

## Influence of SERVQUAL Dimensions (Empathy and Responsiveness) on Patient Satisfaction at Mulawarman University Dental Hospital

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### KEYWORDS

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### ABSTRACT

**Introduction:** Mulawarman University Dental Hospital (RSGM Unmul), as a new teaching hospital in East Kalimantan, acts as both oral healthcare services and clinical education. Oral health service utilization of certain populations is still low in East Kalimantan, despite the strategic function of oral health service, it indicates ongoing challenges with regard to access and patient engagement. However, only few studies empirically explore the relationship between specific service management dimensions and patient satisfaction in a dental teaching hospital context, particularly with regard to empathy and responsiveness as related to SERVQUAL. So far, there has been no systematic study at RSGM Unmul, which is obviously an empirical and contextual research gap.

**Objective:** The study aims to determine influence of dental healthcare service management on patient satisfaction at Mulawarman University Dental Hospital Empathy And Responsiveness.

**Methods:** This study had a descriptive-analytic quantitative approach with cross sectional design involving 81 patients in RSGM Unmul that was selected by purposive sampling. Data collection utilized a modified SERVQUAL questionnaire with Likert type responses on the intervals of 1–5. All statistical analyses were performed with SPSS version 25, Mann-Whitney test was applied for comparison of satisfaction levels between patients from rural and urban areas ( $\alpha = 0.05$ ).

**Results:** Patient satisfaction scores were high for both empathy and responsiveness averaged over rural (empathy  $3.95 \pm 0.715$ ; responsiveness  $3.93 \pm 0.722$ ) and urban areas (empathy  $4.30 \pm 0.640$ ; responsiveness  $4.28 \pm 0.655$ ). There were no significant regional differences for either dimension of patient satisfaction ( $p > 0.05$ ), although mean scores tended to be higher among urban participants.

**Conclusion:** Overall, RSGM Unmul has excellent performance in the aspect of empathy and responsiveness on dental healthcare service management resulting in high patient satisfaction levels.

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## **INTRODUCTION**

Enhancing the quality of dental healthcare services is a key priority in public health development, particularly in developing nations like Indonesia (1). Variation in access to oral healthcare in Indonesia is stark, particularly for eastern regions where health care infrastructure and workforce are mal-distributed. The inherent structural limitations highlight the need for a system-level assessment of service management norms to ensure that approaches to dental care provision are equity-focused, quality driven and patient-centred (2).

Patient satisfaction serves as a key indicator of healthcare quality, as it captures not only the technical competence of services provided but also the interpersonal interactions involved in care delivery, it has become one of the most critical outcomes for assessing how well health services meet patient needs. The SERVQUAL framework has been extensively used for its application in service quality research, especially for the measurement of healthcare delivery through five key characteristics: i.e., tangibles, reliability, responsiveness, assurance and empathy (3). Among these dimensions, empathy and responsiveness are consistently identified as the Both empathy and responsiveness are frequently reported as the most important predictors of patient satisfaction in dental hospital settings (4), since these two dimensions directly determine patients' perceptions related to attentiveness, communication clarity & timeliness of care.

In the East Kalimantan, the use of oral health services remains relatively low due to a range of contributing factors; regional figures showed that less than a fifth population regularly visited dental care facilities. This condition emphasizes the strategic role of Mulawarman University Dental Hospital (RSGM Unmul) as a new teaching hospital to improve coverage and equity of services. However, so far, there is very little empirical evidence assessing service management practice at RSGM Unmul (4,5) .

Most studies in Indonesia assessed community health centers or general hospitals, and there is insufficient focus on dental teaching hospitals and what their unique organizational characteristics are. Furthermore, despite having documented urban–rural differences in patient perceptions of quality of care, such comparisons are typically hampered due to methodological challenges and inadequate anchoring within the context of dental service (6–8). This gap signifies the need for further research that employs SERVQUAL dimensions to measure patient satisfaction specifically using dental teaching hospitals, with explicit consideration of contextual limitations.

Although empathy and responsiveness are recognized as key components within the SERVQUAL framework, no study to date has systematically evaluated their influence on patient satisfaction at Mulawarman University Dental Hospital. This absence of research highlights a clear gap, both empirically and in terms of contextual understanding, especially in light of the hospital's importance to address inequities surrounding regional service availability and dental education. Understanding this gap is critical to the steering of quality management improvements in service and policy development that would be relevant specifically to dental teaching hospitals in eastern Indonesia (9,10).

Considering the aforementioned description, the objective of this research is to determine the impact of management of dental health service delivery on patient satisfaction at Mulawarman University Dental Hospital dimensions empathy and responsiveness. By offering an empirically based evaluation, this study aims to inform best practice in the management of dental service delivery, promote patient-centered care and assist strategic planning for Indonesian dental teaching hospitals within a rapidly changing health system.

## **METHODS**

This study employed a quantitative method using a descriptive-analytic cross-sectional design. It aims to examine the influence of dental healthcare service management on patient satisfaction, focusing on two key SERVQUAL dimensions: empathy and responsiveness. The study participants consisted of patients aged 18 years and above, selected based on their place of residence (urban or rural) to capture variations in satisfaction levels.

Several key steps were involved in the recruitment of participants. Firstly, the clear background on what is this study about that it is intend to evaluate patient satisfaction with management of dental health services as one aspect evaluation of hospital. Participants respond to a structured questionnaire that presents them with choices in terms of response options. We had to read or explain the information sheet and patient consent form, be able to ask questions, and make sure that they are adequately answered as part of recruitment. It had to be given voluntarily and

free from coercion, and there needed to be a full understanding that refusal or withdrawal at any stage could occur at no cost or subsequent penalty.

Study population consisted all patients of dental health services at Mulawarman University Dental Hospital (RSGM Unmul). Purposive sampling was performed with a total of 81 respondents who met the inclusion criteria as adult 18 years; had experience in dental service at least one time; and subjected to sign an informed consent form. Data were gathered using a modified and validated SERVQUAL questionnaire that assessed two dimensions: empathy (8 items) and responsiveness (9 items). Each item was rated on a five-point Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied). The scores for each dimension were then classified into three categories: low (1.00–2.33), moderate (2.34–3.66), and high (3.67–5.00).

