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The Relationship Between Overcrowding and Patient Satisfaction in the Emergency Department of Harapan Anda Islamic General Hospital in Tegal

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Abstract

This study demonstrates that Emergency Department (ED) overcrowding is an important condition associated with patients' experiences during emergency care. The study involved 85 respondents, with overcrowding assessed using the National Emergency Department Overcrowding Score (NEDOCS) and patient satisfaction measured using the Brief Emergency Department Patient Satisfaction Scale (BEPSS). The most frequent overcrowding category was crowded, involving 26 respondents (30.6%), while 62 respondents (72.9%) reported satisfaction and 23 respondents (27.1%) reported dissatisfaction. Pearson Chi-Square analysis demonstrated a significant relationship between overcrowding and patient satisfaction (χ^2=35.525; df=4; p=0.000), with a Cramer's V of 0.646 indicating a strong association. Dissatisfaction was most prevalent under very crowded conditions, whereas all respondents in the very busy, busy, and not busy categories reported satisfaction. These findings indicate that higher levels of overcrowding were associated with a greater tendency toward lower patient satisfaction in the ED. The findings also highlight the importance of maintaining responsive healthcare services during periods of increased patient demand. Controlling overcrowding through optimized triage, patient flow, diagnostic services, interunit coordination, bed availability, and effective communication with patients and families is necessary to maintain service quality and improve the emergency care experience. Further attention to operational capacity and patient-centered service delivery may support consistent satisfaction despite fluctuations in ED workload.

Keywords: *BEPSS, Emergency Department, NEDOCS, Overcrowding, Patient Satisfaction.*

INTRODUCTION

Emergency departments (EDs) have become increasingly important within contemporary health systems because they function as critical access points for patients requiring immediate assessment, stabilization, and acute medical intervention, while simultaneously accommodating unpredictable fluctuations in patient volume and clinical severity. Across health systems, the growing demand for emergency care has intensified concerns regarding the capacity of hospitals to maintain timely, safe, patient-centered, and responsive services when demand exceeds available resources. In this context, hospital service management is expected to ensure that emergency care remains effective and aligned with patient needs, particularly because the quality of ED services is reflected not only in clinical outcomes but also in operational indicators such as triage accuracy, response time, waiting time, patient transfer time, and patient satisfaction (Rinduan et al., 2025). The increasing complexity of emergency care means that patient experience has become an important component of quality assessment rather than merely a secondary outcome of clinical service delivery. Evidence from emergency care settings indicates that patients evaluate services through multiple dimensions, including responsiveness, communication, professional competence, accessibility, and the physical environment in which care is provided (Abass et al., 2021). These dimensions are particularly consequential in the ED because patients and their families commonly encounter uncertainty, anxiety, and heightened expectations for rapid and clearly communicated care. The capacity of an ED to balance clinical urgency with operational efficiency therefore represents an important determinant of whether increased service demand can be translated into satisfactory patient experiences.

The challenge becomes more pronounced when increasing patient arrivals interact with constrained staffing, limited treatment spaces, restricted inpatient bed availability, delays in diagnostic

procedures, and difficulties in transferring or discharging patients. In Indonesia, the data presented in the research manuscript indicate that ED visits increased from 8,597,000 in 2020 to 10,124,000 in 2021 and further to 16,712,000 in 2022, illustrating a substantial escalation in demand for emergency services and a greater potential for patient accumulation. International evidence similarly characterizes ED crowding as a multidimensional phenomenon produced by the interaction between patient inflow, internal care processes, and the capacity of hospitals to move patients efficiently through and beyond the emergency unit (Morley et al., 2018). Savioli et al. (2022) conceptualize overcrowding as a condition in which ED functioning becomes impaired because the number of patients requiring consultation, diagnosis, treatment, transfer, or discharge exceeds available physical and human resources. Sartini et al. (2022) further distinguish the determinants of overcrowding into input, throughput, and output components, highlighting that congestion cannot be attributed solely to excessive patient arrivals. This distinction is important because a high volume of patients does not inevitably produce overcrowding when internal processes and downstream capacity are sufficiently responsive. Conversely, even moderate patient volumes may generate substantial congestion when diagnostic processes, staffing, treatment spaces, or inpatient transfers become bottlenecks within the overall patient flow.

