Alsulimani Saudi J Er Med. 2022;3(2):120-129
https://doi.org/10.24911/SJEMed/72-1649846851

ORIGINAL ARTICLE

Public awareness of triage in emergency departments in Saudi Arabia in the era of COVID-19

Loui K. Alsulimani[1]

ABSTRACT

Background: There is an increasing demand for services from the emergency department (EDs), which has limited resources. The triage process is the key determining step for prioritization in EDs, especially during pandemics. This study aimed to assess public awareness of the triage process in EDs and the effect of the COVID-19 pandemic on awareness levels.

Methods: This cross-sectional study was performed from August to October 2020. Data were collected using an online survey that was randomly distributed to the public in Saudi Arabia using social media.

Results: Of the 1,047 people who received the survey, 687 (66%) completed it. The majority of the respondents (80%) knew why some patients were taken to a room before others, even though they may not have waited as long, and 85.3% thought this was fair. However, only 52% knew exactly what triage meant. Some factors seemed to significantly influence the level of awareness, such as age group [*p* value = 0.001 and odds ratio (OR) = 0.170], gender (*p* value = 0.001 and OR = 0.170), employment (*p* value < 0.001 and OR = 4.904), and region of residency (*p* value = 0.005 and OR = 2.556). The COVID-19 pandemic did not affect participants' general knowledge about triage (*p* value = 0.555, OR = 1.122).

Conclusion: The majority of the respondents were aware of the triage process in EDs and thought it was fair. However, there is an existing need for more information when visiting EDs, especially after going through the triage process. ED visitors' expectations of more clarification and communication should be addressed by the responsible administrations.

Keywords: Triage, public, awareness, emergency, COVID-19.

Introduction

Emergency care is among the most sensitive areas of health care in terms of factors such as urgency and crowding. Urgent treatment needs arise from a combination of physical and psychological trauma resulting from sudden, unexpected, painful, and often life-threatening illness that brings a patient to emergency services [1]. Typically, emergency departments (EDs) worldwide have limited staff, space, and equipment. Patients often must wait for a long time before they are seen by a physician and must wait even longer to be transferred to a hospital bed. The result of these long waits is not just inconvenience but the deterioration of overall patient outcomes. The quality of care is affected, the health of the patient is at risk, the productivity of the staff is disturbed, and the cost of health care services increases [2]. In addition, the widespread COVID-19 pandemic represents a very challenging problem for EDs. The causative agent, SARS-CoV-2, is very infectious for health care workers and patients and can lead to fatal disease, especially for older patients with comorbidities such as diabetes mellitus, liver diseases, heart diseases, renal diseases, organ transplantation, and obesity [3,4]. This agent has caused more than 250 million cases of COVID-19 and 5 million deaths as of the end of 2021 [5]. Furthermore, it progresses quickly in intensive care unit patients, such as those with severe hypoxia, acute

Correspondence to: Loui K. Alsulimani
*Emergency Medicine Consultant and Assistant Professor, Department of Emergency Medicine, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia.
Email: lkalsulimani@kau.edu.sa
Full list of author information is available at the end of the article.
Received: 13 April 2022 | **Accepted:** 24 April 2022

respiratory distress, and acute renal failure [6]. All these factors present challenges for the EDs [7-9]. The COVID-19 pandemic has increased workload and has led to crowding in EDs [10]. This is because suspected COVID-19 patients must be separated from other patients. Moreover, health care workers must wear full protective equipment, which limits their productivity; furthermore, additional work is created by the need for frequent monitoring of COVID-19 patients' vital signs [11]. Increased ED crowding has a negative impact on patient outcomes and work processes for health care workers [12-15].

A cross-sectional survey was conducted in 2010 to identify the factors involved in patients' decision to visit a specific local ED. Of the 634 participants, 44% chose distance as their major reason for choosing that ED, while 9.3% chose wait time [16]. Reviewed studies showed similar results for most of the factors that may influence patients' decision to visit an ED instead of a primary health care centre (PHCC) [16]. A high percentage of patients reported a perception of urgency, believing that their condition was urgent even if the nurse triage classified it as nonurgent. Other factors included convenience and ease of access since patients tend to use EDs because they can access them 24 hours a day, 7 days a week; additionally, some patients reported dissatisfaction with PHCCs due to lack of access, frustration with the appointment system, and limited open hours [17,18].

The ED uses a screening and classification (triage) system to identify priorities to ensure the most effective allocation of available staff and equipment. The workplace environment of the ED is unique, complex, and unpredictable. This is apparent in the varying and often exorbitant numbers of patients treated [19]. Triage is a process of screening patients according to medical needs in an effort to prioritize the necessary medical care. The primary goal of triage is to identify life-threatening conditions. The secondary goal is to prioritize patients according to urgency [20].

This comparative cross-sectional study, which was conducted in 2020, aimed to evaluate and compare the Saudi population's awareness of the triage system, including its scoring and prioritization process, before and during the COVID-19 pandemic in an effort to decrease the burden on EDs and improve the health care system and patient satisfaction, especially as we could not find other studies that assessed public awareness of this system during the pandemic. This study aimed to assess public awareness in an effort to locate the gaps that can be targeted with education and awareness campaigns.

Methods

This was a comparative cross-sectional community-based study using an online survey that was distributed from August 30, 2020 to October 25, 2020. It reflects the awareness level of participants from Saudi Arabia during this period. For those who had visited the ED, the targeted period was the preceding year, which reflected approximately 6 months before (and 6 months after) the announcement of the presence of COVID-19 in Saudi Arabia on March 2, 2020 [21].

