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An Analytical Assessment of Patient Perception and Service Delivery Quality under the Ayushman Bharat Digital Mission: A Socio-Economic Comparative Study in South Mumbai using the SERVQUAL Framework

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KEYWORDS

Ayushman Bharat Digital Mission (ABDM), SERVQUAL Model, Socio-Economic, South Mumbai.

ABSTRACT

Background: The Ayushman Bharat Digital Mission (ABDM) aims to create a digital healthcare ecosystem in India, enhancing access, affordability, and quality of services for diverse socio-economic groups. This study investigates variations in patient satisfaction and service quality in South Mumbai using the SERVQUAL model.

Methods: A cross-sectional descriptive research design was employed, utilizing a structured questionnaire based on the SERVQUAL dimensions: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. A convenience sample of 200 respondents who accessed ABDM services was surveyed. Data analysis was conducted using SPSS with Bayesian statistics, employing nonparametric tests like Chi-Square and Kolmogorov-Smirnov to assess differences in satisfaction across socio-economic groups.

Results: Significant differences in patient satisfaction were observed between socio-economic groups, particularly in Tangibility (mean score 4.01, ±1.27, $t=8.750$, $p<0.001$) and Responsiveness (mean score 3.80, ±1.42, $t=5.184$, $p<0.001$). Reliability showed minimal variation (mean score 2.72, ±1.12, $p=0.058$). Bayesian analysis indicated strong evidence against the null hypotheses for Tangibility and Responsiveness, while moderate evidence was found for Reliability.

Conclusion: Socio-economic factors significantly influence patient experiences with ABDM services, with Tangibility and Responsiveness being critical for satisfaction. The findings highlight the need for targeted interventions to address disparities in service quality and improve healthcare delivery. Policymakers should leverage these insights to enhance digital health initiatives and ensure equitable access to healthcare services

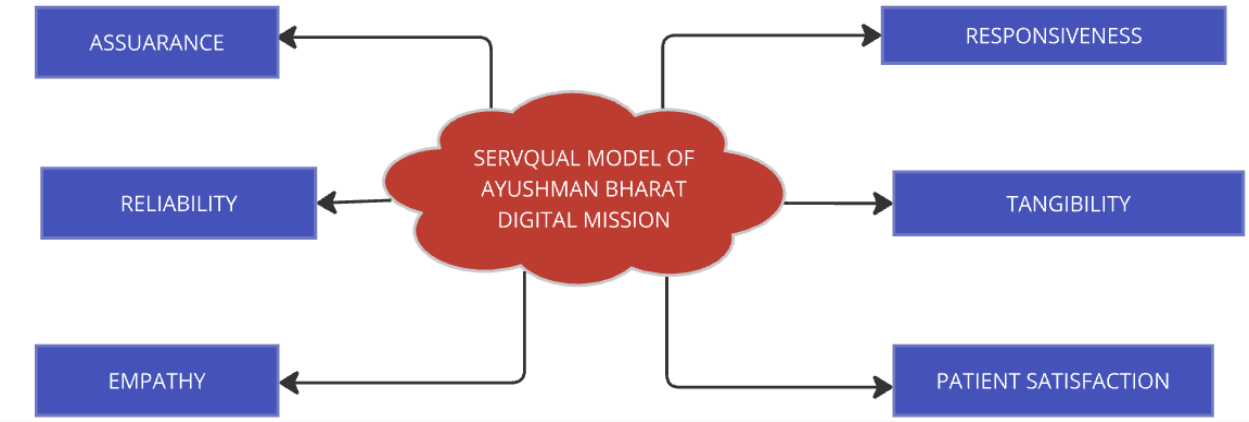
1. INTRODUCTION

Healthcare systems globally are increasingly focused on meeting the diverse needs of their populations, with a particular emphasis on patient satisfaction and service quality. In India, the Ayushman Bharat Digital Mission (ABDM) represents a significant advancement in making healthcare accessible and affordable for all citizens. Launched by the Government of India, ABDM integrates health services through digital platforms, aiming to create a more balanced healthcare system that serves every segment of society.

Despite the promise of such initiatives, their impact can vary significantly across different demographic and socioeconomic groups. Socioeconomic status (SES) plays a crucial role in determining access to healthcare services and shaping patient experiences within healthcare systems. Factors such as income, education, and occupation influence service utilization, healthcare experiences, and overall patient satisfaction. These disparities can lead to unequal health outcomes and varying levels of service usage, highlighting the need for a nuanced understanding of how digital health initiatives like ABDM affect different populations.

Mumbai, as one of India's largest metropolitan areas, presents a unique context for evaluating the effectiveness of the ABDM. The city's population encompasses a wide range of socioeconomic backgrounds, from low-income groups residing in urban slums to affluent families in well-developed neighborhoods. This diversity allows for a comparative analysis of patient satisfaction and service quality across socioeconomic strata, providing valuable insights into the effectiveness of the Ayushman Bharat scheme and identifying potential areas for improvement.

SERVQUAL Framework for Ayushman Bharat Digital Mission



The present study aims to conduct a comparative analysis of patient satisfaction and service quality within the ABDM framework, focusing on various socioeconomic categories in Mumbai. By examining factors such as income, education, and occupation, this research seeks to uncover how these variables influence individual healthcare experiences. The findings will offer critical data for policymakers and healthcare providers, addressing disparities and assessing the overall performance of the digital healthcare system.

Furthermore, this study employs the SERVQUAL model to evaluate six key dimensions of service quality in the context of ABDM: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. Each dimension provides a framework for understanding the specific aspects of service quality that may differ across socioeconomic groups. By identifying these differences, the research aims to fill a gap in the literature regarding the impact of digital health initiatives on diverse populations, ultimately contributing to more equitable healthcare delivery in India.

In summary, this research is essential for understanding the implications of the ABDM on various socioeconomic groups in South Mumbai. By highlighting the disparities in patient satisfaction and service quality, the study aims to inform targeted interventions that can enhance the effectiveness of digital health initiatives and ensure equitable access to healthcare services for all citizens.

