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Overcrowding In Emergency Departments At Buraydah Central Hospital, KSA- A Cross Sectional Study

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ABSTRACT:

Introduction: Overcrowding in emergency departments is a growing concern worldwide. It occurs when the number of patients seeking medical attention exceeds the capacity of the department to provide timely and appropriate care. This can lead to long wait times, delayed treatment, and increased risk of adverse outcomes for patients. Overcrowding is often caused by a combination of factors, including an aging population, inadequate staffing levels, and limited hospital bed availability. To address this issue, healthcare providers are exploring innovative solutions such as telemedicine and community-based care to reduce the burden on emergency departments and improve patient outcomes.

Aim: The main aim of this study was to reduce overcrowding in emergency departments by identifying the factors that cause it.

Method: The researcher used a cross-sectional design to investigate the cause of overcrowding in emergency department at Buraydah Central Hospital. The sample of the study included the staff of ED in Buraydah Central Hospital. 100 participants took part in this research study. The researcher used questionnaires to gather the necessary data. Data were analyzed using SPSS Software.

Results: The results indicated that human resources played a significant role in overcrowding, as believed by the majority of participants (62.1%). Similarly, a significant proportion of participants (58.83%) identified population density as a contributing factor, while 59.85% believed that the lack of beds in the hospital was a cause for overcrowding. In addition, the study found that health awareness was acknowledged by 63.75% of participants as a significant factor. Another finding was that emergency department design had an impact on overcrowding, as agreed upon by 61.63% of participants. Finally, the study found a very significant relation between causes of overcrowding (human resources and population density) and demographic

information (age, nationality, gender, marital status, specialty, and work experience length) with a p-value of $0.000 < 0.05$ and 0.01. In conclusion, the factors contributing to overcrowding in the emergency department at Buraydah Central Hospital can be categorized as human resources, health awareness, emergency department design, population density, and lack of beds with means of 3.4465, 3.4438, 3.4175,3.3142, and 3.3417 respectively.

Conclusion: the findings of this study can be used to guide future interventions to reduce overcrowding in the emergency department and improve patient outcomes. Suggestions include increasing staffing levels, improving hospital bed availability, increasing health awareness among the community, and improving the design of the emergency department.

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INTRODUCTION BACKGROUND

In the present era, a lot of radical and rapid transformations have prompted and are still pushing many health institutions to provide high-quality services. Therefore, quality has become a basic requirement in facing future challenges and changes. Therefore, it must be dealt with efficiently and effectively. Quality, according to the administrative perspective, means change for the better. Local field experiences that the quality of health services leads to a radical change to improve the performance of services provided to beneficiaries and achieve their satisfaction.Emergency department is considered one of the most important and critical departments in the healthcare facilities. Sometimes, these departments are overcrowded. Overcrowding in emergency departments (EDs) is a major public health concern around the world. Overcrowding in the emergency department is characterized as a condition in which demand for emergency services exceeds a department's ability to deliver quality care within reasonable time constraints. Multiple variables contribute to ED congestion, including an increase in the number of arriving ED patients (input factor), a paucity of ED resources (throughput factor), and the number of admitted patients waiting to be transferred from the ED to a hospital ward (output factor). Overcrowding in the emergency department reduces the quality of medical care by delaying medication and raising the mortality rate of hospitalized patients. It also results in a variety of indirect issues, such as longer wait times, lower patient satisfaction, and a loss of profit for medical institutions. Medical decisions, like as triage and admission, should ideally be made based on the patient's need for care and the level of therapy required. And the degree of ED congestion should have no bearing on these decisions. Overcrowding in the ED, however, has been proven in prior research to affect medical decisions relating to admission or triage level. While earlier research has looked into the link between ED overcrowding and the likelihood of admission, no studies have looked into the characteristics of admitted patients in a congested ED.

1.2 RESEARCH QUESTION

The main research questions of this study are given below.

1- What are the reasons for overcrowding in emergency departments?

2- What could be done to reduce the overcrowding in emergency department?

1.3 Aim of the Study

The main aim of this study is to reduce overcrowding in emergency departments. 1.4Objectives of the study

Primary Objective: To investigate the causes of overcrowding in the emergency department

Secondary Objectives: To measure the impacts of the overcrowding and to find a solution to the overcrowding.

2.CONCEPTUAL FRAMEWORK

The conceptual framework for overcrowding in emergency departments can be divided into two main categories: causes and effects. The causes of overcrowding in emergency departments include human resources, patient density, lack of beds, health awareness, and emergency department design. The effects of overcrowding on patients can be categorized into physical, psychological, and financial impacts.

