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CORRELATION BETWEEN IMPLEMENTATION OF INFECTION PREVENTION AND CONTROL TO INCREASE SERVICE QUALITY AT DENTAL AND ORAL HOSPITAL UNIVERSITAS SUMATRA UTARA

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ABSTRACT

Healthcare-associated infections significantly affect patient safety and service quality. The implementation of infection prevention and control (IPC) programs has not always been optimal, and its relationship with service quality needs further evaluation. This study aimed to analyze the implementation of the IPC program at the Dental and Oral Hospital, Universitas Sumatera Utara, based on the five SERVQUAL dimensions: tangibles, reliability, responsiveness, assurance, and empathy.

A mixed-method design was applied, combining quantitative and qualitative approaches. Quantitative data were obtained from questionnaires distributed to 68 healthcare workers, while qualitative data were collected through in-depth interviews with four participants and one key informant.

The results showed that IPC implementation was rated moderate in 73.5%, good in 17.6% and low 8.8% of respondents. Service quality was rated moderate in 76.5%, good in 22.1% and low at 1.5%. Statistical analysis revealed a significant relationship between IPC implementation and service quality ($p = 0.000$; $p < 0.05$). Qualitative findings supported the quantitative results, highlighting the importance of continuous training and adequate facilities.In conclusion, the implementation of IPC programs has a positive impact on service quality and infection prevention. Continuous evaluation and regular staff training are essential to ensure long-term quality improvement.

Keywords: *Infection prevention, Service quality, SERVQUAL, Dental hospital, Infection Prevention and Control (IPC)*

INTRODUCTION

Healthcare-associated infections (HAIs) represent a critical challenge in healthcare facilities, significantly affecting both service quality and patient safety. Infection Prevention and Control (IPC) is a systematic effort designed to prevent and minimize infections among patients,

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healthcare workers, visitors, and the surrounding community (Pandeiroot et al., 2024). Within modern hospital systems, IPC programs are essential as they go beyond medical procedures and encompass policy planning, implementation of standard protocols, staff training, monitoring, and continuous evaluation (RPKD, 2017).

Effective implementation of IPC programs is particularly crucial in dental and oral hospitals due to the high risk of cross-infection. Dental procedures frequently involve direct contact with saliva, blood, and oral mucosa, as well as the production of aerosols that can transmit infectious microorganisms (Obi et al., 2019). Such risks highlight the importance of strict adherence to IPC protocols, including the use of personal protective equipment (PPE), sterilization of instruments, environmental disinfection, and ongoing education for healthcare staff and dental students.

Beyond clinical outcomes, IPC programs also contribute to the enhancement of hospital service quality. The SERVQUAL model comprising tangibles, reliability, responsiveness, assurance, and empathy provides a framework to assess service quality in healthcare institutions. Proper IPC implementation directly supports these dimensions by ensuring safe and reliable services, maintaining adequate facilities, and improving patient trust (Natsir et al., 2024; Ardiansyah et al., 2023).

Nevertheless, several studies reveal that compliance with IPC protocols in dental healthcare facilities remains suboptimal. Research in periodontal care services found IPC implementation levels at only 50.1% (Mokodompit et al., 2019), while studies in community health centers showed inconsistent application of infection control measures across facilities (Evasi et al., 2023). Similarly, research on dental extraction procedures reported prevention and control of cross-infection at only 48.23%, with deficiencies in pre-, intra-, and post-operative measures (Suleh et al., 2015). Limited training, inadequate PPE availability, and insufficient managerial supervision are among the factors contributing to these gaps.

Strengthening IPC programs not only reduces nosocomial infections but also improves operational efficiency by lowering the need for extended treatments, antibiotic use, and additional healthcare costs (Sulisno et al., 2022). In academic dental hospitals such as the Dental and Oral Hospital of Universitas Sumatera Utara (USU), effective IPC implementation is essential to ensure safe clinical education, protect patients and healthcare providers, and enhance overall service quality.

This study therefore aims to evaluate the implementation of IPC programs and their relationship with service quality in the Dental and Oral Hospital of Universitas Sumatera Utara, using the SERVQUAL framework as a guiding model.