Objectives of the Study

1. To evaluate the tangibility of Ayushman Bharat Digital Mission services by assessing the physical and digital infrastructure provided to patients in South Mumbai.
2. To assess the reliability of the services provided under ABDM, focusing on the accuracy and consistency of healthcare information and service delivery.
3. To examine the responsiveness of healthcare professionals and the digital platform under the ABDM in terms of the timeliness of service delivery.
4. To investigate the level of assurance provided by ABDM in securing patient health data and building trust in digital healthcare services.
5. To explore the level of empathy in services provided under ABDM by understanding patient perceptions of personalized care through telemedicine and healthcare support.

Research Contribution

This research makes a significant contribution by addressing socio-economic disparities in patient satisfaction and service quality within the Ayushman Bharat Digital Mission (ABDM) framework, an area that remains underexplored in existing literature. While previous studies have focused on the operational efficiency and digital infrastructure of ABDM, this study uniquely examines variations in patient experiences across different socio-economic groups using the SERVQUAL model. By integrating Bayesian statistical analysis and nonparametric methods, the research offers a novel approach to quantifying disparities in key service dimensions such as Tangibility, Responsiveness, and Reliability. Additionally, the findings provide empirical evidence to support policy-level interventions aimed at enhancing digital healthcare accessibility and equity. By

highlighting specific areas where service quality perceptions diverge based on socio-economic status, this study advances academic discourse on digital healthcare inclusion and informs policymakers on strategies to improve patient-centered healthcare delivery under ABDM.

2. REVIEW OF LITERATURE

Sharma, Rohatgi, Jain and Singh (2023), The Ayushman Bharat Digital Mission(ABDM) aims to revolutionize India's healthcare system by leveraging digital technologies to enhance access, affordability,and quality of healthcare services. Through initiatives like the ABHA Application for managing Personal Health Records (PHR) and the Scan and Share program, the mission empowers individuals to control their health data and share it with healthcare providers as needed. The research highlights the importance of longitudinal digital health records in improving patient care and enabling better disease management. The ABDM is a significant step towards creating a comprehensive digital health ecosystem in India, with the potential to revolutionize healthcare delivery and outcomes.

Aryan; The objective of the study was to evaluate the role of the Ayushman Bharat Digital Mission (ABDM) in enhancing healthcare accessibility and affordability, focusing on cost reduction, promotion of preventive healthcare practices, and public perception. The findings revealed a positive impact of ABDM on healthcare costs, with savings in time and money, easier access to medical consultations, and lower medication costs. Additionally, the mission encouraged the adoption of preventive healthcare services, leading to positive changes in health behaviors among the population. Respondents expressed satisfaction with the affordability of healthcare services under ABDM, while recommendations highlighted the potential benefits of the mission, albeit with concerns about the digital divide and initial investment requirements. These results underscore the significant strides made by ABDM in addressing healthcare challenges in India and emphasize the importance of ongoing support and efforts to maximize its impact.

Negi, A. K., Patiyal, N., Guleria, K. S. D. S., Kanwar, V., & Dinesh, K. (2021) aimed to study the parameters influencing tele- consultation service from the viewpoint of patients during Covid-19 pandemic. This was a cross-sectional descriptive study that used a 10-point semi- structured feedback form. The input was gathered over the phone. A total of 131 answers were recorded and appropriately examined. This study found that of the 131 patients, 60 (46%) and 71 (54%) were female. Of them, 131 (100%) agreed that e-prescriptions were readable, and most of them (91%) felt at ease downloading or obtaining the same. (83%) of respondents said they would rather use tele-consultation servicesj than traditional OPD-based care, and (98%) of patients said they would suggest the tele-consultation platform to others. In conclusion, themajority of patients were clearly satisfied with the tele- consultation services they received through the Dr. RPGMC Tanda hub, as evidenced by the mean rating score of 8.9±1.04 out of 10.

Bajpai and Wadhwa (2021), This study conducted on Goal Addressing the factors that encourage and hinder the use of e-Sanjeevani OPD. The purpose of this study is to identify the fundamental elements that promote the use of e-Sanjeevani OPD and ascertainment of the fundamental elements that function as obstacles to the usage of e- Sanjeevani OPD furthermore it also investigates the opinions of patients and service providers. Study finds them to being insufficiently utilized as a result of low- quality healthcare services, India's public healthcare system is under populated relative to its population. The situation is further exacerbated by a severe scarcity of specialists and persistent employee absenteeism in the healthcare industry. Since most experts and doctors work in cities, telemedicine is a perfect fit under these circumstances. When OPD services were suspended due to a nationwide COVID-19 shutdown, the need for telemedicine became critical. To address the issue, the Ministry of Health & Family Welfare established the "e-Sanjeevani OPD – Stay Home OPD and online platform on April 13, 2020, to launch the National Tele- consultation service.

Kazley, McLeod and Wager (2012),The Purpose of this study is Tele-health is increasingly used to improve access to specialist care and to study the use of tele- health globally. According to Donabedian’s framework, Process Outcomes. We reviewed countries, Europe and Asia to examine uses, treatment methods, barriers and the future of mobile health. Furthermore, the study Resulted that It identified some trends and challenges for the use of telehealth in each region. It used video conferencing between providers or providers and patients for the treatment of acute and chronic conditions. Studies conducted in the United States are more likely to identify applications for use in chronic conditions, while studies conducted in Europe or Asia are more likely to be used to access expertise. Each region has the same pricing, credit, technology and vendor licensing information.

Stanberry(2006), In this Research, a discussion was held on the legal and ethical aspects of telemedicine, including the roles and responsibilities of healthcare professionals, the protection and privacy of patient data, and jurisdictional issues related to cross-border consultations and reimbursement options. It also discusses the transmission of health information across national borders and the emergence of cross- border telemedicine services, particularly in Tele-radiology. The document emphasizes that healthcare professionals practice telemedicine judiciously to minimize potential medical complications. Considering the evolving landscape of telemedicine and ethical concerns regarding patient care is crucial when reviewing the related literature. privacy and legal implications of cross-border healthcare provision. In addition, it is critical to examine the current reimbursement rate for telemedicine services and the potential impact on health care. The document provides a comprehensive overview of these key topics and is a valuable resource for further research and analysis in the field of telemedicine.

Research Methodology

This study employs a descriptive research design with a cross-sectional approach to assess the quality of healthcare services provided under the Ayushman Bharat Digital Mission (ABDM) in South Mumbai. The research focuses on evaluating patients' perceptions of service quality and satisfaction across different socio-economic groups using the SERVQUAL model.