CAUSES:

1. Human Resources: The shortage of healthcare professionals such as doctors, nurses, and support staff can lead to overcrowding in emergency departments. This can result in longer wait times for patients and delays in treatment.

2. Patient Density: An increase in the number of patients visiting the emergency department can lead to overcrowding. This may occur due to seasonal illnesses or outbreaks of infectious diseases.

3. Lack of Beds: A shortage of hospital beds can lead to patients being held in the emergency department for longer periods than necessary.

4. Health Awareness: Patients who are not aware of alternative healthcare options may choose to visit the emergency department for non-emergency medical issues.

5. Emergency Department Design: Poorly designed emergency departments with inadequate space and equipment can

contribute to overcrowding.

EFFECTS:

1. Physical Impacts: Overcrowding in emergency departments can result in delays in treatment which may worsen a patient's condition or lead to complications.

2. Psychological Impacts: Long wait times and crowded conditions can cause anxiety and stress for patients and their families.

3. Financial Impacts: Overcrowding may result in increased healthcare costs due to longer hospital stays or unnecessary tests and procedures.

In conclusion, addressing the causes of overcrowding such as improving human resources, increasing hospital beds, promoting health awareness, and designing efficient emergency departments is crucial to mitigate its negative effects on patients' physical health, psychological well-being, and financial stability.

3. LITERATURE REVIEW

Emergency department (ED) offers the medical care for patients with a range of diseases.ED is supposed to deliver well-timed and efficient treatment. However, several considerations in operations impact the ED's capability to provide the proper care (1). The rising patient`s needs and restricted medical resources are frequent encounters in cu ED functions within all hospitals

(2). Overcrowding of EDs can be defined as "the condition where ED work is delayed mostly due to the excessive amount of patients awaiting to be seen, undertaking evaluation and care, or awaiting for departure comparison to the physical or employee capacity of the ED.Patients' safety and confidentiality(3) (4) duration of the services, and frustration between the ED staff (5) should be considered in the researches of overcrowding in EDs.

Overcrowding in EDs is a concerning global problem and has been identified as a national crisis in some countries (6). In the United States within the years 1993-2003, ED visits enlarged by

23.6 million, and at the same period 425 EDs closed and overall hospital beds dropped by 198,000.Throughout the years, the causes for the overcrowding have consisted of: the poor and uninsured who don't have the primary care; pointless visits, and seasonal illness (7). Discrepancies between the capacity of the ED and the necessary for patient triage, Radiographic images, laboratory tests, and consultations impact the flow of the patients in ED (8). Also, some findings from studies have found the impact of high occupancy (more than 90%) and access block as reasons of unfavorable patient results, treatment delays and increased mortality rates (20%–30%), prolonged staying of patients (9). The high occupancy of the ED can also be described by the majority (50%–75%) of patients get admitted to the clinics through ED (10). To lessen the issue of overcrowding, many different ideas were proposed by investigators such as input throughput output conceptual model of ED crowding, (11) adding to the resources, managing demand, (12) lean thinking (Holden, 2011) fast evaluation areas, chest pain observation units, (13) and medical decision units (14). Plans to accomplish throughput ED flow

of the patiens should emphasis on the following matters: Patient awareness levels, extended ED evaluations, insufficient inpatient bed capability, scarcity of medical staff, difficulties with approach on call specialists (15) .

Some strategies were tested in several literatures such as, Fast track .Numerous hospitals established their individual urgency to offer fast track care, for example simple allergic reactions, shallow injuries, fractures small joints and bones, simple animal bites, and slight burns (16). Another strategy is team triage in which Medical doctors and nurses make a triage which is considered to be further cost effective. The job is to run with triage team to rush the attention of patients built on their health requirements, particularly for those with irregular waiting times

(17) (18). There is a demand to think about the different aspects of overcapacity to defeat the developing disputes. Overcrowding is related with mortality raising, misplacing patients, delaying in the beginning of serious cares,extended physician awaiting, entrée block, diminished patient care, reduced inpatient bed capacity owed to elevated occupancy, and incompetent flow in the ED for needless call for inpatient beds for optional operation (19) (20).

Numerous interferences have been planned to lessen ED overfilling in entirely the three stages of input throughput, and output: An example on input is ambulance alteration, secondly through put, for example fast assessment areas and medical decision units.