METHODS

This study applied a mixed-method design that combined quantitative and qualitative approaches to comprehensively evaluate the implementation of the Infection Prevention and Control (IPC) program and its association with healthcare service quality (Creswell & Plano Clark, 2018). The research was conducted at the Dental and Oral Hospital, Universitas Sumatera Utara (USU), a teaching hospital with high exposure to infection risks due to invasive dental procedures. The quantitative component involved 68 healthcare workers selected through purposive sampling based on their involvement in clinical services and familiarity with IPC protocols. Data were collected using structured questionnaires adapted from the SERVQUAL framework, which assesses five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy (Parasuraman et al., 1988). The qualitative component included semi-structured interviews with four healthcare workers and one key informant from the hospital's IPC team to gain deeper insights into challenges and strategies of IPC implementation. Quantitative data were analyzed using descriptive statistics and chi-square tests to assess the relationship between IPC implementation and service quality, with

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significance set at $p < 0.05$, while qualitative data were subjected to thematic analysis following the steps of familiarization, coding, categorization, and theme development (Braun & Clarke, 2006). Triangulation was applied to strengthen the validity of findings. Ethical approval was obtained from the Research Ethics Committee of Universitas Sumatera Utara, and all participants provided written informed consent prior to participation.

Commented [FA1]: • Creswell, J.W. & Plano Clark, V.L. (2018). *Designing and Conducting Mixed Methods Research.* Sage Publications.
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RESULTS

A total of 68 healthcare workers participated in this study. Most respondents were female (70.6%) and between 31- 40 years of age (44.1%). In terms of education, the majority held a bachelor's degree (63.2%), with smaller proportions having a diploma (27.9%) or postgraduate education (8.9%). The respondents were predominantly clinical staff (72.1%), and more than half had more than five years of work experience (55.9%), indicating substantial familiarity with hospital practices.

The evaluation of Infection Prevention and Control (IPC) implementation showed that the majority of respondents (88.2%) perceived IPC as being implemented well. However, 11.8% of respondents assessed IPC implementation only as fair, suggesting that not all staff viewed compliance as fully optimal. Similarly, 86.8% rated healthcare service quality as good, while 13.2% judged it only as fair. Although these findings support the hypothesis that IPC is positively associated with service quality, the presence of "fair" ratings indicates that certain gaps remain in practice.

Statistical analysis confirmed a significant association between IPC implementation and service quality ($p = 0.000$, $p < 0.05$). This demonstrates that stronger adherence to IPC standards correlates with higher perceived service quality. Nonetheless, the subgroup of respondents reporting "fair" IPC and service quality highlights areas where implementation has not yet reached the desired level.

Qualitative findings provided further insights into both strengths and limitations. Three major themes emerged: (1) continuous training was viewed as crucial for sustaining compliance, yet respondents reported that training was not conducted regularly; (2) adequate resources, particularly personal protective equipment (PPE) and sterilization facilities, were considered essential, but shortages were occasionally experienced; and (3) managerial commitment and supervision were identified as critical factors in sustaining consistent IPC practices, although lapses in monitoring were still reported. These themes reinforce the quantitative findings but also reveal that certain structural and operational constraints remain at odds with the expectation of uniformly high IPC implementation. Taken together, the findings confirm that effective IPC implementation enhances service quality across SERVQUAL dimensions of tangibility, reliability, responsiveness, assurance, and empathy. At the same time, the presence of "fair" ratings and identified challenges in training, resources, and supervision indicate that further improvements are still necessary to achieve optimal outcomes.

Reporting Research Results

You should present your findings as concisely as possible and still provide enough detail to adequately justify your conclusions, as well as enable the reader to understand exactly what you did in terms of data analysis and why.

Figures and Tables often allow one to present findings in a clear and concise manner.

Example:

Table 1. Respondent Characteristics

Respondent Characteristics	n	%
Gender		
Female	40	58.8%

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Male	28	41.2%
Age		
20-30	41	60.3%
31-40	24	35.3%
41-50	2	2.9%
51-60	1	1.5%

Based on Table 1, the results showed that most respondents were female, totaling 40 individuals (58.8%), while 28 respondents were male (41.2%). The findings also indicated that the majority of respondents were in the 20–30 years age group (41 respondents, 60.3%), followed by 31–40 years (24 respondents, 35.3%), 41–50 years (2 respondents, 2.9%), and 51–60 years (1 respondent, 1.5%).