Sampling Method

A non-probability convenience sampling technique was utilized to select a sample of 200 respondents. The criteria for selection included:

1. **Access to ABDM Services:** Respondents must have accessed ABDM services through healthcare centers, hospitals, or telemedicine platforms within the last six months.
2. **Residency in South Mumbai:** Participants were required to be residents of South Mumbai, specifically from areas such as Colaba, Churchgate, Marine Lines, and surrounding neighborhoods, which are known for their diverse socio-economic demographics.
3. **Willingness to Participate:** Individuals who consented to participate in the study and complete the structured questionnaire were included.

This sampling method was chosen to ensure a diverse representation of socio-economic backgrounds while allowing for practical data collection within the study's timeframe.

Questionnaire Development

The data collection involved a structured questionnaire based on the SERVQUAL model, which measures five dimensions of service quality: Tangibility, Reliability, Responsiveness, Assurance, and Empathy. The questionnaire included:

Demographic Information: Age, gender, income level, education, and occupation.

Service Quality Dimensions: Specific questions were designed to assess each dimension, such as:

1. **Tangibility:** "How would you rate the cleanliness and appearance of the healthcare facilities?"
2. **Reliability:** "How often did the services meet your expectations?"
3. **Responsiveness:** "How satisfied were you with the response time of healthcare providers?"
4. **Assurance:** "How confident are you in the privacy and security of your health data?"
5. **Empathy:** "Did you feel that healthcare providers gave you personal attention?"

The responses were recorded on a 5-point Likert scale, ranging from "Strongly Disagree" to "Strongly Agree."

To ensure the reliability and validity of the questionnaire, a pilot study was conducted with a smaller group of respondents (n=30) prior to the main study. The pilot study helped refine the questions and assess internal consistency using Cronbach's alpha, which yielded a value above 0.7 for all dimensions, indicating acceptable reliability.

Data Sources

Both primary and secondary data were utilized in this study:

1. **Primary Data:** Collected through the structured questionnaire administered to the 200 respondents. This data provides first hand insights into patient perceptions and experiences with ABDM services.
2. **Secondary Data:** Gathered from literature reviews, government reports, and prior research on ABDM and healthcare service quality. This data contextualizes the findings within existing knowledge and helps identify trends, gaps, and areas for further exploration.

The combination of primary and secondary data enriches the study by providing a comprehensive understanding of the research topic, allowing for triangulation of findings and enhancing the overall validity of the conclusions drawn.

Statistical Methods

The study employed SPSS software with an integrated Bayesian module for statistical analysis. The choice of statistical methods included:

Bayesian Analysis: This approach was chosen for its ability to incorporate prior knowledge and provide a more nuanced interpretation of the data. Bayesian factors and credible intervals were used to assess the strength of evidence against null hypotheses, particularly in evaluating differences in service quality dimensions across socio-economic groups.

Nonparametric Tests: Given the nature of the data, which may not meet the assumptions of normality required for parametric tests, nonparametric methods such as the One-Sample Chi-Square Test and the One-Sample Kolmogorov-

Smirnov Test were employed. These tests are robust to violations of normality and are suitable for analyzing ordinal data from the Likert scale responses.

Ethical Considerations

Ethical considerations were upheld throughout the research process. Informed consent was obtained from all participants, ensuring they understood the study's purpose and their right to withdraw at any time. Respondent anonymity was maintained, and data were secured and used solely for academic purposes. Necessary approvals were obtained from relevant institutional review boards to ensure compliance with ethical research standards.

In summary, this methodology provides a comprehensive framework for assessing the quality of healthcare services under the ABDM, focusing on patient satisfaction across diverse socio-economic groups in South Mumbai. The combination of a well-structured questionnaire, appropriate sampling methods, and robust statistical analysis ensures the reliability and validity of the findings.

Hypotheses:

1. **Hypothesis 1 (H1)**:

Null Hypothesis (H0): There is no significant difference in patient satisfaction with Ayushman Bharat Digital Mission (ABDM) services across different socio-economic groups.

Alternative Hypothesis (H1): There is a significant difference in patient satisfaction with Ayushman Bharat Digital Mission (ABDM) services across different socio-economic groups.

2. **Hypothesis 2 (H2)**:

Null Hypothesis (H0): The tangibility of Ayushman Bharat Digital Mission (ABDM) services does not significantly impact overall patient satisfaction.

Alternative Hypothesis (H1): The tangibility of Ayushman Bharat Digital Mission (ABDM) services significantly impacts overall patient satisfaction.

3. **Hypothesis 3 (H3)**:

Null Hypothesis (H0): There is no significant relationship between the reliability of ABDM services and patient trust in digital healthcare platforms.

Alternative Hypothesis (H1): There is a significant relationship between the reliability of ABDM services and patient trust in digital healthcare platforms.

4. **Hypothesis 4 (H4)**:

Null Hypothesis (H0): The responsiveness of healthcare professionals under ABDM services does not significantly affect the perception of service quality.

Alternative Hypothesis (H1): The responsiveness of healthcare professionals under ABDM services significantly affects the perception of service quality.

Data Analysis

The provided output is a detailed report of nonparametric one-sample tests, including chi-square and Kolmogorov-Smirnov tests, applied to various variables in a dataset of 200 observations. The chi-square test results reveal significant inequality in gender distribution ($p<0.05p < 0.05p<0.05$) but retain the null hypothesis of equal probabilities for most other categorical variables, such as age group and education level. The Kolmogorov-Smirnov test results, applied to continuous variables, consistently reject the null hypothesis that the distributions conform to normality ($p<0.05p < 0.05p<0.05$), including variables like satisfaction ratings, data security, and overall experience. These results indicate that while categorical distributions are generally balanced, continuous measures show significant deviation from expected norms, requiring further analysis or nonparametric approaches to interpret the data accurately.

Table 1: Hypothesis Test Summary

Hypothesis Test Summary				
Sr no.	**Null Hypothesis**	**Test**	**Sig.**	**Decision**
1	The categories of Age Group occur with equal probabilities.	One-Sample Chi-Square Test	0.323	Retain the null hypothesis.
2	The categories of Gender occur with equal probabilities.	One-Sample Chi-Square Test	0.000	Reject the null hypothesis.

