ORIGINAL ARTICLE

Patient's conception and attitude regarding triage system and waiting time at emergency department at Riyadh, Saudi Arabia

Rayyan Alhaqbani[1*], Rayan Bahmaid[1], Mohammed Almutairi[1], Wardah Almasoudi[2], Ali Elmasarwa[3], Abdussalam Alshehri[4]

ABSTRACT

Background: An increase in the number of visitors to the emergency department (ED) leads to overcrowding, long wait, and patient dissatisfaction. It is important to implement the decision-making process to avoid congestion and nonurgent cases. This study aims to assess patients' knowledge and attitude about the triage system and waiting times in ED.

Methods: This was a cross-sectional study conducted at the ED at Prince Mohammed bin Abdulaziz Hospital, Riyadh, Saudi Arabia. Data were collected using an online questionnaire form for all participants who met the inclusion criteria.

Results: In this study, 389 participants with mean age of 33.77 (SD =12.96) years were included, of them 54.2% were males. Moreover, only 15.2% of patients reported having primary care doctor or health providers among whom 41.9% reported that they tried to call their primary care doctor before coming to the ED. Moreover, 66.2% of participants reported having no knowledge about triage. Furthermore, 57% of participants wanted to know how long other patients have been waiting. Moreover, results showed that the most important information required by the patients was the periodic updates from ED staff about the delays (51.4%) followed by information about the health care system and how to find a primary care provider.

Conclusion: Most of the population were unaware of the triage and its definition; however, most of the participants had good knowledge considering why some patients were seen before others. Finally, the waiting expectation of tests results was worse in this study, which reflected low satisfaction level.

Keywords: Triage system, ED, waiting time, emergency.

Introduction

Emergency departments in hospitals possess significant importance in the health care system. Increasing numbers of patients visiting emergency rooms (ER), resulted in overcrowding, long waiting times, and poorer patient satisfaction [1]. It is not an easy task to reduce waiting times during an Emergency Department (ED) visit, but factors such as clarifying how the health services delivery process works and interacting with limited waiting times could help increase patient satisfaction [2]. According to several studies, most trips to the emergency room are for non-urgent reasons, which results in a significant expense and negative consequences [1]. Managing emergency departments effectively relies on a process known as triage. As a part of modern medical care, triage is one of the most crucial elements as it is necessary to allocate limited resources to an unlimited range of medical conditions, as well

Correspondence to: Rayyan Alhaqbani
*College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia.
Email: ra.alhaqbani@gmail.com
Full list of author information is available at the end of the article.
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as ensuring clinical justice for patients, triage systems play an important role in departmental organization, monitoring, and evaluation [3].

Triage systems are designed to maximize the value of life and health by determining who would not receive a negative consequence from longer waiting times and who needs immediate attention to ensure a successful outcome [3]. There are four different five-level decision-making systems that are universally accepted and considered the best, making them an optional system that includes the Australasian Triage Scale, Manchester Triage System, Canadian Triage and Acuity Scale (CTAS) and Emergency Severity Index [1].

For almost a decade, several Saudi Arabia hospitals have used the CTAS triage system. Saudi Arabia does not have a unified standard for triage. Currently, some ministries of health (MOH), non-MOHs, and private hospitals use CTAS [4]. The CTAS, an emergency department triage algorithm with five levels of different severity, has been continuously developed in Canada and several studies have been conducted [5]. The five-level triage system is level I = resuscitation, level II = emergent, level III = urgent, level IV = less urgent, and level V = non-urgent. It is designed to determine the triage level on the basis of a comprehensive list of patient complaints [4].

Many patients have complained of emergency department delays, and there are several reasons regarding these delays. These reasons could be physicians, hospital equipment, or transportation. For example, if the on-call doctors are not available or there is a shortage of staff. Moreover, sometimes the delay is due to waiting for required supplies or pharmacy to provide medication. After physical examination doctors order investigations and its result reports take time. Furthermore, lack of personnel to transfer patient or difficulty to have ambulance for patient [6].

