understanding of their condition and greater demands for quality communication (Adhikari et al., 2021) and (Kalaja & Myshketa, 2016; McFarland et al., 2015). This approach often overlooks the need to control for these variables in order to isolate the purely influence of actionable service factors (Chenhui et al., 2022; Crow et al., 2002).

The urgency of this research is based on three main research gaps: the incompatibility of global models with the local context, the methodological limitations of previous studies, and the urgent need for data-driven policies in Indonesia. First, there is a contextual gap in which service quality models such as SERVQUAL and the Health Belief Model psychological framework are mostly validated in developed countries, rendering them often less sensitive to access barriers and infrastructure limitations typical of developing countries (Darzi et al., 2023; Endeshaw, 2020; Nguyen et al., 2021). Second, previous studies have exercised limited control over non-actionable sociodemographic factors, and as a result often fail to accurately isolate the true influence of technical and functional service quality on patient satisfaction (Crow et al., 2002; McFarland et al., 2015). Third, in terms of health policy, there is a disconnect between Indonesia's national satisfaction target of 90–95% and the current achievement of only 82.7%, making it necessary to map specific service elements to ensure efficient allocation of limited resources within the national health system (Ivany et al., 2023; Rajić et al., 2021; Ramadia et al., 2022).

The novelty of this study lies in its innovative approach of positioning sociodemographic factors as control variables, addressing a research gap in which previous studies have often treated these variables as primary independent variables, thereby obscuring the causal relationship between service quality and patient satisfaction (Aljarallah et al., 2023; Chenhui et al., 2022; Crow et al., 2002; McFarland et al., 2015). By controlling for baseline patient characteristics such as age, education, and gender — where older patients tend to be more easily satisfied due to lower expectations while more educated patients tend to be more critical (Adhikari et al., 2021; Kalaja & Myshketa, 2016) — this study isolated the true influence of the Health Belief Model dimensions (perceived benefits and barriers) and SERVQUAL attributes (reliability and responsiveness) on satisfaction (Chenhui et al., 2022; Sonali & Shenoy, 2024). This approach allows for the identification of actionable variables that can be targeted by management, such as strengthening therapeutic communication to address perceived benefits and standardizing service times to improve responsiveness, in order to

effectively enhance patient satisfaction in cardiac polyclinics (Khatimah et al., 2024; Qanitha et al., 2022; Subagja & Rosyidah, 2023).

Despite Indonesia achieving a national hospital satisfaction rate of 82.7% (Ivany et al., 2023; Ramadia et al., 2022), this remains below the government target of 90–95%. Cardiac polyclinics, due to the complexity of cardiovascular treatments and intricate procedures, frequently face challenges in service delivery, particularly in the responsiveness dimension, which represents the most critical gap identified in SERVQUAL evaluations of public healthcare (Faeni, 2023).

Previous studies have largely emphasized patient characteristics as primary predictors of satisfaction; yet emerging literature underscores that sociodemographic factors such as age, education, and gender serve as confounding variables. Older patients often demonstrate lower expectations, resulting in higher reported satisfaction, while highly educated patients tend to evaluate service quality more critically (Adhikari et al., 2021; Kalaja & Myshketa, 2016; McFarland et al., 2015). Controlling for these variables is essential to isolate the genuine influence of actionable service factors on patient satisfaction (Chenhui et al., 2022).

The methodological gap in existing research is significant. While service quality frameworks such as SERVQUAL and psychological models such as the Health Belief Model (HBM) have been validated in developed countries, they are often misaligned with the realities of developing healthcare systems, where infrastructure limitations and access barriers are prevalent (Darzi et al., 2023; Endeshaw, 2020; Nguyen et al., 2021). This underscores the necessity for context-specific empirical studies to adapt these models to local healthcare environments.

In addition, prior studies often inadequately control for sociodemographic factors, which diminishes the ability to discern the actual contribution of service quality attributes to patient satisfaction. This presents an opportunity for research designs that integrate sociodemographic controls to accurately measure the impact of reliability, responsiveness, and health belief dimensions on satisfaction outcomes (Crow et al., 2002; McFarland et al., 2015).

This research addresses these gaps by employing a quantitative, cross-sectional design focused on outpatients at a cardiac polyclinic in Indonesia. By explicitly controlling for sociodemographic factors, the study isolates the effects of HBM dimensions — perceived benefits and perceived barriers — and key SERVQUAL attributes — reliability and responsiveness — on patient satisfaction (Baždarić et al., 2021; Bujang et al., 2022).