Overcrowding has consequences that extend beyond prolonged waiting because it can alter the entire patient-care environment and influence how patients perceive the quality and safety of services they receive. Prolonged waiting, reduced privacy, restricted physical space, delayed clinical assessment, and limited opportunities for communication may create perceptions of neglect even when clinical personnel continue to provide appropriate treatment. A review of factors associated with ED overcrowding identifies increasing patient arrivals, inadequate staffing, limited infrastructure, prolonged treatment processes, and delayed patient disposition as interconnected contributors to congestion (Hidayah et al., 2020). Contemporary evidence also emphasizes that overcrowding requires multifaceted solutions because its causes involve both conditions within the ED and structural problems elsewhere in the hospital system (Alshiakh et al., 2023). At the workforce level, persistent crowding may increase workload and occupational pressure, potentially affecting the consistency of interpersonal interactions that patients use to evaluate their care experience. At the organizational level, congestion may prolong ED length of stay and disrupt patient flow, creating a cycle in which delayed transfers increase occupancy and increased occupancy further restricts the capacity to receive incoming patients (Colella et al., 2022). The problem is therefore not simply a matter of physical crowding but a systems-level condition capable of modifying both service performance and the psychological experience of patients seeking emergency care.

Patient satisfaction provides an important perspective for examining these consequences because it captures how patients interpret the responsiveness, reliability, communication, assurance, empathy, and physical characteristics of the services they receive. Research in emergency settings has shown that satisfaction is influenced by multiple factors, meaning that waiting time or clinical treatment alone cannot fully explain variations in patients' evaluations of care (Idahor et al., 2025). The five dimensions commonly associated with service quality—tangibles, reliability, responsiveness, assurance, and empathy—provide a framework for understanding why patients may respond differently to similar levels of operational pressure (Melani & Setyoningrum, 2024). Evidence concerning nursing care likewise demonstrates that patients' satisfaction is associated with perceived quality of interpersonal and professional care, indicating that communication and staff responsiveness can shape the patient experience even within technically complex healthcare environments (Alharbi et al., 2023). In emergency care, response time has also been identified as an important factor associated with patient satisfaction because delays can directly conflict with patients' expectations for prompt attention during acute illness (Tumurang et al., 2023). These findings suggest that overcrowding may affect satisfaction through several interconnected pathways rather than through patient volume alone. The psychological burden created by uncertainty, waiting, limited communication, and perceived lack of attention may amplify dissatisfaction when crowded conditions prevent staff from maintaining the level of responsiveness that patients expect.

Despite extensive discussion of overcrowding and patient satisfaction as separate quality concerns, the empirical relationship between the two constructs remains insufficiently clarified, particularly within specific Indonesian hospital settings. Existing studies have documented the consequences and determinants of ED overcrowding, but much of the literature emphasizes operational

indicators, capacity management, or proposed system-level solutions rather than directly testing whether measured overcrowding is statistically associated with patients' satisfaction. Studies of patient satisfaction have similarly identified service quality, response time, communication, and treatment-related factors as important determinants, yet these variables do not necessarily capture the broader structural pressure created by ED congestion (Adzania et al., 2021). Research examining overcrowding using instruments such as the National Emergency Department Overcrowding Score (NEDOCS) has strengthened the measurement of crowding as an operational phenomenon, but measurement of crowding alone does not establish how patients subjectively experience that condition (Zola & Ghani, 2025). This creates an important conceptual gap because overcrowding can be objectively observable through occupancy and flow indicators while its consequences may vary according to the responsiveness and communication of healthcare personnel. Indonesian evidence has also reported persistent or stagnant patient satisfaction in emergency departments, suggesting that improvements in individual service encounters may not automatically resolve broader problems affecting the patient experience (Rochana & Djogotuga, 2020). The unresolved issue is therefore whether overcrowding constitutes a meaningful correlate of patient satisfaction in a particular hospital context or whether satisfaction is primarily shaped by other service-quality mechanisms that can buffer the negative effects of congestion.

Addressing this question has both scientific and practical significance because ED overcrowding represents a systems problem whose consequences may become visible through patients' perceptions of service quality, while patient satisfaction provides information about aspects of care that cannot be captured solely through administrative performance indicators. Understanding this relationship can help distinguish whether dissatisfaction should be interpreted primarily as an interpersonal service problem or as a manifestation of structural constraints affecting the delivery of emergency care. The use of NEDOCS as an approach to assessing ED crowding offers a more systematic basis for relating operational conditions to patient-centered outcomes than relying exclusively on subjective descriptions of a busy emergency department (Fatahilah & Muhardi, 2023). At the same time, evidence that satisfaction is related to broader healthcare service quality indicates that patient perceptions should be examined alongside operational conditions rather than treated as an independent or purely subjective phenomenon (Velanda et al., 2023). The present study is positioned within this intersection by examining overcrowding and patient satisfaction simultaneously in the Emergency Department of Harapan Anda Islamic General Hospital in Tegal. Its focus on a specific hospital context provides empirical evidence concerning whether variation in ED crowding corresponds to variation in patients' evaluations of the services they receive. The study aims to determine the relationship between overcrowding and patient satisfaction in the emergency department and contributes theoretically by connecting an operational systems construct with a patient-centered quality outcome, while contributing methodologically by providing empirical evidence for testing this relationship within an Indonesian emergency-care setting.

