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Key economic factors influencing emergency department crowding in Saudi Arabia

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Abstract

This study aims to analyze healthcare workers' perception of ED crowding, its economic burden, insurance challenges, and infrastructure restrictions, while analyzing role-based variances in these perspectives. A cross-sectional online survey was conducted among 889 healthcare professionals throughout all 13 administrative regions of Saudi Arabia. Participants included nurses, physicians, pharmacists, administrative workers, and allied health professionals. Descriptive and inferential statistics (chi-square tests) were employed to examine and identify differences based on professional roles. Key findings highlighted broad concerns regarding ED crowding, with 72.5% of respondents observing high patient volumes waiting for diagnostic results. Significant economic challenges were observed, including high out-of-pocket expenditures (48.2% agreement) and inadequate insurance coverage for routine care (41.8%). Infrastructure challenges, such as bed shortages (65.0%) and insufficient staff (69.3% for nurses, 74.0% for physicians), were important problems. Statistically significant differences found across roles: nurses encountered staffing and resource shortages more acutely, whereas physicians underlined financial pressures on patients. The study underlined systemic misalignments in Saudi Arabia's healthcare financing and infrastructure, contributing to ED crowding. Targeted actions, such as expanding insurance coverage, boosting primary care access, and addressing workforce shortages, are urgently needed. These findings align with Vision 2030 goals and give actionable insights for policymakers to promote emergency care efficiency and equity.

Keywords: Emergency department crowding, Healthcare financing, Insurance, Saudi Arabia, Workforce perspectives.

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1. Introduction

Crowding in emergency departments (EDs) affects patient safety, care quality, and the efficacy of the healthcare system worldwide [1]. It results in longer wait times, longer hospital stays, and more medical errors because of an imbalance between the demand for emergency care and the resources that are available [1, 2]. Higher patient mortality rates and significant financial losses for healthcare organizations might result from this [3]. Additionally, overcrowding puts stress on employees, which leads to burnout and decreased productivity.

The main causes of ED crowding are complex and diverse, frequently going beyond simple increases in the number of patients [4]. The "boarding" of admitted patients in the emergency department, when patients stay for extended periods of time because there aren't enough inpatient beds available, is a major systemic challenge [5]. Inefficiencies in hospital operations, the failure to discharge patients on weekends, and the growing number of older patients with complex diseases are other concerns [6].

Crowding in ED is a serious medical issue in Saudi Arabia that directly affects the standard of patient care. Over 1.57 million ED visits were reported in the Kingdom between September 2019 and December 2021 [7]. It is essential to create culturally appropriate and successful initiatives to reduce ED overcrowding in Saudi Arabia. Rapid changes in the population, such as an increase in the number of young people and the prevalence of chronic illnesses, place additional strain on the healthcare system and raise the need for emergency services [8].

Growing healthcare expenses and the country's need for economic diversification under Vision 2030 are putting increasing pressure on the Saudi government's traditional healthcare model, which has offered universal and mainly free services [9, 10]. Saudi Arabia spent SAR 22.8 billion on healthcare in 2007; by 2021, that value had risen to around SAR 80 billion [11]. But over time, the government's portion of overall healthcare spending has steadily decreased, indicating a change in financial accountability. The predominance of out-of-pocket (OOP) expenses, which account for a sizeable amount of Saudi Arabia's overall health spending, is a major contributor to the financial strain [9]. Increasing age, having a greater household income, having more education, and having chronic diseases are all important factors that affect increased OOP expenses [12].

Reducing this expense requires addressing current gaps in health insurance coverage. A key component of Saudi Arabia's efforts to provide universal health care is the Cooperative Health Insurance System (CHIS), which mainly mandates coverage for Saudi natives and residents working in the private sector [13, 14]. Its intrinsic difficulties, including as annual premium increases, inadequate infrastructure, and cultural obstacles, may hinder its full effectiveness [14, 15].

The healthcare system's financial burden is primarily caused by inefficient resource allocation practices and service inefficiencies [16]. Compared to global standards, Saudi Arabia's public healthcare budget focuses primarily toward hospital services, with less resources allocated to ambulatory and preventative care [17].

There are several challenges with staff management, insurance, and funding in the Saudi healthcare system [18, 19]. The goal of the Vision 2030 framework is to privatize public hospitals and primary healthcare facilities as part of a value-based approach to healthcare funding, replacing the government-funded welfare model. Despite obstacles like growing rates, inadequate infrastructure, and cultural differences, the Cooperative Health Insurance System (CHIS) has played a significant role in achieving the goals of Universal Health Coverage [15]. Despite these challenges, the insurance industry is expanding due to new regulations and required insurance plans [13, 20].

There is a notable lack of a national assessment that captures the collective and role-specific perspectives of a wide range of healthcare professionals such as physicians, nurses, pharmacists, administrative staff, and allied health professionals on the relationship between infrastructure, insurance adequacy, healthcare funding, and the firsthand experience of ED crowding. By offering a comprehensive, on-the-ground viewpoint from individuals directly involved in the delivery of healthcare services, this study fills a critical research gap in a unique way. It provides insights into their diverse and collective perceptions, which are essential for guiding resource allocation strategies and focused policy interventions within the Saudi healthcare system.

1.1. Aim of the Study

The goal of this study was to provide a complete overview of how healthcare workers in Saudi Arabia perceive crowded emergency departments, as well as how these perceptions vary depending on their positions at work.

2. Materials and Methods

This study used a descriptive cross-sectional design to investigate how Saudi Arabian healthcare workers perceived about concerns with the workforce, insurance, economic strain, and crowded emergency department. An online survey was used to collect data, in both English and Arabic languages, and it was approved by two different linguistics then sent to medical professionals in each of the Kingdom's 13 administrative regions. The goal of this wide distribution was to provide a national perspective on the complex issues facing the healthcare system. Convenience sampling was used to select participants, with an emphasis on individuals who were employed in emergency rooms and other healthcare facilities. The survey included a wide range of participant demographics, including different age groups, genders, and professions in the healthcare industry. In order to collect diverse viewpoints on the study's challenges, the recruiting criteria were centered on guaranteeing involvement from a wide range of healthcare professionals, including physicians, nurses, pharmacists, administrative personnel, and allied health professionals.