The novelty of this study lies in its integrative approach, which positions actionable service variables at the forefront while neutralizing the effects of immutable patient characteristics. This approach reveals that responsiveness is the dominant predictor of satisfaction, followed by reliability and perceived barriers, whereas perceived benefits exhibit a "must-be quality" effect, functioning as a baseline expectation rather than a differentiator of satisfaction (Wang et al., 2024; Bibliometric Analysis, 2024).

The urgency of this research is amplified by the discrepancy between national targets and actual satisfaction rates. By identifying and quantifying the impact of specific, actionable factors, healthcare administrators can optimize resource allocation, streamline service protocols, and implement targeted interventions to meet or exceed satisfaction benchmarks (Ivany et al., 2023; Ramadia et al., 2022).

The purpose of this research is to provide evidence-based insights linking patient

psychological perceptions and service quality dimensions to measurable satisfaction outcomes, offering a validated model suitable for implementation in Indonesian cardiac polyclinics. In doing so, it contributes a framework for performance improvement, managerial decision-making, and policy formulation in healthcare operations (Khatimah et al., 2024; Subagja & Rosyidah, 2023).

Ultimately, the study's objectives extend beyond theoretical contributions, aiming to enhance practical healthcare management, enabling hospitals to improve patient experiences, strengthen trust, and achieve national satisfaction targets. By clarifying the causal relationships between HBM, SERVQUAL, and satisfaction, the research benefits both academic discourse and the operational efficiency of cardiac care services in Indonesia, potentially informing broader healthcare strategy and policy (Afro, 2021; AlOmari & Hamid, 2022).

RESEARCH METHOD

This study will use a quantitative approach with a cross-sectional design. The quantitative approach was chosen because it aims to test hypotheses and analyze the influence of sociodemographic factors, Health Belief Model, and service quality individually on the satisfaction of cardiac polyclinic patients (Baždarić et al., 2021; Bujang et al., 2022). The cross-sectional design allows for the collection of data from participants at a single point in time, which is efficient for analyzing prevalence and correlations between variables. This design is suitable for identifying patterns and relationships of pseudo-causality without intervention, providing an overview of the conditions at the time the study was conducted.

Population and Sample

The target population of this study is all adult patients who undergo outpatient treatment at the cardiac polyclinic at hospital X in Indonesia. The selection of this population is based on a research focus that examines patient satisfaction in the specific environment of cardiovascular services, a crucial area given the high prevalence of heart disease and its impact (Qanitha et al., 2022).

Sampling will use the purposive sampling method. This method was chosen because it allows researchers to deliberately select participants who meet specific criteria relevant to the research objectives, thereby obtaining in-depth information from a well-defined group. This approach ensures that each respondent has relevant experience with the cardiac polyclinic and can provide appropriate data for hypothesis testing, while also being able to answer the research objectives with a focus on the relevant target population.

The sample size will be targeted at a minimum of 140 respondents. This number is considered adequate for multiple regression analysis, which requires a large enough sample to produce a stable parameter estimate and adequate statistical strength, especially considering the number of independent variables to be tested (Baždarić et al., 2021; Bujang et al., 2022; Mahat et al., 2024).

In general, some literature suggests a minimum of 10 to 15 subjects per independent variable in regression models to achieve adequate statistical strength and reduce the risk of estimation bias (Moschis, 2024). Other literature for multiple regression analysis includes formulas such as $N \geq 50+8m$ (for R2) or $N \geq 104+m$ (for individual predictor coefficients), where m is the number of predictors (Memon et al., 2020). Assuming there are 10 predictors,

this formula will produce between 130 and 114 respondents. Therefore, the target of 140 respondents is more than enough and will provide high statistical power to detect significant effects, if any, as well as ensure the stability and validity of regression model results (Althubaiti, 2022; Seabrook, 2025).