The data were analyzed statistically using SPSS version 25. Descriptive analysis was conducted to identify frequency distributions and calculate mean scores for each dimension. Furthermore, the Mann-Whitney test was employed to assess differences in patient satisfaction between urban and rural groups, with a significance level set at  $\alpha = 0.05$ . The research instrument was adapted from previous studies and adjusted to fit the local context of RSGM Unmul (11), with validity and reliability testing performed prior to its implementation. Ethical clearance for this study was granted by the Health Research Ethics Committee of the Faculty of Health, Mulawarman University (No. 168/KEPK-FK/IX/2025). All participants provided informed consent before taking part in the study

The Importance-Performance Analysis (IPA) method is applied to evaluate patient satisfaction. IPA is widely utilized across various fields to provide insights into customer evaluations in this study, patients' assessments regarding critical aspects of service quality. The approach simultaneously considers importance (expectations) and performance (perceived satisfaction), and the results are categorized into four distinct quadrants (Figure 1). In the IPA framework, expectations are plotted on the Y-axis, while performance is represented on the X-axis. Results of the analysis will be recommended in improving service quality including enhancement of interpersonal competence of health personnel and improvement of queue management system and responsive administrative information. This methodology will yield objective insights into the association between service management and levels of satisfaction among patients, while also constituting a useful contribution to formulate dental hospital service policies.

**Table 1.** Assessment of the Validity and Reliability in Research Questionnaire Variabel Empathy

No	List of Question Variable Empathy	Validity	Reliability
1	Dentist gave an explanation related to the patient's treatment (E1)	0.707 <sup>a*</sup>	0.896 <sup>b*</sup>
2	Dental assistant gave explanation related to the patient's treatment (E2)	0.829 <sup>a*</sup>	0.884 <sup>b*</sup>
3	Administrative staff gave explanation related to administration procedures (E3)	0.650 <sup>a*</sup>	0.901 <sup>b*</sup>
4	Dentist gave personal attention in listening to the patient's complaint (E4)	0.517 <sup>a*</sup>	0.910 <sup>b*</sup>
5	Dental assistant gave personal attention in listening to the patient's complaint (E5)	0.694 <sup>a*</sup>	0.899 <sup>b*</sup>
6	Administration staff gave personal attention to registration procedures (E6)	0.781 <sup>a*</sup>	0.889 <sup>b*</sup>
7	Dentist's knowledge regarding the patient's needs for the treatment (E7)	0.743 <sup>a*</sup>	0.894 <sup>b*</sup>
8	Dental assistant's knowledge regarding the patient's needs for the treatment (E8)	0.748 <sup>a*</sup>	0.892 <sup>b*</sup>

Source: Primary Data, 2025

<sup>a\*</sup>Correlation Coefficient  $\geq 0.3$  indicates statistically significant correlation in the validity test (items considered valid);

<sup>b\*</sup>Cronbach's Alpha  $\geq 0.60$  indicates the item is reliable.

Based on Table 1, the validity test of the eight items measuring the empathy variable showed that three items were not valid. The analysis was conducted using the Pearson Product Moment Correlation with corrected item total correlation to assess the relationship between each item and the overall empathy score. The results indicated that most items had correlation coefficients above 0.3, demonstrating acceptable validity. Out of the eight items, five met the validity criteria with coefficients equal to or greater than 0.3, namely the dentist's explanation (E1), the dental assistant's explanation (E2), the administrative staff's personal attention (E6), the dentist's knowledge (E7), and the dental assistant's knowledge (E8). In contrast, three items had coefficients below 0.3, specifically the administrative staff's explanation regarding procedures (E3), the dentist's attention in listening to patient complaints (E4), and the dental assistant's attention in listening to patient complaints (E5), and were therefore considered invalid. These

findings suggest that the three items were not able to adequately represent the empathy dimension in the context of dental healthcare services.

The reliability test was conducted using Cronbach’s Alpha to evaluate the internal consistency of the instrument. The findings indicated that all items had Cronbach’s Alpha values above the minimum threshold of 0.60, with values ranging from 0.884 to 0.910, confirming that the instrument is reliable. This high level of reliability suggests that the instrument consistently measures the empathy dimension in dental health services. Therefore, even though three items need to be revised due to insufficient validity, the instrument as a whole demonstrates strong reliability and remains suitable for use in this study, as long as the invalid items are improved to enhance measurement accuracy.

**Table 2.** Assessment of the Validity and Reliability in Research Questionnaire Variabel Responsiveness

No	List of Question Variable Responsiveness	Validity	Reliability
1	Dentist was able to help and instill confidence in the patient on the treatment (R1)	0.776 <sup>a*</sup>	0.858 <sup>b*</sup>
2	Dental assistant was able to assist the dentist during treatment (R2)	0.803 <sup>a*</sup>	0.855 <sup>b*</sup>
3	Administrative staff was able to complete administration procedures (R3)	0.878 <sup>a*</sup>	0.866 <sup>b*</sup>
4	Dentist responded promptly to patient’s request and needs during treatment (R4)	0.768 <sup>a*</sup>	0.857 <sup>b*</sup>
5	Dental assistant responded promptly to patient’s request and needs during treatment (R5)	0.774 <sup>a*</sup>	0.845 <sup>b*</sup>
6	Administrative staff responded promptly related to long waiting time (R6)	0.770 <sup>a*</sup>	0.873 <sup>b*</sup>
7	Dentist was capable and adept in doing all procedures (treatment) (R7)	0.610 <sup>a*</sup>	0.865 <sup>b*</sup>
8	Dental assistant was capable and adept in doing all procedures (assisting the dentists in treatment) (R8)	0.686 <sup>a*</sup>	0.880 <sup>b*</sup>
9	Administrative staff was capable and adept in doing all administration procedures (R9)	0.912 <sup>a*</sup>	0.838 <sup>b*</sup>

Source: Primary Data, 2025

<sup>a\*</sup>Correlation Coefficient  $\geq 0.3$  indicates statistically significant correlation in the validity test (items considered valid);

<sup>b\*</sup>Cronbach’s Alpha  $\geq 0.60$  indicates the item is reliable.