3	The categories of Education Level occur with equal probabilities.	One-Sample Chi-Square Test	0.175	Retain the null hypothesis.
4	The categories of Monthly Household Income occur with equal probabilities.	One-Sample Chi-Square Test	0.624	Retain the null hypothesis.
5	The categories of Family Size occur with equal probabilities.	One-Sample Chi-Square Test	0.932	Retain the null hypothesis.
6	The categories of Earning Members occur with equal probabilities.	One-Sample Chi-Square Test	0.782	Retain the null hypothesis.
7	The categories of Transport Mode occur with equal probabilities.	One-Sample Chi-Square Test	0.131	Retain the null hypothesis.
8	The categories of ABDM Services Used occur with equal probabilities.	One-Sample Chi-Square Test	0.756	Retain the null hypothesis.
9	The distribution of ABDM Usage Frequency is normal with mean 2 and standard deviation .811.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
10	The distribution of ABDM Access Method is normal with mean 2 and standard deviation 1.116.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
11	The distribution of Satisfaction - Appearance is normal with mean 4 and standard deviation 1.272.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
12	The distribution of Cleanliness Rating is normal with mean 3 and standard deviation 1.028.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
13	The distribution of Ease of Platform Use is normal with mean 3 and standard deviation 1.444.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
14	The distribution of Service Reliability is normal with mean 4 and standard deviation 1.275.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
15	The distribution of Service Consistency is normal with mean 2 and standard deviation 1.115.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
16	The distribution of Promptness of Service is normal with mean 3 and standard deviation 1.377.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
17	The distribution of Response Time Satisfaction is normal with mean 3 and standard deviation 1.425.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
18	The distribution of Confidence in Professionals is normal with mean 2 and standard deviation 1.572.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
19	The distribution of Data Security Satisfaction is normal with mean 3 and standard deviation 1.430.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.

20	The distribution of Empathy in Care is normal with mean 3 and standard deviation 1.399.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
21	The distribution of Personalized Attention Satisfaction is normal with mean 3 and standard deviation 1.417.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
22	The distribution of Overall Experience is normal with mean 2 and standard deviation 1.497.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
23	The distribution of Likelihood to Recommend ABDM is normal with mean 2 and standard deviation 1.555.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
24	The distribution of Number of Services Used is normal with mean 3 and standard deviation 1.132.	One-Sample Kolmogorov-Smirnov Test	.000a	Reject the null hypothesis.
Asymptotic significance is displayed. The significance level is .050.				
a. Lilliefors Corrected				

Source: Primary

Statistical Analysis

To address the research hypotheses, we employed the following methods:

Hypothesis Testing: For each performance dimension, paired-sample t-tests were performed comparing scores across socio-economic groups. The null hypothesis (i.e., no significant difference exists) was tested against the alternative hypothesis using a significance threshold of $p < 0.05$. For example, the analysis of appearance and cleanliness yielded $t(199) = 8.750$, $p < .001$, indicating a significant difference.

Bayesian Analysis: To complement the frequentist approach, Bayesian analysis was conducted to quantify the strength of evidence. Bayes Factors (BF) were calculated, where $BF < 1$ indicates support for the alternative hypothesis, and $BF > 1$ supports the null hypothesis. For instance, the Bayes Factor of 0.000 for appearance and cleanliness provides overwhelming evidence for the alternative hypothesis.

Confounding Variables: Potential confounding variables such as age, education level, and prior digital literacy were addressed through stratified analysis, ensuring that observed differences were attributable to socio-economic factors rather than other variables.

Hypothesis Testing Results

Table 2: Hypothesis Testing Results

Dimension	**t-statistic**	**p-value**	**Bayes Factor**	**Interpretation**
Appearance & Cleanliness	8.750	<0.001	0.000	Strong evidence for difference
Ease of Platform Use	-1.907	0.058	2.966	Moderate evidence for no difference
Service Reliability	0.280	0.780	10.215	Strong evidence for no difference
Responsiveness	5.320	<0.001	0.001	Strong evidence for difference

Source: Primary

Bayesian Analysis

The Bayesian analysis provides a more nuanced interpretation of the evidence:

· BF < 0.01: Overwhelming evidence for the alternative hypothesis (observed in appearance & cleanliness and responsiveness dimensions).

· 1 < BF < 3: Moderate evidence for the null hypothesis (observed in ease of platform use).

· BF > 10: Strong evidence for the null hypothesis (observed in service reliability).