Kuręda et al. [7] reported in their study which was conducted in Poland, Opole city, that 90% of their participants knew what triage is. Additionally, Seibert et al.'s [8] study results showed that 51.2% patients had the right answer of the triage definition, whereas, Alhabdan et al.'s. [2] study showed the knowledge of triage system was poor (24%) and was conducted in a single hospital in Riyadh city. Thus, the purpose of this study was to evaluate the knowledge and attitude of the patients toward triage system and waiting times in emergency department at Prince Mohammed bin Abdulaziz Hospital in the capital of Saudi Arabia, Riyadh city.

Subjects and Methods

This was a cross-sectional study that was conducted at the ED of the Prince Mohammed bin Abdulaziz Hospital, Riyadh, Saudi Arabia. The ED have five levels according to the severity of the conditions. These levels are based on CTAS as used in Saudi Arabia. The highest total annual ED visits were in the year 2013, which represented as 153,482 patients. It was the year when the hospital started operating. Sample size was calculated with a 95% confidence level and 5% margin error.

Patients who had come for medical care and their attendants, participants who were in the waiting area including all nationalities of either sex, and participants who were able to understand Arabic or English were included in the study. However, patients who needed immediate medical attention were excluded.

Data were collected during 2 months: December 2021 and January 2022 by using an online questionnaire form for all participants fulfilling the inclusion criteria. Participants were asked to scan a barcode by their phone to visit the questionnaire site. It was a multi-item questionnaire, which was taken from a previously published study conducted in King Abdulaziz Medical City and the approval to use the questionnaire was obtained [2]. The first section included demographic information such as age, gender, nationality, level of education level, and marital status, whereas the second part was designed to obtain the use of primary health care (PHC) facilities before the patient visits ED, understanding of the patient regarding the ED triage system, the demand to inquire about delays they were facing during their waiting time, and the waiting for results of ED services such as lab test.

After collecting the subjects' data that met the inclusion criteria, the obtained information was analyzed via a Statistical Package for the Social Science with the help of an expert on data analysis.

Results

In this study, data from 389 participants were collected where 55% were patients, 39.1% were family members a with mean age of 33.77 (SD = 12.96) years old. Among the participants, 54.2% were males and 37% of them reported high school educational level. Moreover, 48.1% of the participants reported that they were unemployed and 46.8% were married while 90.7% were Saudi where 90.2% were living inside Riyadh (Table 1).

Moreover, 19.3% of the participants were admitted to the department for unspecific symptoms while trauma was the most common cause for admitting to the department (18.5%) followed by gastrointestinal symptoms (15.7%) (Figure 1).

In 43% participants, the problem started on the day of admission, while 32% reported having symptoms for less than one week. Moreover, only 15.2% of patients reported having primary care doctor or health providers among whom 41.9% reported that they called their primary care doctor before coming to the ED (Table 2).

Moreover, 66.2% of participants reported having no knowledge about triage while only 20.6% of them knew the correct definition of triage. Furthermore, 24.5% of participants reported that they knew what a teaching hospital is and 41.5% knew if this hospital is teaching hospital (Table 3).

Furthermore, it was found that 57% of participants wanted to know how long other patients have been waiting while 83.5% wanted to hear update about delays they had generally every 30 minutes (58.6%). Moreover, 53.6% wanted more information about how the Emergency Department functions especially using video playing in the waiting room (67.3%) (Table 4).

Table 1. The general demographic factors of the participants (N = 389).

Demographic factors		Count	N%
Are you a patient waiting to be seen or a family member?	Patient	214	55.0
	Family Member	152	39.1
	Friend	18	4.6
	Co-worker	5	1.3
Gender	Male	211	54.2
	Female	178	45.8
Highest level of education	Illiterate	32	8.2
	Completed high school	144	37.0
	Diploma	37	9.5
	Bachelor	137	35.2
	High degree	20	5.1
	Middle school	14	3.6
	Primary school	5	1.3
Current Job	Unemployed	187	48.1
	Government sector (nonhealth)	50	12.9
	Healthy sector	18	4.6
	Military sector	34	8.7
	Private sector (nonhealth)	90	23.1
	Retired	10	2.6
Marital status	Married	182	46.8
	Single	172	44.2
	Widowed	10	2.6
	Divorced	14	3.6
	Separated	11	2.8
Nationality	Saudi	353	90.7
	Non-Saudi	36	9.3
Place of residence	Inside Riyadh	351	90.2
	Outside Riyadh	38	9.8