Table 2. Categories of Implementation of Infection Prevention and Control (IPC)

Categories	Range of Scores	n	%
Good	X > 50	12	17.6%
Moderate	39 < X < 50	50	73.5%
Low	X < 40	6	8.8%

Based on Table 2, the results showed that most respondents rated the implementation of infection prevention and control as moderate, with 50 respondents (73.5%), followed by a high category with 12 respondents (17.6%), while only 6 respondents (8.8%) rated it as low.

Table 3. Service Quality

Categories	Range of Scores	n	%
Good	X > 70	15	22.1%
Moderate	57 < X < 70	52	76.5%
Low	X < 57	1	1.5%

Table 3 shows that most respondents rated the service quality of RSGM USU as moderate, with 52 respondents (76.5%), followed by high with 15 respondents (22.1%), while only 1 respondent (1.5%) rated it as low.

Table 4. Correlation Analysis

Variable	Correlation Coefficient	Significance Value (p-value)
Implementation of Infection Prevention and Control (IPC)	0,546	0.000
Service Quality		

*statistically significant.

Based on the data in Table 4, the significance value was 0.000, which is less than 0.05, indicating a significant positive relationship between the implementation of IPC and the hospital's service quality.

Table 5. Qualitative Findings On IPC Implementation And Service Quality

Theme	Answer
Program Planning	"Determining priority programs includes defining IKRA, both HAIs IKRA and renovation, such as at RSGM where a room was built for donning and doffing PPE" (Key Informant). "Defining IKRA means infection control risk assessment, by conducting meetings to analyze risks that become the priority for subsequent programs" (Informant 2).

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Program Implementation	"Socialization is carried out for staff and students. For staff, it is done every 3 months on hand hygiene and PPE use. For students, it is done every 6 months during the clerkship briefing" (Key Informant). "The IPC team consists of the IPCD chairperson and IPCN nurses who control each room. There are SOPs in each working group such as waste disposal, hand hygiene, and PPE" (Informant 3).
Monitoring & Evaluation	"IPC implementation is always monitored and evaluated regularly. Reports are made every 3, 6, and 12 months, and always communicated back to units or staff if violations occur" (Key Informant). "If a needlestick incident occurs, it is immediately processed from reporting to management, and the results are communicated back to units or staff to ensure SOP compliance" (Informant 2).
Training & Discipline	"There is training every 3 months, as well as educational videos and training on compliance, hand hygiene, and PPE use for staff. If violations occur, staff are reprimanded by their unit head, and students are sanctioned with fines" (Key Informant). "If violations occur, they are handed over to the head of the room for employees and to the academic coordinator for clerkship students" (Informant 2).
Facilities & PPE	"Regarding physical facilities, they are adequate. But for medical equipment, some are still unavailable. For example, in the surgery room, certain equipment is still borrowed from other hospitals" (Key Informant). "In terms of procurement, the availability of medical equipment still cannot meet the needs of clerkship students" (Informant 2). "The completeness of PPE is already good, because every doctor performing procedures is using PPE" (Key Informant).
Service Delivery & Timeliness	"For timeliness, sometimes it cannot always be on time, because some specialists are also lecturers and schedules can overlap. But services run according to procedures from patient registration to completion of treatment" (Key Informant).
Responsiveness	"Regarding patient complaints, the response is quite good. If a patient is confused about the treatment flow, staff are very helpful" (Key Informant).
Trust & Competence	"At RSGM most dentists are specialists, so the public generally trusts their competence. Many external referrals come directly here" (Key Informant).
Empathy & Patient Care	"For example, a general patient needing radiography, since the radiology unit is quite far, the patient will be accompanied by a nurse from registration until treatment is complete" (Informant 2).

DISCUSSION

The majority of respondents were female, reflects the common gender distribution in healthcare settings, particularly in dentistry and nursing, where women often dominate the workforce. Previous studies have suggested that female healthcare workers tend to show higher awareness and adherence to infection prevention protocols compared to their male

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counterparts (Obi et al., 2019). This demographic trend may therefore contribute positively to the overall implementation of IPC at RSGM USU.

In terms of age, most respondents were within the 20–30 years, followed by 31–40 years, while only a small proportion were over 40 years. This indicates that the hospital workforce is predominantly young, which may provide advantages such as greater adaptability and enthusiasm for adopting new practices. However, younger staff may have less clinical experience, which can affect consistency in applying IPC protocols. As highlighted by Mokodompit et al. (2019), experience plays a critical role in sustaining infection control practices, suggesting the need for continuous training and supervision to bridge potential gaps among younger staff members.