Based on Table 2, the validity assessment of the nine items measuring the responsiveness variable indicated that all items were valid. The evaluation was performed using the Pearson Product Moment Correlation method with corrected item total correlation to determine the relationship between each item and the overall responsiveness score. The findings showed that all questionnaire items had item-total correlation coefficients  $< 0.3$ , ranging from 0.610 to 0.912, which indicates their validity. These include: the dentist (R1) is able to help and comfort patient, the dental assistant (R2) helps the dentist, the administrative staff (staff type R3) complete administrative procedures; the dentist’s prompt response to patient needs (R4), the dental assistant’s promptness (R5), the administrative staff’s response to waiting time (R6), the dentist’s expertise in treatment procedures (R7), the dental assistant’s expertise (R8), and the administrative staff’s expertise (R9). These results indicate that all items adequately measure the main dimensions of responsiveness in dental healthcare services.

Cronbach’s Alpha was used for conducting the reliability test which helps in assessing the internal consistency of instrument. The reliability coefficients for all items were above the minimum threshold of 0.60, with values ranging from 0.838 to 0.880, indicating good reliability. This suggests that the instrument is consistent in assessing the responsiveness dimension within dental health service settings. Consequently, the instrument for the responsiveness variable demonstrates excellent validity and reliability, and can be confidently used in this study without the need for revision, as all items reliably measure the intended construct with high consistency.

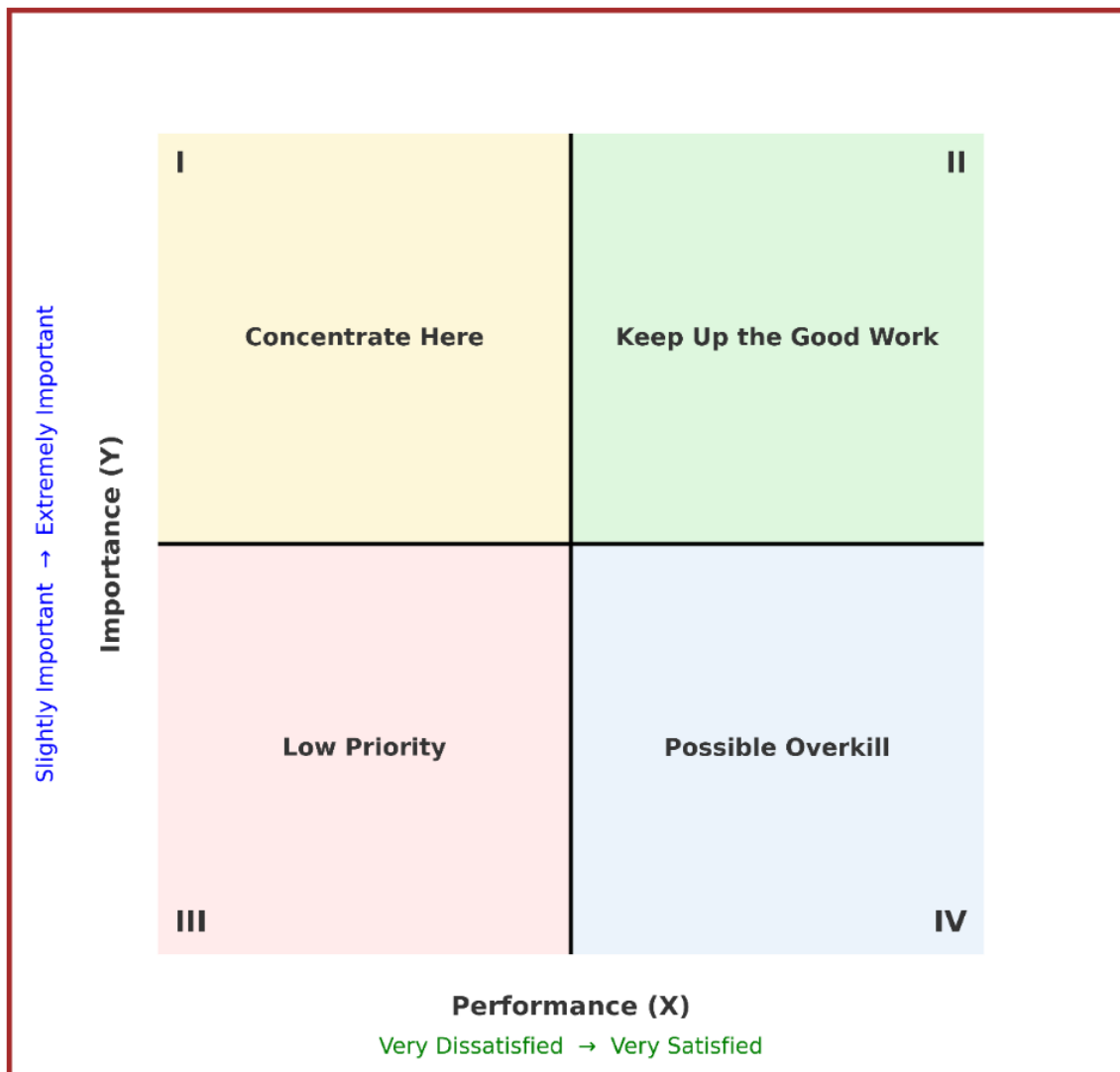


Figure 1. Importance-performance grid

RESULTS

Table 3. Characteristics of subjects by socio-demographic factors

Variables	Rural		Urban		Total	
	n	%	n	%	N	%
Gender						
Male	2	40.00	30	39.50	32	39.50
Female	3	60.00	46	60.50	49	60.50
Age (years old)						
18-24	2	40.00	53	69.70	55	67.90
25-34	0	0.00	8	10.50	8	9.90
35-44	1	20.00	4	5.30	5	6.20
45-55	1	20.00	7	9.20	8	9.90
56>	1	20.00	4	5.30	5	6.20