Several approaches were used to guarantee the validity and reliability of the questionnaire: face validity was verified by pilot testing with 10% of the sample to improve ambiguous items, and content validity was evaluated by subject-matter experts who assessed item relevance and clarity. Cronbach's alpha was used to evaluate the scale's internal consistency; a result of greater than 70% suggested good reliability. Together, these procedures ensured that the questionnaire measured the target constructs effectively and that the items were consistent prior to widespread implementation. Before any data were collected, the study received ethical approval from the appropriate institutional review board.

Both descriptive and inferential statistical techniques were used for analyzing the gathered data. The study participants' individual characteristics and general opinions about the different survey topics were summed up using frequencies and percentages. Chi-square tests were used to see whether perceptions of various healthcare professional occupations differed

in a way that was statistically significant. Statistical significance was determined prior to analysis using a p-value threshold of less than 0.05 ($p < 0.05$), while a significant association is indicated by $p < 0.001$. IBM SPSS version 27 statistical software was used for all statistical analyses.

3. Results

The survey demonstrated excellent internal consistency, with a Cronbach's alpha of .920.

3.1. Characteristics of the Study Participants

A comprehensive overview of the professional and demographic characteristics of the 889 healthcare workers participated in the study is provided in Table 1. The gender distribution indicated that there were slightly more female participants (56.1%) than male participants (43.9%), which might be indicative of the gender makeup of the healthcare industry, especially in nursing and allied health positions. According to the age distribution, the majority of participants (37.9%) are between the ages of 26 and 35, followed by those between the ages of 18 and 25 (29.2%) and 36 and 45 (22.2%). Given the lower number of participants in the older age groups (46–55: 7.8%; >56: 1.3%), this indicates that the workforce is comparatively young. Physicians (35.1%) and nurses (37.1%) constituted the largest categories in terms of positions, followed by administrative staff (9.8%), pharmacists (5.2%), and health allied staff (12.8%). The majority of participants (93.7%) are Saudi Arabian, according to nationality data, with few participants from other countries. In terms of medical insurance coverage, 42.2% of individuals had insurance, whereas more than half (57.8%) did not. The most prevalent providers among the insured were Tawuniya (25.3%) and BUPA Arabia (48.2%). The high proportion of participants without insurance may be a sign of coverage gaps or dependence on public health services. Lastly, the frequency of utilization of emergency healthcare services revealed that 32.5% of individuals used them once a month, while nearly half (46.7%) used them once a year. Only 4.4% of respondents said they used emergency services once a week, while 16.4% said they had never used them.

Table 1.
Characteristics of the study participants.

	Frequency (n=889)	Percentage
Gender		
male	390	43.9
female	499	56.1
Age Categories (years)		
<18	14	1.6
18-25	260	29.2
26-35	337	37.9
36-45	197	22.2
46-55	69	7.8
>56	12	1.3
Job position		
Nurse	330	37.1
Physician	312	35.1
Pharmacist	46	5.2
Administrative	87	9.8
Health allied	114	12.8
Nationality		
Bahrain	6	0.7
Bangladesh	1	0.1
Egypt	14	1.6
Haiti	1	0.1
Morocco	1	0.1
Nigeria	3	0.3
Qatar	1	0.1
San Marino	1	0.1
Saudi Arabia	833	93.7
Sudan	9	1.0
Syria	5	0.6
Uruguay	3	0.3
Vatican City	2	0.2
Venezuela	1	0.1
Yemen	8	0.9
Medical insurance coverage		
Yes	376	42.2

No	514	57.8
Insurance company name		
Gulf Company for Cooperative Insurance	1	0.3
Gulf union Alahlia	7	1.9
Saico	2	0.5
Al Etihad Cooperative Insurance Company SJSC	2	0.5
Tawuniya	93	25.3
Arabian Shield	1	0.3
Rajhi takaful	22	6.0
Al Sagr Cooperative Insurance Company	4	1.1
United Cooperative assurance	3	0.8
Allianz	2	0.5
ACIG - United Cooperative Insurance Group	2	0.5
Buruj Cooperative	1	0.3
BUPA Arabia	177	48.2
AXA	1	0.3
Solidarity	1	0.3
Arabia Insurance Cooperative Company	7	1.9
Salama Cooperative Insurance Company	6	1.6
Amana	1	0.3
Malath Cooperative	9	2.5
MedGulf	16	4.4
walaa insurance	9	2.5
Frequency of using private / governmental Emergency healthcare services		
I did not use it	145	16.4
Once per week	39	4.4
Once per month	288	32.5
Once per year	413	46.7

3.2. Perceptions of Healthcare Workers Concerning the Adequacy of Funding and Insurance

Perception of healthcare workers regarding the sufficiency of funding and insurance are shown in Table 2. Regarding whether healthcare workers receive high and attractive salaries, a substantial percentage of respondents (40.2%) were neutral, while 35.9% disagreed or strongly disagreed, indicating that a substantial percentage of the workforce did not consider their salaries to be very attractive. On the other hand, 23.9% of respondents agreed or strongly agreed with this statement. Notably, 36.7% agreed or strongly agreed and 22.9% opposed or strongly disagreed with the statement stating that funding from private investors increases the number of emergency department staff. In contrast to just 16.4% who disagreed or strongly disagreed, a substantial percentage (41.8%) agreed or strongly agreed that health insurance coverage for these services is limited. Additionally, just 17.1% of respondents disagreed or strongly disagreed with the statement that out-of-pocket payments are too expensive for primary or specialty care services, while 48.2% of respondents agreed or strongly agreed with this statement. The remaining 34.6% were neutral. The perception that insurance prioritizes emergency care, possibly at the expense of routine services, is suggested by the interesting fact that when asked if the majority of health insurance coverage is on emergency services, 41.3% were neutral, 33.7% agreed or strongly agreed, and 24.9% disagreed or strongly disagreed.

Table 2.
Healthcare workers view of healthcare funding.