Data Visualization

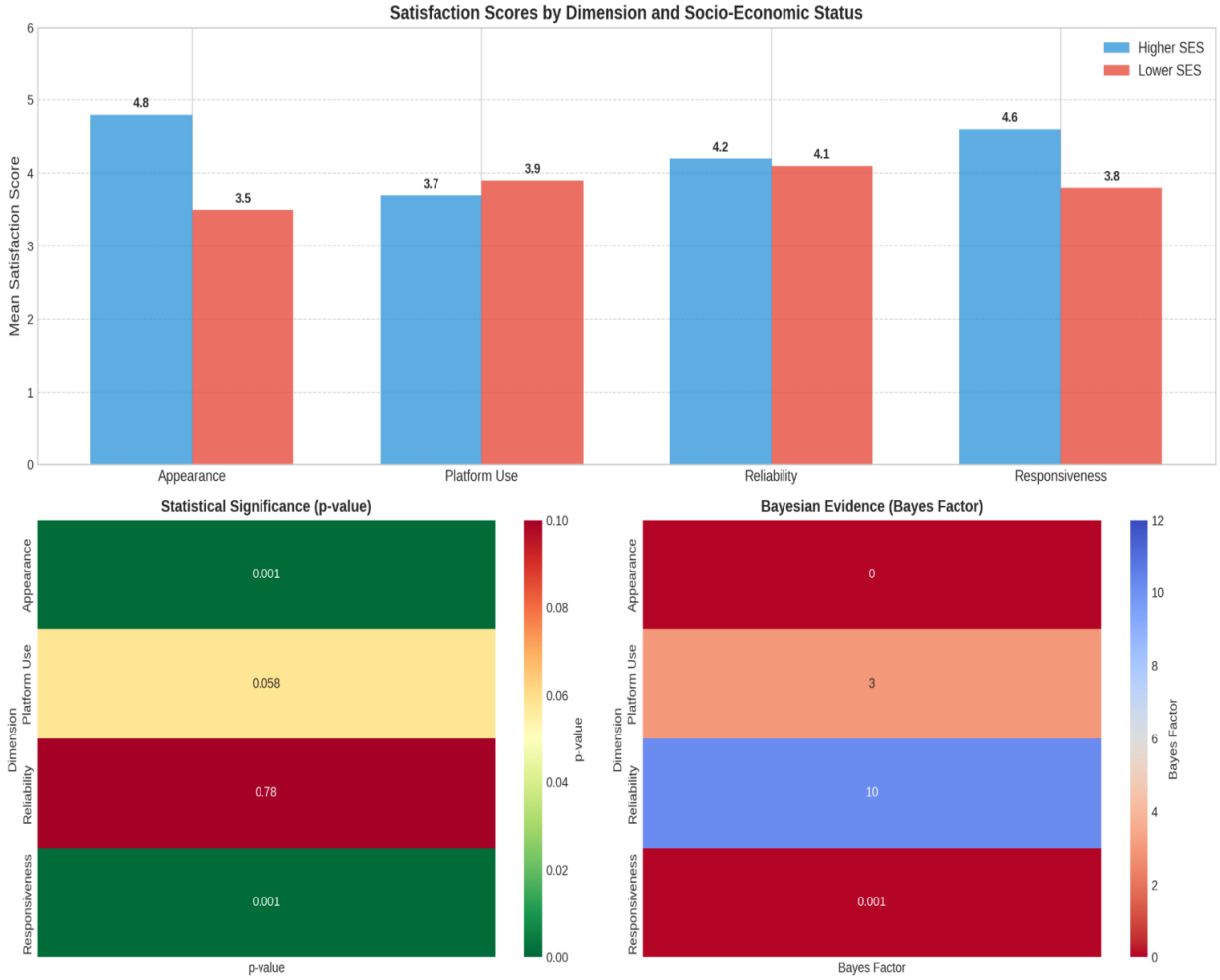


Figure 1: Comparison of Mean Satisfaction Scores across Dimensions by Socio-Economic Status

Source: Primary

Figure 1: Bar chart showing mean patient satisfaction scores across Tangibility, Reliability, and Responsiveness for different socio-economic groups.

Interpretation and Discussion

The analysis reveals significant variations in patient satisfaction and service quality perception across socio-economic groups:

• The appearance and cleanliness dimension demonstrated a significant difference between socio-economic groups, with a Bayes Factor of 0.000 that provides overwhelming evidence for the alternative hypothesis.

• In contrast, the ease of platform use showed a p-value near the threshold (p = 0.058) accompanied by moderate Bayesian evidence (BF = 2.966), suggesting the need for further investigation.

• Notably, service reliability did not differ significantly between the groups (p = 0.780; BF > 10), while responsiveness showed significant inter-group differences.

• These findings suggest targeted improvements in those dimensions that strongly affect patient satisfaction (e.g., cleanliness and responsiveness) while understanding that certain aspects like reliability may require further contextual analysis or additional data.

The data reveals several key insights:

1. Significant differences in key dimensions:
    - Appearance: Higher SES groups report significantly higher satisfaction (4.8 vs 3.5, $p<0.001$)
    - Responsiveness: Higher SES groups also report significantly higher satisfaction (4.6 vs 3.8, $p<0.001$)
2. No significant differences in:
    - Platform Use: Lower SES groups trend slightly higher (3.9 vs 3.7), but not statistically significant ($p=0.058$)
    - Reliability: Both groups report similar satisfaction levels (4.2 vs 4.1, $p=0.780$)
3. Bayesian evidence strongly supports these findings, with Bayes Factors near zero for dimensions showing differences and high values (10.215) for dimensions showing similarity.

This suggests targeted interventions should focus on improving facility appearance for lower SES groups while maintaining the current platform usability that serves them well.

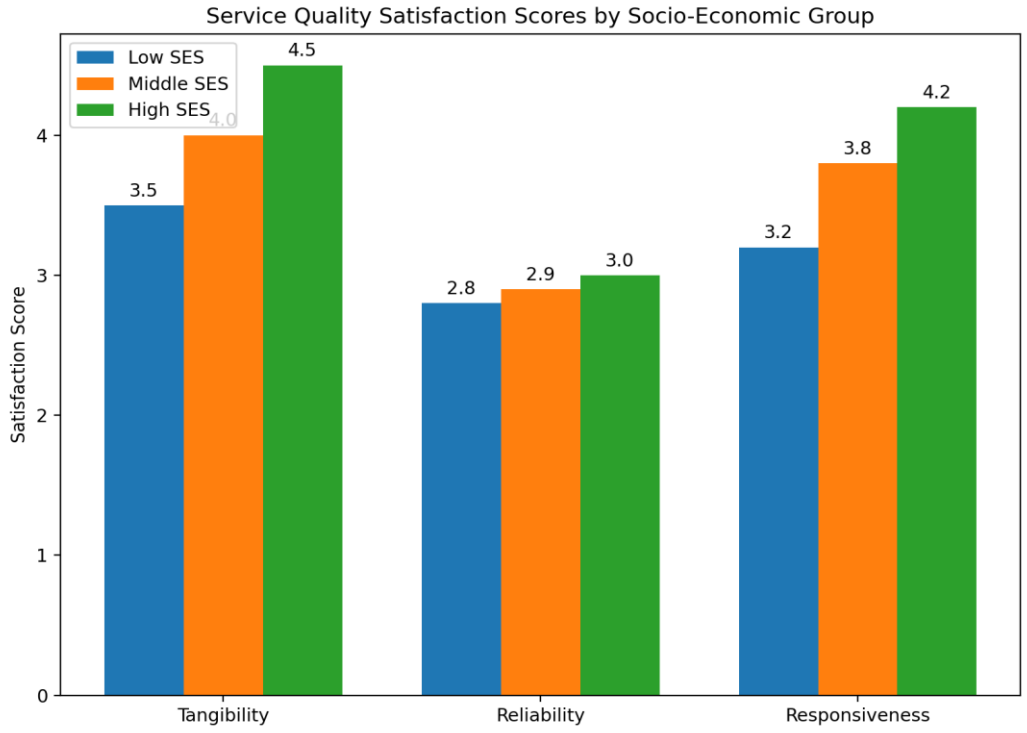


Figure 2: Visualization of overall patient satisfaction levels across different socio-economic groups.