The inclusion criteria for the study were members of the general population who had visited the ED within the past year, adults older than 18 years, Arabic speakers, and residents of Saudi Arabia. Participants who had visited the ED during the 6 months before the start of the study were considered to have visited during the COVID-19 pandemic, while those whose visits did not take place during that period were considered to have visited before the pandemic. The study received ethical approval from the Unit of Biomedical Ethics Research Committee of King Abdulaziz University, Faculty of Medicine, Jeddah, Saudi Arabia (Reference No. 419-20). Participants who refused to complete the consent form were excluded.

The questionnaire was first developed and validated by a previous study [22] and was derived from a study by Alhabdan et al. [23], who translated it into Arabic. The questionnaire was modified for use within the framework of this study to increase the target population's (the public's) understanding. Data were collected using an online survey tool (SurveyMonkey, Inc., Palo Alto, CA, www.surveymonkey.com). An invitation to complete the survey was distributed to the public through the social media applications Twitter (where the author posted the survey link on his account) and WhatsApp (where the data collection team directly distributed the link to random people in their contacts). The survey had two versions (supplementary to this article): English and Arabic.

Data were collected into Microsoft® Excel (Office 365) spreadsheets (Microsoft Corporation, Redmond, WA) and then entered into International Business Machines Corporation (IBM)'s Statistical Package for the Social Sciences for Windows (version 25, Armonk, NY, IBM Corp) for statistical analysis. Categorical variables are presented as numbers and percentages. We compared the participants' knowledge of the ED's triage system before and during the COVID-19 pandemic using the chi-square test. A logistic regression analysis of the factors affecting participants' knowledge of triage was performed. All tests were two-tailed, and a p value < 0.05 was considered statistically significant. Data were double-checked for accuracy and verified by the author.

Results

Of the 1,047 individuals who received the survey, 687 (66%) completed it. Of those 687 participants, 648 answered the Arabic version, and 39 answered the English version. Among the respondents, 42% were 20-29 years old, 6% were younger than 20 years and 13% were over 50 years old. The sample comprised 56% women, and 49% were married. In total, 65% of the respondents had a bachelor's degree, 38% were unemployed, and 19% worked in the health sector. Fifty-three percent were from the western region, while 9% were from the eastern region. Of all the participants, 33% had a monthly family income of more than 15,000 Saudi riyals (Table 1).

Fifty-five percent of the participants had visited the ED of any hospital more than once in the previous year, and 39% developed their complaint on the day of their ED visit. Of the participants, 38% were patients, and 36% were family members; 59% did not try to call their

Table 1. *Demographic characteristics of participants.*

		N	%
Age (in years)	Less than 20	39	6
	20-29	291	42
	30-39	159	23
	40-49	112	16
	50 and above	86	13
Gender	Female	386	56
	Male	301	44
Highest level of education	Ignorant	5	1
	Completed high school	111	16
	Diploma	61	9
	Bachelor	445	65
	High degree	65	9
Current job	Government sector (not health)	117	17
	Health sector	129	19
	Military sector	31	5
	Private sector (not health)	45	7
	Private work	16	2
	Unemployed	264	38
	Other	85	12
Marital status	Divorced	20	3
	Married	334	49
	Single	320	47
	Widowed	13	2
Nationality	Non-Saudi	32	5
	Saudi	655	95
Place of residence in Saudi Arabia	Central Region	119	17
	Eastern Region	64	9
	Northern Region	20	3
	Southern Region	117	17
	Western Region	367	53
Monthly family income (Saudi Riyal)	Less than 5,000	77	11
	From 5,000 to 10,000	202	29
	Between 10,000 to 15,000	183	27
	More than 15,000	225	33

primary care doctor before coming to the ED; 54% went to government hospitals; and 43% had visited the ED during the previous 6 months. Of all the cases, 41% were not initially classified as critical in the ED, and 37% were not classified as a suspected COVID-19 case. Among the participants, 84% did not have a primary care doctor or other health provider, and 65% reported that they did not try to reach a primary care doctor before going to the ED (Table 2).

The participants' level of knowledge was high: 82% of those who visited the ED before the pandemic said that they knew why some patients were taken to a room before others even though they may not have waited as long, compared to 79% of those who visited the ED during the pandemic; moreover, 85% of those who visited before the pandemic thought that this process was fair, compared with versus 86% of those who visited during the pandemic. A total of 51% who visited before the pandemic versus 44% who visited during the pandemic knew what triage meant, and 41% and 47%, respectively, knew what a teaching hospital was (Table 3).