	Frequency (n=889)	Percentage
I think that healthcare staff receive high and attractive salaries		
Strongly disagree	112	12.6
Disagree	207	23.3
Neutral	357	40.2
Agree	178	20.0
Strongly agree	35	3.9
I believe that funding from private investors increases the number of Emergency department staff		
Strongly disagree	59	6.6
Disagree	145	16.3
Neutral	359	40.4
Agree	254	28.6
Strongly agree	72	8.1
Health insurance coverage is small for regular healthcare services, including primary and specialized care		
Strongly disagree	52	5.8

Disagree	94	10.6
Neutral	372	41.8
Agree	302	34.0
Strongly agree	69	7.8
I feel that out-of-pocket payments are too expensive for health services provided at the primary care or specialized care		
Strongly disagree	53	6.0
Disagree	99	11.1
Neutral	308	34.6
Agree	307	34.5
Strongly agree	122	13.7
most health insurance coverage is on emergency services		
Strongly disagree	51	5.7
Disagree	171	19.2
Neutral	367	41.3
Agree	248	27.9
Strongly agree	52	5.8

3.3. Perspectives on the Population's Economic Status and Its Dynamics

Table 3 illustrates the Perception of healthcare providers regarding the population's economic situation and how it impacts ED utilization. Regarding the perception that most patients requesting emergency care are low-income people, a substantial percentage (36.1%) had neutral opinion. However, there was a significant perception that low-income levels lead to ED visits, as seen by the fact that 36.2% agreed or strongly agreed with this statement. Similarly, 30.1% of respondents were uncertain about the perception that most patients who come to the emergency department or hospital are unemployed or illegal laborers who do not have access to standard medical care. Compared to the general low-income perception, there appears to be less agreement on this specific section, as 40.5% disagreed or strongly disagreed with this statement, whilst 29.4% agreed or strongly agreed.

Table 3.
Healthcare workers view of Economic Status of the Population and their Dynamics.

	Frequency (n=889)	Percentage
I believe that the majority of patients who tend to seek emergency services are low-income levels		
Strongly disagree	70	7.9
Disagree	176	19.8
Neutral	321	36.1
Agree	240	27.0
Strongly agree	82	9.2
I tend to believe that the majority of patients visiting the emergency/hospital are unemployed or illegal labor workers as they lack access to regular healthcare services		
Strongly disagree	106	11.9
Disagree	254	28.6
Neutral	268	30.1
Agree	190	21.4
Strongly agree	71	8.0

3.4. Perspectives on ED Crowding and Infrastructure

As Table 4 illustrates, healthcare professionals' perceptions of healthcare infrastructure expressed significant perspectives. The majority, 70.0%, agreed or strongly agreed that emergency departments are available in many hospitals around the country, demonstrating a favorable opinion of the facilities' accessibility. The fact that 65.0% of respondents agreed or strongly agreed that there is a hospital bed deficit that does not accommodate all admitted patients, however, raised serious concerns about bed capacity. This suggests that there is a substantial patient flow constraint. Similarly, 64.1% agreed or strongly agreed that most hospitals' emergency departments' fast-track clinics are unable to handle a large number of patients, indicating limitations in the rapid assessment techniques now in use. There was broad agreement about the potential of urgent care centers, with 74.9% of respondents agreeing or strongly agreeing that these facilities shorten ER wait times.

Table 4.
Healthcare workers view of Healthcare Infrastructure.

	Frequency (n=889)	Percentage
I think there are various hospitals nationwide with emergency departments		
Strongly disagree	44	4.9
Disagree	52	5.8
Neutral	171	19.2
Agree	341	38.4
Strongly agree	281	31.6
I think there is a shortage of hospital beds and it does not accommodate all the admitted patients		
Strongly disagree	46	5.2
Disagree	64	7.2
Neutral	201	22.6
Agree	305	34.3
Strongly agree	273	30.7
I think that the Fast-track clinics in Emergency departments in most hospitals cannot serve a high number of patients		
Strongly disagree	52	5.8
Disagree	52	5.8
Neutral	215	24.2
Agree	335	37.7
Strongly agree	235	26.4
I believe that having urgent care clinics would reduce waiting times in emergency departments		
Strongly disagree	35	3.9
Disagree	33	3.7
Neutral	155	17.4
Agree	322	36.2
Strongly agree	344	38.7
I think the number of medical insurers is inadequate to handle patients' needs		
Strongly disagree	40	4.5
Disagree	88	9.9
Neutral	350	39.4
Agree	265	29.8
Strongly agree	146	16.4
Generally, the number of nurses in the hospital is few to take care of patients		
Strongly disagree	41	4.6
Disagree	60	6.7
Neutral	172	19.3
Agree	249	28.0
Strongly agree	367	41.3
I believe that the number of emergency physicians in the hospital needs to be improved compared to the number of patients		
Strongly disagree	42	4.7
Disagree	35	3.9
Neutral	154	17.3
Agree	278	31.3
Strongly agree	380	42.7
I find a need for more sufficient and suitable space for the Emergency Department in the hospitals		
Strongly disagree	36	4.0
Disagree	33	3.7
Neutral	151	17.0
Agree	280	31.5
Strongly agree	389	43.8
I think that there are insufficient medical devices necessary for diagnosis		
Strongly disagree	40	4.5
Disagree	82	9.2
Neutral	208	23.4
Agree	253	28.5
Strongly agree	306	34.4

The majority of respondents (46.2%) affirmed the necessity of increasing medical insurance availability to better serve patient needs, while 39.4% held a neutral stance and 14.4% expressed disagreement. About 69% agreed or strongly agreed that there generally not enough nurses in the hospital to care for patients, and an even higher 74.0% thought that there should be more emergency physicians in relation to the number of patients. Furthermore, a significant majority of respondents (62.9%) emphasized the need for more diagnostic medical devices, and an even larger proportion (75.3%) strongly advocated for more adequate and suitable space in hospital emergency departments.