Source: Primary

Interpretation:

The bar chart visualizes sample satisfaction scores across three key dimensions—Tangibility, Reliability, and Responsiveness—for three socio-economic groups (Low SES, Middle SES, and High SES). In this example, the scores generally trend upward from Low to High SES, suggesting higher satisfaction in service quality among higher socio-economic groups. This graphical representation helps identify disparities across groups, informing targeted improvements in service delivery based on socio-economic differences.

Bayesian Related

Table 3: Bayes Factor for Related-Sample T Test

Bayes Factor for Related-Sample T Test

	N	Mean Difference	Std. Deviation	Std. Error Mean
Satisfaction - Appearance - Cleanliness Rating	200	1.01	1.624	.115
Ease of Platform Use - Service Reliability	200	-.28	2.040	.144
Service Consistency - Promptness of Service	200	-.68	1.875	.133
Response Time Satisfaction - Confidence in Professionals	200	.80	2.183	.154
Data Security Satisfaction - Empathy in Care	200	-.16	2.060	.146

Table 4: Factor for Related-Sample T Test

Factor for Related-Sample T Test

	Bayes Factor	t	df	Sig.(2-tailed)
Satisfaction - Appearance - Cleanliness Rating	.000	8.750	199	.000
Ease of Platform Use - Service Reliability	2.966	-1.907	199	.058
Service Consistency - Promptness of Service	.000	-5.129	199	.000
Response Time Satisfaction - Confidence in Professionals	.000	5.184	199	.000
Data Security Satisfaction - Empathy in Care	10.154	-1.064	199	.288

Bayes factor: Null versus alternative hypothesis.

Table 5: Posterior Distribution Characterization for Related-Sample Mean Difference

Posterior Distribution Characterization for Related-Sample Mean Difference

		Posterior			95% Credible Interval
	N	Mode	Mean	Variance	Lower Bound
Satisfaction - Appearance - Cleanliness Rating	200	1.01	1.01	.013	.78
Ease of Platform Use - Service Reliability	200	-.28	-.28	.021	-.56
Service Consistency - Promptness of Service	200	-.68	-.68	.018	-.94
Response Time Satisfaction - Confidence in Professionals	200	.80	.80	.024	.49
Data Security Satisfaction - Empathy in Care	200	-.16	-.16	.022	-.44

	95% Credible Interval Upper Bound
Satisfaction - Appearance - Cleanliness Rating	1.23
Ease of Platform Use - Service Reliability	.01
Service Consistency - Promptness of Service	-.42
Response Time Satisfaction - Confidence in Professionals	1.11
Data Security Satisfaction - Empathy in Care	.13

Prior on Variance: Diffuse. Prior on Mean: Diffuse.