<b>Religion</b>						
Islam	5	100.00	67	88.20	72	88.90
Protestant	0	0.00	8	10.50	8	9.90
Catholic	0	0.00	1	1.20	1	1.20
<b>Marital Status</b>						
Unmarried	2	40.00	61	80.30	63	77.80
Married	1	20.00	14	18.40	15	18.50
Widower	1	20.00	0	0.00	1	1.20
Widow	1	20.00	1	1.30	2	2.50
<b>Educational Status</b>						
Elementary school	0	0.00	10	13.20	10	12.30
Junior high school	0	0.00	2	2.60	2	2.50
Senior high school	2	40.00	19	25.00	21	25.90
University	3	60.00	45	59.20	48	59.30
<b>Occupation</b>						
Unemployment/housewife	1	20.00	12	15.80	13	16.00
Entrepreneur	0	0.00	5	6.60	5	6.20
Farmer	0	0.00	3	3.90	3	3.70
Civil Servant	1	20.00	2	2.60	3	3.70
Private sector employees	0	0.00	6	7.90	6	7.40
Others	3	60.00	48	63.20	51	63.00
<b>Monthly Income</b>						
Rp0-150.000	2	40.00	43	46.60	45	55.60
Rp150.000-500.000	0	0.00	5	6.60	5	6.20
Rp500.000-1.000.000	1	20.00	7	9.20	8	9.90
Rp1.000.000-2.000.000	0	0.00	5	6.60	5	6.20
>Rp2.000.000	2	40.00	16	21.10	18	22.20
<b>Distance to the Health Service Centre</b>						
0 – 5 km	2	30.00	44	57.90	46	56.80
6 – 10 km	3	60.00	24	31.60	27	33.30
>10 km	0	0.00	8	10.50	8	9.90
<b>Health Coverage Status</b>						
Yes	4	80.00	44	57.90	48	59.30
No	1	20.00	32	42.10	33	40.70

Table 3 presents the distribution of respondents based on socio demographic characteristics across rural and urban areas. The results indicate that the majority of participants were female (60.5%), mostly within the age group of 18 to 24 years (67.9%), and predominantly identified as Muslim (88.9%). Most respondents had attained higher education (59.3%). In terms of marital status, a substantial proportion were unmarried (77.8%), and a significant portion were either unemployed or homemakers (16.0%). The largest income group fell within the 0–150,000 Rupiah per month range (55%). Regarding geographic access to health facilities, the majority of respondents lived within a 0–5 km radius (56.8%), and most reported having health insurance coverage (59.3%).

**Table 4.** Profile of responses on empathy dimensions among urban and rural participants

No	Empathy	Rural			Urban		
		Mean	SD	Category	Mean	SD	Category
1	Dentist gave an explanation related to the patient's treatment (E1)	4.00	0.707	High	4.36	0.687	High
2	Dental assistant gave explanation related to the patient's treatment (E2)	4.00	0.707	High	4.29	0.708	High
3	Administrative staff gave explanation related to administration procedures (E3)	3.80	0.837	High	4.25	0.733	High
4	Dentist gave personal attention in listening to the patient's complaint (E4)	4.00	0.707	High	4.39	0.713	High
5	Dental assistant gave personal attention in listening to the patient's complaint (E5)	4.00	0.707	High	4.26	0.719	High
6	Administration staff gave personal attention to registration procedures (E6)	3.80	0.837	High	4.20	0.766	High
7	Dentist's knowledge regarding the patient's needs for the treatment (E7)	4.00	0.707	High	4.39	0.655	High
8	Dental assistant's knowledge regarding the patient's needs for the treatment (E8)	4.00	0.707	High	4.33	0.700	High

Low: (1-2,33); Moderate: (2,33-3,66); High (3,67-5,00).

Table 4 shows the distribution of respondents' answers regarding the empathy dimension. In rural areas, the average score was  $4.31 \pm 0.71$ , which falls into the high category. Similarly, in urban areas, the average score was  $3.95 \pm 0.74$ , which is also categorized as high.

**Table 5.** Profile of responses on responsiveness dimensions among urban and rural participants

No	Responsiveness	Rural			Urban		
		Mean	SD	Category	Mean	SD	Category
1	Dentist was able to help and instill confidence in the patient on the treatment (R1)	4.00	0.707	High	4.36	0.706	High
2	Dental assistant was able to assist the dentist during treatment (R2)	4.00	0.707	High	4.26	0.719	High
3	Administrative staff was able to complete administration procedures (R3)	3.80	0.837	High	4.20	0.749	High
4	Dentist responded promptly to patient's request and needs during treatment (R4)	4.00	0.707	High	4.36	0.706	High
5	Dental assistant responded promptly to patient's request and needs during treatment (R5)	4.00	0.707	High	4.30	0.693	High
6	Administrative staff responded promptly related to long waiting time (R6)	3.80	0.837	High	4.20	0.766	High
7	Dentist was capable and adept in doing all procedures (treatment) (R7)	4.00	0.707	High	4.37	0.65	High
8	Dental assistant was capable and adept in doing all procedures (assisting the dentists in the treatment) (R8)	4.00	0.707	High	4.32	0.677	High
9	Administrative staff was capable and adept in doing all administration procedures (R9)	3.80	0.837	High	4.22	0.723	High

Low: (1-2,33); Moderate: (2,33-3,66); High (3,67-5,00).

Table 5 shows the distribution of respondents' answers related to the responsiveness dimension. In rural areas, the mean score was  $3.93 \pm 0.75$ , which falls within the high category. Meanwhile, in urban areas, the mean score was  $4.29 \pm 0.71$ , also classified as high.

**Table 6.** Average scores of participant responses on empathy and responsiveness dimensions by urban and rural areas

Dimensions		Mean	SD	Category
Rural	Empathy	3.95	0.715	High
	Responsiveness	3.93	0.722	High
Urban	Empathy	4.30	0.640	High
	Responsiveness	4.28	0.655	High

Low: (1-2,33); Moderate: (2,33-3,66); High (3,67-5,00).

Based on Table 6, the average responses of subjects regarding the empathy and responsiveness dimensions were compared between rural and urban areas. In rural areas, the mean scores for empathy and responsiveness were  $3.95 \pm 0.715$  and  $3.93 \pm 0.722$ , respectively, both of which fall into the high category. In urban areas, the average scores were  $4.30 \pm 0.640$  for empathy and  $4.28 \pm 0.655$  for responsiveness, also classified as high. These findings suggest that, in both urban and rural settings, patients expressed a relatively high level of satisfaction with the services provided particularly in relation to the empathy and responsiveness of healthcare personnel.

