Original Article

The effect of having a physician in the triage area on the rate of patients leaving without being seen

A quality improvement initiative at King Fahad Specialist hospital

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ABSTRACT

الأهداف: تقييم تأثير وجود الطبيب في منطقة الفرز على عدد المرضى الذين يغادرون دون رؤيتهم (LWBS) وبعض العوامل التي تؤثر على ازدحام قسم الطوارئ (ED).

المنهجية: أجريت هذه دراسة قبلية وبعدية في مستشفى الملك فهد التخصصي، الدمام، المملكة العربية السعودية. قمنا بتقسيم الدراسة التي استمرت 3 أشهر، واشتملت على 7826 مريضًا، إلى فترتي ما قبل الطبيب وما بعد الطبيب. وكانت المتغيرات التي تمت مقارنتها عبر هذه الفترات هي عدد مرضى LWBS، ومدة الإقامة في المستشفى، والوقت اللازم لزيارة الطبيب، ووقت لاتخاذ قرار التصرف. أجرينا التحليل الإحصائي باستخدام الإصدار R 4.3.0.

النتائج: أظهرت نتائجنا أن وجود طبيب الفرز أدى إلى انخفاض كبير في عدد مرضى الذين يغادرون دون رؤيتهم (p<0.001) والوقت المستغرق لمقابلة طبيب الطواري (p<0.001). ومع ذلك، لم يكن له أي تأثير كبير على مدة الإقامة في المستشفى (p=0.5) أو الوقت لاتخاذ قرار التصرف (p=0.9).

الخلاصة: أدى تعيين طبيب الفرز إلى سهولة تدفق المرضى وخفض معدلات LWBS في قسم الطوارئ، مما يدل على الحاجة إلى مزيد من البحث الشامل في هذا المجال.

Objectives: To evaluate the effect of the presence of a physician in the triage area on the number of patients who leave without being seen (LWBS) and some of the factors affecting emergency department (ED) crowding.

Methods: This was a pre-post study carried out at King Fahad Specialist Hospital, Dammam, Saudi Arabia. The 3-month study, consisting of 7826 patients, was split into pre-physician and post-physician periods. Variables compared across these periods were the number of LWBS patients, length of hospital stay, time to physician, and time to disposition decision. Statistical analysis was carried out using R version 4.3.0.

Results: Our results showed that the presence of a triage physician significantly decreased the number of LWBS patients (p<0.001) and the time taken to encounter an ED physician (p<0.001). However, it did not have any significant impact on the length of hospital stay (p=0.5) or time to disposition decision (p=0.9).

Conclusion: The appointment of a triage physician has streamlined patient flow and decreased LWBS rates in the ED, demonstrating the need for more thorough research in this area.

Keywords: left without being seen, triage, physician, emergency department, crowding

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The American College of Emergency Physicians defines emergency department (ED) crowding as "a situation that occurs when the identified need for emergency services exceeds available resources for patient care in the ED, hospital, or both".[1]

Considering the significant rise in ED crowding across multiple healthcare systems globally, the International Federation of Emergency Medicine has recognized it as a global public health concern.[2,3]

Staff working in a congested emergency are less likely to adhere to standard medical guidelines and are more

likely to commit errors due to stress and burnout.[4] In addition, studies have demonstrated that ED congestion increases mortality rates, lowers patient satisfaction, and results in medication errors.[5,6] Also, delays in assessment due to ED crowding compel patients to leave the ED without being seen. Patients who leave the emergency room without receiving care or a visit from a doctor serve as a helpful barometer of the quality of emergency care.[7] Kenny et al[8] reported that the crowding of the ED and reception directly increased the rate of leave without being seen (LWBS) in these hospitals. Another study stated that LWBS patients sought alternative medical services and medical consultations by personal primary clinicians or other EDs. Additionally, the study revealed that patients with LWBS have a high risk of re-presenting to an ED within 48 hours compared to patients who have completed the treatment during their first appearance at an ED. Furthermore, the 30-day mortality rate was significantly lower among those who did not wait to be seen compared to those who received complete healthcare services at the initial presentation.[9]

Asplin et al[10] divided the determinants of ED crowding into 3 broad categories: input, throughput, and output. Factors that affected the demand for ED care were included in the input category. The throughput category included the elements that affected the flow of patients through the ED. Lastly, factors affecting the outflow of patients from the ED after their treatment was completed were included in the output category.[10]

Interestingly, the majority of the potential solutions for ED crowding target improving the throughput process.[8] Grant et al[11] evaluated the effect of various triage-related interventions that could be used to expedite the throughput process. Among these, the assignment of a physician in the triage area showed promising results in terms of improving patient flow through the ED. Recent literature has shown that this intervention not only significantly decreases the number of patients that leave without being seen but also reduces ED length of stay, waiting times, and mortality rates.[12,13]

The purpose of this study is to evaluate the impact of having a physician in the triage area on ED crowding. In order to achieve this aim, we plan to investigate the effect of the presence of a physician in the triage area on the rate of LWBS patients in King Fahad Specialist Hospital, Dammam, Saudi Arabia. Furthermore, we will assess the impact of having a triage physician on other factors of ED crowding for which data is available.

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Methods. This was a pre-post study carried out at the King Fahad Specialist Hospital, a tertiary care hospital in Dammam, Saudi Arabia. It is the only government center of its capability in the Eastern Province of Saudi Arabia, covering an area of around 672,522 km^2. The institutional review board committee approval was obtained from King Fahad Specialist Hospital (IRB no.: IRB-Pub-022-006).