Data Collection Techniques

Data collection will be carried out using a structured questionnaire that is self-administered by patients. This process will follow the following stages, ensuring that the data collected is relevant and valid to answer the research objectives:

1. Research Permit: Permits will be submitted to the hospital management and the relevant research ethics committee.
2. Enumerator Training: A team of researchers or trained research assistants will be trained on the research objectives, data collection procedures, research ethics, and how to explain the questionnaire to respondents.
3. Respondent Approach: Respondents who meet the inclusion criteria will be identified at the cardiac polyclinic after they have completed receiving services and before leaving the healthcare facility.
4. Explanation and Informed Consent: Each prospective respondent will be provided with a full explanation of the research objectives, the benefits of participation, the rights of the respondents, and the guarantee of data confidentiality. After understanding, the respondent will be asked to sign an informed consent sheet as proof of consent.
5. Filling out the questionnaire: Willing respondents will fill out the questionnaire independently. The enumerator will be ready to help if there are any questions or difficulties in understanding the questionnaire items, but it will not affect the respondent's answers.
6. Completeness Check: After the questionnaire is filled out, the enumerator will conduct a brief check to ensure that all questions have been answered completely.
7. Data Anonymity: Data will be collected anonymously to maintain respondents' privacy. Each questionnaire will be assigned a unique code without a personal identity.

Data Analysis Techniques

The data collected in this study will be analyzed using a statistical program through several stages of analysis to answer the formulation of the problem and the purpose of the research comprehensively. Descriptive analysis was used to describe the sociodemographic characteristics of respondents as well as the data distribution of each research variable through frequency values, percentages, averages, standard deviations, medians, minimum values, and maximums presented in the form of tables and graphs using SPSS. Furthermore, data quality tests were carried out which included validity tests using Pearson correlation, reliability tests using Cronbach's Alpha with a value of ≥ 0.7, and classical assumption tests consisting of normality, multicollinearity, heteroscedasticity, and linearity tests to ensure that the data met the requirements of inferential analysis. The research instrument was also tested first through a pilot test on 15-30 respondents with similar characteristics to the research sample to ensure that the instrument was valid and reliable. Bivariate analysis was carried out using the Pearson and Spearman Rank correlation tests to determine the relationship between independent and dependent variables while detecting the potential for initial multicollinearity between independent variables. Furthermore, inferential analysis was carried out using Hierarchical Multiple Regression with two main stages, namely including sociodemographic control

variables in the first stage and the main variables of the Health Belief Model and SERVQUAL in the second stage to see the contribution of the influence of each variable on patient satisfaction. Model testing was conducted using determination coefficients, simultaneous significance tests, partial significance tests, and standard beta coefficients to determine the most dominant variables influencing patient satisfaction at cardiac polyclinics.

RESULTS AND DISCUSSION

Results of Descriptive Analysis of Research Variables

The descriptive analysis provides an overview of patients' perceptions of the following research variables:

1. **Perceived Benefits & Barriers**: These two variables had an identical average score of 24.9. However, *Perceived Barriers* showed a wider variation of answers (SD = 4.98) than *Perceived Benefits* (SD = 3.59).
2. **SERVQUAL:** The *Reliability* variable has an average of 24.8 (SD = 3.12), while *Responsiveness* has an average of 16.6 (SD = 2.11).
3. **Patient Satisfaction**: Overall, patients reported a high level of satisfaction with an average score of 30.3 (SD = 3.44) of the maximum total score. This is in line with the national average of hospital satisfaction in Indonesia which is 82.7% (Ivany et al., 2023; Ramadia et al., 2022).

Descriptive statistical table:

Variabel	N	Minimum	Maximum	Mean	Hours of deviation
Perceived Benefits	146	6	30	24.9	3.59
Perceived Barriers	146	7	35	24.9	4.98
Reliability	146	12	30	24.8	3.12
Responsiveness	146	8	20	16.6	2.11
Patient Satisfaction	146	20	35	30.3	3.44

Instrument Quality Test

1. Validity Test

The validity test was performed using the Pearson correlation between the score of each item and the total score of the construct. An item is declared valid if it has a positive and significant correlation with the total score of its construct.

Based on the test results, all items in the patient satisfaction variable (D1–D7) had a significant item-total correlation, ranging from 0.751 to 0.852 with a p-value of < 0.001, and were therefore all declared valid. This shows that each item in the patient satisfaction construct adequately represents the measured construct.

In the perceived benefits construct, all items (B1–B6) also showed a significant item-total correlation, ranging from 0.686 to 0.764 with a p-value of < 0.001. Thus, all items in the perceived benefits variable are declared valid.

In the perceived barriers construct, items B7a–B13a have an item-total correlation coefficient ranging from 0.687 to 0.852, all of which are significant at $p < 0.001$. This result confirms that all items in the perceived barriers variable are valid as construct measures.

In the reliability construct, all items (C1–C5) have an item-total correlation ranging from 0.752 to 0.880 with a p-value of < 0.001. This indicates that all items comprising the reliability variable are valid.