Lastly is output, for example protocols for full capacity, bed supervisors . The previous two interferences will increase output for hospitalized patients, although these are not totally under the command of ED managers and demand method broad interferences (21). Though, it is significant to identify that delay in the flow of the patients during throughput stage has an important effect on overcrowding. Answers in the ED can include performance patient register at the bedside other than in the front of the ED has displayed to reduction of waiting time for patients but it was not the same case everywhere (22).The causes for it was not clear, could be linked to the lack to implement in the same ways. Solutions external to the ED Successful results are determined by its capability to improve capacity. One of them is easing of elective cases, primary discharge of hospitalized patients, and improved weekend discharges. There is a need for a strategy which increasing the safety of patients in times of over-capacity (23)

4. METHODS

4.1 Study Design

The researcher used quantitative cross-sectional approach. The quantitative component of the study could involve collecting data on the number of patients admitted to emergency departments, the length of stay, and the number of available beds. This data could be analyzed using statistical methods to identify patterns and trends in overcrowding.

4.2 STUDY AREA AND SETTING

The study was conducted at Buraydah Central Hospital, Qassim, KSA

4.3 Study Population

The study population for the research consisted of healthcare workers who work in emergency departments. This included physicians, nurses, and other healthcare professionals who are involved in the care of patients in emergency departments. The study aims to investigate the causes of overcrowding from healthcare workers' prospective

4.4 SAMPLE SIZE AND METHODS

The sample number and sampling method for this study are crucial to ensure the validity and reliability of the results. The researcher needs to select an appropriate sample size that is representative of the entire population of healthcare workers in emergency departments. They also need to use a suitable sampling method that eliminates bias and ensures that every member of the population has an equal chance of being selected. The researchers used a purposive sampling method which is a non-probability sampling method that involves selecting participants based on specific criteria or characteristics that are relevant to the research question or objective. This method is also known as judgmental, selective, or subjective sampling.

In purposive sampling, the researcher identifies and selects participants who have the desired characteristics or meet certain criteria that are important for the study. The selection process may involve using expert judgment, referrals from key informants, or targeted recruitment strategies.200 healthcare workers, who were involved in providing healthcare services on emergency department, were included in the study.

4.5 DATA COLLECTION

Primary sources: through the field study that the researcher applied to the staff of ED at Burayah Central Hospital, using the questionnaire.

Secondary sources: The researcher used a number of Arab and foreign references and previous studies to enrich the theoretical side of his study.

The questionnaire included two main parts. The first part was designed to collect the demographic information about the participants regarding "age, nationality, gender, specialty and work experience length ". The second part was designed to address the factors that cause overcrowding at emergency department. It was divided into 5 sub-parts. They discussed human resources, patients' density, lack of beds, health awareness, and emergency department design respectively.

Reliability of questionnaire was tested using Cronbach's alpha. Reliability of part one: demographic information is good (alpha = 0.501) and Cronbach's alpha (alpha = 0.767) is very good for part two A: Human resources. Also, reliability of part two B: Population density is good (alpha = 0.654), reliability of part two C: Lack of Beds is very good (alpha = 0.755), part two D: Health Awareness is good (alpha = 0.566), part two E: Emergency Department Design is very good (alpha = 0.618) and the reliability for

all questionnaire is very good (alpha = 0.871), (Table 1).

Table 1: Reliability coefficients questionnaire

PART	Question (N)	Alpha
One	6	0.501
Two A	10	0.767
Two B	6	0.654
Two C	6	0.755
Two D	4	0.566
Two E	4	0.618
Total	36	0.871