Regarding the participants' reasons for preferring the ED over another health care centre, among those who visited the ED before the pandemic, 72% said they were too sick to visit another centre and needed to go to the ED, while 25% said it was faster to see a doctor at the ED. Only 6% said they visited the ED because of medical insurance coverage and eligibility for treatment, and 4% said that they did so for other financial reasons. Among those who visited the ED during the pandemic, 61% said they were too sick to visit another centre and needed to go to the ED, while 26% said it was faster to see a doctor at the ED. Only 8% said that they chose to visit the ED because of medical insurance coverage, and 6% said that they did so for other financial reasons. There were significant differences before and during the pandemic only regarding the following reasons for visiting the ED: "they were too sick to go to another centre and needed

Table 2. *History of emergency hospital visits.*

		N	%
Have you (as a patient or a companion) ever visited the ED of any hospital in the last year?	No	153	22
	Yes, more than once.	375	55
	Yes, only once.	159	23
When did the problem at that time start?	Same day	269	39
	In a week period	127	18
	In more than a week	45	7
	A long-term chronic problem	95	14
Were you a patient waiting to be seen or a family member?	Co-worker	9	1
	Family member	246	36
	Friend	20	3
	Patient	261	38
Did you try to call your primary care doctor before coming to the ED?	No	404	59
	Yes	132	19
What kind of hospital did you go to?	Government hospital	369	54
	Military hospital	52	8
	Private hospital	93	14
	University hospital	22	3
In the ED, was the case initially classified as a critical case?	I don't know	92	13
	No	284	41
	Yes	160	23
Did you visit ED in the last 6 months?	No	390	57
	Yes	297	43
Was the case classified as a COVID-19 suspected case?	No	256	37
	Yes	43	6
Do you have a primary care doctor or another health provider?	No	575	84
	Yes	112	16
Would you try to reach a primary care doctor before going to the ED?	No	448	65
	Yes	239	35

to go to the ED (72% *vs.* 61%, respectively, $p = 0.004$)," "it is normal to go to the ED for care (12% *vs.* 18%, respectively, $p = 0.032$)" and "care is better at the ED (15% *vs.* 24%, $p = 0.007$)." Regarding the main reason for visiting the ED, 56% of those who visited before the pandemic said they chose the ED because of the hospital's resources, compared to 66% of those who visited after the pandemic; the difference was significant ($p = 0.011$). Moreover, there was a statistically significant difference between those who said they visited the ED because it was "close to where I worked" before and during the pandemic ($p = 0.026$) (Table 4).

A logistic regression analysis of the factors that affected the participants' knowledge about triage found that the significant factors were age, gender, employment, and location of residence; the other factors were nonsignificant. Significant differences were found between those under 20 years old and those over 50 years old [$p = 0.001$ and odds ratio (OR) = 0.170]; between females and males ($p = 0.001$ and OR = 0.170); between health care workers and unemployed respondents ($p < 0.001$ and OR = 4.904); and between those living in the eastern and western regions ($p = 0.005$ and OR = 2.556). The COVID-19 pandemic was not a statistically significant factor ($p = 0.555$) (Table 5).

When asked about their expectations from the ED, 90% of the respondents wanted to hear updates about delays in being seeing by a doctor, and 85% wanted to know why they had to wait. More than 80% reported that periodic updates about delays, information about the health care system, and information about triage and medical conditions were important (Figure 1).

Regarding the participants' beliefs about how being seen at a teaching hospital might affect their care, there was no significant difference between those who visited the ED before the pandemic and those who visited during the pandemic. However, 23% versus 27%, respectively, said that teaching hospitals train future doctors, while 24% versus 21% believed that being treated at a teaching hospital meant that they would be seen by more than one doctor (Figure 2).

Overall, 32% and 35% before and during the pandemic, respectively, expected to wait from half an hour to 1 hour to obtain laboratory results and computed tomography (CT) scan results. Forty-five percent and 27%, respectively, thought they would wait less than half an hour to obtain X-ray results and be taken to a bed if admitted (Figure 3).

Table 3. *Participants' knowledge about the triage system in the ED before and during the COVID-19 pandemic.*

		Total	Before COVID-19		During COVID-19			
		N	*N*	%	*N*	%	χ^2	*p*-value
Do you know why some patients are taken to a room before others even though they may not have waited as long?	No	135	71	18.2	64	21.5	1.194	0.275
	Yes	552	319	81.8	233	78.5		
Do you think this (what is in the previous question) is fair?	No	101	59	15.1	42	14.1	0.131	0.717
	Yes	586	331	84.9	255	85.9		
Do you know what triage means?	No	330	200	51.3	130	43.8	3.811	0.051
	Yes	357	190	48.7	167	56.2		
Do you know what a teaching hospital is?	No	386	229	58.7	157	52.9	2.349	0.125
	Yes	301	161	41.3	140	47.1		

Table 4. *Participants views on cause of preference and cause of visit of the ED before and during the COVID-19 pandemic.*

		Total *N*	Before COVID-19		During COVID-19		χ^2	*p*-value
			N	%	*N*	%		
What would make you go to the ED directly without going to another health care center?	Too sick-need to go to the ED	462	280	71.8	182	61.3	8.465	0.004*
	It is regular to go to the ED for care	102	48	12.3	54	18.2	4.602	0.032*
	No appointments available at other healthcare centers	116	66	16.9	50	16.8	0.001	0.976
	No file in other healthcare centers	76	37	9.5	39	13.1	2.276	0.131
	Need tests that other healthcare centers cannot do	155	86	22.1	69	23.2	0.135	0.714
	Care is better in the ED	130	60	15.4	70	23.6	7.361	0.007*
	It is faster to see a doctor in the ED	173	96	24.6	77	25.9	0.154	0.695
	Medical insurance coverage and eligibility for treatment	48	25	6.4	23	7.7	0.462	0.497
	Other financial reasons	31	14	3.6	17	5.7	3.048	0.218
	A doctor advised to go to the ED directly	66	39	10.0	27	9.1	0.160	0.689
	Close to where I live/work	75	38	9.7	37	12.5	1.277	0.258
What is your main reason for going to a certain ED?	Hospital resources	416	220	56.4	196	66.0	6.482	0.011*
	Reputation of medical staff	247	135	34.6	112	37.7	0.701	0.402
	Speed of care	337	194	49.7	143	48.1	0.172	0.679
	Insurance coverage or eligibility for treatment	133	82	21.0	51	17.2	1.604	0.205
	A doctor told me to go to that ED	103	58	14.9	45	15.2	0.010	0.919
	Close to where I live/work	252	157	40.3	95	32.0	4.965	0.026*