RESEARCH METHODS

This study employed an empirical quantitative approach using a non-experimental correlational design with a cross-sectional approach, conducted in the Emergency Department (ED) of Harapan Anda Islamic General Hospital in Tegal in April 2026. The study population comprised newly admitted patients receiving services through the ED, with 85 respondents included based on the planned total sampling approach. Cross-sectional designs are appropriate for examining relationships between variables measured within a defined period of observation (Notoatmodjo, 2018). Eligible participants were patients who received ED services, had a good general condition and compos mentis consciousness, and were willing to participate in the study. Patients with visual or hearing impairments, those who were uncooperative, refused participation or withdrew during the study, and those younger than 17 years were excluded. Data collection was conducted after research permission and ethical clearance had been obtained, with participants receiving an explanation of the study objectives and benefits before providing informed consent.

Overcrowding was assessed using the National Emergency Department Overcrowding Score (NEDOCS), an established approach for measuring and classifying the level of emergency department crowding (Zola & Ghani, 2025). NEDOCS scores were categorized as not busy (0–<20), busy (20–<60), very busy but not overcrowded (60–<100), overcrowded (100–<140), severely overcrowded

(140–<180), and extremely overcrowded (>180), allowing the operational condition of the ED to be analyzed categorically (Fatahilah & Muhardi, 2023). Patient satisfaction was assessed using the Brief Emergency Department Patient Satisfaction Scale (BEPSS), consisting of 20 items rated on a four-point Likert scale and covering emergency department staff, emergency department environment, physician care satisfaction, general patient satisfaction, and patient's family satisfaction (Atari & Atari, 2015). The Indonesian version of the instrument had undergone translation, back-to-back translation, and face validity procedures, and no additional validity or reliability testing was conducted because the instrument had previously demonstrated adequate reliability. Data were analyzed using univariate analysis to describe respondent characteristics, overcrowding levels, and patient satisfaction, while the relationship between overcrowding and patient satisfaction was examined using the Pearson Chi-Square test at a 5% significance level, with Cramer's V used to determine the strength of association (Akbar et al., 2024). Data processing, including editing, coding, processing, cleaning, and tabulation, was performed using IBM SPSS Statistics 26, and the study received ethical approval under Ethical Clearance No. 541/A.1-KEPK/FIK-SA/VI/2026, with informed consent obtained from all participants before data collection.

RESULTS AND DISCUSSION

Respondent Characteristics

The characteristics of respondents provide an initial overview of the demographic composition of patients included in the study. These characteristics are important because age, gender, and educational background may shape patients' perceptions, expectations, communication patterns, and evaluations of healthcare services. Differences in demographic profiles can influence how patients interpret information provided by healthcare professionals and how they assess the quality of care received during emergency treatment (Miftahuddin et al., 2024). The distribution of respondents according to age, gender, and educational background is presented in Table 1. The table also provides the basis for interpreting the representativeness of the respondents within the context of patient satisfaction in the Emergency Department (ED).

Table 1. Distribution of Respondent Characteristics (n=85)

Characteristic	Category	Frequency (f)	Percentage (%)
Age	17–25 years	16	18.8
	26–35 years	27	31.8
	36–45 years	19	22.4
	46–55 years	16	18.8
	>55 years	7	8.2
Gender	Male	38	44.7
	Female	47	55.3
Education	Elementary school	12	14.1
	Junior high school	20	23.5
	Senior high school	38	44.7
	Higher education	15	17.6
Total		**85**	**100%**

Source: Primary data processed using IBM SPSS Statistics 26 (2026)

As shown in Table 1, the largest age group was respondents aged 26–35 years, comprising 27 respondents (31.8%). This was followed by the 36–45-year age group with 19 respondents (22.4%), while the 17–25-year and 46–55-year groups each accounted for 16 respondents (18.8%). Respondents aged over 55 years represented the smallest age category, with 7 respondents (8.2%). The predominance of adults aged 26–35 years indicates that ED utilization in this study was concentrated among patients within a relatively active adult age range. Age differences may be associated with variations in healthcare expectations and perceptions of service quality, particularly because patients at different life stages may evaluate communication, responsiveness, and treatment processes differently (Muthiah et al., 2022). The relatively smaller proportion of older respondents may also reflect differences in patterns

of healthcare utilization or the distribution of acute conditions requiring ED services during the study period.