In the responsiveness construct, items C6–C9 show an item-total correlation ranging from 0.814 to 0.861 with a p-value of < 0.001. Thus, all items in the responsiveness variable are declared valid.

Variabel	Item-total range r	p-value	Remarks
Perceived Benefits	0.691 – 0.764	< 0.001	Valid
Perceived Barriers	0.687 – 0.852	< 0.001	Valid
Reliability	0.752 – 0.880	< 0.001	Valid
Responsiveness	0.814 – 0.861	< 0.001	Valid
Patient Satisfaction	0.751 – 852	< 0.001	Valid

2. Reliability Test

The reliability test was carried out using Cronbach's Alpha coefficient. An instrument is declared reliable if it has a Cronbach's Alpha value of at least 0.70. The results of the analysis showed that the research instrument consisting of 29 items had a Cronbach's Alpha value of 0.908. This value indicates that the research instrument has excellent reliability, so that all items are declared consistent and suitable for use in further analysis.

Classic Assumption Test

1. Normality Test

The normality test was performed on *unstandardized residual* using the Shapiro–Wilk Test. The test results showed a Shapiro–Wilk significance value of 0.184. Taking into account the sample size and the results of the Shapiro–Wilk assay, the residual model can be declared to be practically normally distributed, so that the assumption of normality is considered to be met.

2. Multicollinearity Test

The multicollinearity test was carried out by looking at *the value of tolerance* and *variance inflation factor* (VIF). Multicollinearity does not occur if the tolerance value is > 0.10 and VIF is < 10. No multicollinearity problem was found because all variables had a VIF < 10 (range 1.041 to 3.552) and *a Tolerance* value > 0.10 (Garg et al., 2024; Putri et al., 2023).

Multicollinearity Table:

Variabel	Tolerance	LIVE	Remarks
Perceived Benefits	0.652	1.534	Non-multicollinearity
Perceived Barriers	0.960	1.052	Non-multicollinearity
Reliability	0.286	3.494	Non-multicollinearity
Responsiveness	0.282	3.552	Non-multicollinearity
Age	0.906	1.103	Non-multicollinearity
Gender	0.960	1.041	Non-multicollinearity
Education	0.882	1.134	Non-multicollinearity
Marital status	0.801	1.249	Non-multicollinearity

3. Heteroscedasticity Test

The heteroscedasticity test was carried out through the Glejser test between predictive and residual values. The model is declared to be heteroscedasticity when the residual points are randomly spread around the zero line and do not form a specific pattern. Indications of heteroscedasticity were found in the control variables (Gender, Education, and Marital Status with). However, the main variable still met the homoskedasticity assumption (p<0.005).

Variabel	p-value	Remarks
Perceived Benefits	0.581	Non-heterokedasdicity
Perceived Barriers	0.612	Non-heterokedasdicity
Reliability	0.824	Non-heterokedasdicity
Responsiveness	0.123	Non-heterokedasdicity
Age	0.353	Non-heterokedasdicity
Gender	0.008	Heterokedasdity
Education	0.025	Heterokedasdity
Marital status	0.048	Heterokedasdity

4. Linearity Test

The linearity test is performed to ensure that the relationship between the independent variable and the dependent variable is linear. A relationship is expressed as linear when the significance value *of deviation from linearity* is greater than 0.05 or the relationship pattern on the graph indicates a linear tendency. The *Perceived Benefits* and *Barriers variables* show a linear relationship with satisfaction. However, *Reliability* and *Responsiveness* show a non-linear pattern in these data (Akbari et al., 2023; Muslimin et al., 2020).

Variable Pairs	p-value	Remarks
Perceived Benefits – Kepuasan	0.113	Linear
Perceived Barriers– Kepuasan	0.109	Linear
Reliability – Satisfaction	0.003	Non-linear
Responsiveness – Satisfaction	0.018	Non-linear

Bivariate Analysis

The bivariate analysis in this study aims to see the strength and direction of the relationship between the research variables, namely *the Health Belief Model* dimension (B1 and B2), *the SERVQUAL* dimension (C1 and C2), and the Patient Satisfaction variable (D1). Given that the data uses an ordinal scale and went through previous normality tests, the correlation technique used is *Spearman's Rho*.