* Statistically signficant *p*-value

Discussion

This comparative cross-sectional community-based study included 687 participants from Saudi Arabia. It aimed to assess and evaluate the Saudi population's awareness of the triage system, its scoring, and its priorities before and during the COVID-19 pandemic in an effort to decrease the burden on EDs and improve the health care system and patient satisfaction. The factors that significantly affected participants' knowledge about triage were age, gender, employment, and residence; other factors were nonsignificant.

The growing number of patients seeking care at EDs can lead to overcrowding and often adds to organizational problems. Triage aims to predict the severity of disease, with the aim of managing patient flow [24]. The public's knowledge of triage systems is not a widely investigated topic in the literature. Addressing this issue is important because increased knowledge of triage systems is associated with increased patient satisfaction [25], especially in the era of the COVID-19 pandemic.

In the present study, 80% of the participants reported understanding why some patients were seen before others, and 85.3% thought this process was fair. When comparing the responses to this question between those who visited the ED before the pandemic and those who visited it during the pandemic, there was no significant difference. In another study by Seibert et al. [22], 68% of participants reported understanding this issue, and those who understood it were more likely to consider the process fair [23]. Furthermore, 52% of the participants in the present study knew what triage means, more than the 11% reported by Alhabdan et al. [23] and the 33% reported in the USA [22]. The present results are consistent with the findings of Adeniji and Mash [26], who reported a percentage of 50%. There was no significant difference between those who visited the ED before the pandemic and those who visited during the pandemic regarding

Table 5. *Logistic regression analysis of factors affecting participants' knowledge about triage.*

		B	*p*-value	OR	95% CI for OR	
					Lower	Upper
Age (in years)	Less than 20	-1.769	0.001	0.170	0.057	0.507
	20-29	-0.045	0.905	0.956	0.457	1.998
	30-39	0.116	0.723	1.123	0.591	2.135
	40-49	0.326	0.323	1.386	0.725	2.649
	50 and above[a]		1			
Sex	Female	-1.769	0.001	0.170	0.057	0.507
	Male[a]		1			
Highest level of education	Ignorant[a]		1			
	Completed high school	-1.879	0.125	0.153	0.014	1.682
	Diploma	-1.966	0.108	0.140	0.013	1.539
	Bachelor	-2.122	0.089	0.120	0.010	1.378
	High degree	-1.608	0.203	0.200	0.017	2.385
Current job	Government sector (not health)	-0.194	0.490	0.824	0.475	1.427
	Health care workers	1.590	<0.001	4.904	2.693	8.930
	Military sector	0.168	0.717	1.182	0.478	2.922
	Private sector (not health)	-0.626	0.261	0.535	0.179	1.595
	Private work	-0.522	0.144	0.593	0.294	1.195
	Other	-0.082	0.762	0.921	0.540	1.571
	Unemployed[a]		1			
Marital status	Divorced	0.173	0.827	1.189	0.251	5.637
	Married	-0.431	0.480	0.650	0.197	2.147
	Single	-0.425	0.521	0.654	0.178	2.393
	Widowed[a]		1			
Nationality	Non-Saudi	0.099	0.819	1.104	0.473	2.579
	Saudi[a]		1			
Place of residence in Saudi Arabia	Central Region	0.194	0.428	1.214	0.752	1.960
	Eastern Region	0.939	0.005	2.556	1.321	4.948
	Northern Region	-0.134	0.803	0.875	0.305	2.511
	Southern Region	-0.319	0.174	0.727	0.459	1.151
	Western Region[a]		1			
Monthly family income	Less than 5,000	-0.395	0.194	0.674	0.371	1.222
	From 5,000 to 10,000	-0.245	0.275	0.783	0.505	1.215
	Between 10,000 to 15000	0.050	0.826	1.052	0.671	1.649
	More than 15,000[a]		1			
Have you ever visited the ED of any hospital in the last year?	No	0.106	0.696	1.112	0.653	1.893
	Yes, more than once.	0.198	0.344	1.219	0.809	1.835
	Yes, only once[a]		1			
COVID-19 pandemic	Before the pandemic[a]		1			
	During the pandemic	0.115	0.555	1.122	0.765	1.645

[a] Reference category.

the responses to the four knowledge questions. This suggested that the COVID-19 pandemic is not associated with an increase in the public's awareness regarding the ED, a finding that was confirmed by the logistic analysis, in which the COVID-19 pandemic was not a significant predictor of knowledge. However, the percentage of participants who knew what "triage" and "teaching hospital" meant was higher among those who visited the ED during the pandemic than among those who visited the ED before the pandemic. No other studies that have assessed public awareness during the pandemic could be found for comparison with the results of the current study.

In the present study, more than 80% of the participants viewed the provision of information about medical conditions (e.g., heart attack, stroke) during the waiting period as important, consistent with the findings of a study conducted in Boston [27]. Overall, 80% of the participants were aware of the importance of triage and how the ED operates, a greater proportion than the 61% reported by Alhabdan et al. [23].