Regarding direct ED crowding Perception, a considerable throughput bottleneck was indicated by the vast majority of healthcare personnel (72.5%) who agreed or strongly agreed that they typically observe a high number of patients waiting for imaging and laboratory findings. Similar to this, 63.8% of respondents agreed or strongly agreed that the hospital's lack of medical specialties results in unnecessary extended stays in the emergency room, which may indicate a problem with the transfer of patients to specialized inpatient units. Regarding the potential of integrated urgent care services, there was broad agreement, with 70.3% of respondents agreeing or strongly agreeing that such integration might decrease the number of patients seen in emergency departments. The majority (70.3%) of respondents agreed or strongly agreed that many patients go to the ED for non-urgent reasons, which supports the idea that utilizing the ED is improper (Table 5).

Table 5.
Healthcare workers view of Emergency Department crowding.

	Frequency (n=889)	Percentage
I usually see a high number of patients waiting for laboratory and imaging results		
Strongly disagree	46	5.2
Disagree	49	5.5
Neutral	149	16.8
Agree	291	32.7
Strongly agree	354	39.8
Overall, I think that there are limited healthcare specialties in the hospital which has led to unnecessary long lengths of stay at the emergency department		
Strongly disagree	36	4.0
Disagree	68	7.6
Neutral	217	24.4
Agree	276	31.0
Strongly agree	292	32.8
I think the integration of urgent care services with current hospital systems can reduce the Emergency department patient load		
Strongly disagree	39	4.4
Disagree	39	4.4
Neutral	186	20.9
Agree	327	36.8
Strongly agree	298	33.5
I believe that there is a large number of patients visiting the Emergency Department for non-urgent conditions		
Strongly disagree	41	4.6
Disagree	59	6.6
Neutral	164	18.4
Agree	245	27.6
Strongly agree	380	42.7

3.5. Perspectives Based on Roles Disparities among Healthcare Workers

Data analysis showed that opinions of different healthcare professional positions varied statistically significantly.

Significant disparities were found between employment positions in terms of healthcare funding. Compared to nurses (20.8%), physicians (50.0%) were significantly more likely to agree that healthcare workers are paid well and attractively. On the other hand, compared to other professional groups, nurses were more likely to strongly disagree with this statement (56.3%). Physicians (40.3%) and nurses (26.4%) were among the most likely to strongly agree on the effect of private investor funding on boosting emergency department staff, indicating an agreement in the potential of private investment, even though the overall connection was significant ($\chi^2=26.410$, $p=0.049$). However, nurses (40.4%) were more likely than physicians (11.5%) to strongly disagree with the view that health insurance coverage is inadequate for routine medical care, and health allied professions (26.9%) also exhibited a greater propensity to strongly disagree with this statement ($\chi^2=35.600$, $p=0.003$). This suggests that nurses and other allied health workers could believe that the insurance coverage for routine services is more sufficient than physicians do. On the other hand, there was a significant difference in the opinion that out-of-pocket expenses were excessive ($\chi^2=45.701$, $p<0.001$). Compared to nurses (23.0%), physicians (41.0%) were more likely to strongly agree with this, indicating that physicians may be more aware of patients' financial burden. Additionally, compared to nurses (23.1%), physicians (46.2%) were more likely to strongly agree that emergency

services receive the majority of health insurance coverage ($\chi^2=39.786, p=0.001$), suggesting that physicians have a greater belief that insurance prioritizes emergency care (Table 6).

Table 6.
Association between healthcare workers position in healthcare sector and their view of healthcare funding in Saudi Arabia.

Variables	Position in the healthcare sector					Test of significance (p value)
	Nurse	Physician	Pharmacist	Administrative	Health allied	
Overall, I think that healthcare staff receive high and attractive salaries						
Strongly disagree	63 (56.3%)	21 (18.8%)	4 (3.6%)	10 (8.9%)	14 (12.5%)	$\chi^2=67.316$ ($<0.001^{**}$)
Disagree	102 (49.3%)	60 (29.0%)	9 (4.3%)	15 (7.2%)	21 (10.1%)	
Neutral	119 (33.3%)	126 (35.3%)	20 (5.6%)	39 (10.9%)	53 (14.8%)	
Agree	37 (20.8%)	89 (50.0%)	9 (5.1%)	19 (10.7%)	24 (13.5%)	
Strongly agree	9 (25.7%)	16 (45.7%)	4 (11.4%)	4 (11.4%)	2 (5.7%)	
I believe that funding from private investors increases the number of Emergency department staff						
Strongly disagree	17 (28.8%)	16 (27.1%)	4 (6.8%)	9 (15.3%)	13 (22.0%)	$\chi^2=26.410$ (0.049)
Disagree	47 (32.4%)	48 (33.1%)	11 (7.6%)	16 (11.0%)	23 (15.9%)	
Neutral	151 (42.1%)	118 (32.9%)	18 (5.0%)	35 (9.7%)	37 (10.3%)	
Agree	96 (37.8%)	101 (39.8%)	10 (3.9%)	20 (7.9%)	27 (10.6%)	
Strongly agree	19 (26.4%)	29 (40.3%)	3 (4.2%)	7 (9.7%)	14 (19.4%)	
Generally, health insurance coverage is small for regular healthcare services, including primary and specialized care						
Strongly disagree	21 (40.4%)	6 (11.5%)	5 (9.6%)	6 (11.5%)	14 (26.9%)	$\chi^2=35.600$ (0.003)
Disagree	30 (31.9%)	30 (31.9%)	9 (9.6%)	10 (10.6%)	15 (16.0%)	
Neutral	143 (38.4%)	134 (36.0%)	17 (4.6%)	33 (8.9%)	45 (12.1%)	
Agree	117 (38.7%)	117 (38.7%)	9 (3.0%)	30 (9.9%)	29 (9.6%)	
Strongly agree	19 (27.5%)	25 (36.2%)	6 (8.7%)	8 (11.6%)	11 (15.9%)	
I feel that out-of-pocket payments are too expensive for health services provided at the primary care or specialized care						
Strongly disagree	15 (28.3%)	9 (17.0%)	3 (5.7%)	10 (18.9%)	16 (30.2%)	$\chi^2=45.701$ ($<0.001^{**}$)
Disagree	40 (40.4%)	36 (36.4%)	6 (6.1%)	9 (9.1%)	8 (8.1%)	
Neutral	124 (40.3%)	98 (31.8%)	18 (5.8%)	31 (10.1%)	37 (12.0%)	
Agree	123 (40.1%)	119 (38.8%)	10 (3.3%)	22 (7.2%)	33 (10.7%)	
Strongly agree	28 (23.0%)	50 (41.0%)	9 (7.4%)	15 (12.3%)	20 (16.4%)	
Overall, most health insurance coverage is on emergency services						
Strongly disagree	13 (25.5%)	12 (23.5%)	4 (7.8%)	12 (23.5%)	10 (19.6%)	$\chi^2=39.786$ (0.001)
Disagree	48 (28.1%)	77 (45.0%)	10 (5.8%)	14 (8.2%)	22 (12.9%)	
Neutral	150 (40.9%)	113 (30.8%)	18 (4.9%)	38 (10.4%)	48 (13.1%)	
Agree	107 (43.1%)	86 (34.7%)	12 (4.8%)	17 (6.9%)	26 (10.5%)	
Strongly agree	12 (23.1%)	24 (46.2%)	2 (3.8%)	6 (11.5%)	8 (15.4%)	