**Table 7.** The average level of patient satisfaction with the quality of health services at Mulawarman University Dental Hospital, based on empathy and responsiveness dimensions in urban and rural areas

Questions	Rural				Urban				P-value
	Satisfied		Unsatisfied		Satisfied		Unsatisfied		
Empathy	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Dentist gave an explanation related to the patient's treatment (E1)	4.33	0.577	3.50	0.707	4.92	0.28	3.85	0.533	0.304
Dental assistant gave explanation related to the patient's treatment (E2)	4.33	0.577	3.50	0.707	4.92	0.28	3.73	0.52	0.405
Administrative staff gave explanation related to administration procedures (E3)	4.33	0.577	3.50	0.707	4.86	0.351	3.70	0.516	0.251
Dentist gave personal attention in listening to the patient's complaint (E4)	4.33	0.577	3.50	0.707	4.97	0.167	3.88	0.607	0.251
Dental assistant gave personal attention in listening to the patient's complaint (E5)	4.33	0.577	3.50	0.707	4.89	0.319	3.70	0.464	0.45
Administration staff gave personal attention to registration procedures (E6)	4.33	0.577	3.50	0.707	4.86	0.351	3.60	0.496	0.313
Dentist's knowledge regarding the patient's needs for the treatment (E7)	4.33	0.577	3.50	0.707	4.97	0.167	3.88	0.463	0.251
Dental assistant's knowledge regarding the patient's needs for the treatment (E8)	4.33	0.577	3.50	0.707	4.97	0.167	3.75	0.439	0.342
Responsiveness									
Dentist was able to help and instill confidence in the patient on the treatment (R1)	4.33	0.577	3.50	0.707	4.94	0.232	3.83	0.549	0.304
Dental assistant was able to assist the dentist during treatment (R2)	4.33	0.577	3.50	0.707	4.86	0.351	3.73	0.506	0.45

Administrative staff was able to complete administration procedures (R3)	4.33	0.577	3.50	0.707	4.83	0.378	3.63	0.49	0.313
Dentist responded promptly to patient's request and needs during treatment (R4)	4.33	0.577	3.50	0.707	4.92	0.28	3.85	0.58	0.304
Dental assistant responded promptly to patient's request and needs during treatment (R5)	4.33	0.577	3.50	0.707	4.89	0.319	3.78	0.48	0.382
Administrative staff responded promptly related to long waiting time (R6)	4.33	0.577	3.50	0.707	4.86	0.351	3.60	0.496	0.131
Dentist was capable and adept in doing all procedures (treatment) (R7)	4.33	0.577	3.50	0.707	4.92	0.28	3.88	0.463	0.286
Dental assistant was capable and adept in doing all procedures (assisting the dentists in the treatment) (R8)	4.33	0.577	3.50	0.707	4.92	0.28	3.78	0.423	0.362
Administrative staff was capable and adept in doing all administration procedures (R9)	4.33	0.577	3.50	0.707	4.83	0.378	3.68	0.474	0.277

Based on the findings shown in Table 7, no significant difference was observed in patient satisfaction regarding the quality of services at the Dental and Oral Hospital of Universitas Mulawarman between respondents from rural and urban areas, in terms of both empathy and responsiveness dimensions. All p-values for each indicator were above 0.05 ( $p > 0.05$ ), indicating that the difference in satisfaction between satisfied and unsatisfied subjects was not statistically significant. Although the mean scores of the satisfied group tended to be higher across all indicators, the differences were not statistically strong enough to indicate a meaningful distinction. This suggests that perceptions of satisfaction with services are relatively uniform between urban and rural areas, even though numerically there is a trend toward higher scores in urban areas.

The Importance Performance quadrant analysis shown in Figures 1 and 2 for rural and urban areas respectively reveals different patterns in patient perceptions of dental healthcare service quality. In rural areas, the distribution of all attributes appears relatively even and closely clustered around the intersection point between the importance and performance axes. Those in rural settings may perceive providing all of the aspects of service equally important and/or gratifying thus creating no characteristics that rise above based on those two measures. Therefore, such composite measures of rural service quality should have their utilization uniformly deployed over all matrices.

Conversely, urban patient perceptions are more heterogeneous, with attributes clearly represented across all four IPA quadrants. In Quadrant I, which reflects high importance but low performance, only one attribute is identified: R5, representing the administrative staff's ability to assist patients with their needs. This attribute requires immediate attention as it is seen as essential but currently underperforming. Quadrant II indicates high importance and high performance, which is the case for E1, E4, E7, R1, R4, R5 and R7 services since they meet patient expectation effectively and should be maintained. Quadrant III Lower Importance & Lower Performance. The aspect in Quadrant III includes some elements such as R3, E6, R6, R9 (occasionally), or even E3 and E5 and/or R2 that are relatively less important but underperformance still needs a gradual improvement to keep up the overall quality of service. On the other hand, E2 and E8 both performed well in Quadrant IV but are not deemed by patients as overly important indicating that it may be prudent to assess efficiency of resource allocation in these services. These findings provide useful guidance for healthcare providers on the areas where they should focus their local quality improvement efforts, depending on patients' priorities and expectations in their respective contexts.