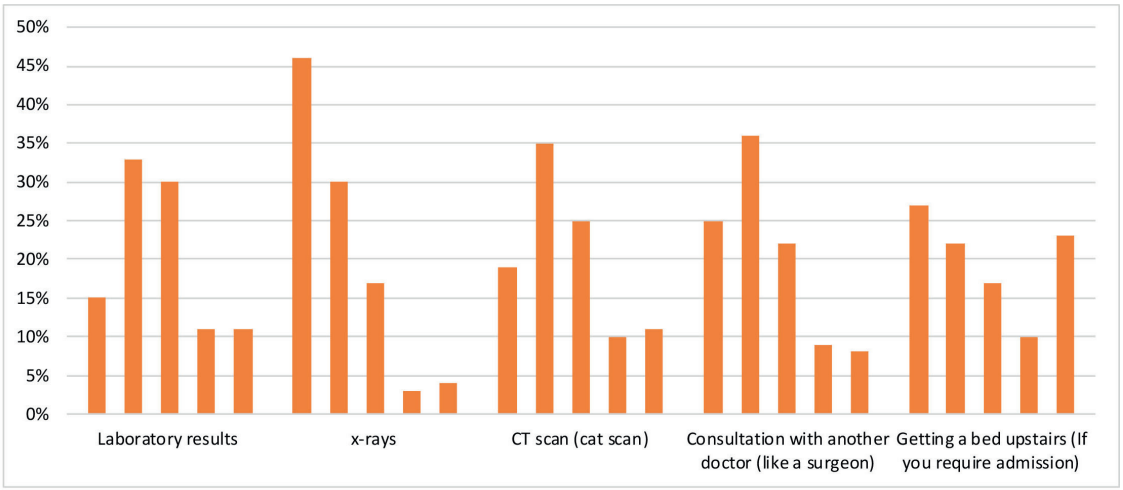

Figure 1. *Participants' expectations from the ED.*

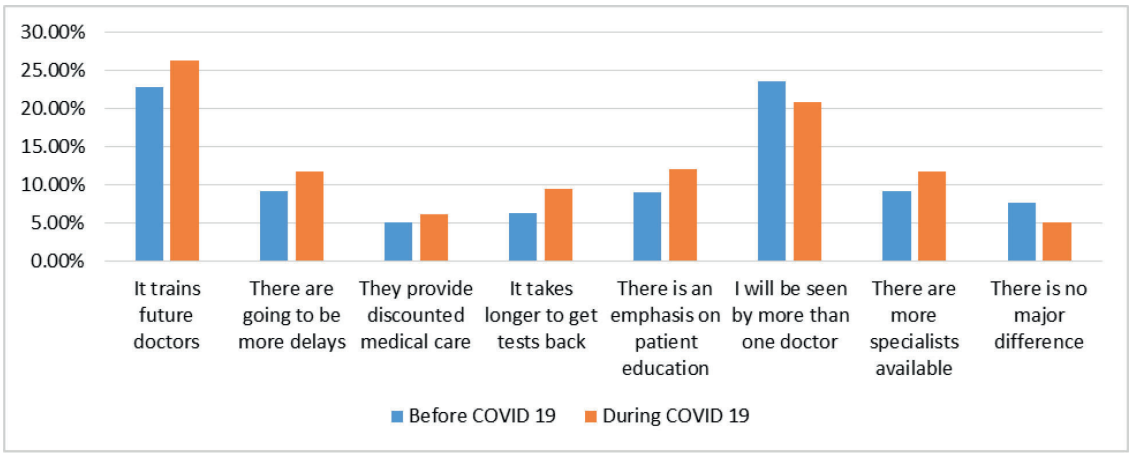

Figure 2. *Participants views on how being at a teaching hospital might affect their care before and during the pandemic.*