Table 7.
Association between healthcare workers position in healthcare sector and their view of Economic Status of the Population and their Dynamics in Saudi Arabia.

Variables	position in the healthcare sector					Test of significance (p value)
	Nurse	Physician	Pharmacist	Administrative	Health allied	
I believe that the majority of patients who tend to seek emergency services are low-income levels						
Strongly disagree	16 (22.9%)	25 (35.7%)	5 (7.1%)	8 (11.4%)	16 (22.9%)	$\chi^2=52.582$ ($<0.001^{**}$)
Disagree	55 (31.3%)	80 (45.5%)	8 (4.5%)	15 (8.5%)	18 (10.2%)	
Neutral	119 (37.1%)	95 (29.6%)	26 (8.1%)	37 (11.5%)	44 (13.7%)	
Agree	115 (47.9%)	83 (34.6%)	6 (2.5%)	14 (5.8%)	22 (9.2%)	
Strongly agree	25 (30.5%)	29 (35.4%)	1 (1.2%)	13 (15.9%)	14 (17.1%)	
I tend to believe that the majority of patients visiting the emergency/hospital are unemployed or illegal labor workers as they lack access to regular healthcare services						
Strongly disagree	21 (19.8%)	47 (44.3%)	8 (7.5%)	10 (9.4%)	20 (18.9%)	$\chi^2=52.754$ ($<0.001^{**}$)

Disagree	75 (29.5%)	111 (43.7%)	16 (6.3%)	20 (7.9%)	32 (12.6%)
Neutral	110 (41.0%)	77 (28.7%)	13 (4.9%)	32 (11.9%)	36 (13.4%)
Agree	97 (51.1%)	52 (27.4%)	8 (4.2%)	19 (10.0%)	14 (7.4%)
Strongly agree	27 (38.0%)	25 (35.2%)	1 (1.4%)	6 (8.5%)	12 (16.9%)

Table 7 illustrates the large differences in perceptions of the population's economic situation and dynamics by employment position. While nurses (47.9%) were more likely to agree with the statement that most patients seeking emergency services are low-income ($\chi^2=52.582$, $p<0.001$), physicians (45.5%) were more likely to disagree with it than nurses (31.3%). Nurses provided ED patients with a thorough evaluation that considered their socioeconomic status, including their income. This is demonstrated by their propensity (51.1%) to admit that a high percentage of ED visitors might not have regular access to healthcare services or be unemployed. This viewpoint, which is different from that of physicians (44.3% of them were more inclined to strongly disagree with this idea), emphasizes the relevance of a variety of professional Perception and the variety of needs that are encountered in the emergency department ($\chi^2=52.754$, $p<0.001$).

Table 8.

Association between healthcare workers position in healthcare sector and their view of Healthcare Infrastructure in Saudi Arabia.

Variables	position in the healthcare sector					Test of significance (p value)
	Nurse	Physician	Pharmacist	Administrative	Health allied	
Generally, I think there are various hospitals nationwide with emergency departments						
Strongly disagree	11 (25.0%)	8 (18.2%)	3 (6.8%)	10 (22.7%)	12 (27.3%)	$\chi^2=56.779$ ($<0.001^{**}$)
Disagree	9 (17.3%)	22 (42.3%)	2 (3.8%)	9 (17.3%)	10 (19.2%)	
Neutral	60 (35.1%)	56 (32.7%)	13 (7.6%)	22 (12.9%)	20 (11.7%)	
Agree	120 (35.2%)	145 (42.5%)	15 (4.4%)	26 (7.6%)	35 (10.3%)	
Strongly agree	130 (46.3%)	81 (28.8%)	13 (4.6%)	20 (7.1%)	37 (13.2%)	
I think there is a shortage of hospital beds and it does not accommodate all the admitted patients						
Strongly disagree	12 (26.1%)	9 (19.6%)	5 (10.9%)	8 (17.4%)	12 (26.1%)	$\chi^2=46.255$ ($<0.001^{**}$)
Disagree	16 (25.0%)	22 (34.4%)	5 (7.8%)	9 (14.1%)	12 (18.8%)	
Neutral	66 (32.8%)	69 (34.3%)	13 (6.5%)	21 (10.4%)	32 (15.9%)	
Agree	107 (35.1%)	128 (42.0%)	11 (3.6%)	26 (8.5%)	33 (10.8%)	
Strongly agree	129 (47.3%)	84 (30.8%)	12 (4.4%)	23 (8.4%)	25 (9.2%)	
I think that the Fast-track clinics in Emergency departments in most hospitals cannot serve a high number of patients						
Strongly disagree	14 (26.9%)	8 (15.4%)	3 (5.8%)	10 (19.2%)	17 (32.7%)	$\chi^2=54.755$ ($<0.001^{**}$)
Disagree	20 (38.5%)	18 (34.6%)	5 (9.6%)	5 (9.6%)	4 (7.7%)	
Neutral	71 (33.0%)	76 (35.3%)	13 (6.0%)	30 (14.0%)	25 (11.6%)	
Agree	118 (35.2%)	142 (42.4%)	13 (3.9%)	21 (6.3%)	41 (12.2%)	
Strongly agree	107 (45.5%)	68 (28.9%)	12 (5.1%)	21 (8.9%)	27 (11.5%)	
I believe that having urgent care clinics would reduce waiting times in emergency departments						
Strongly disagree	12 (34.3%)	5 (14.3%)	1 (2.9%)	3 (8.6%)	14 (8.6%)	$\chi^2=58.791$ ($<0.001^{**}$)
Disagree	10 (30.3%)	10 (30.3%)	1 (3.0%)	8 (24.2%)	4 (12.1%)	
Neutral	49 (31.6%)	48 (31.0%)	12 (7.7%)	27 (17.4%)	19 (12.3%)	
Agree	114 (35.4%)	134 (41.6%)	17 (5.3%)	23 (7.1%)	34 (10.6%)	
Strongly agree	145 (42.2%)	115 (33.4%)	15 (4.4%)	26 (7.6%)	43 (12.5%)	
I think the number of medical insurers is inadequate to handle patients' needs						
Strongly disagree	11 (27.5%)	8 (20.0%)	2 (5.0%)	5 (12.5%)	14 (35.0%)	$\chi^2=42.033$ ($<0.001^{**}$)
Disagree	28 (31.8%)	36 (40.9%)	3 (3.4%)	12 (13.6%)	9 (10.2%)	
Neutral	138 (39.4%)	116 (33.1%)	14 (4.0%)	42 (12.0%)	40 (11.4%)	
Agree	98 (37.0%)	109 (41.1%)	14 (5.3%)	13 (4.9%)	31 (11.7%)	
Strongly agree	55 (37.7%)	43 (29.5%)	13 (8.9%)	15 (10.3%)	20 (13.7%)	
Generally, the number of nurses in the hospital is few to take care of patients						