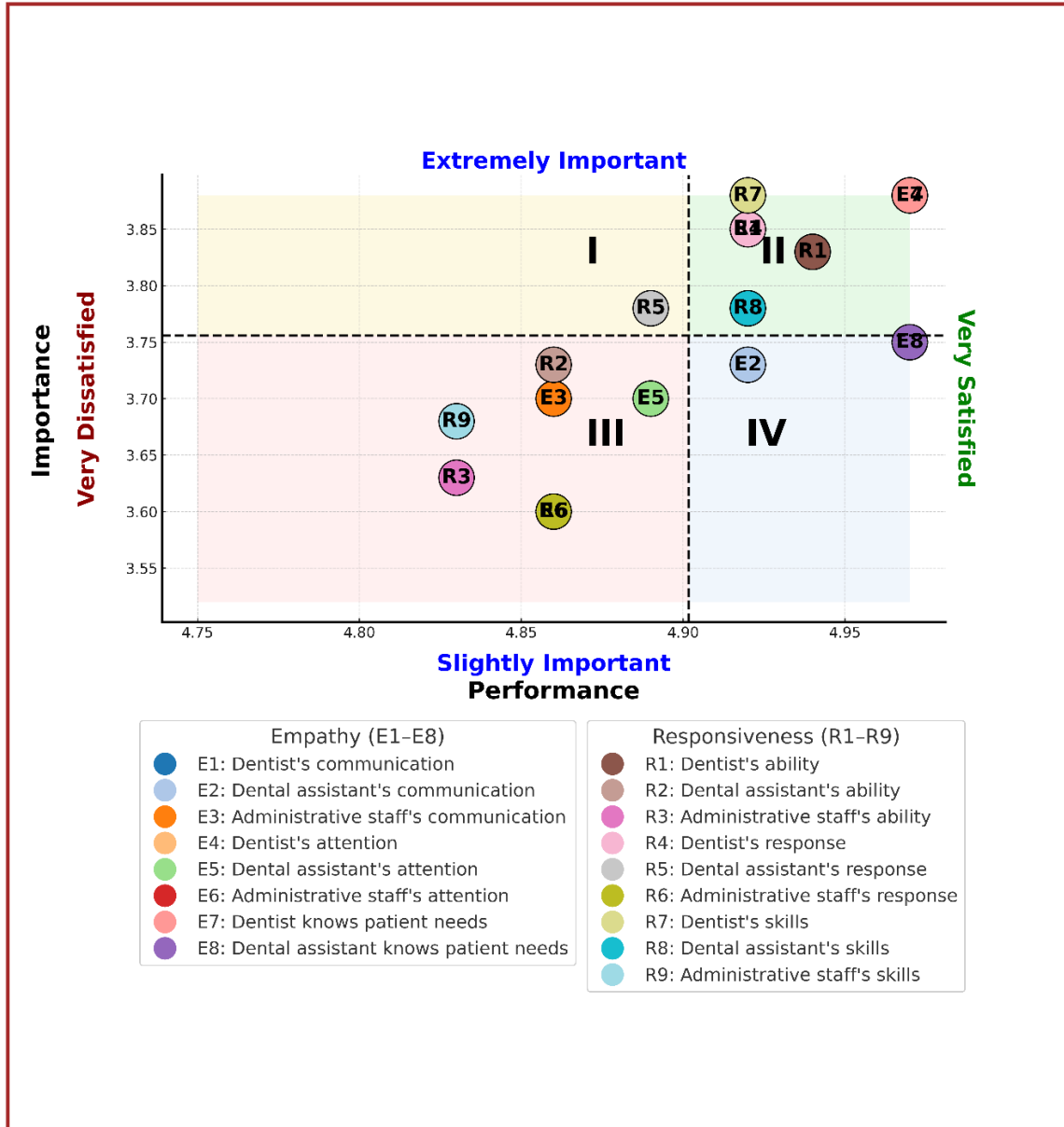


Figure 2. Importance-performance analysis quadrant in urban areas.

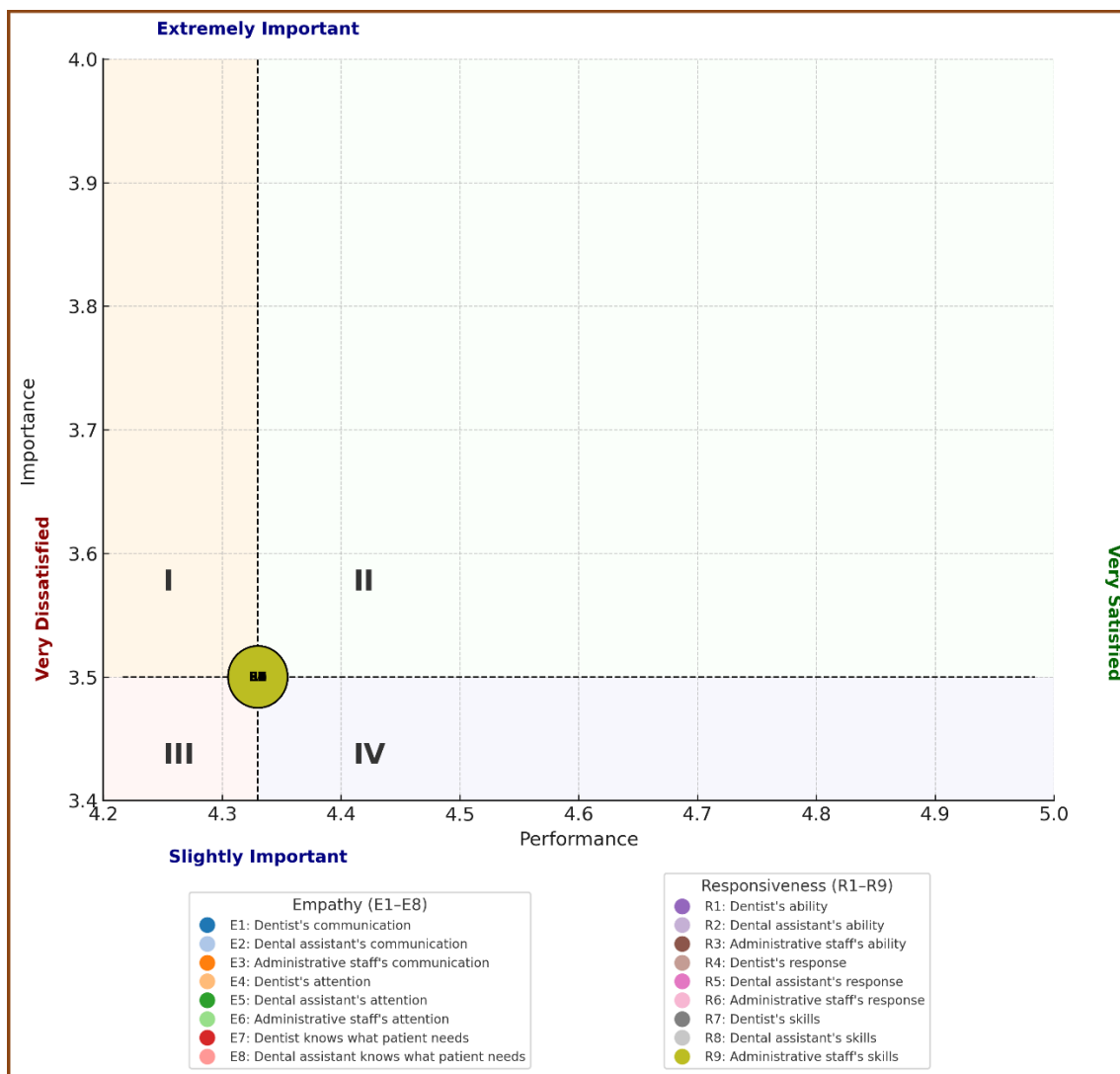


Figure 3. Importance-performance analysis quadrant in rural areas.