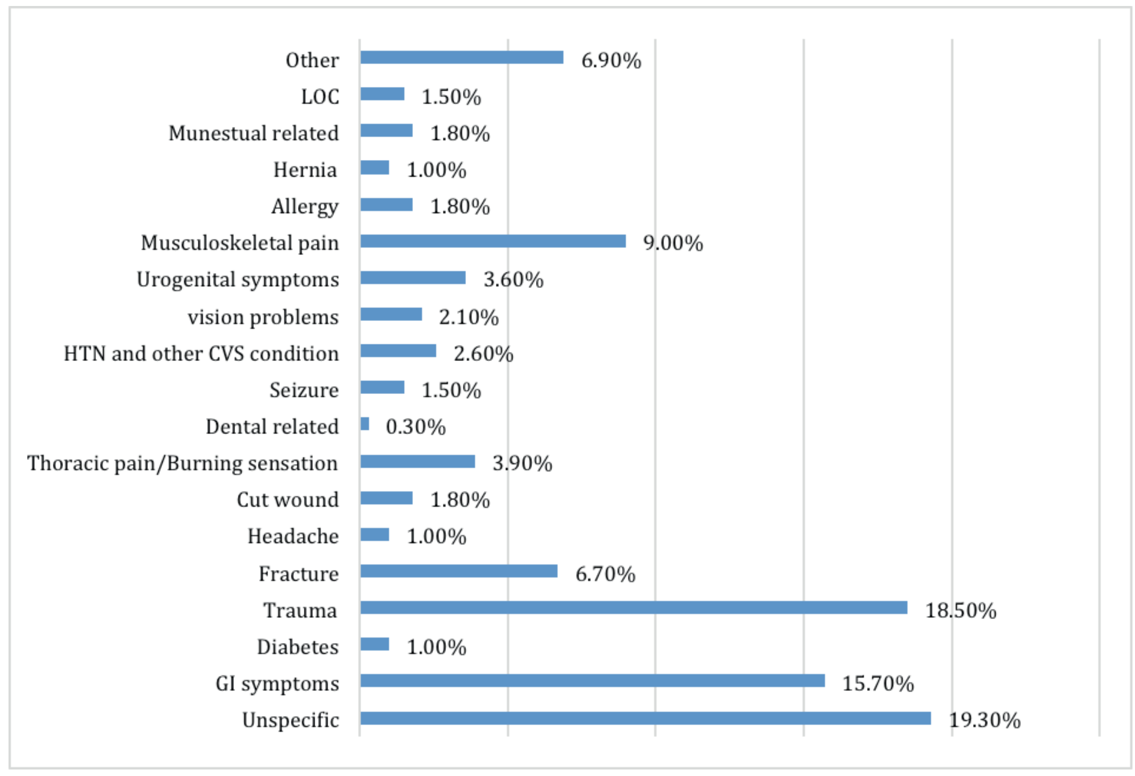

Figure 1. *What is the main problem you have come for today?*

Table 2. Baseline characteristics of participants.

		Count	N%
When did this problem start?	Today	167	43.0
	Less than a week ago	127	32.7
	More than a week ago	51	13.1
	It is a chronic/ long term condition	43	11.1
Do you have a primary care doctor or other health provider?	Yes	59	15.2
	No	330	84.8
Did you try to call your primary care doctor before coming to the ER?	Yes	26	41.9
	No	36	58.1
If the answer yes, what did the office say?	No appointments	5	19.2
	Too sick need to go to ER	13	50.0
	Not a patient any more	2	7.7
	Need further testing that the doctor's office can't do	6	23.1

Table 3. Knowledge of the participants about the triage system in the emergency department.