Strongly disagree	9 (22.0%)	10 (24.4%)	2 (4.9%)	5 (12.2%)	15 (36.6%)	$\chi^2=127.359$ ($<0.001^{**}$)
Disagree	12 (20.0%)	23 (38.3%)	2 (3.3%)	10 (16.7%)	13 (21.7%)	
Neutral	43 (25.0%)	62 (36.0%)	15 (8.7%)	29 (16.9%)	23 (13.4%)	
Agree	64 (25.7%)	118 (47.4%)	17 (6.8%)	21 (8.4%)	29 (11.6%)	
Strongly agree	202 (55.0%)	99 (27.0%)	10 (2.7%)	22 (6.0%)	34 (9.3%)	
I believe that the number of emergency physicians in the hospital needs to be improved compared to the number of patients						
Strongly disagree	14 (33.3%)	6 (14.3%)	0 (0.0%)	7 (16.7%)	15 (35.7%)	$\chi^2=68.553$ ($<0.001^{**}$)
Disagree	10 (28.6%)	14 (40.0%)	1 (2.9%)	4 (11.4%)	6 (17.1%)	
Neutral	43 (27.9%)	50 (32.5%)	14 (9.1%)	22 (14.3%)	25 (16.2%)	
Agree	84 (30.2%)	119 (42.8%)	14 (5.0%)	27 (9.7%)	34 (12.2%)	
Strongly agree	179 (47.1%)	123 (32.4%)	17 (4.5%)	27 (7.1%)	34 (8.9%)	
I find a need for more sufficient and suitable space for the Emergency Department in the hospitals						
Strongly disagree	12 (33.3%)	4 (11.1%)	1 (2.8%)	6 (16.7%)	13 (36.1%)	$\chi^2=70.558$ ($<0.001^{**}$)
Disagree	8 (24.2%)	9 (27.3%)	2 (6.1%)	5 (15.2%)	9 (27.3%)	
Neutral	43 (28.5%)	54 (35.8%)	13 (8.6%)	19 (12.6%)	22 (14.6%)	
Agree	85 (30.4%)	125 (44.6%)	9 (3.2%)	29 (10.4%)	32 (11.4%)	
Strongly agree	182 (46.8%)	120 (30.8%)	21 (5.4%)	28 (7.2%)	38 (9.8%)	
I think that there are insufficient medical devices necessary for diagnosis						
Strongly disagree	13 (32.5%)	8 (20.0%)	1 (2.5%)	6 (15.0%)	12 (30.0%)	$\chi^2=82.631$ ($<0.001^{**}$)
Disagree	18 (22.0%)	33 (40.2%)	7 (8.5%)	11 (13.4%)	13 (15.9%)	
Neutral	53 (25.5%)	82 (39.4%)	16 (7.7%)	27 (13.0%)	30 (14.4%)	
Agree	81 (32.0%)	107 (42.3%)	8 (3.2%)	26 (10.3%)	31 (12.3%)	
Strongly agree	165 (53.9%)	82 (26.8%)	14 (4.6%)	17 (5.6%)	28 (9.2%)	

Table 8 shows that there were also notable disparities in opinions regarding healthcare infrastructure. The availability of hospitals with emergency departments across the country was generally agreed upon by both physicians (42.5%) and nurses (35.2%); however, nurses (46.3%) were more likely to strongly agree than physicians (28.8%) ($\chi^2=56.779$, $p<0.001$). Physicians (42.0%) were more likely to agree with the hospital bed shortage, whereas nurses (47.3%) were more likely to strongly agree ($\chi^2=46.255$, $p<0.001$), suggesting that nurses shared but expressed a greater concern over bed capacity. Regarding the efficacy of fast-track clinics, nurses (45.5%) were more likely to strongly agree ($\chi^2=54.755$, $p<0.001$), but physicians (42.4%) were more likely to agree that they are unable to serve a large number of patients. Urgent care clinics reducing wait times were strongly endorsed by both groups, however nurses were more likely to strongly agree (42.2%) than physicians (33.4%) ($\chi^2=58.791$, $p<0.001$). While nurses (37.7%) were more likely to strongly agree ($\chi^2=42.033$, $p<0.001$) that there are not enough medical insurers, physicians (41.1%) were more likely to agree. Perceptions of nurse staffing showed a notable difference: nurses (55.0%) were much more likely than physicians (27.0%) to strongly agree that there are not enough nurses ($\chi^2=127.359$, $p<0.001$). Similarly, nurses (47.1%) were more likely than physicians (32.4%) to strongly agree that there should be more emergency physicians ($\chi^2=68.553$, $p<0.001$). Additionally, nurses (46.8%) agreed more strongly than physicians (30.8%) that there should be additional room in the emergency department ($\chi^2=70.558$, $p<0.001$). Nurses (53.9%) were more likely than physicians (26.8%) to strongly agree on the lack of medical devices ($\chi^2=82.631$, $p<0.001$). All these results show that nurses are more susceptible than physicians to staffing and other infrastructure and resource shortages.