The gender distribution showed that female respondents were more numerous than male respondents, with 47 women (55.3%) compared with 38 men (44.7%). The difference was not substantial, indicating that the respondent composition remained relatively balanced by gender. A slightly higher representation of women may be related to differences in healthcare-seeking behavior and willingness to report experiences with health services. Previous research has identified patient characteristics as relevant contextual factors when interpreting satisfaction with healthcare services because perceptions of service delivery can vary across demographic groups (Abass et al., 2021). In an ED setting, however, gender should not be interpreted independently from clinical circumstances, waiting experiences, communication with healthcare personnel, and the urgency of treatment received. The relatively balanced distribution in the present study provides a useful basis for examining overcrowding and satisfaction without a markedly disproportionate representation of one gender.

Educational background was dominated by respondents who had completed senior high school, totaling 38 respondents (44.7%). Respondents with junior high school education accounted for 20 respondents (23.5%), followed by those with higher education at 15 respondents (17.6%) and elementary school at 12 respondents (14.1%). This distribution indicates that most respondents had at least a basic level of formal education that may support their ability to receive and process information related to emergency care. Educational attainment can influence health literacy, communication, and patients' ability to understand explanations concerning their condition and treatment, which may subsequently shape their evaluation of healthcare experiences (Miftahuddin et al., 2024). The concentration of respondents in the senior high school category is also relevant because patients with different educational backgrounds may have different expectations regarding information clarity, staff responsiveness, and involvement in healthcare decisions. Such differences should be considered when interpreting satisfaction because satisfaction is not determined solely by the physical conditions of the ED but also by how patients perceive interactions and information received during care.

The predominance of respondents aged 26–35 years, together with the relatively balanced gender distribution, illustrates a respondent profile characterized mainly by young and middle-aged adults. This age composition is relevant to the ED context because adults in productive age groups may have particular expectations regarding service speed and efficiency, especially when emergency care involves disruption to work or daily responsibilities. Patient expectations are closely related to perceptions of service performance, including the timeliness and responsiveness of healthcare personnel (Fadhilla & Marbun, 2023). The educational profile, which was dominated by senior high school graduates, further suggests that many respondents had sufficient formal education to articulate their experiences of ED services. These demographic characteristics provide important contextual information before examining the distribution of overcrowding and patient satisfaction in the subsequent analysis. The findings also indicate that the interpretation of satisfaction should account for the demographic composition of the sample rather than treating patient perceptions as independent of their individual characteristics.

Overall, the respondent characteristics demonstrate variation across age, gender, and educational attainment. The largest proportion was represented by patients aged 26–35 years and those with senior high school education, while female respondents constituted a slightly larger proportion than male respondents. This profile provides a demographic context for understanding how patients evaluated the services they received in the ED. Demographic variation is important because patient satisfaction may reflect not only the clinical service itself but also individual expectations, communication experiences, and perceptions of healthcare delivery (Alharbi et al., 2023). The characteristics identified in this study also establish the descriptive foundation for assessing whether the observed level of overcrowding was accompanied by differences in patient satisfaction. The next analysis focuses on the distribution and classification of overcrowding experienced in the ED during the study period.

Emergency Department Overcrowding

Emergency department overcrowding represents a condition in which the demand for emergency services exceeds the available capacity of personnel, treatment spaces, beds, and supporting resources. This condition can emerge from the interaction between high patient arrivals, prolonged

treatment processes, limited bed availability, and delays in transferring patients to inpatient units. NEDOCS provides a structured approach for quantifying ED crowding by incorporating several operational indicators into a standardized score (Zola & Ghani, 2025). The use of NEDOCS in the present study enables overcrowding to be assessed objectively rather than relying solely on subjective perceptions of staff or patients. The classification is particularly relevant because increasing crowding may alter the timeliness, responsiveness, and overall organization of emergency services. Previous research has also demonstrated that crowding is an important operational issue that can influence the quality and efficiency of emergency care delivery (Fatahilah & Muhardi, 2023).

Based on the NEDOCS assessment, the respondents were distributed across five observed overcrowding categories, ranging from not busy to very crowded. The highest proportion was found in the crowded category, whereas the lowest proportion was found among respondents in the not busy category. The distribution indicates that the ED experienced varying levels of operational pressure during the observation period rather than remaining within a single crowding condition. Such variation is important because ED crowding is a dynamic phenomenon that may fluctuate according to patient arrival patterns, treatment duration, bed availability, and service capacity. The distribution of overcrowding levels among the 85 respondents is presented in Table 2.