## DISCUSSION

The objective of this research is to analyze the impact of dental health service management on patient satisfaction at Mulawarman University Dental Hospital dimensions empathy and responsiveness. The results indicated that the empathy and responsiveness dimensions in both rural and urban areas were found to be high scores on average (rural areas:  $3.95 \pm 0.715$  for empathy;  $3.93 \pm 0.722$  for responsiveness, Urban areas:  $4.30 \pm 0.640$  for empathy;  $4.28 \pm 0.655$  for responsiveness). Statistical analysis by the Mann-Whitney test showed no significant ( $p > 0.05$ ) differences in the indicators of empathy and responsiveness for patient satisfaction between rural and urban areas (Table 5). At both practices, empathy and responsiveness dimensions were rated similarly by urban ( $3.58 \pm 0.94$  and  $3.50 \pm 0.94$ ) and rural ( $3.43 \pm 0.99$  and  $3.63 \pm 0.86$ ) areas resident in Bone Regency, Indonesia however, which contrasts with this more recent investigation which suggested that improvement was warranted for these aspects (11).

The high empathy and responsiveness scores illustrated in this study show that healthcare personnel at Mulawarman University Dental Hospital which consisted of dentists, dental assistants, and administrative staff were capable of clearly explaining treatment procedures as well as listening to the patients' concerns personally and responding to the needs of patients quickly. This is consistent with the SERVQUAL dimension importance of

healthcare quality where these two dimensions expressed as empathy (individual attention and understanding of patient needs) and responsiveness (ability to deliver appropriate care in a timely manner). Historically, high empathy and responsiveness scores reflect that dental healthcare personnel; dentists and/or clinic staff/support teams provide individualized attention (e.g., clearly explaining treatment procedures, personally listening to patients' complaints, responding to patient needs immediately through flexible scheduling and timely communication) (12–15). This is consistent with SERVQUAL model which suggests that empathy (individual attention and understanding of patient needs) and responsiveness (ability to provide prompt and appropriate service) are the main dimensions of quality dental healthcare services. Regression analysis, path analysis and modified SERVQUAL indicate that empathy and responsiveness affect overall patient satisfaction; intention to return as well as reducing the gap between expectations and actual experiences of patients in urban and rural areas by these dimensions confirming previous studies on this subject (12–15).

The lack of statistically significant difference between rural and urban areas patient satisfaction finding can be attributed to some reasons. First, Mulawarman University Dental Hospital with standardized service protocols has been used in the study, so that geographic differences do not affect the assessment of hospital services by patients. This is supported by previous studies, showing that the establishment of a standardized and decentralized healthcare management system in Indonesia tends to produce relatively similar dental service quality between urban and rural areas, thus providing a more consistent service experience with some gaps remaining mainly at dimensions of empathy and responsiveness (15,16). Second, a much larger proportion of dentate persons within any area can expect access to and use of dental health services if they are covered by state-funded or private health insurance or dental insurance which increases sole patient satisfaction and decreases the gap in satisfaction between rural and urban areas (17). Third, high education level of the respondents habitually affects their attitude and cognizance in dental health facilities; the expectations of highly educated patients regarding services are often found to be higher; this leads to more objective or critical assessment of satisfaction depending on whether SERVQUAL dimensions need is fulfilled (12).

Overall, the satisfaction scores were in the top box although average scores for empathy (4.30) and responsiveness (4.28) were higher in urban areas than in rural areas (3.95 and 3.93 respectively). This could indicate greater access to health facilities in urban areas, which also would have improved availability of resources (56.8% lived on 0–5 km range) compared to more isolated ones. The dentist-to-population ratio is considerably higher in urban areas (one dentist per 1,470 residents) than in rural areas (one dental surgeon per 3,850 residents), thus lowering geographic barriers and increasing use of preventive services (16,17). A study by A in Bone Regency also found that access to health facilities influenced perceptions of service quality, but currently satisfaction score is lower than the findings of this study (11).

The empathy dimension in this study showed high scores, especially in indicators in the empathy dimension of this study, almost perfect scores were observed, especially for two indicators: dentist's explanation of treatment (E1: 4.00 in rural; 4.36 urban) and dentist's personal attention to patient complaints (E4: 4.00 rural; 4.39 urban). This suggests that dentists at this hospital have been trusted by patients through appropriate communication methods such as empathy and service quality. Elements of trust, empathy, and attention to service quality are critical determinants in an effort to increase patient satisfaction and loyalty toward dental healthcare (18,19). Earlier studies have shown that dental healthcare providers with good empathy skills (and, by inference good communication) help patients develop trust in their clinicians via emotional resonance and personalized care, which leads to improved patient satisfaction (20–22). and treatment compliance. On the other hand, administrative indicators (E3 and E6) were slightly lower than clinical ones for dentists and assistances, indicating that the level of satisfaction in administrative aspect could be even better to reach the same level as in clinical aspect.

The responsiveness dimension also provided a good score, indicators such as dentist helps patients (R1: 4.00 in rural areas; 4.36 in urban areas) and respond quickly to the patient needs (R4: 4.00 in rural areas; an R5: 4.36 in urban areas) ranked in high level.

This indicates that healthcare personnel deliver services in a prompt and timely manner, minimize delays in addressing patient complaints, and demonstrate a proactive willingness to assist with patient needs. These findings are consistent with previous studies which concluded that the responsiveness dimension in the SERVQUAL model

is a key factor influencing perceived service quality and patient satisfaction in various dental clinic settings (23,24), suggesting that responsiveness serves as an important predictor of patient satisfaction in the healthcare sector.

However, as with the empathy dimension, scores for administrative staff (R3 and R6) were slightly lower, possibly indicating challenges in administrative efficiency, such as long waiting times. Studies (25–27) indicate challenges in administrative efficiency, such as long waiting times in the registration or reception area, lack of individual attention from front desk staff, and less empathetic responses to patient complaints related to administrative processes, which impact the overall perception of the quality of dental health services (27,28).