1. Spearman's Rho Correlation Test Results

The results of the calculation of correlation coefficients for all the main variables of the study are presented in the following table:

Table 4.X Summary of Spearman's Rho Correlation Results

Variabel	R	p-value	Remarks
Age	-0,148	0,075	Insignificant
Gender	-0,039	0,644	Insignificant
Education	0,032	0,701	Insignificant
Marital Status	0,037	0,662	Insignificant
Perceived Benefits	0,387	<0.001	Signifikan
Perceived Barriers	0,253	<0.001	Signifikan
Reliability	0,687	<0.001	Signifikan
Responsiveness	0,718	<0.001	Signifikan

Based on the results of the correlation test in Table 4.X, several important findings can be drawn as follows:

a. The Relationship of the Health Belief Model Dimension to Patient Satisfaction

The B1 variable had a significant positive correlation with patient satisfaction (D1) of $0.422p < 0.001$). Variable B2 also showed a significant positive association with satisfaction of $0.336 (). These findings indicate that the more positive an individual's health beliefs, the more likely they are to increase their satisfaction with services. This is in line with research that states that understanding aspects of patients' health beliefs can be a supporting factor in evaluating health service experiences (Purwanto et al., 2023).

b. The Relationship of the SERVQUAL Dimension with Patient Satisfaction

The service quality dimension showed the strongest correlation with patient satisfaction. The C1 variable has a correlation value of 0.677 ($p < 0.001$), and the C2 variable has the highest value of 0.713 ($p < 0.001$). The strength of this correlation at a strong level suggests that the SERVQUAL dimension is a major determinant that directly affects patient satisfaction at the study site. These results reinforce the theory that improving the quality of health services, both technically and functionally, will have a direct impact on patient loyalty and satisfaction (AlOmari & Hamid, 2022; Darzi et al., 2023).

c. **Relationships Between Independent Variables**

There is an interesting finding in which no significant relationship was found between dimensions B1 and B2. This shows that the two dimensions of the Health Belief Model are independent and measure entirely different constructs. In contrast, between the C1 and C2 dimensions there was a very strong correlation of 0.803 ($p < 0.001$). This high correlation between SERVQUAL dimensions often appears in healthcare facility assessments, where patients' perceptions of one aspect of service (such as reliability) tend to align with their perceptions of other aspects (such as empathy or reassurance) (Trayvilla, 2025). Overall, all independent variables (B1, B2, C1, and C2) showed a significant unidirectional relationship with the dependent variable (D1). This provides a solid basis for proceeding to the multiple linear regression stage to examine the simultaneous and partial influence of these variables on patient satisfaction.

Results of Hierarchical Multiple Linear Regression Analysis

Multiple linear regression analysis was performed hierarchically in two models. Model 1 only included sociodemographic control variables, namely age, gender, education, and marital status. Model 2 includes all variables in Model 1 plus the main variables of the study, namely *perceived benefits*, *perceived barriers*, *reliability*, and *responsiveness*.

1. Model 1: Sociodemographics as a Control Variable

The regression results in Model 1 showed that gender had a B coefficient of -0.147 with $p = 0.810$, education had a B coefficient of -0.039 with $p = 0.911$, marital status had a B coefficient of 0.204 with $p = 0.592$, and age had a B coefficient of -0.057 with $p = 0.061$. The overall p-value in Model 1 was greater than 0.05, so it can be concluded that sociodemographic factors have not shown a significant influence on patient satisfaction. Sociodemographic factors collectively explain only 3% () of the variation in patient satisfaction. None of the control variables (age, gender, education, marital status) had a partially significant effect (). This finding is interesting because in Model 1, age was almost close to significance (), which indicates a tendency for elderly patients to feel more easily satisfied, although it was not

statistically strong enough in this sample (Adhikari et al., 2021; Kalaja & Myshketa, 2016).

Model 1 coefficient table

Variabel	R	p-value	Remarks
Gender	-0,147	0,810	Insignificant
Education	-0,039	0,911	Insignificant
Marital status	0,204	0,592	Insignificant
Age	-0,057	0,061	Insignificant

2. Model 2: Addition of Major Variables

In Model 2, after the variables perceived *benefits*, *perceived barriers*, *reliability*, and *responsiveness* were included in the model, sociodemographic factors remained unchanged to a significant effect on patient satisfaction. Gender has p = 0.492, education p = 0.795, marital status p = 0.727, and age p = 0.783. This suggests that all four sociodemographic variables function as control variables in the model and not as the primary predictors of patient satisfaction.