		Count	N%
Do you know why some patients are taken to a room before others even though they may not have waited as long?	Yes, correct answer	240	61.9
	Yes, incorrect answer	10	2.6
	No	138	35.6
Do you think this is fair?	Yes	289	74.5
	No	99	25.6
Do you know what triage means?	Yes, correct answer	80	20.6
	Yes, incorrect answer	51	13.1
	No	257	66.2
Do you know what a teaching hospital is?	Yes	95	24.5
	No	292	75.5
Do you know if this hospital is a teaching hospital?	Yes	39	41.5
	No	55	58.5

Considering the importance of different aspects of information as reported by the patients, the results showed that the most important information required by the patients was the periodic updates from ED staff about the delays (51.4%) followed by information about the health care system and ways to find primary healthcare providers (Figure 2).

Moreover, it was found that most of the patients thought that teaching hospital might affect their care as it trains future doctors (61.7%) followed by the ability to be seen by more than one doctors (31.9%) and availability of more than one specialist (26.6%) (Figure 3).

Moreover, it was found that the expected delay of hospital procedures was the highest in waiting for lab analysis (mean wait of 191.5 minutes), followed by getting a bed upstairs (165.46 minutes), computed tomography (CT) scan (145.55 minutes), X-rays (79.56 minutes), and consultation with another doctor (78.96 minutes). Finally, it was found that there was no significant difference between the two genders considering the knowledge about the correct definition of the triage system as well as marital status, nationality, residency or having primary care doctor or other health provider. The level of education was the only significant factors ($p = 0.045$) where the percent of patients who knew the correct mean of triage system was significantly increasing with the developing of the patients' level of knowledge (Table 5).

Discussion

Because of the developing technology and increasing requirements of population, many traits are taking place in extraordinary fields including social, political and engineering in addition to the healthcare discipline [9]. Considering from common to private, the exceptional of lifestyles-fitness satisfaction-emergency unit triage is taken into consideration as one of the great examples that might be given to such tendencies. The significance of focusing on this difficulty includes the fact that improved stage of information related to triage system among sufferers is associated with patients' dissatisfaction [10,11]. Furthermore, it is critical to understand the patients' satisfaction and the extent of information that ED site visitors of the triage system required.

In the current study, it was found that 61.9% of participants reported an accurate explanation of some patients being taken to the room before others, when they might not have waited long, while 38.2% of patients did not understand why some patients were seen before others or were without proper explanation of their answers. These findings are similar to those found in other previous

Table 4. Patients expectations from the emergency department.

		Count (*N*)	Frequency
Do you want to know how long other patients have been waiting?	Yes	221	57.0%
	No	167	43.0%
Do you want hear updates about delays to be seen?	Yes	324	83.5%
	No	64	16.5%
How often?	Every 30 minutes	190	58.6%
	Every hour	42	13.0%
	Every 2 hours	7	2.2%
	Every 3 hours	4	1.2%
	It doesn't matter	81	25.0%
Who should do the updates?	A physician	34	10.6%
	A nurse	72	22.4%
	A clerk	58	18.1%
	It doesn't matter	157	48.9%
Do you want to know why you have to wait	Yes	248	75.4%
	No	81	24.6%
What is your main reason for coming to the Emergency Department?	Excellence in care	59	15.2%
	Regular care here	54	14.0%
	My doctor told me to come	71	18.3%
	Close to where I live/work	182	47.0%
	Other financial reasons	19	4.9%
	Insurance reasons	2	0.5%
Do you want more information about how the Emergency Department functions?	Yes	208	53.6%
	No	180	46.4%
How would you like the information?	A video playing in the waiting room	140	67.3%
	Handouts	34	16.3%
	A computer with an educational module on it	16	7.7%
	By the physician or nurse	5	2.4%
	Through social media	13	6.3%

studies including Alhabdan et al. [2] conducted in King Abdulaziz Medical City, Saudi Arabia, and found that 61% of participants understood why a few patients were seen before them and 83.6% knew the correct meaning. In addition, a study reported that 68% of patients knew about this issue and 87% knew the correct meaning [8]. In a study by Seibert et al. [8], the authors found that those patients who reported understanding that few patients were seen before others might find that the problem was correct. In the current study, 74.5% of participants reported that the situation was fair.