The lack of a statistically significant difference ( $p > 0.05$ ) between the satisfied and dissatisfied groups suggests that, although there are variations in mean scores, these differences are not substantial enough to be considered significant. This finding contrasts with study (11), which reported significant differences ( $p < 0.05$ ) in several indicators, including communication by administrative staff and the attentiveness of dental assistants, between rural and urban populations in Bone Regency. This difference may be due to the different context of the health facility, where the Mulawarman University Dental and Oral Hospital has a higher standard of service as an educational and health institution. In addition, the relatively small number of rural respondents ( $n = 5$ ) compared to urban respondents ( $n = 76$ ) in this study may affect the sensitivity of the statistical test, as explained regarding the impact of sample size on statistical significance.

These findings also highlight the importance of Importance-Performance Analysis (IPA) as a tool for identifying strengths and weaknesses in healthcare services (11). Although this study did not present IPA quadrants, high scores on all indicators indicate that most aspects of the service fall into the “continue good performance” quadrant (high importance and high performance). However, to ensure continued satisfaction, hospitals must maintain the quality of clinical services and improve administrative efficiency, particularly in terms of long waiting times, waiting area comfort, and administrative staff communication and responsiveness to patient needs, as these aspects are often the main sources of dissatisfaction that influence overall perceptions of dental healthcare quality (28–30).

Sociodemographic factors such as age, education, and income also contribute to shaping perceptions of patient satisfaction. Most respondents were aged 18 to 24 years (67.9%) and held a college degree (59.3%), which may be associated with higher satisfaction levels, as individuals in this group tend to have a better understanding of healthcare processes, more realistic expectations, and greater access to information regarding patient rights and the quality of dental care (31). The vast majority of respondents also possessed health insurance (59.3%), by lowering financial barriers, increasing preventive and restorative care utilization, and possibly improving overall patient satisfaction by eliminating out-of-pocket costs and facilitating regular visits (32,33).

### **Strengths of the study**

The research offers noteworthy strengths. In terms of methodology, it uses cross-sectional quantitative design based on a valid SERVQUAL questionnaire instrument which further assessment show strong reliability and clarity in reporting the ethical procedure followed. Including both urban and rural participants facilitates meaningful comparison of geographic disparities in satisfaction. At the analytical level, Likert data is applicable to the Mann-Whitney test, and at a practical level, combining Importance Performance Analysis complements empirical analysis by recognizing priorities for action. Building on the context, which pertains to under-utilization of dental services in East Kalimantan by assessing a teaching hospital with educational and patient roles, the study is pertinent. As the findings are in accordance with national health policies, it offers practical recommendations to managers on how to improve patient satisfaction through especially strengthening empathy and responsiveness dimensions.

### **Research Limitations**

This study has several limitations to consider. First, the rural sample size was very small ( $n=5$ ) compared to the urban sample ( $n=76$ ), which may affect the sensitivity of statistical testing and the generalizability of findings. Second, the study only focused on the empathy and responsiveness dimensions of the SERVQUAL model, without considering other dimensions such as reliability, assurance, and tangibles, resulting in a less comprehensive picture of service quality. Third, the analyzed socio-demographic data were limited and did not include variables such as frequency of patient visits or types of dental treatment received, which may affect satisfaction levels. Fourth, the study was conducted at a university hospital, which has specific characteristics as both an educational and healthcare

institution, so the results may not be fully generalizable to other facilities like public health centers or private hospitals.

### **Future Directions**

There are some possible directions of future research. The first one is to increase the sample size that we are investigating, especially from rural areas and use stratified sampling method to ensure equal portions. Secondly, measure all the components of SERVQUAL to gain a wider-ranging perspective about service quality. Third, add on other variables like type of dental care or frequency of visits to assess their effect on patient satisfaction. Fourth, implement the Importance-Performance Analysis (IPA) in a clear manner to help identify priority service area(s) for improvement. fifth, perform comparative studies between institutions (like university hospitals and public health centers) to learn more differences in service management. Last, this study can provide data for longitudinal research to monitor changes in patient satisfaction over time and determine the impact of interventions initiated as a result of the recommendations made in this study (11).

Overall, the results of this study concluded that management of dental healthcare services at the Mulawarman University Dental Hospital was good quality, but patient satisfaction in empathy and responsiveness management was high only for urban patients. But if the administrative staff improved their efficiency and communication even more patient satisfaction would be admitted. This result will help hospital management to maintain or enhance quality delivery of dental healthcare services.

### **CONCLUSION**

This study shows that the management of dental health services at Mulawarman University Dental Hospital validity good quality in competence empathy and responsiveness with high patient satisfaction reports obtained around both rural and urban areas. Statistically no significant differences between the two groups were seen ( $p > 0.05$ ) with similar service delivery across regions. The exceptional performance with respect to empathy and responsiveness reflects healthcare personnel offering factual explanation, personal attention up to meet patient needs, and timely response from them, whereas administrative aspects like waiting time and communication need more changes. Factors based on socio-demographic distributions also contribute positively (higher education and with health insurance ownership) to the patients' satisfaction.

The hospital can take some other steps like improving administrative efficiency by training the staff in communication and reducing the waiting time of patients to improve service quality. Continuing education courses must also be held on stimulation and response, so that dentists, assistants and administrative staff are aware of the standards set and work towards that. In rural areas, for example, more extensive communication skills training could reinforce empathy and responsiveness. The conclusion advises the hospital for periodic application of IPA to keep a close tab on service quality and in ascertaining critical areas requiring development. Outreach programs in the form of mobile dental clinics can also be implemented to increase access to healthcare facilities in rural populations of remote areas and ensure equity in service delivery.

### **AUTHOR CONTRIBUTION STATEMENT**

EG and ASJ conceptualized the manuscript; carried out data analysis; and drafted the manuscript. RD and ML carried out the methodology; edited the manuscript; and oversaw project administration. II supervised the project and provided critical revisions of intellectual content. All authors subsequently revised the drafts. All authors read and approved the final manuscript.

### **CONFLICT OF INTEREST**

None declared.

### **DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS**

The authors of this manuscript declare that no artificial intelligence (AI) was used during the writing process.

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