Table 2. Distribution of Emergency Department Overcrowding Levels (n=85)

Overcrowding Level	Frequency (f)	Percentage (%)
Very crowded	18	21.2
Crowded	26	30.6
Very busy	21	24.7
Busy	14	16.5
Not busy	6	7.1
Total	**85**	**100%**

Source: Primary data processed using IBM SPSS Statistics 26 (2026)

As shown in Table 2, the crowded category constituted the largest proportion, involving 26 respondents (30.6%). The very busy category followed with 21 respondents (24.7%), while 18 respondents (21.2%) were classified as experiencing a very crowded condition. Meanwhile, 14 respondents (16.5%) were categorized as busy and only 6 respondents (7.1%) were included in the not busy category. The predominance of crowded and very busy conditions indicates that the ED frequently operated under substantial service pressure during the study period. A high level of crowding can reflect an imbalance between patient demand and the capacity of emergency facilities to accommodate patients efficiently. Previous studies have associated ED overcrowding with delays in patient management, increased workload, and difficulties in maintaining optimal service processes (Sartini et al., 2023). The relatively small proportion of respondents in the not busy category further suggests that low-demand conditions were less frequently encountered than moderate or high-demand conditions.

The findings demonstrate that overcrowding was not limited to the most severe category but was distributed across several levels of operational intensity. The combined proportion of respondents classified as crowded and very crowded reached 51.8%, indicating that more than half of the respondents encountered ED conditions characterized by considerable service pressure. This pattern is consistent with the concept that overcrowding is influenced by multiple interconnected factors rather than patient volume alone. Prolonged length of stay, limited treatment spaces, delayed inpatient admission, and inadequate resource availability may collectively contribute to persistent crowding within emergency services (Fatahilah & Muhardi, 2023). When these conditions occur simultaneously, healthcare personnel may face greater difficulty maintaining rapid patient flow and providing individualized attention. The resulting operational pressure may become particularly visible to patients through longer waiting periods, reduced interaction time, or delays in receiving information. Such experiences are relevant to the assessment of patient satisfaction because the perceived quality of emergency services can be shaped by the way patients experience the service process.

The presence of 18 respondents (21.2%) in the very crowded category deserves particular attention because this represents a substantial proportion of the study population. A very crowded ED condition may indicate that service demand has approached or exceeded the functional capacity of

available resources. Under these circumstances, healthcare personnel may need to prioritize patients according to clinical urgency while simultaneously managing limited physical and human resources. Emergency care systems are especially vulnerable to crowding because treatment cannot simply be postponed when patients present with urgent or potentially life-threatening conditions. Operational congestion may consequently affect patient flow, communication, waiting time, and the perceived responsiveness of healthcare workers. Research on emergency department performance has emphasized the importance of managing patient flow and resource utilization to reduce the negative consequences associated with crowding (Sartini et al., 2023). The observed distribution in this study therefore provides an important operational context for interpreting subsequent differences in patient satisfaction.

The relatively low proportion of respondents in the not busy category also suggests that the ED had limited periods of low operational pressure during the study period. Only 6 respondents (7.1%) were categorized as not busy, compared with 79 respondents (92.9%) who were distributed across busy, very busy, crowded, and very crowded conditions. This pattern indicates that patients generally received services in an environment characterized by some degree of activity and operational demand. Patient perceptions of emergency care can be influenced by such environmental conditions because crowding may affect waiting experiences, interactions with staff, and perceptions of service responsiveness (Abass et al., 2021). However, the presence of a busy environment does not necessarily mean that patients will be dissatisfied, particularly when communication and clinical care remain responsive to patient needs. The subsequent analysis of patient satisfaction is consequently necessary to determine whether the observed crowding conditions were accompanied by unfavorable evaluations of ED services.

Overall, the NEDOCS-based assessment shows that the ED experienced predominantly moderate to high levels of overcrowding, with the crowded category representing the largest proportion of respondents. The distribution across five categories demonstrates that ED operational conditions varied considerably among the respondents. More than half of the respondents were exposed to crowded or very crowded conditions, while only a small proportion encountered a not busy environment. This pattern indicates that overcrowding constituted a relevant operational characteristic of the ED during the April 2026 study period. The findings provide an important basis for examining patient satisfaction because crowding can alter the service environment in which patients interact with healthcare personnel and receive emergency treatment. The next section examines the distribution of patient satisfaction and considers how respondents evaluated the services provided by the ED.