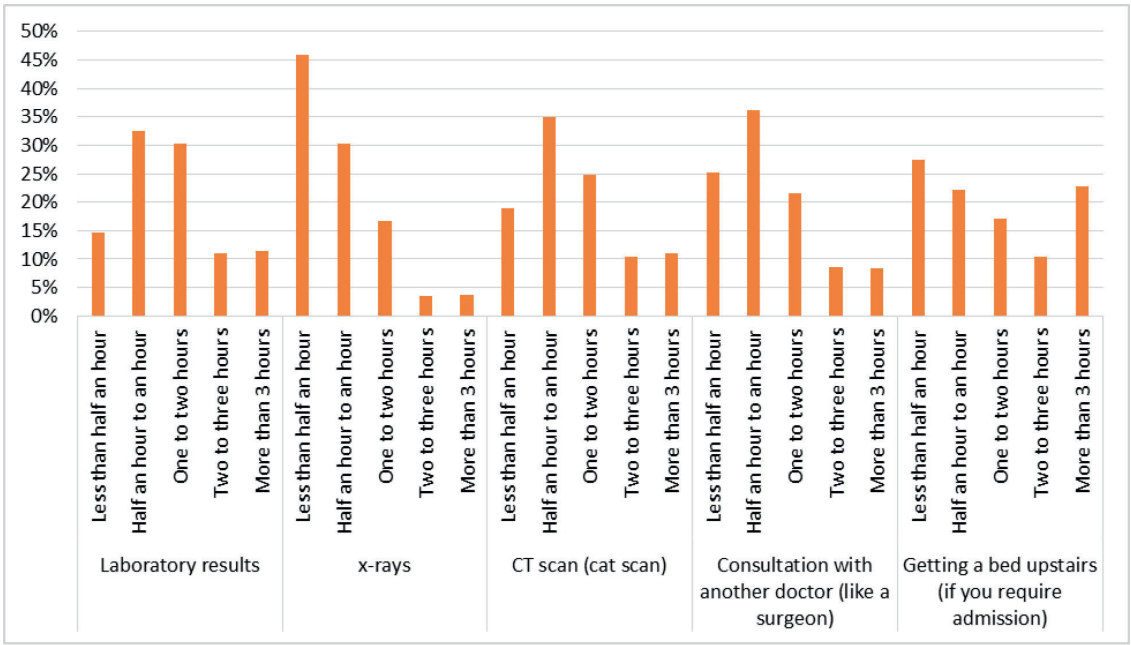

Figure 3. *Participants' expectations on time required for the procedures in the ED until the results are obtained.*

Primary health care (PHC) plays an integral role in the quality of every sector of the health care system, including the ED. Overall health in communities, mortality, and health inequalities can be improved by providing high-quality primary care services [28]. Access to well-established PHC services reduces ED visits by approximately 50% and referrals to specialty care by 30% [29]. A lack of regular access to primary care providers (PCPs) is among the reasons for ED overcrowding worldwide [30,31].

Of the participants, 84% had no primary care doctor or other health provider. This finding is not in agreement with an international study conducted by Van den Berg et al. [32] that showed the following percentages of participants without a PCP: 7.8% in Denmark, 10.7% in Belgium, 16.6% in Finland, 20.5% in England, 23.8% in Australia, 25.7% in Canada, 29% in Germany, 41% in Norway and Slovenia, 51.9% in the Czech Republic, and 73.6% in Slovakia. Additionally, 35% of the participants had attempted to contact a primary care doctor before going to the ED. This is a good proportion (although it needs to be increased) and was higher than the 22% reported in the study by Afilalo et al. [33]. This may be due to differences in health care among different countries.

Regarding the participants' reasons for preferring to go to the ED instead of another health care centre, there were significant differences before and during the pandemic for only the following reasons: "too sick to go to another service and needed to go to the ED (72% *vs.* 61%, respectively)," "it is normal to go to the ED for care (12% *vs.* 18%, respectively)" and "care is better at the ED (15% *vs.* 24%, respectively)." It is notable that a lower proportion of patients who were seen during the pandemic than before the pandemic indicated being "too sick" as a reason for seeking care at the ED. This may be because during the pandemic, people are afraid of becoming infected if they go to the hospital. However, a higher proportion of patients seen during the pandemic indicated that they chose the ED for care because they normally go to the ED for care or because better care is available at the ED (although the difference was small); further research is needed to determine the exact reasons for these beliefs, which may contribute to increased crowding at the ED. Regarding the main reason for the ED visit, 56% of those seen before the pandemic cited hospital resources, compared to 66% of those seen during the pandemic. This matter must also be addressed in health education campaigns, as such habits can cause hospital resources to be wasted on those who do not need them.

When asked about how being seen at a teaching hospital might affect their care, there was a nonsignificant difference between patients seen before and during the pandemic for all items. However, the proportion of participants who thought that being treated at a teaching hospital meant that they would be seen by more than one doctor was lower among those who visited the ED during the pandemic than those who visited before the pandemic. This difference may be because people became aware that most health care workers are now very busy with the high number of COVID-19 cases and deaths.

This study found that 32% and 35% of participants expected to wait half an hour to an hour to obtain laboratory and CT scan results, respectively. This result is consistent with another study that found that 58% of respondents expected to receive their test results within 1 hour [33]. This means that more participants expect to wait long periods to undergo different procedures. The reasons for this may be clarified in further studies to improve the provision of health care services.

Age, gender, employment, and place of residence were significantly associated with participants' knowledge about triage. Significant differences existed between those under 20 years old and those over 50 years old, females and males, health care workers and unemployed individuals, and between the eastern and western regions. People who were younger than 20 years old were more likely to have lower awareness than people who were older than 50 years (OR = 0.170). These results differ from those of a study that found that participants who were younger than 20 years old had a greater understanding of the triage system than those who were over 50 years old; however, this difference was not statistically significant [23]. Moreover, in the current study, females were more likely to have less awareness than males (OR = 0.170), which was contrary to a previous study that found that gender was a statistically nonsignificant factor [22]. Additionally, health care workers were more likely to have higher awareness of the triage system than unemployed respondents (OR = 4.904) in the current study although this was also a nonsignificant factor in a similar previous study [23]. Finally, participants who lived in the were more likely to have higher awareness of the triage system than those who lived in the western region (OR = 2.556), a difference that could be due to more efficient health education in the eastern region. The COVID-19 pandemic was a nonsignificant predictor of public knowledge, as there was no significant difference in knowledge between participants who visited the ED before and during the pandemic.

Limitation

Because of the nature of the study, recall bias may have occurred. However, the study required the participants to recall experiences only within 1 year, which was thought to be a reasonable period. Additionally, inherent variations in work pressure and patient flow in the ED over time might have influenced our findings. However, such influence is not expected to be a major issue since such variations in the ED over time are not large, and the sample size was large enough to represent the average situation in the ED over time.