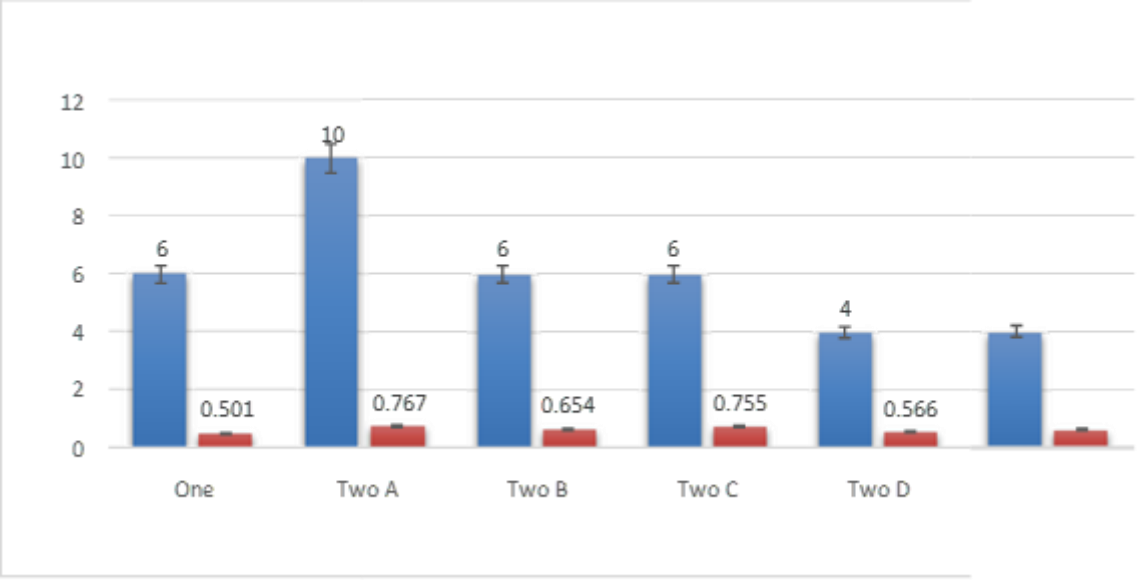


Fig 1: Reliability coefficients for questionnaire

4.6 Process of data collection

To collect the necessary data, the researcher gained the necessary approvals before carrying out the researcher. The questionnaire was sent to the healthcare workers attached with a form of informed-consent. All the participants were informed about the main aim of the study and they were told that taking part in this study wasn't obligatory. 110 questionnaires were distributed, but 10 questionnaires weren't fully filled and were excluded. The process of gathering data took about one week to be accomplished.

4.7 DATA ANALYSIS

The researcher used SPSS software, version 25.0 to carry out the data analysis. Pearson correlation was used to discuss the relationship between the demographic characteristics of the participants and the different variables of the study.

4.8 ETHICAL CONSIDERATIONS

Ethical approvalswere obtained from the Standing Committee for Research Ethics, The University of Hail. The necessary permissions to undertake the study were also obtained from the hospital manager and relevant authorities. The study participants were properly instructed and indicated that they consent to participate by signing on the written informed consent form provided.

5. RESULTS

The primary aim of this research was to alleviate the issue of overcrowding in emergency departments by investigating the

underlying causes at Buraydah central hospital in KSA through a Cross-sectional study. The questionnaire underwent a pretest to ensure its validity and reliability and was adjusted accordingly. SPSS version 28 was utilized to analyze the data and obtain descriptive statistics, including frequency percentages and non-parametric statistics such as appropriate correlation coefficients.

After administering the questionnaire, 200 responses were collected for the first part which included demographic information. The distribution of males and females was 63.5% and 36.5%, respectively. Among the respondents, 26% were aged between 21 to 30 years, 47.5% belonged to the age group of 31 to 40 years, 22% belonged to 41 to 50 years, and 4.5% were above 50 years. In terms of nationality, 65.5% of the respondents were Saudi while 34.5% were non-Saudi. Regarding their marital status, 27% of the sample were single, 56.5% were married, 15% were divorced, and 1.5% were widowed. The majority of the workers at Buraydah Central Hospital had more than 10 years of experience, with 41% belonging to the 11-15 years' experience group and 17% having more than 15 years of experience. In terms of job positions, 30.5% were specialists, 31.5% were physicians, 21% were nurses, 14% were receptionists, and 3% belonged to other specialties, as shown in Table 2.

Table 2: Demographic information.

demographic information		**Number**	**(Percentage) %**
Age			
	From 21-30 years	52	26.0
	From 31-40 years	95	47.5
	From 41- 50 years	44	22.0
	More than 50 years	9	4.5
	Total	200	100.0
Nationality			
	Saudi	131	65.5
	Non-Saudi	69	34.5
	Total	200	100.0
Gender			
	Male	127	63.5
	Female	73	36.5
	Total	200	100.0
	Marital status		
	Single	54	27.0
	Married	113	56.5
	Divorced	30	15.0
	Widow	3	1.5
	Total	200	100.0
Specialty			

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	Specialist	61	30.5
	Physician	63	31.5
	Nurse	42	21.0
	Receptionist	28	14.0
	Other	6	3.0
	Total	200	100.0
Length of experience			
Up to 1 year		21	10.5
1-5 years		41	20.5
6-10 years		22	11.0
11-15 years		82	41.0
More than 15 years		34	17.0
Total		200	100.0