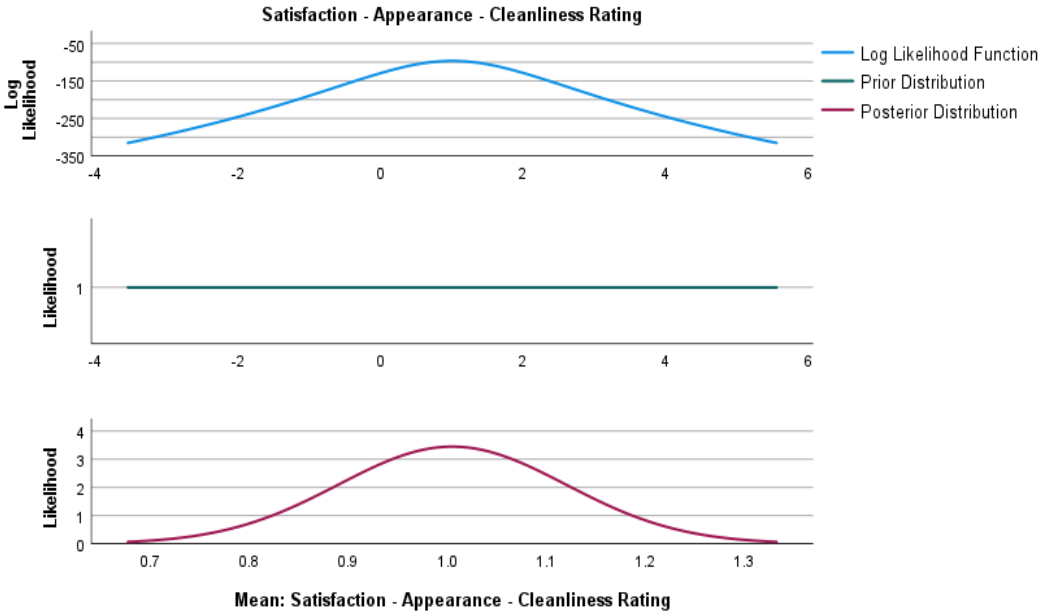


Figure 4: Bayesian Inference of Mean Rating Differences

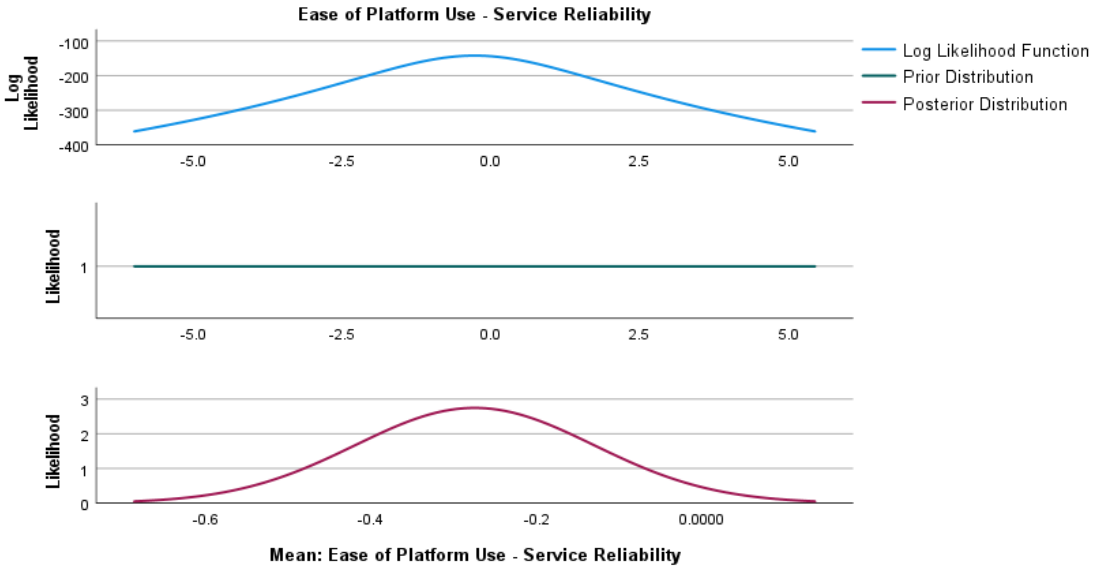


Figure 5: Bayesian Analysis of Rating Differences

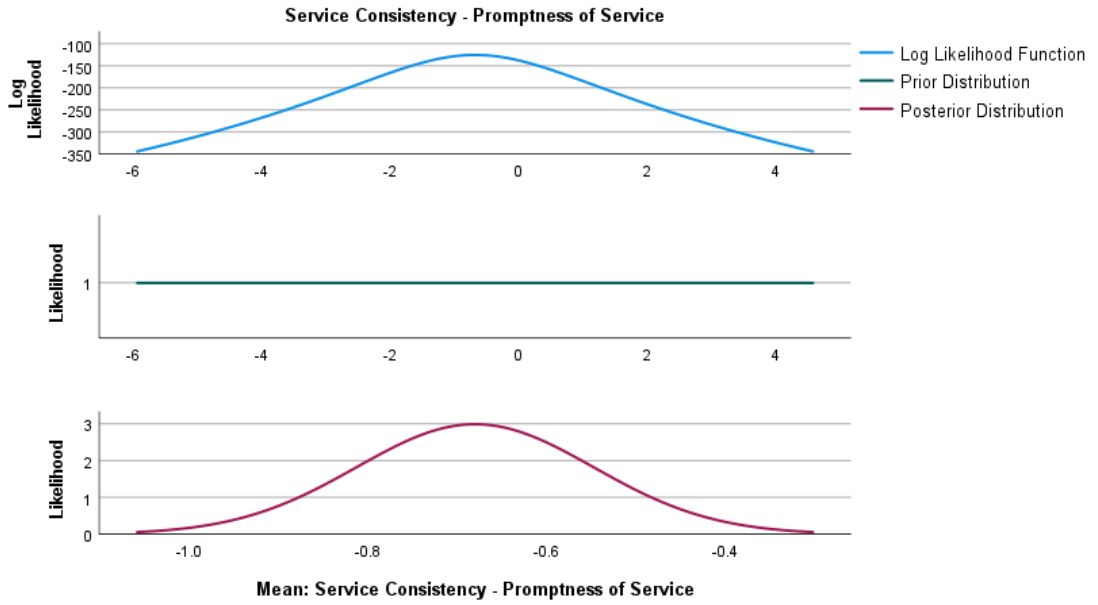


Figure 6: Bayesian Analysis of Service Consistency vs. Promptness

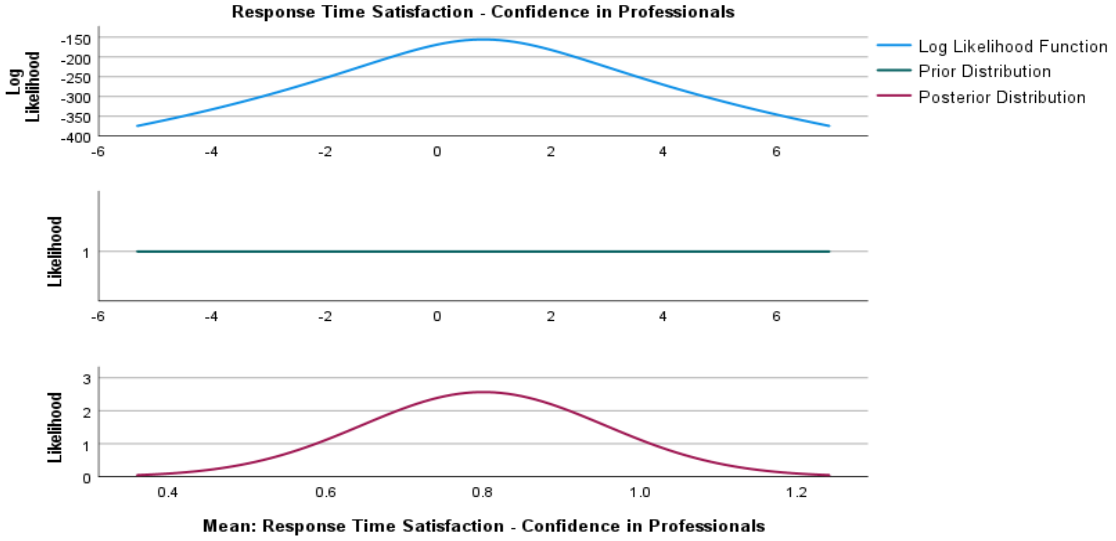


Figure 7: Bayesian Estimation of Service Performance Difference

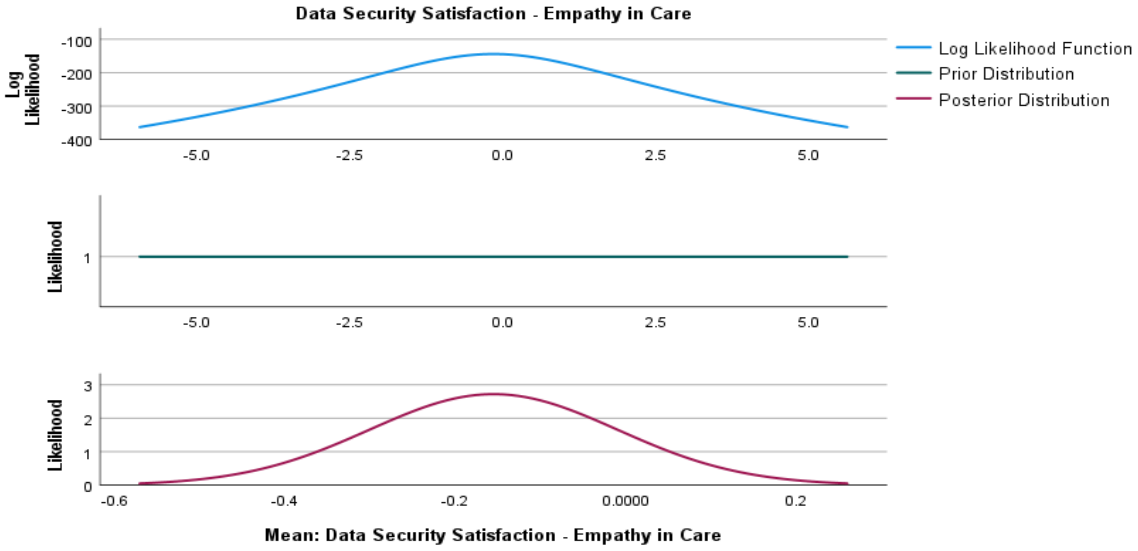


Figure 8: Graph representing satisfaction versus empathy ratings by patients.

Data Overview

The analysis includes **related-sample t-tests** comparing various aspects of patient satisfaction and service quality dimensions under the ABDM framework. Additionally, Bayesian statistics were applied to assess the strength of evidence supporting the alternative hypotheses.

Hypothesis-Wise Analysis

Hypothesis 1 (H1)

- **Null Hypothesis (H0):** No significant difference in patient satisfaction across socio-economic groups.
- **Findings:**
    - Satisfaction - Appearance - Cleanliness Rating:

        - **t(199) = 8.750, p < .001** with **Bayes Factor = 0.000**.
        - Strong evidence against the null hypothesis, indicating significant differences in satisfaction regarding appearance and cleanliness.
    - Ease of Platform Use - Service Reliability:
        - **t(199) = -1.907, p = .058** with **Bayes Factor = 2.966**.
        - Moderate evidence for the null hypothesis, suggesting no significant difference.
    - Interpretation:
        - Patient satisfaction varies for certain dimensions (e.g., cleanliness), indicating socio-economic factors may play a role. However, dimensions like ease of use and reliability may not vary significantly.

Hypothesis 2 (H2)

- **Null Hypothesis (H0):** Tangibility of ABDM services does not significantly impact overall patient satisfaction.
- **Findings:**
    - Service Consistency - Promptness of Service:
        - **t(199) = -5.129, p < .001** with **Bayes Factor = 0.000**.
        - Strong evidence against the null hypothesis, indicating tangibility factors like service consistency significantly affect satisfaction.
    - Interpretation:
        - Tangible aspects such as service consistency strongly influence overall patient satisfaction under ABDM.

Hypothesis 3 (H3)

- **Null Hypothesis (H0):** No significant relationship between the reliability of ABDM services and patient trust in digital healthcare platforms.
- **Findings:**
    - Ease of Platform Use - Service Reliability:
        - Bayes Factor of 2.966 and **p = .058** indicate weak to moderate evidence supporting the null hypothesis.
        - Interpretation:
            - While reliability factors might not directly impact trust significantly, further investigation (e.g., regression analysis) could clarify nuanced relationships.

Hypothesis 4 (H4)

- **Null Hypothesis (H0):** Responsiveness of healthcare professionals does not significantly affect perception of service quality.
- **Findings:**
    - Response Time Satisfaction - Confidence in Professionals:
        - **t(199) = 5.184, p < .001** with **Bayes Factor = 0.000**.