Patient Satisfaction

Patient satisfaction is an important indicator for evaluating the quality of healthcare services because it reflects how patients perceive the care, communication, responsiveness, and service environment they experience. In the Emergency Department (ED), satisfaction is particularly relevant because patients commonly encounter urgent conditions, limited waiting tolerance, and rapid interactions with healthcare personnel. Satisfaction is influenced not only by the clinical outcome but also by patients' experiences throughout the service process, including communication with staff, physician care, and the physical environment (Alharbi et al., 2023). The BEPSS used in this study captures these dimensions through assessments of emergency department staff, emergency department environment, physician care, general patient satisfaction, and family satisfaction. This multidimensional approach allows patient satisfaction to be viewed as a comprehensive evaluation of the emergency service experience rather than as an assessment of one particular aspect of care. Previous research has also emphasized that patient perceptions are important in assessing the performance and acceptability of emergency healthcare services (Abass et al., 2021).

The distribution of patient satisfaction among the 85 respondents demonstrates that the majority evaluated the services they received favorably. A total of 62 respondents (72.9%) were categorized as satisfied, whereas 23 respondents (27.1%) were categorized as not satisfied. This distribution indicates that favorable evaluations were more common than unfavorable evaluations among patients receiving emergency services. Patient satisfaction may be supported by effective communication, appropriate staff responsiveness, and the ability of healthcare providers to address patients' needs during the treatment process. Communication quality is particularly relevant because patients may evaluate healthcare services more positively when explanations are clear and interactions with healthcare

personnel are responsive (Miftahuddin et al., 2024). The distribution of patient satisfaction is presented in Table 3.

Table 3. Distribution of Patient Satisfaction (n=85)

Patient Satisfaction	Frequency (f)	Percentage (%)
Satisfied	62	72.9
Not satisfied	23	27.1
Total	**85**	**100%**

Source: Primary data processed using IBM SPSS Statistics 26 (2026)

As shown in Table 3, satisfied respondents accounted for nearly three-quarters of the study population, while slightly more than one-quarter reported dissatisfaction. The proportion of satisfied respondents was therefore considerably higher than that of respondents who were not satisfied. This pattern suggests that the presence of crowding within the ED did not automatically result in an unfavorable evaluation of healthcare services among every respondent. Patients may continue to perceive care positively when healthcare personnel remain responsive and provide appropriate clinical attention despite demanding service conditions. The quality of interaction between patients and healthcare providers can play an important role in shaping satisfaction, particularly when patients require clear information and reassurance during emergency treatment (Fadhilla & Marbun, 2023). The relatively high satisfaction proportion may also indicate that aspects of service delivery beyond physical crowding contributed positively to patients' overall evaluations.

Patient satisfaction in an ED should be interpreted within the context of the specific expectations associated with emergency healthcare. Patients generally expect prompt attention, competent treatment, clear communication, and appropriate responses to their immediate needs. When these expectations are adequately addressed, patients may maintain positive evaluations even when the surrounding service environment is busy. Research on patient satisfaction in emergency settings indicates that interactions with healthcare personnel and perceptions of care quality are important components of the overall patient experience (Abass et al., 2021). The presence of 62 satisfied respondents in the current study indicates that a substantial proportion of patients perceived the services as meeting their expectations. This finding is important because satisfaction reflects the interaction between service performance and patient expectations rather than being determined by operational conditions alone. Consequently, the relatively high satisfaction level should not be interpreted as evidence that the ED was free from service pressures identified through the NEDOCS assessment.

The 23 respondents categorized as not satisfied represent an important proportion that warrants consideration despite being smaller than the satisfied group. Dissatisfaction may arise when patients perceive delays, inadequate communication, limited attention, or an unfavorable service environment during their ED experience. Crowded conditions may intensify these perceptions because patients may associate congestion with longer waiting times or reduced accessibility to healthcare personnel. Patient satisfaction research has shown that service responsiveness and communication can influence how patients evaluate healthcare encounters (Miftahuddin et al., 2024). In a crowded ED, healthcare personnel may face competing demands that make consistent communication and individualized attention more difficult to maintain. The presence of dissatisfaction among more than one-quarter of respondents consequently suggests that positive evaluations were not experienced uniformly across the study population. These findings reinforce the need to examine patient satisfaction together with the level of ED overcrowding rather than interpreting satisfaction as an isolated outcome.