Table three provides valuable insights into the opinions of participants regarding the first factor that may contribute to overcrowding in emergency departments, which is human resources, at Buraydah Central Hospital in KSA. The mean and standard deviation for these responses were 3.4465 and 0.63932, respectively. The data shows that a small percentage of participants (1.75%) strongly disagreed with the statements, while a larger percentage (30.7%) disagreed with it. A small proportion of participants (5.45%) remained neutral on the issue, while a significant number (45.35%) agreed with the statements and believed that human resources were a y l contributing factor to overcrowding in emergency departments. Finally, 16.75% of participants strongly agreed with this statement.

Table 3: Human Resources

NO		**Strongly disagree**		**Disagree**		**Neutral**		**Agree**		**Strongly Agree**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Shortage of medical staff specialized in emergency medicine	1	.5	32	16.0	6	3.0	94	47.0	67	33.5
2	Shortage of nursing staff specialized in emergency	2	1.0	61	30.5	12	6.0	80	40.0	45	22.5
3	Long time consumed in laboratory, radiolog and other procedures	3	1.5	49	24.5	9	4.5	110	55.0	29	14.5

4	The physician documentation process for patients which leads to consuming a long time in the examination process	4	2.0	78	39.0	8	4.0	78	39.0	32	16.0
5	Emergency department don`t adopt the initia examination process	8	4.0	61	30.5	18	9.0	88	44.0	25	12.5
6	Inability of the hospital to predict the numbers of patients who come to emergency	3	1.5	77	38.5	10	5.0	75	37.5	35	17.5
7	The EHRS allows me to spend more time on oth aspects of patient care	4	2.0	60	30.0	9	4.5	91	45.5	36	18.0
8	Records and forms used in recording admission of patients are multiple and diverse leading to confusion	4	2.0	67	33.5	11	5.5	95	47.5	23	11.5
9	Emergency department staff (Nurses and physicians) feel stressed due to their shortage and large number of patients	0	0.0	62	31.0	10	5.0	100	50.0	28	14.0
10	Lack of coordination between workers in emergency department	6	3.0	67	33.5	16	8.0	96	48.0	15	7.5

Table four presents the results of a survey conducted to determine the impact of population density on overcrowding in the emergency department at Buraydah Central Hospital. The mean and standard deviation for the responses were 3.3142 and 0.66314, respectively. The survey responses were categorized into five options ranging from strongly disagree to strongly agree. Only 2.42% of participants strongly disagreed that population density affects overcrowding in the emergency department, while 32.42% disagreed, 6.33% were neutral, and 49% agreed that population density has an impact on overcrowding in the emergency department. Finally, 9.83% of participants strongly agreed with this statement.

Table 4: Population density

NO		**Strongly disagree**		**Disagree**		**Neutral**		**Agree**		**Strongly Agree**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Large increase in the percentage of patients due to accidents like burns, electric shock, poisoning ……etc	0	0.0	57	28.5	14	7.0	104	52.0	25	12.5

2	Escalating increase in the number of injured as a result of traffic accidents	7	3.5	68	34.0	9	4.5	94	47.0	22	11.0
3	Increase in the percentage of the disease associated with atherosclerosis, heart attack an neurological diseases	2	1.0	58	29.0	13	6.5	106	53.0	21	10.5
4	Increase in the percentage of the injured in the work places due to lack of occupational safety measures	4	2.0	75	37.5	15	7.5	91	45.5	15	7.5
5	Lack of the practice and application observatio medicine (Which classifies patients to dangerou And moderate cases) in the emergenc department	7	3.5	67	33.5	12	6.0	100	50.0	14	7.0
6	There is no schedule for a preset emergency shifts through which physicians and nurses are	29	2.4	389	32.4	76	6.3	588	49%	389	32.42
	called in the time of emergency										

The results presented in Table five indicate the responses of participants regarding the lack of beds at Buraydah Central Hospital as a contributing factor to overcrowding in the emergency department. The mean and standard deviation were calculated to be 3.3417 and 0.73380, respectively. Out of all the participants, only 1.42% strongly disagreed that lack of beds was a factor for overcrowding, while 33.67% disagreed, 5% were neutral, 49.17% agreed, and 10.75% strongly agreed.