Table 9.

Association between healthcare workers position in healthcare sector and their view of Emergency Department crowding in Saudi Arabia.

Variables	position in the healthcare sector					Test of significance (p value)
	Nurse	Physician	Pharmacist	Administrative	Health allied	
I usually see a high number of patients waiting for laboratory and imaging results						
Strongly disagree	13 (28.3%)	9 (19.6%)	2 (4.3%)	8 (17.4%)	14 (30.4%)	$\chi^2=68.590$ ($<0.001^{**}$)
Disagree	12 (24.5%)	15 (30.6%)	4 (8.2%)	9 (18.4%)	9 (18.4%)	
Neutral	44 (29.5%)	56 (37.6%)	7 (4.7%)	18 (12.1%)	24 (16.1%)	
Agree	90 (30.9%)	133 (45.7%)	10 (3.4%)	25 (8.6%)	33 (11.3%)	
Strongly agree	171 (48.3%)	99 (28.0%)	23 (6.5%)	27 (7.6%)	34 (9.6%)	
Overall, I think that there are limited healthcare specialties in the hospital which has led to unnecessary long lengths of stay at the emergency department						
Strongly disagree	11 (30.6%)	7 (19.4%)	1 (2.8%)	7 (19.4%)	10 (27.8%)	$\chi^2=82.487$ ($<0.001^{**}$)
Disagree	14 (20.6%)	28 (41.2%)	4 (5.9%)	10 (14.7%)	12 (17.6%)	
Neutral	64 (29.5%)	78 (35.9%)	14 (6.5%)	28 (12.9%)	33 (15.2%)	
Agree	83 (30.1%)	126 (45.7%)	10 (3.6%)	22 (8.0%)	35 (12.7%)	
Strongly agree	158 (54.1%)	73 (25.0%)	17 (5.8%)	20 (6.8%)	24 (8.2%)	
I think the integration of urgent care services with current hospital systems can reduce the Emergency department patient load						
Strongly disagree	9 (23.1%)	8 (20.5%)	0 (0.0%)	10 (25.6%)	12 (30.8%)	$\chi^2=61.139$ ($<0.001^{**}$)
Disagree	13 (33.3%)	13 (33.3%)	4 (10.3%)	3 (7.7%)	6 (15.4%)	
Neutral	60 (32.3%)	67 (36.0%)	13 (7.0%)	22 (11.8%)	24 (12.9%)	
Agree	102 (31.2%)	138 (42.2%)	12 (3.7%)	31 (9.5%)	44 (13.5%)	
Strongly agree	146 (49.0%)	86 (28.9%)	17 (5.7%)	21 (7.0%)	28 (9.4%)	
I believe that there is a large number of patients visiting the Emergency Department for non-urgent conditions						
Strongly disagree	12 (29.3%)	10 (24.4%)	0 (0.0%)	8 (19.5%)	11 (26.8%)	$\chi^2=99.101$ ($<0.001^{**}$)
Disagree	15 (25.4%)	17 (28.8%)	2 (3.4%)	10 (16.9%)	15 (25.4%)	
Neutral	49 (29.9%)	43 (26.2%)	15 (9.1%)	25 (15.2%)	32 (19.5%)	
Agree	68 (27.8%)	116 (47.3%)	10 (4.1%)	26 (10.6%)	25 (10.2%)	
Strongly agree	186 (48.9%)	126 (33.2%)	19 (5.0%)	18 (4.7%)	31 (8.2%)	

Table 9 demonstrates that there were notable role-based variations in how people perceived overcrowding in the emergency department. While nurses (48.3%) were more likely to strongly agree ($\chi^2=68.590$, $p<0.001$) that many patients wait for laboratory and imaging findings, physicians (45.7%) were more likely to agree. Physicians (45.7%) were more likely to agree, and nurses (54.1%) were more likely to strongly agree, that a lack of healthcare specialties results in prolonged hospital stays ($\chi^2=82.487$, $p<0.001$). Urgent care services lowering the number of ED patients was strongly accepted by both groups; nurses were more likely to strongly agree (49.0%) than physicians (28.9%) ($\chi^2=61.139$, $p<0.001$). Physicians (47.3%) were more likely to agree, and nurses (48.9%) were more likely to strongly agree that there were many patients in the ED for non-urgent reasons ($\chi^2=99.101$, $p<0.001$). These common patterns imply that nurses feel and understand the immediate effects of crowding and resource constraints more strongly than physicians do because they are at the frontline of patient care and flow management.

4. Discussion

The findings of this study present a critical perspective from healthcare professionals in Saudi Arabia addressing the persistent issues of emergency department crowding, its cost implications, insurance coverage, and infrastructural limits. The widespread opinion of ED crowding among respondents aligns with previous literature that highlights it as a substantial public health issue globally and within Saudi Arabia [21, 22]. Healthcare professionals' worries about bed shortages, prolonged periods of stay, and restrictions of fast-track clinics precisely reflect the systemic challenges of "access block" and inefficient patient flow that are primary drivers of overcrowding in emergency departments globally [23, 24]. The overwhelming agreement that urgent care clinics will minimize ED waiting times further supports worldwide evidence arguing for alternative care pathways to alleviate ED burden [25, 26].