Perceived Benefits had a B coefficient of -0.018 with p = 0.790, so it did not have a significant effect on patient satisfaction after sociodemographic factors were controlled. In contrast, *perceived barriers* have an R coefficient of 0.107 with p = 0.007, *reliability* has an R coefficient of 0.328 with p = 0.006, and *responsiveness* has an R coefficient of 0.757 with p < 0.001. These findings show that *perceived barriers*, *reliability*, and *responsiveness* have a positive and significant effect on patient satisfaction after controlling for age, gender, education, and marital status.

Based on standardized values, *responsiveness* was the most dominant variable on patient satisfaction (R = 0.464), followed by *reliability* (R = 0.297) and *perceived barriers* (R = 0.155). Thus, increasing service responsiveness is the most powerful factor related to increasing patient satisfaction in this research model.

Model 2 coefficient table:

Variabel	R	Say.	Remarks
Gender	-0,283	0,492	Insignificant
Education	-0,060	0,795	Insignificant
Marital status	0,089	0,727	Insignificant
Age	-0,006	0,783	Insignificant
Perceived Benefits	-0,018	0,790	Insignificant
Perceived Barriers	0,107	0,007	Signifikan
Reliability	0,328	0,006	Signifikan
Responsiveness	0,757	<0.001	Signifikan

3. Partial Regression Coefficient Interpretation

Based on the results of the t-test on Model 2, the influence of each predictor can be explained as follows:

a. Responsiveness: This variable is the strongest and most dominant predictor in the model. Any one-unit improvement in staff responsiveness will significantly improve patient satisfaction (Ali & Younas, 2021; Jones et al., 2024). This confirms that in cardiac

polyclinics, the speed of response of officers is a critical factor that determines patient perception (Khatimah et al., 2024; Wang et al., 2024).

b. Reliability: The reliability of the service has a positive and significant influence. Consistency in medical services and the accuracy of doctor's appointments provide a sense of security for heart patients (Aninda, 2023, 2023).
c. Perceived Barriers: Perceived barriers have a significant influence on the satisfaction model. This shows that the hospital's efforts in mitigating operational obstacles (such as queues and bureaucracy) are greatly benefited by patients (Afro, 2021; Wang et al., 2024).
d. Perceived Benefits: Interestingly, perceived health benefits do not have a significant effect on satisfaction. This indicates the occurrence of a "benefit paradox", where patients consider medical benefits as a basic standard (*must-be quality*) that must exist, so that they are no longer the main differentiator of their satisfaction level (Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Russ, 2006).

4. Regression equations

Based on the results of Model 2, the regression equation obtained is as follows:

$$Y = 7.726 - 0.283(\text{Gender}) - 0.060(\text{Education}) + 0.089(\text{Marital Status}) - 0.006(\text{Age}) - 0.018(\text{Perceived Benefits}) + 0.107(\text{Perceived Barriers}) + 0.328(\text{Reliability}) + 0.757(\text{Responsiveness})$$

The equation shows that, when all other variables are held constant, higher scores in responsiveness, reliability, and perceived barriers were associated with greater patient satisfaction. Meanwhile, perceived benefits did not show a meaningful contribution in the model.

5. Coefficient of Determination and Model Feasibility Test

The R Square value in Model 1 was 0.173, which means that sociodemographic variables explain 17.3% variation in patient satisfaction. Once the main variable is entered on Model 2, the R Square value increases to 0.761. This shows that the *variables perceived benefits*, *perceived barriers*, *reliability*, and *responsiveness* provide an additional contribution of 76.1% to the variation in patient satisfaction beyond the influence of sociodemographic factors. The results of the ANOVA test showed that the regression model in Model 2 was significant simultaneously with an R2 value of 0.578 and a p-value of 0.001<001. Thus, regression models are feasible to be used to explain the influence of independent variables on patient satisfaction.

Model	R	R Square	p-value
Model 1	0.173	0.03	0.364
Model 2	0.761	0.578	<0.001

6. Pengujian Hypothesis

Based on the above analysis, the hypothesis testing conclusions are:

a. H1: Rejected. Sociodemographic factors did not have a significant influence on the satisfaction of cardiac polyclinic patients at hospital X in Indonesia.
b. H2: Rejected. There was no significant effect on patient satisfaction of cardiac polyclinic patients at hospital X in Indonesia.

c. H3: Accepted. There was a significant influence after controlling for sociodemographic variables on the satisfaction of cardiac polyclinic patients at hospital X in Indonesia.
d. H4: Accepted. There was a significant positive influence on the satisfaction of cardiac polyclinic patients at hospital X in Indonesia.
e. H5: Accepted. There is a very significant positive influence and is the dominant factor on the satisfaction of cardiac polyclinic patients at hospital X in Indonesia.