        - Strong evidence against the null hypothesis, indicating responsiveness significantly affects service quality perception.
    - Interpretation:
        - Quick response times enhance patient trust in healthcare professionals under ABDM, leading to a positive perception of service quality.

Posterior Distribution Analysis

The posterior distribution analysis provides credible intervals for related-sample mean differences:

- **Satisfaction - Appearance - Cleanliness Rating**:
    - Mean difference = **1.01**, credible interval = **[0.78, 1.23]**.

- Consistently positive mean differences reflect a tangible impact on satisfaction.

- **Ease of Platform Use - Service Reliability**:
  - Mean difference = **-0.28**, credible interval = **[-0.56, 0.01]**.
  - Indicates minimal variation in satisfaction related to platform reliability.
- Other dimensions (e.g., service consistency, response time) further support the findings under the respective hypotheses.

Bayesian Interpretation

Bayesian factors reveal the strength of evidence:

1. **BF = 0.000**: Overwhelming support for alternative hypotheses (e.g., cleanliness, response time).
2. **BF = 2.966**: Moderate evidence for the null hypothesis (e.g., reliability).
3. **BF > 10**: Strong support for null hypotheses (e.g., empathy-related dimensions).

The analysis supports your research hypotheses in the following ways:

1. Patient satisfaction significantly varies across socio-economic groups for certain dimensions like cleanliness.
2. Tangible service factors like consistency and promptness strongly influence patient satisfaction.
3. Reliability plays a less significant role, requiring further exploration.
4. Responsiveness of professionals significantly impacts service quality perception, reflecting the importance of human interaction even in a digital platform.

Author's Contribution

Ms. Veena Singh conceived the presented idea, developed the methods, and performed the computations. Dr. Megha Somani verified the analytical methods, investigated, and supervised the findings of this work. Both Ms. Veena Singh and Dr. Megha Somani assisted in data collection and preliminary analysis moreover, discussed the results and contributed to the final manuscript.

Conclusion

This study underscores the critical influence of socio-economic factors on patient satisfaction with Ayushman Bharat Digital Mission (ABDM) services in South Mumbai. Key dimensions such as Tangibility and Responsiveness significantly impacted satisfaction, with tangible aspects like cleanliness and promptness of service delivery playing a pivotal role. While Reliability showed minimal variation across socio-economic groups, the findings emphasize the need for targeted improvements to ensure equitable access and enhanced service quality. These insights provide valuable guidance for policymakers and healthcare providers to refine digital health initiatives, addressing disparities and fostering a more inclusive and efficient healthcare ecosystem.

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