Conclusion

A large percentage of the respondents were aware of the triage process in EDs, and they thought it was fair. However, the respondents indicated a desire to receive more information when they visit the ED, especially after they have gone through the triage process. Most of our population did not have a primary care doctor.

This indicates a need to increase public awareness of the importance of primary care through different media, such as health education campaigns, mass media, or social media. Furthermore, a large percentage of the respondents reported that they would not try to contact a primary care doctor before going to the ED. Providing community members with access to primary care is important.

The number of respondents who listed hospital resources, regularly visiting the ED for care, and receiving better care at the ED as reasons for visits was higher during the pandemic than before it, and further research is necessary to determine the specific reasons for these responses, which may contribute to increased crowding at the ED. These responses also indicate the need for related health education campaigns, as unnecessary visits to the ED can waste hospital resources. The reasons for this expectation must be clarified in further studies to improve the health care services provided to our clients.

Age, gender, employment, and residence were significantly associated with participants' knowledge about triage. The COVID-19 pandemic was not significantly associated with participants' knowledge. The respondents in this study wanted more general health information and information regarding their visit. These expectations should be met through either public health campaigns or brochures available in the ED. Finally, ED visitors' expectations regarding more clarification and communication should be addressed by the responsible administration.

Acknowledgments

The author would like to thank all the data collection teams who helped with distributing the survey to the public.

List of Abbreviations

CT	Computed tomography
ED	Emergency department
IBM	International Business Machines Corporation
PCPs	Primary care providers
PHCC	Primary health care centre
USA	United States of America

Conflict of interest

The author declares no conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

None.

Consent to participate

Written informed consent was obtained from all the participants.

Ethical approval

The study was approved by the Unit of Biomedical Ethics Research Committee of author's institute (IRB No. 419-20) 18-8-2020.

Author details

Loui K. Alsulimani[1]

1. Emergency Medicine Consultant and Assistant Professor, Department of Emergency Medicine, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia

References

1. Aacharya RP, Gastmans C, Denier Y. Emergency department triage: an ethical analysis. BMC Emerg Med. 2011;11(1):1–3. https://doi.org/10.1186/1471-227X-11-16
2. Feng YY, Wu I, Chen TL. Stochastic resource allocation in emergency departments with a multi-objective simulation optimization algorithm. Health Care Manag Sci. 2017;20(1):55–75. https://doi.org/10.1007/s10729-015-9335-1
3. Allotey J, Stallings E, Bonet M, Yap M, Chatterjee S, Kew T, et al. Clinical manifestations, risk factors, and maternal and perinatal outcomes of coronavirus disease 2019 in pregnancy: living systematic review and meta-analysis. BMJ. 2020;370. https://doi.org/10.1136/bmj.m3320.
4. Swedish Public Health Agency. Information to risk groups regarding COVID-19. 2022 [cited 2022 Apr 2]. Available from: https://www.folkhalsomyndigheten.se/smittskydd-beredskap/utbrott/aktuella-utbrott/covid-19/rad-och-information-till-riskgrupper/
5. Johns Hopkins University & Medicine. Saudi Arabia overview. Coronavirus Resource Canter; 2022 [cited 2022 Apr 2]. Available from: https://coronavirus.jhu.edu/region/saudi-arabia
6. Bhatraju PK, Ghassemieh BJ, Nichols M, Kim R, Jerome KR, Nalla AK, et al. Covid-19 in critically ill patients in the Seattle region - case series. N Engl J Med. 2020;382(21):2012–22. https://doi.org/10.1056/NEJMoa2004500
7. Gagliano A, Villani PG, Manelli A, Paglia S, Bisagni PA, Perotti GM, et al. COVID-19 epidemic in the middle province of Northern Italy: impact, logistics, and strategy in the first line hospital. Disaster Med Public Health Prep. 2020;14(3):372–6. https://doi.org/10.1017/dmp.2020.51
8. Paganini M, Conti A, Weinstein E, Della Corte F, Ragazzoni L. Translating COVID-19 pandemic surge theory to practice in the emergency department: how to expand structure. Disaster Med Public Health Prep. 2020;14(4):541–50. https://doi.org/10.1017/dmp.2020.57
9. Whiteside T, Kane E, Aljohani B, Alsamman M, Pourmand A. Redesigning emergency department operations amidst a viral pandemic. Am J Emerg Med. 2020;38(7):1448–53. https://doi.org/10.1016/j.ajem.2020.04.032
10. American College of Emergency Physicians. Crowding & boarding. 2016 [cited 2022 Apr 2]. Available from: https://www.acep.org/administration/crowding%2D%2Dboarding/
11. Af Ugglas B, Skyttberg N, Wladis A, Djärv T, Holzmann MJ. Emergency department crowding and hospital transformation during COVID-19, a retrospective, descriptive study of a university hospital in Stockholm, Sweden. Scand J Trauma Resusc Emerg Med. 2020;28(1):1–10. https://doi.org/10.1186/s13049-020-00799-6
12. Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA. Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. BMJ. 2011;342. https://doi.org/10.1136/bmj.d2983

13. McCusker J, Vadeboncoeur A, Lévesque JF, Ciampi A, Belzile E. Increases in emergency department occupancy are associated with adverse 30-day outcomes. Acad Emerg Med. 2014;21(10):1092–100. https://doi.org/10.1111/acem.12480