Linearity Test Explained: Why Is There Something Not Linear?

An interesting finding emerged on the classical assumption test, where the *Perceived Benefits* and *Barriers* is linear, however *Reliability* and *Responsiveness* show a non-linear pattern (in $p < 0{,}05$*Deviation from Linearity*) .(Akbari et al., 2023; Muslimin et al., 2020)

Academically in service operations management, this can be explained through the theory Diminishing Returns. On the dimensions *Responsiveness* and *Reliability*, the relationship with satisfaction does not always form a straight line. There is a "saturation point" where a very extreme increase in responsiveness no longer significantly increases satisfaction because the patient already feels fulfilled at a certain standard level. On the other hand, on the dimensions *Health Belief Model*, relationships are linear because health beliefs are internal psychological aspects that continue to evolve along with the information the patient receives, so their influence on satisfaction tends to be stable and unidirectional.(Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Russ, 2006)

Hierarchical Regression Analysis: The Role of Control Variables and Key Predictors

The jump in value from 3% in Model 1 to 57.8% in Model 2 proves the significance of the variable R^2*actionable* (can be intervened by management) .(Altman & Krzywinski, 2015; Gupta et al., 2024)

1. **Responsiveness as the Strongest Predictor:** With, responsiveness is the main key. In cardiac polyclinics, time is a crucial aspect (e.g. in dealing with acute exacerbations). Patients are very satisfied when the staff is quick to respond to their complaints.$\beta = 0{,}464$(Khatimah et al., 2024; Wang et al., 2024)
2. **Reliability:** Reliability in diagnosis and consistency of doctors' schedules provide a sense of security for heart patients who are at high risk of fatality.(Aninda, 2023, 2023)

Paradoks Perceived Benefit vs. Perceived Barrier

One of the most crucial findings in this thesis is why *the Perceived Benefit* is insignificant (), while $p = 0{,}790$*the Perceived Barrier* is significant ().$p = 0{,}007$

1. Why is Perceived Benefit Insignificant?

In the context of cardiac specialist services, medical benefits (such as recovery or reduced risk of death) are considered Must-be Quality. Patients consider health benefits to be something that "should already be there" when they choose a specialist doctor. Because all patients have uniformly high expectations of benefits, these variables are no longer the differentiators (predictors) that cause one person to feel "more satisfied" or "less satisfied" than another.(Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Russ, 2006)(Bibliometric Analysis of the Health Belief

Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024)

2. Mengapa Perceived Barrier Signifikan?

In contrast to benefits, barriers (such as BPJS queues, costs, or administrative complexities) are highly personal and vary for each patient. Heart patients in Indonesia often face huge bureaucratic hurdles. When the patient feels high resistance but the hospital is able to provide (Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Wang et al., 2024)(Faeni, 2023)*Responsiveness* Good, patients feel their efforts are "comparable", so that the barrier becomes a factor that greatly determines their final assessment of the service.(Afro, 2021; AlOmari & Hamid, 2022)

Implications for Patient Satisfaction Comprehensive

Overall, the regression results showed that patient satisfaction at Hospital X's Cardiac Polyclinic was a result of process management, not just a medical outcome. The fact that the main variable was able to explain 57.8% of the satisfaction variation suggests that management still has 42.2% of the space that may be influenced by other factors such as physical facilities (*Tangible*) or staff empathy that is not included in this model. However, by prioritizing the reduction of barriers ((Faeni, 2023; Sonali & Shenoy, 2024)*barriers*) and increased responsiveness (*responsiveness*), hospitals can effectively pursue the national satisfaction target set at 90–95%.(Ivany et al., 2023; Ramadia et al., 2022)

Implications of the Findings

Based on the findings of the research at Hospital X's cardiac polyclinic—where the main variable was able to explain the 57.8% variation in patient satisfaction ()—here are the sharp and strategic managerial implications for improving hospital performance:$R^2 = 0{,}578$

1. Top Priority: Standardization and Acceleration of "Responsiveness"

The findings suggest that responsiveness is the strongest predictor () of patient satisfaction at Hospital X. This suggests that the speed and alertness of staff are the most crucial factors for heart patients.$\beta = 0{,}464$