Table 5: Lack of Beds

NO		**Strongly disagree**		**Disagree**		**Neutral**		**Agree**		**Strongly Agree**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	Lack of beds for patient hospitalized in emergency department	0	0.0	73	36.5	7	3.5	97	48.5	23	11.5
2	Small number of patient admission rooms for in emergency department	1	.5	69	34.5	6	3.0	109	54.5	15	7.5
3	Numbers of beds in the hospital are not enoug for patient hospitalization	4	2.0	69	34.5	7	3.5	101	50.5	19	9.5

4	Presence of patients in the emergency department waiting for free hospital beds	4	2.0	75	37.5	15	7.5	91	45.5	15	7.5
5	Lack of material resources needed to increase th number of beds in the emergency department	7	3.5	58	29.0	14	7.0	102	51.0	19	9.5
6	The continuous increase in the number of patients under constant the possibilities of the emergency department	0	0.0	66	33.0	6	3.0	93	46.5	35	17.5

Table six presents the findings on health awareness as a factor contributing to overcrowding in the emergency department at Buraydah Central Hospital. The mean score of the responses was 3.4438 with a standard deviation of 0.70996. Out of the total participants, 1.125% strongly disagreed that health awareness was a factor for overcrowding, 30.125% disagreed, 5% were neutral, 50.75% agreed, and 13% strongly agreed.

Table 6: Health Awareness

NO		**Strongly disagree**		**Disagree**		**Neutral**		**Agree**		**Strongly Agree**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
1	There are patients who come to the emergency department and are not considered emergency cases	4	2.0	47	23.5	6	3.0	107	53.5	36	18.0
2	The majority of patients coming to the emergency department at Evening times	0	0.00	60	30.0	5	2.5	101	50.5	34	17.0
3	Some patients interfere in the work of the docto and request Treatments may not be needed fo the patient	4	2.0	72	36.0	10	5.0	101	50.5	13	6.5
4	Some patients treat Emergency Department staff in an improper manner	1	.5	62	31.0	19	9.5	97	48.5	21	10.5

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Table seven provides information on the responses of participants regarding the emergency department design at Buraydah Central Hospital and its impact on overcrowding in the emergency department. The mean and standard deviation were found to be 3.4175 and 0.76682, respectively. Out of the participants, 1.875% strongly disagreed with the emergency department design, while 30.625% disagreed, 5.875% were neutral, 47.125% agreed, and 14.5% strongly agreed.

Table 7: Emergency Department Design

NO		Strongly disagree		Disagree		Neutral		Agree		Strongly Agree	
		N	%	N	%	N	%	N	%	N	%
1	The difficulty of movement within the emergency department (Current planning is not suitable for the emergency department)	2	1.0	58	29.0	17	8.5	95	47.5	28	14.0
2	The inadequacy of places allocated to waiting patients	5	2.5	62	31.0	9	4.5	98	49.0	26	13.0
3 I	neffectiveness of the resources available Emergency department	2	1.0	65	32.5	5	2.5	92	46.0	36	18.0
4	Lack of space allocated to the emergency department under continuous increase of numbers of Patients	6	3.0	60	30.0	16	8.0	92	46.0	26	13.0

Table eight presents the results of Pearson correlation coefficient analysis, which aimed to investigate the relationship between causes of overcrowding and socio-demographic characteristics of participants at Buraydah Central Hospital. The findings indicate that there is a highly significant correlation between causes of overcrowding, specifically human resources and population density, and several socio-demographic factors such as age, nationality, gender, marital status, specialty, and work experience length, with a P-value of 0.000, which is less than the significance level of 0.05 and 0.01. However, there was no significant correlation between demographic information such as age and specialty and lack of beds, gender, and emergency department design, with a P-value greater than 0.05 and 0.01. Furthermore, the results showed that there is a significant relationship between lack of beds and socio-demographic characteristics such as nationality and gender, health awareness and age, nationality, gender, and marital status, and emergency department design and age, nationality, marital status, specialty, and work experience length with a P-value of 0.000, which is less than the significance level of

0.05 and 0.01. Overall, the study found that several socio-demographic factors are significantly related to the causes of overcrowding in the emergency department at Buraydah Central Hospital.