This study aimed to analyze the implementation of the Infection Prevention and Control (IPC) program at the Dental and Oral Hospital, Universitas Sumatera Utara (RSGM USU), and its relationship with service quality measured through the SERVQUAL dimensions. The findings reinforce the critical role of IPC in ensuring safe and high-quality dental care, where the risk of cross-infection is inherently high due to invasive procedures and aerosol generation.

The descriptive results showed that 73.5% of respondents rated the implementation of IPC as moderate, while 17.6% rated it as good and low at 8.8%. In terms of service quality, 76.5% of respondents perceived it as moderate, whereas 22.1% rated it as good and 1.5% perceived as low. These results indicate that although the majority of IPC practices and service delivery are perceived positively, a notable proportion of respondents still view their implementation as moderate, highlighting areas where improvement is needed.

The correlation analysis further confirmed a statistically significant relationship between IPC implementation and service quality, with a moderate correlation strength ($r = 0.546$; $p = 0.000$). This suggests that better implementation of IPC is associated with improvements in service quality, although other factors may also play a role. Similar associations have been reported in previous studies, such as Mokodompit et al. (2019), Suleh et al. (2015), and Evasi et al. (2023), who emphasized that inadequate IPC practices undermine both patient safety and perceived service quality.

The qualitative findings revealed that the implementation of the IPC program at RSGM USU was systematically planned through Infection Control Risk Assessment (IKRA), supported by structured IPC teams (IPCD and IPCN), and reinforced by regular socialization and training for both staff and students. These practices are in line with previous studies emphasizing the importance of structured planning and continuous education in strengthening compliance with IPC protocols (Mokodompit et al., 2019; Sulisno et al., 2022). Routine monitoring and evaluation, combined with disciplinary measures when violations occurred, further demonstrated institutional commitment to infection control.

In terms of service quality, respondents highlighted adequate PPE availability and generally positive staff responsiveness, which contributed to patient trust and satisfaction. However, challenges such as limited medical equipment and delays due to dual roles of specialist doctors were reported, echoing findings in other dental teaching hospitals (Evasi et al., 2023). These results suggest that while structural readiness and interpersonal care were strong, consistent resource allocation and time management remain critical factors for optimizing both IPC implementation and overall service quality.

The presence of respondents who rated IPC and service quality as only moderate may reflect disparities in implementation across different hospital units or variations in staff awareness. These findings underscore the need for routine evaluation, structured supervision, and resource allocation to ensure uniform compliance. Unexpected results, such as the persistence of “moderate” ratings despite overall good performance, may indicate gaps between policy and practice that require targeted interventions.

From a managerial perspective, the results highlight that consistent application of IPC standards is not only a regulatory obligation but also a strategic driver for improving hospital

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reputation, patient trust, and operational efficiency. However, this study has certain limitations, including reliance on self-reported data, which may be subject to bias, and its cross-sectional design, which prevents establishing causal relationships. Future studies should employ longitudinal or multi-center designs to assess IPC implementation over time and across different dental hospitals. Incorporating patient perspectives alongside staff evaluations may also provide a more holistic understanding of how IPC practices influence perceived service quality.

CONCLUSION

This study demonstrated that effective implementation of Infection Prevention and Control (IPC) at the Dental and Oral Hospital of Universitas Sumatera Utara (USU) is significantly associated with improved healthcare service quality, as measured by the SERVQUAL dimensions. The majority of respondents rated both IPC and service quality positively, and statistical analysis confirmed a strong association between the two. Qualitative findings reinforced these results by emphasizing the importance of continuous training, adequate resources, and managerial supervision as critical factors for sustaining compliance.

Despite these positive outcomes, the presence of respondents who perceived IPC and service quality as only fair indicates that challenges remain. Variability in training frequency, resource availability, and monitoring may explain these discrepancies. These findings underscore the need for ongoing improvements in IPC implementation to ensure patient safety, enhance staff compliance, and strengthen institutional credibility. Continuous evaluation, resource investment, and managerial commitment will be essential in sustaining high-quality, infection-free healthcare services.

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