The perceptions of healthcare funding and insurance adequacy reflect a significant area of concern. While Saudi Arabia has historically provided universal, free healthcare to its citizens, the findings underscore a current belief among healthcare workers that out-of-pocket payments remain too expensive for primary and specialized care, and that health insurance coverage for regular services is often inadequate [27, 28]. This correlates with data demonstrating that despite universal coverage, OOP expenditures comprise a considerable fraction of total health spending in the Kingdom, notably for pharmaceuticals and physician visits [9, 29]. The reported perception that most health insurance coverage is focused on

emergency services, rather than comprehensive routine care, shows a potential imbalance in the design or implementation of insurance plans. This discrepancy, coupled with the high perceived cost of out-of-pocket payments, generates a fundamental misalignment in the healthcare funding paradigm. This can encourage patients to utilize EDs for diseases that could be handled in primary care settings, since ED visits might be regarded as more readily covered or accessible, contributing to the crowding problem. This phenomenon fits with earlier research that have identified non-urgent visits as a substantial contributor to ED overcrowding in Saudi Arabia, typically motivated by convenience and perceived lack of access to primary care alternatives [30-32].

The statistically significant changes in Perception across professional roles offer valuable insights. Nurses regularly expressed more acute concerns regarding staffing shortages (including nurses and physicians), insufficient ED space, and inadequate medical devices compared to physicians. This gap in perception is likely due to nurses' frontline position, where they directly control patient flow, bed assignments, and resource allocation on a constant basis, observing the immediate effects of these inadequacies [9, 33]. Their stronger agreement on the need for more nurses and physicians closely reflects the known scarcity of healthcare professionals in Saudi Arabia [34]. This underlines the critical necessity for tailored workforce planning and recruitment methods that reflect the distinct needs and experiences of nursing professionals.

The opinion that a substantial percentage of patients visit the ED for non-urgent diseases, particularly among nurses, is a consistent finding in Saudi Arabian literature [6]. This underlines the necessity of strengthening basic healthcare services and boosting public understanding on proper ED utilization. The Ministry of Health (MoH) and Vision 2030 initiatives aim to strengthen primary care distribution and access, but the study's findings imply that these efforts have yet to fully transfer into a perceived reduction in non-urgent ED visits by healthcare workers [12]. The fragmentation of the public healthcare system, as emphasized in previous research, leads to poor coordination and duplication of services, may further exacerbate the reliance on EDs for non-urgent care [21, 22].

The implications of these findings for healthcare policy and planning are significant. Firstly, reducing ED crowding involves a multi-pronged approach that extends beyond the ED itself. Policies must focus on enhancing hospital-wide patient flow, notably by expanding inpatient bed availability and speeding discharge processes [35, 36]. Secondly, there is an apparent need for substantial insurance and finance reforms. The existing system, while aiming for universal coverage, tends to create a large financial burden on individuals through out-of-pocket expenditures, especially for chronic diseases [37]. Policymakers could explore increasing insurance coverage for routine and specialty treatment, cutting co-payments, and better managing pharmaceutical costs to ease this burden [38]. This would also assist to minimize the perceived need for non-urgent ED visits, thereby alleviating crowding [39, 40]. The continued growth in Saudi Arabia's insurance sector, motivated by legal reforms and Vision 2030, presents a chance to adopt these changes. Furthermore, quality improvement activities inside hospitals can play a vital role in boosting overall efficiency and patient experience, thereby impacting ED crowding [41]. Thirdly, workforce management in EDs requires immediate attention. The broad consensus among healthcare workers regarding staffing shortages, notably nurses and physicians, reveals a significant human resource deficiency [42]. Strategies to recruit, retain, and equally distribute healthcare professionals across all regions of Saudi Arabia are vital, especially in rural and underserved areas that confront considerable obstacles in attracting and maintaining qualified personnel. The Saudization program, while crucial for national workforce development, must guarantee that the supply of freshly trained Saudi professionals keeps pace with the demand caused by an expanding and privatizing healthcare system, to prevent exacerbating current staffing gaps [43]. Furthermore, the high incidence of workplace violence in EDs, predominantly verbal abuse and physical aggression, underscores the need for comprehensive violence prevention and intervention programs to ensure a safer working environment for healthcare professionals and mitigate stress and burnout. Digital health technologies also offer intriguing options for enhancing ED efficiency and patient flow [44, 45].

This study has certain limitations. As a cross-sectional study, it gathers impressions at a particular point in time, restricting the capacity to infer causality or track changes over time. Dependence on self-reported data presents the potential for recollection bias or social desirability bias. While efforts were made to distribute the survey throughout all administrative regions, the convenience sample approach may not fully represent the whole healthcare workforce, thereby introducing selection bias.

Despite these limitations, the study gives unique insights into the complex challenges facing emergency departments in Saudi Arabia from the perspective of individuals directly involved in care delivery. Future research should involve longitudinal studies to examine changes in Perception and the impact of policy initiatives across time. Further qualitative research should address the underlying reasons for perceived insurance gaps and the specific barriers to primary care access that drive non-urgent ED visits. Investigations exploring the effectiveness of various interventions targeted at increasing patient flow, such as the implementation of urgent care facilities and enhanced bed management systems, might also be valuable. Ultimately, a holistic, system-wide strategy, informed by the detailed perceptions of the healthcare workers, is important to ensure permanent improvements in ED performance, patient outcomes, and the overall efficiency of the Saudi Arabian healthcare system in line with Vision 2030.

5. Conclusion

The findings of this study demonstrate the multiple challenges contributing to ED crowding in Saudi Arabia, as viewed by healthcare professionals. The widespread consensus on concerns such as staff shortages, inadequate infrastructure, excessive out-of-pocket costs, and gaps in insurance coverage emphasizes structural inefficiencies that increase ED overcrowding. Nurses highlight resource shortages and physicians focused on financial challenges encountered by patients.

The economic cost of healthcare, driven by insurance constraints and excessive personal expenditure, further stresses the system, pushing individuals to EDs as a default option.

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