The relatively high satisfaction level can also be understood from the perspective of emergency service delivery, where clinical needs may take priority over comfort and convenience. Patients may tolerate certain limitations in the service environment when they perceive that healthcare personnel provide competent treatment and respond appropriately to their medical needs. Satisfaction may also be supported by effective teamwork, physician involvement, and staff communication throughout the treatment process. Studies examining healthcare service quality have identified responsiveness, communication, and interactions with healthcare providers as relevant components of patients' evaluations (Alharbi et al., 2023). At the same time, a satisfactory overall assessment does not eliminate the possibility that specific aspects of care remain problematic for some patients. The 27.1%

dissatisfaction proportion indicates that improvements in service processes may still be necessary, particularly under conditions of increased operational demand. Identifying the relationship between satisfaction and overcrowding is therefore important for determining whether the unfavorable evaluations observed in this study are systematically associated with more crowded ED conditions.

Overall, the findings indicate that patient satisfaction in the ED was predominantly favorable, with 72.9% of respondents categorized as satisfied and 27.1% categorized as not satisfied. The predominance of satisfaction suggests that many respondents perceived the emergency services as capable of meeting their expectations despite the varying levels of operational crowding. Nevertheless, the proportion of dissatisfied respondents remains meaningful because it represents patients whose service experiences did not correspond adequately with their expectations. Satisfaction should be viewed as a multidimensional perception involving healthcare personnel, physicians, the service environment, and the broader treatment experience (Abass et al., 2021). The coexistence of high satisfaction and substantial overcrowding in the same study population also suggests that the relationship between operational conditions and patient perceptions requires further statistical examination. The next section analyzes the association between ED overcrowding and patient satisfaction using the Pearson Chi-Square test and Cramer's V.

Relationship Between Overcrowding and Patient Satisfaction

The relationship between emergency department overcrowding and patient satisfaction was examined to determine whether differences in ED crowding levels were accompanied by differences in patients' evaluations of the services received. The analysis was based on 85 respondents who were categorized according to their NEDOCS-based overcrowding level and their level of satisfaction. Emergency department overcrowding can affect the patient experience through changes in waiting conditions, service flow, staff workload, and opportunities for communication with patients and families. Previous research has identified overcrowding as an important factor associated with delays and challenges in maintaining effective emergency service delivery (Sartini et al., 2023). Patient satisfaction, meanwhile, reflects patients' overall evaluation of healthcare interactions, service responsiveness, and the environment in which care is provided (Abass et al., 2021). Examining the two variables simultaneously is important because a favorable overall satisfaction level may conceal substantial differences in satisfaction across varying degrees of operational crowding.

The cross-tabulation shows a clear pattern in the distribution of satisfaction across overcrowding categories. Among respondents classified as very crowded, only 5 of 18 respondents were satisfied, while 13 respondents were not satisfied. In the crowded category, 16 of 26 respondents were satisfied and 10 were not satisfied. In contrast, every respondent categorized as very busy, busy, or not busy reported satisfaction, with 21, 14, and 6 satisfied respondents, respectively. This distribution indicates that dissatisfaction was concentrated in the two highest observed overcrowding categories. The detailed relationship between overcrowding and patient satisfaction is presented in Table 4.

Table 4. Relationship Between Emergency Department Overcrowding and Patient Satisfaction

Emergency Department Overcrowding	Satisfied	Not Satisfied	Total
Very crowded	5	13	18
Crowded	16	10	26
Very busy	21	0	21
Busy	14	0	14
Not busy	6	0	6
Total	**62**	**23**	**85**

Source: Primary data processed using IBM SPSS Statistics 26 (2026)

The distribution in Table 4 demonstrates that dissatisfaction increased as the observed overcrowding condition became more severe. In the very crowded category, dissatisfaction represented 13 of 18 respondents, whereas satisfaction accounted for only 5 respondents. The crowded category also showed a notable proportion of dissatisfaction, with 10 of 26 respondents reporting that they were not satisfied. No dissatisfaction was recorded among respondents classified as very busy, busy, or not

busy. This pattern suggests that the threshold between moderate operational activity and more severe crowding may be particularly relevant to patients' perceptions of emergency services. Previous research has linked overcrowding with compromised patient flow and increased pressure on emergency healthcare personnel, conditions that may influence patients' experiences of care (Fatahilah & Muhardi, 2023). The concentration of dissatisfaction in the most crowded categories provides descriptive support for a negative association between overcrowding and patient satisfaction.

Statistical analysis confirmed that the observed distribution was significantly associated with emergency department overcrowding. The Pearson Chi-Square test produced a value of $\chi^2 = 35.525$ with 4 degrees of freedom and a significance value of $p = 0.000$, indicating a statistically significant relationship between the two variables at the 5% significance level. The result means that the distribution of satisfied and dissatisfied respondents differed significantly across the overcrowding categories. The strength of the relationship was assessed using Cramer's V, which produced a value of 0.646. This value indicates a strong association between emergency department overcrowding and patient satisfaction based on the interpretation applied in this study. The finding is consistent with evidence that operational crowding can interfere with service processes and negatively influence patients' perceptions of emergency care quality (Sartini et al., 2023). The statistical evidence consequently supports the descriptive pattern showing that dissatisfaction was concentrated among respondents exposed to more severe crowding.