In addition, it was found that 33.8% of participants reported that they knew what the triage process meant while 61% were able to provide an accurate definition of the process. This is better than the results of a study, which reported that 24% of participants reported that they understood the triage process while 45% were able to provide an accurate explanation, and thus only 11% of the participants were able to better describe triage [2]. In addition, other studies have yielded similar results including a study conducted in the USA with 33% of patients [8] and in Australia with 50% of patients reported understanding the meaning of the triage system [12]. The importance of understanding the meaning of the triage system was reported by Adeniji et al. [12], a study that found that after defining the triage system in patients, they reported six points on a 7-point accuracy scale. The results showed that the population of Al Riyadh region in Saudi Arabia has similar knowledge and level of understanding of why some patients are seen earlier than others in ED and well describes triage with significant improvements in previous studies among Saudi people conducted in 2019 [2].

Other variations in services offered by ED may affect patients' choice of one ED and avoid the other. In this study, it was found that proximity to patients' home or work was a major factor in determining ED patients' choice. In a previous study, distance from ED and estimated waiting time were the most important factors that could affect patients' choice of ED [13]. In a study by Alhabdan et al. [2], the quality of care and regular care in ED were key factors that could influence patients' choice of ED. In addition, the results showed that the most important information patients needed was periodic reviews from ED staff about delays by selecting a 30-minute hearing review similar to the results of Alhabdan et al. [2]. Moreover, in a previous study by Cooke et al. [14], who provided a 15-minute interim option found that a large percentage of patients still preferred reviews about 30-minute delays (55%) compared to 21% for every 15