14. Sun BC, Hsia RY, Weiss RE, Zingmond D, Liang LJ, Han W, et al. Effect of emergency department crowding on outcomes of admitted patients. Ann Emerg Med. 2013;61(6):605–11. https://doi.org/10.1016/j.annemergmed.2012.10.026

15. Johnston A, Abraham L, Greenslade J, Thom O, Carlstrom E, Wallis M, et al. Staff perception of the emergency department working environment: integrative review of the literature. Emerg Med Australas. 2016;28(1):7–26. https://doi.org/10.1111/1742-6723.12522

16. Grafstein E, Wilson D, Stenstrom R, Jones C, Tolson M, Poureslami I, et al. A regional survey to determine factors influencing patient choices in selecting a particular emergency department for care. Acad Emerg Med. 2013;20(1):63–70. https://doi.org/10.1111/acem.12063

17. Uscher-Pines L, Pines J, Kellermann A, Gillen E, Mehrotra A. Deciding to visit the emergency department for non-urgent conditions: a systematic review of the literature. Am J Manag Care. 2013;19(1):47.

18. Alyasin A, Douglas C. Reasons for non-urgent presentations to the emergency department in Saudi Arabia. Int Emerg Nurs. 2014;22(4):220–5. https://doi.org/10.1016/j.ienj.2014.03.001

19. Abo-Hamad W, Arisha A. Simulation-based framework to improve patient experience in an emergency department. Eur J Oper Res. 2013;224(1):154–66. https://doi.org/10.1016/j.ejor.2012.07.028

20. Albahri OS, Albahri AS, Mohammed KI, Zaidan AA, Zaidan BB, Hashim M, et al. Systematic review of real-time remote health monitoring system in triage and priority-based sensor technology: taxonomy, open challenges, motivation and recommendations. J Med Syst. 2018;42(5):1–27. https://doi.org/10.1007/s10916-018-0943-4

21. Alahmari AA, Khan AA, Elganainy A, Almohammadi EL, Hakawi AM, Assiri AM, et al. Epidemiological and clinical features of COVID-19 patients in Saudi Arabia. J Infect Public Health. 2021;14(4):437–43. https://doi.org/10.1016/j.jiph.2021.01.003

22. Seibert T, Veazey K, Leccese P, Druck J. What do patients want? Survey of patient desires for education in an urban university hospital. West J Emerg Med. 2014;15(7):764. https://doi.org/10.5811/westjem.2014.9.20674

23. Alhabdan N, Alhusain F, Alharbi A, Alsadhan M, Hakami M, Masuadi E. Exploring emergency department visits: factors influencing individuals' decisions, knowledge of triage systems and waiting times, and experiences during visits to a tertiary hospital in Saudi Arabia. Int J Emerg Med. 2019;12(1):1–8. https://doi.org/10.1186/s12245-019-0254-7

24. Azeredo TR, Guedes HM, de Almeida RA, Chianca TC, Martins JC. Efficacy of the Manchester Triage System: a systematic review. Int Emerg Nurs. 2015;23(2):47–52. https://doi.org/10.1016/j.ienj.2014.06.001

25. Shah S, Patel A, Rumoro DP, Hohmann S, Fullam F. Managing patient expectations at emergency department triage. Patient Exp J. 2015;2(2):31–44. https://doi.org/10.35680/2372-0247.1090

26. Adeniji AA, Mash B. Patients' perceptions of the triage system in a primary healthcare facility, Cape Town, South Africa. Afr J Prim Health Care Fam Med. 2016;8(1):1–9. http://dx.doi.org/10.4102/phcfm.v8i1.1148

27. Kit Delgado M, Ginde AA, Pallin DJ, Camargo Jr CA. Multicenter study of preferences for health education in the emergency department population. Acad Emerg Med. 2010;17(6):652–8. https://doi.org/10.1111/j.1553-2712.2010.00764.x

28. Hone T, Macinko J, Millett C. Revisiting Alma-Ata: what is the role of primary health care in achieving the sustainable development goals? Lancet. 2018;392(10156):1461–72. https://doi.org/10.1016/S0140-6736(18)31829-4

29. Kraaijvanger N, Van Leeuwen H, Rijpsma D, Edwards M. Motives for self-referral to the emergency department: a systematic review of the literature. BMC Health Serv Res. 2016;16(1):1–9. https://doi.org/10.1186/s12913-016-1935-z

30. Bornais JA, Crawley J, El-Masri MM. One stop: examining the reasons patients use the emergency department for nonurgent care and the barriers they face. J Emerg Nurs. 2020;46(2):163–70. https://doi.org/10.1016/j.jen.2019.08.007

31. Brasseur E, Gilbert A, Servotte JC, Donneau AF, D'Orio V, Ghuysen A. Emergency department crowding: why do patients walk-in? Acta Clin Belg. 2021;76(3):217–23. https://doi.org/10.1080/17843286.2019.1710040

32. Van den Berg MJ, van Loenen T, Westert GP. Accessible and continuous primary care may help reduce rates of emergency department use. An international survey in 34 countries. Fam Pract. 2016;33(1):42–50. https://doi.org/10.1093/fampra/cmv082

33. Afilalo J, Marinovich A, Afilalo M, Colacone A, Leger R, Unger B, et al. Nonurgent emergency department patient characteristics and barriers to primary care. Acad Emerg Med. 2004;11(12):1302–10. https://doi.org/10.1197/j.aem.2004.08.032