The negative direction of the observed relationship indicates that higher levels of overcrowding were accompanied by lower patient satisfaction. This pattern is particularly visible in the very crowded group, where the number of dissatisfied respondents exceeded the number of satisfied respondents by a substantial margin. A similar tendency was present in the crowded category, although the majority of respondents in this group remained satisfied. The finding suggests that overcrowding may become more consequential for patient perceptions when the operational burden reaches a level that substantially affects the service environment. Under severe crowding, healthcare personnel may have to manage multiple competing demands, potentially reducing the time available for communication, reassurance, and individualized attention. Communication and responsiveness are important components of patient evaluations of healthcare services, particularly when patients require information about their condition and treatment process (Miftahuddin et al., 2024). The present finding therefore provides a plausible explanation for why satisfaction was substantially lower among respondents exposed to the highest crowding conditions.

The strong association identified in this study also highlights the importance of viewing overcrowding as a service-quality issue rather than solely as an operational problem. Managing patient flow, treatment capacity, staffing, and bed availability may have implications for how patients perceive the quality of emergency care. Previous studies have emphasized the consequences of emergency department crowding for service efficiency and the ability of healthcare systems to respond to patient demand (Fatahilah & Muhardi, 2023). At the same time, the presence of satisfied patients within crowded categories demonstrates that overcrowding does not uniformly produce dissatisfaction. Some patients may maintain positive evaluations when healthcare personnel provide effective treatment, communicate adequately, and respond to clinical needs despite challenging operational conditions. This finding indicates that improvements in staff responsiveness and communication may help preserve patient satisfaction even when the ED experiences substantial demand. Patient-centered service practices therefore remain relevant alongside structural strategies for reducing overcrowding.

The findings should be interpreted with consideration of the cross-sectional design of the study. The significant association and strong Cramer's V demonstrate that overcrowding and patient satisfaction were related within the observed study population, but they do not establish that overcrowding directly caused dissatisfaction. Other factors, such as waiting time, disease severity, treatment urgency, communication quality, staff responsiveness, and individual expectations, may also contribute to patient satisfaction. The analysis nevertheless identifies overcrowding as an important factor that is statistically associated with how patients evaluate ED services. From a practical perspective, the concentration of dissatisfaction among respondents in the very crowded and crowded categories indicates that managing periods of high operational pressure should receive particular attention. Improvements in patient flow and service responsiveness may help reduce the unfavorable experiences associated with severe crowding (Sartini et al., 2023). The results provide empirical support

for strengthening ED crowding management while maintaining communication and patient-centered care as integral components of service quality.

CONCLUSION

This study shows that the 85 respondents were predominantly adults, particularly those aged 26–35 years, female, and with a senior high school educational background. The most frequently observed level of Emergency Department overcrowding was the crowded category, involving 26 respondents (30.6%). Most respondents reported satisfaction with the emergency services, with 62 respondents (72.9%) categorized as satisfied and 23 respondents (27.1%) categorized as not satisfied. Statistical analysis demonstrated a significant relationship between the level of overcrowding and patient satisfaction. The Pearson Chi-Square test yielded χ^2=35.525 with df=4 and p=0.000, while Cramer's V of 0.646 indicated a strong association. The distribution showed that dissatisfaction was most prominent under very crowded conditions, whereas all respondents in the very busy, busy, and not busy categories reported satisfaction. These findings indicate that higher levels of overcrowding were associated with a greater tendency toward lower patient satisfaction, although the observed association cannot be interpreted as causal because of the cross-sectional study design.

Controlling overcrowding should be an integral component of strategies to improve the quality of emergency department services, particularly when increasing patient volumes place pressure on service capacity. This can be achieved by optimizing the triage system so that patient prioritization corresponds appropriately to clinical urgency. Patient flow management should also be strengthened to minimize accumulation in examination areas, diagnostic services, and patient transfer processes. Coordination between hospital units and effective management of bed availability are important for facilitating timely patient transfers and maintaining emergency department capacity. Clear and responsive communication with patients and their families should also be maintained because communication experiences can influence perceptions of service quality when emergency departments are crowded. Integrating capacity management, efficient service flow, interunit coordination, and patient communication may help maintain service quality during periods of high operational pressure.

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