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Table 8: The relation between demographic Information and Causes of Overcrowding					
demographic information	**Causes of Overcrowding**				
	Human resources	**Population density**	**Lack of Beds**	**Health Awareness**	**Emergency Department Design**
Age	-0.291**	-0.230**	-0.131	-0.193**	-0.217**
	(0.000)	(0.000)	(0.064)	(0.000)	(0.000)
Nationality	-0.437**	-0.331**	-0.255*	-0.258**	-0.276**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Gender	-0.264**	-0.172*	-0.285**	-0.149*	-0.108
	(0.000)	(0.015)	(0.000)	(0.036)	(0.127)
Marital status	-0.296** (0.000)	-0.299** (0.000)	-0.348** (0.000)	-0.303** (0.000)	-0.240** (0.000)
Specialty	-0.272** (0.000)	-0.173* (0.014)	-0.082 (0.251)	-0.043 (0.543)	-0.219** (0.002)
Work Experience length	-0.269** (0.000)	-0.214** (0.002)	-0.167* (0.018)	-0.130 (0.067)	-0.144* (0.041)

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

From table nine, Pearson correlation coefficient was used to assess the relation between causes of overcrowding (Human resources, Population density, Lack of Beds, Health Awareness and Emergency Department Design) at Buraydah Central Hospital. The relation between Causes of Overcrowding are very significant because (P value=0.000 < 0.05 and 0.01). From Tables (3,4,5,6 and 7), according to the average responses, we can order the causes of overcrowding in order of importance as follows, Human resources, Health Awareness, Emergency Department Design, Population density and Lack of Beds.

Table 9: The relation between Causes of Overcrowding in emergency department					
Causes of Overcrowding	**Human resources**	**Population density**	**Lack of Beds**	**Health Awareness**	**Emergency Department Design**
Human resources		0.682** (0.000)	0.598** (0.000)	0.534** (0.000)	0.623** (0.000)
Population density			0.663** (0.000)	0.551** (0.000)	0.570** (0.000)
Lack of Beds				0.744** (0.000)	0.733** (0.000)

Health Awareness					0.732** (0.000)
Emergency Department Design					

SUMMARY OF MAIN FINDINGS:

1- The majority of participants (62.1%) believed that human resources play a role in overcrowding in emergency departments at Buraydah Central Hospital in KSA.

2- A significant proportion of participants (58.83%) believe that population density is a contributing factor to overcrowding in the emergency department at Buraydah Central Hospital.

3- a significant proportion of participants (59.85%)believe that the lack of beds at Buraydah Central Hospital is a contributing factor to overcrowding in the emergency department.

4- A majority of the participants (63.75%) acknowledged health awareness as a significant factor for overcrowding in the emergency department

5- Participants (61.63%) agreed that the emergency department design at Buraydah Central Hospital has an impact on overcrowding in the emergency department

6- The relation between causes of overcrowding (human resources and population density) and demographic Information (age, nationality, gender, marital status, specialty and work experience length) were very significant because (P value=0.000 < 0.05 and 0.01).

7- Factors affecting overcrowding in emergency department can be categorized as: human resources, health awareness, emergency department design, population density and lack of beds.

6. DISCUSSION

6.1. Discussion

Overcrowding in emergency departments is a global issue that causes delayed patient care, increased wait times, and adverse outcomes. This study aimed to identify the contributing factors to overcrowding in the emergency department at Buraydah Central Hospital in Saudi Arabia and offer potential solutions to address the problem. Human Resources: The majority of participants (62.1%) believed that human resources play a role in overcrowding in emergency departments at Buraydah Central Hospital. The finding is consistent with other studies conducted in Saudi Arabia and other countries, which suggest that the shortage of trained staff, including nurses and physicians, increases the workload and contributes to overcrowding (24) (25). In contrast, other studies have found no significant association between staffing levels and overcrowding (26). Thus, additional research is needed to determine the impact of staffing levels on emergency department overcrowding. Population Density: A significant proportion of participants (58.83%) believe that population density is a contributing factor to overcrowding in the emergency department at Buraydah Central Hospital. Studies have shown that population density and population growth are associated with overcrowding in emergency departments (24). The higher the population density, the higher the demand for emergency services, leading to increased wait times and reduced patient satisfaction. Therefore, policymakers must consider population growth when planning and developing emergency services. Lack of Beds: A significant proportion of participants (59.85%) believe that the lack of beds at Buraydah Central Hospital is a contributing factor to overcrowding in the emergency department. This finding is consistent with other studies conducted in Saudi Arabia and other countries that suggest that the lack of hospital beds increases emergency department overcrowding (27). To reduce overcrowding in emergency departments, policymakers must ensure adequate hospital bed capacity. Health Awareness: A majority of participants (63.75%) acknowledged health awareness as a significant factor for overcrowding in the emergency department. Studies have shown that low health literacy and inadequate knowledge of available health resources contribute to the inappropriate use of emergency services, leading to overcrowding. It was reported that health awareness was the most important factor affecting overcrowding in emergency department (24). Health