Implications: Management must establish *Service Level Agreement* are strict on critical service points, especially registration wait times and the speed of officer response to patient complaints. Responsiveness is not only a matter of physical speed, but also alertness in providing comprehensive information about diagnostic procedures and medications that heart patients urgently need.(Khatimah et al., 2024; Subagja & Rosyidah, 2023)(Subagja & Rosyidah, 2023)

2. Increased Reliability through SOP Compliance

The Reliability dimension was found to have a significant effect (). For patients in cardiac polyclinics, the reliability of services is closely related to a sense of security and trust in medical accuracy.$p = 0{,}006$(Aninda, 2023)

Implications: Hospital X needs to tighten oversight of compliance *Standard Operating Procedure* and the professionalism of medical staff in providing services as promised. The consistency of a cardiologist's practice schedule should be a priority, as inaccuracies can lower the perception of reliability that is the foundation of satisfaction.(2023)(Kamalo et al., 2024, 2023)

3. Obstacle Mitigation Strategy

This study found that Perceived Barriers had a significant effect, while Perceived Benefits did not. This signifies that medical benefits are considered the basic standard (*must-be quality*) that should have been fulfilled in specialist services.(Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Russ, 2006)

Implications: Management should focus on eliminating personal and administrative bottlenecks, such as the complexity of BPJS procedures, transportation constraints, or long queue times. Since health benefits are already considered a basic expectation, the main differentiator that will increase satisfaction at Hospital X is how effectively the hospital is able to reduce the burden of barriers that patients feel when accessing services.(Bibliometric Analysis of the Health Belief Model in Healthcare Workers: Trends, Insights, and Future Directions, 2024; Wang et al., 2024)(Afro, 2021; AlOmari & Hamid, 2022)

4. Resource Allocation Efficiency: Sociodemographic Neutrality

Regression analysis showed that after the service variables were controlled, sociodemographic factors (age, education, gender, marital status) did not have a purely significant influence on satisfaction.

Implications: Hospital X management does not need to segment services too complicated based on the demographic characteristics of patients, as those factors are often beyond the control of the hospital. The focus of resource investment should be completely shifted to improving the quality of operations (service processes) that are (McFarland et al., 2015)*actionable*, because operational performance is much more determinative of satisfaction than the personal profile of the patient.(Crow et al., 2002; McFarland et al., 2015)

5. Pursuing National Satisfaction Targets (90–95%)

Considering that the satisfaction rate in Indonesia nationally has only reached 82.7%, Hospital X has a great chance to excel by pursuing the national target of 90–95%.(Ramadia et al., 2022)(Ivany et al., 2023)

Implications: To close the satisfaction gap, management needs to integrate training *soft-skills* communication for medical staff to strengthen responsiveness. By prioritizing the reduction of operational barriers and improved staff responsiveness, Hospital X can effectively achieve higher and competitive satisfaction targets in the cardiovascular healthcare market.(Ramadia et al., 2022)(Ivany et al., 2023; Ramadia et al., 2022)

CONCLUSION

Based on the results of the study on the influence of sociodemographic factors, the Health Belief Model (HBM), and SERVQUAL on patient satisfaction in cardiac polyclinics, it can be concluded that an integrative model combining the dimensions of HBM and SERVQUAL is able to explain 57.8% of the variation in patient satisfaction beyond the contribution of sociodemographic factors. The responsiveness variable is the most dominant and significant factor in improving patient satisfaction, indicating that the speed and attentiveness of staff in providing assistance and addressing complaints greatly determines the quality of service at the cardiac polyclinic. In addition, reliability also has a positive effect on patient satisfaction, particularly with regard to diagnostic accuracy, timeliness of service, and consistency of hospital operations. Perceived barriers unexpectedly showed a significant positive influence, suggesting that even when patients face procedural and administrative barriers, the presence of

responsive staff is able to mitigate the impact of these barriers such that patients remain satisfied. Meanwhile, perceived benefits and sociodemographic factors such as age, gender, and education did not show a significant influence once the service quality variables were controlled for. Based on these findings, the management of Hospital X is recommended to re-engineer the service flow through the implementation of response time standards, the provision of a real-time waiting time information system, the establishment of a patient assistance unit to simplify administrative procedures, the strengthening of compliance with service SOPs, and the enhancement of health education for patients to foster greater patient autonomy and a better understanding of the independent management of heart disease.

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