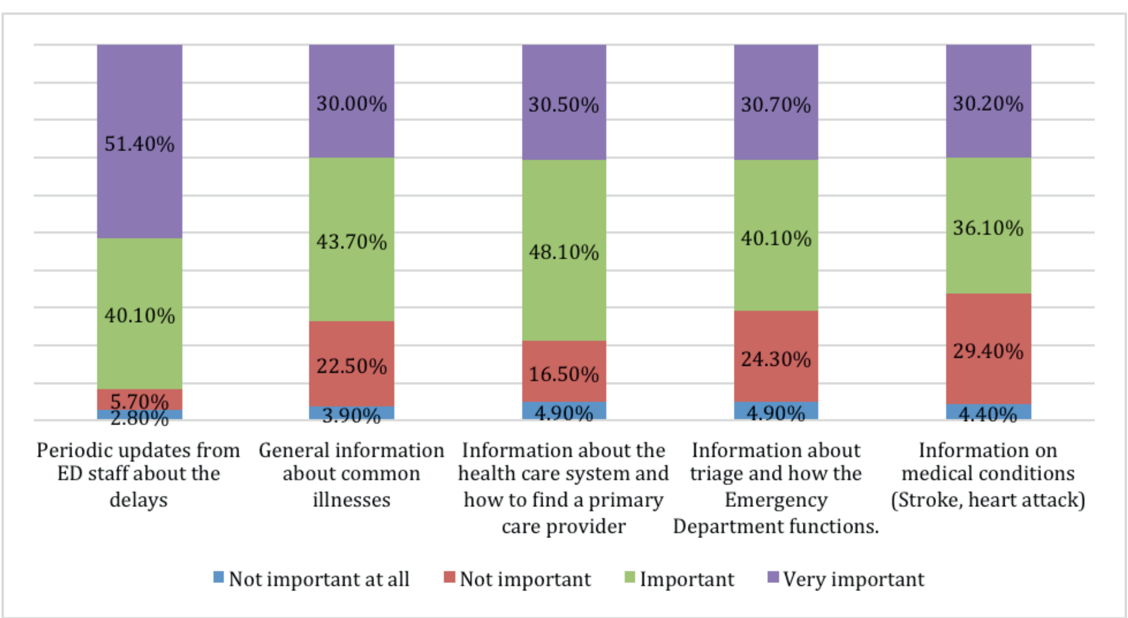

Figure 2. *The level of importance of information according to patients.*

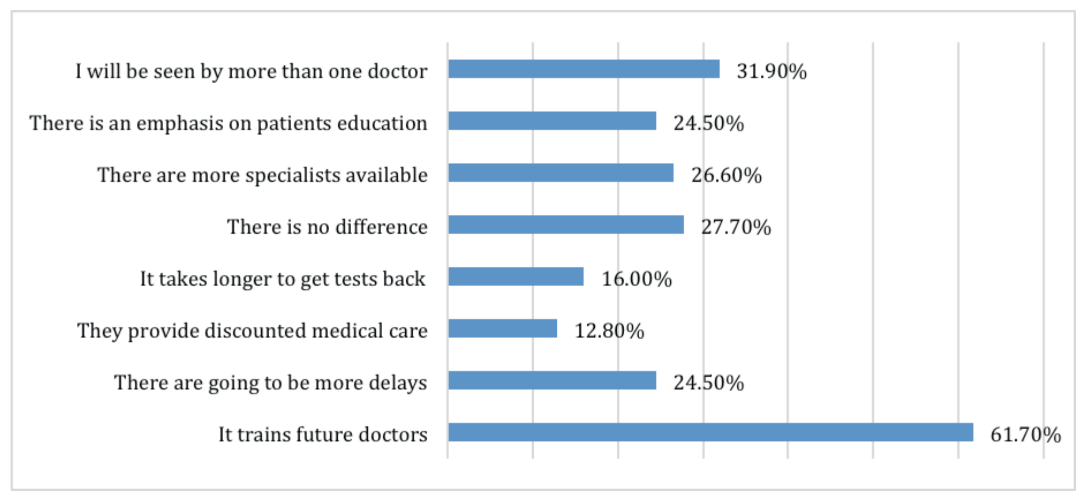

Figure 3. *How do you think being at a teaching hospital might affect your care?*

minutes. In addition, it was found that more than three-quarters of patients reported that they needed information about educational topics during the waiting period as a significant factor such as the results of Alhabdan et al. [2], as well as other studies conducted in Boston [15]. In addition, it was found that 53.6% of participants requested more information about ED performance while 67.3% recommended video playing in the waiting room to transfer information. The use of videos during ED visits has been found to be associated with increased patient satisfaction [16].

PHC plays an important and vital role in improving the quality of the whole health care system including EDs where lifelong health, community mortality and reduction of inequality can be greatly improved by providing high-quality health care services [17]. Obtaining appropriate access to a well-established PHC can reduce the frequency of ED visits by approximately 50% and transfer of specialized care by 30% [18]. On the other hand, lack of regular access to PHCs is one of the most important causes of ED overcrowding [19,20]. In a previous study by Van den Berg et al. [21], to assess how the percent of patients attending to ED is related to accessibility of PHC found that ththe e percentages of participants who did not have access to PHC were 73.6% in Slovakia, 51.9% in the Czech Republic, 7.8% in Denmark, 10.7% in Belgium, 20.5% in England, 23.8% in Australia, 25.7% in Canada, 29% in Germany, 41% in Norway and Slovenia. In the current study, it was found that 84.8% patients reported that they did not have a caring physician or access to PHC similar to other studies conducted in Saudi Arabia [2] and that it was worse than the foreign percentage. In addition, less than half of those who had primary care physicians tried to consult their physician before going to the ED, as reported in the study conducted by Afilalo et al. [22], who found that 22% of patients who went to the ED tried to contact their PCPS before coming to ED. This lack of patient access to PHC can be explained by the diversity of health care systems in different countries. For example, in Saudi Arabia,

Table 5. The relation between demographic factors and knowledge toward triage means.