promotion and education programs are essential in reducing emergency department overcrowding by encouraging patients to seek primary care services and reducing unnecessary emergency department visits. Emergency Department Design: Participants (61.63%) agreed that the emergency department design at Buraydah Central Hospital has an impact on overcrowding in the emergency department. A study conducted in the United States found that emergency department design affects the flow of patients and staff, leading to overcrowding (24). A well-designed emergency department can improve the efficiency of patient care, reduce wait times, and increase patient satisfaction. Demographic Information: The study found a significant relationship between causes of overcrowding (human resources and population density) and demographic information (age, nationality, gender, marital status, specialty, and work experience length). The finding is consistent with other studies that suggest that demographic factors are associated with emergency department overcrowding (24) (28). Understanding the impact of demographic factors on emergency department overcrowding can help healthcare providers develop tailored strategies to reduce overcrowding.

6.2 RECOMMENDATIONS

Based on the findings of the study, researcher can recommend the following:

- Human resources: It is important to ensure that there are adequate numbers of trained staff available in the emergency department at Buraydah Central Hospital. Steps should be taken to address any issues with recruitment, retention, and training of staff.

- Population density: The hospital management should assess the current population density in the area and consider expanding or opening new healthcare facilities to reduce the burden on Buraydah Central Hospital's emergency department.

- Lack of beds: The hospital management should review the current number of beds in the emergency department and take steps to increase the capacity as needed. This could include adding new beds or optimizing bed usage.

- Health awareness: The hospital management should consider launching a health awareness campaign aimed at educating the public about when it is appropriate to visit the emergency department, and when other healthcare facilities or services should be used instead.

- Emergency department design: The hospital management should review the emergency department design and consider making changes to improve patient flow and reduce overcrowding. This could include redesigning the waiting area, triage process, or treatment areas.

- Demographic information: Hospital management should continue to collect and analyze demographic information to identify any patterns or trends in overcrowding. This can help with resource allocation and planning to meet the needs of the population.

6.3 STUDY STRENGTHS AND LIMITATIONS STRENGTHS:

The study strengths can be summarized in the following:

- The research topic is important and relevant to the healthcare industry, as overcrowding in emergency departments is a growing concern worldwide.

- The study utilized a cross-sectional design, which is a common research method for investigating the prevalence and causes of a particular phenomenon at a specific point in time.

- The sample size of the study (100 participants) is reasonable for a research study of this nature, and the use of questionnaires to gather data allows for a large amount of information to be collected in a relatively short amount of time.

- The use of statistical analysis (SPSS software) to analyze the data collected from the questionnaires is a rigorous and objective approach to data analysis.

LIMITATIONS:

However, the study still has some limitations. The limitations are:

- The study was conducted at a single hospital, which may limit the generalizability of the findings to other healthcare settings.

- The study relied on self-reported data, which may be subject to response bias, such as social desirability bias or memory bias.
- The study did not investigate the effectiveness of the proposed solutions to reduce overcrowding, such as telemedicine and community-based care, which may be important in determining the practical implications of the study findings.
- The study did not explore other factors that may contribute to overcrowding, such as the severity of illness or the availability of primary care services.

6.4 CONCLUSION

This study aimed to identify the factors contributing to overcrowding in the emergency department at Buraydah Central Hospital in KSA. The results showed that human resources, population density, lack of beds, health awareness, and emergency department design were all significant factors contributing to overcrowding. Additionally, the study revealed a significant correlation between the causes of overcrowding and demographic information of participants.Overall, the findings of this study can be used to guide future interventions to reduce overcrowding in the emergency department and improve patient outcomes. Suggestions include increasing staffing levels, improving hospital bed availability, increasing health awareness among the community, and improving the design of the emergency department. The strengths of this study include its cross-sectional design and the use of questionnaires to gather data. However, the small sample size and the fact that the study was conducted in a single hospital limit the generalizability of the results. Further research is needed to confirm these findings in other settings and populations.

7. DECLARATIONS

7.1 Scientific and Ethics approval

The ethical approval number (Pending) was received from IRB of University of Hail, Hail City, Saudi Arabia. Even written permission number (Pending) was taken from Ministry of Health, Buraydah Health Affairs to collect the necessary data for the research. See Appendix 9.2 (A & B)

7.2 Sources of Funding

My research received no funding

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