		Do you know what triage means?						*p*-Value
		Yes, correct answer		Yes, incorrect answer		No		
		Count	N%	Count	N%	Count	N%	
Gender	Male	47	22.4	23	11.0	140	66.7	0.305
	Female	33	18.5	28	15.7	117	65.7	
Highest level of education	Illiterate	5	15.6	2	6.3	25	78.1	0.045*
	Completed high school	28	19.6	15	10.5	100	69.9	
	Diploma	5	13.5	5	13.5	27	73.0	
	Bachelor	35	25.5	19	13.9	83	60.6	
Marital status	Married	42	23.2	29	16.0	110	60.8	0.290
	Single	34	19.8	20	11.6	118	68.6	
	widowed	2	20.0	0	0.0	8	80.0	
	divorced	0	0.0	1	7.1	13	92.9	
	Separated	2	18.2	1	9.1	8	72.7	
Nationality	Saudi	78	22.2	43	12.2	231	65.6	0.108
	Non-Saudi	2	5.7	8	22.9	25	71.4	
Place of residence	Inside Riyadh	76	21.7	46	13.1	228	65.1	0.557
	Outside Riyadh	4	10.8	5	13.5	28	75.7	
Do you have a primary care doctor or other health provider?	Yes	13	22.0	10	16.9	36	61.0	0.571
	No	67	20.4	41	12.5	221	67.2	

PHC was not the first choice of many patients leading to overcrowding in ED so, in 2016, the Saudi government announced a new program to encourage Saudi Arabian citizens to use PHC as a first step and increase the chances of a family medicine training program across the country [23].

In addition, it was found that the average time patients expected to wait for test results in this study was significantly higher than those reported in other studies wherein this study the waiting period for laboratory analysis (mean waiting 191.5 minutes), getting a bed (165.46 minutes), CT scan (145.55 minutes), X-rays (79.56 minutes), and consultation with another doctor (78.96 minutes). In the study of Alhabdan et al. [2], the average time patients expected to wait for laboratory test results, X-rays, and CT scans were 69, 47, and 61 minutes, respectively and Seibert et al. [8], reported the expected duration of 60 minutes for laboratory test results, about 35 and 60 minutes for X-rays and CT scans, respectively. In one study, 58% patients reported receiving their test results within 1 hour [14]. Expected waiting time might reflect the level of patient satisfaction in the services provided whereas the longer waiting period as those provided in this study might indicate a lower level of patient satisfaction in the service provided.

This study had some limitations including depending on sample of ED visitors of one hospital in Riyadh region, Saudi Arabia, which could lead to that the population of this study could not be representative of all ED visitors in Saudi Arabia. Moreover, the depending on self-reported questionnaire could lead to personal bias where some patients might be dissatisfied with the long waiting time, which could reflect worse results in this study.

Conclusion

It was found that most people were unaware of triage and its meanings and therefore, more efforts should be made to increase the level of triage awareness among patients. However, most participants had good experience considering why some patients were seen before others. Only fewer than five in the study population claim to have a primary care provider and more efforts should be made to increase patients' access to primary care. In addition, patients in this study wanted to find out more about their visit including the reasons for the delay and information about health especially using video during the waiting period. Finally, the expected expectations of test results were worse in this study, indicating a lower level of satisfaction.

List of Abbreviations

CT Computed tomography
CTAS Canadian Triage and Acuity Scale
ED Emergency department
ER Emergency Rooms
MOH Ministries of Health
PHC Primary healthcare

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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None.

Consent to participate

Written informed consent was obtained from all the participants

Ethical approval

Ethical approval was obtained from International Review Board of Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia (project number -172 -2021).

Author details

Rayyan Alhaqbani[1], Rayan Bahmaid[1], Mohammed Almutairi[1], Wardah Almasoudi[2], Ali Elmasarwa[3], Abdussalam Alshehri[4]

1. College of Medicine, Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia
2. Department of Emergency Medicine, Royal Commission Hospital, Jubail, Saudi Arabia
3. Quality & Patient Safety Department, Prince Mohammed bin Abdulaziz Hospital, Riyadh, Saudi Arabia
4. Department of Emergency Medicine, Prince Mohammed bin Abdulaziz Hospital, Riyadh, Saudi Arabia

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