The 3-month study duration was split into 2 distinct periods. During the first period, data was collected for all patients admitted to the ED in the triage area. It lasted for the months of August and September of 2020. During this period, no physicians or clinicians were present in the triage area. Immediately after registration in the ED, patients were completely managed by a nurse doing the triaging according to the Canadian triage and acuity scale (CTAS) scoring system.

In the second period, data was collected for all patients admitted to the ED at the triage area for one month in October 2020. During this time period, there was a physician assigned to the triage area.

The sample population of this study included 7826 patients admitted to the King Fahad Specialist Hospital ED during the 3 months of the study. Detailed information on the study participants' age, gender, nationality, CTAS level, patient type, and outcome variables was collected from the hospital database.

The primary outcome variable of the study was the number of patients who had LWBS. It was defined as the number of patients who registered themselves but left without being examined by a licensed physician.

The secondary outcome variables were length of hospital stay, time to physician, and time to disposition decision. The length of hospital stay was defined as the time spent in the hospital from registration to discharge. Time to physician (waiting time) was equivalent to the time from registration to being evaluated by a physician. Time to disposition decision refers to the time taken by a doctor to make a decision regarding the admission or discharge of a patient.

Statistical analysis. The triage physician month (October 2020) was compared separately with each of the pre-triage physician months (August and September 2020) using the Chi-square test to determine the association between the number of LWBS patients and the presence of a triage physician. Due to the non-normal distribution of data, an independent-samples Kruskal-Wallis test was carried out to evaluate the effect of the presence of a triage physician on the

length of hospital stay, time to physician (waiting time), and time to disposition decision. All statistical analysis was carried out using R Version 4.3.0 (the R Project for Statistical Computing).

Results. The study included a total of 7826 patients admitted to the King Fahad Specialist Hospital ED from August to October 2020. The median age of patients admitted was similar across the 3 months of the study. During each month of the study, most of the admitted patients were female of Saudi nationality, and distributed to level 3 or 4 of the CTAS (Table 1).

A total of 140 patients left the ED without being seen by a physician during the 3-month study period. Our analysis showed that the presence of a physician in the triage area significantly impacted the number of patients who left without being seen. Chi-square analysis showed a reduction of >1% in LWBS patients in October as compared to August or September (p<0.001, Table 2).

The Kruskal-Wallis test showed that the time taken to encounter a physician was significantly affected by the presence of a physician in the triage area (p<0.001). Post-hoc pairwise comparisons among the months of study showed that there was a statistically significant decrease of 4 minutes in time taken to encounter a physician in October in contrast to August (p<0.001) as well as September (p<0.001, Table 2). The presence of a triage physician did not significantly affect the length of hospital stay (p=0.5) or time to disposition decision (p=0.9).

Discussion. Our study reported that patients are less likely to leave an ED if a physician is present in the triage area. We also discovered that our intervention significantly shortened the amount of time needed to see a physician (waiting time) in the ED. However, we did not find any association between our intervention and length of hospital stay or time taken for the disposition decision.

Benabbas et al[14] evaluated the efficacy of recruiting physicians in triage across the EDs of the United States. One of the meta-analyses in this study, consisting of 6 trials including >140,000 patients, reported a statistically significant decrease in the number of LWBS patients (relative risk [RR]=0.62, 95% confidence interval [CI]: [0.54-0.71]) when an attending physician was recruited in the triage area. Similarly, Burstrom et al[15] reported in their retrospective study a 38% (odds ratio [OR]=0.62, 95% CI: [0.54–0.72]) lower probability of patients leaving without being seen when triage was carried out by a physician-led team as compared to a nurse-led team. We found similar trends in our study. This may be due to the fact that increased waiting times lead to a rise in the number of patients who leave without being seen.[16] Since waiting times are reduced with the

Table 1 - Demographics of the patient's included in the study (N=7,826).

Characteristic	Overall (N=7,826)	Months			*P*-values*
		August (n=2,854)	September (n=2,321)	October (n=2,651)	
Age, median (IQR)	45 (30-59)	45 (30-60)	44 (30-59)	45 (29-59)	0.2
Gender					
Female	4,260 (54.0)	1,505 (53.0)	1,298 (56.0)	1,457 (55.0)	0.058
Male	3,566 (46.0)	1,349 (47.0)	1,023 (44.0)	1,194 (45.0)	
Nationality					
Non-Saudi	340 (4.3)	107 (3.7)	110 (4.7)	123 (4.6)	0.15
Saudi	7,486 (96.0)	2,747 (96.0)	2,211 (95.0)	2,528 (95.0)	
CTAS					
Resuscitation	10 (0.1)	1 (<0.1)	3 (0.1)	6 (0.2)	
Emergent	85 (1.1)	35 (1.2)	21 (0.9)	29 (1.1)	
Urgent	4,009 (51.0)	1,435 (50.0)	1,132 (49.0)	1,442 (54.0)	
Less urgent	3,277 (42.0)	1,171 (41.0)	1,085 (47.0)	1,021 (39.0)	
Non-urgent	445 (5.7)	212 (7.4)	80 (3.4)	153 (5.8)	
Patient's type					
Active	6,928 (89.0)	2,507 (88.0)	2,034 (88.0)	2,387 (90.0)	0.001
Dependent	131 (1.7)	39 (1.4)	51 (2.2)	41 (1.5)	
Employee	285 (3.6)	109 (3.8)	82 (3.5)	94 (3.5)	
New patient	404 (5.2)	171 (6.0)	135 (5.8)	98 (3.7)	
Non-active	77 (1.0)	27 (0.9)	19 (0.8)	31 (1.2)	

Values are presented as numbers and precentages (%) or median interquartile range (IQR). *Kruskal-Wallis rank sum test; Pearson's Chi-squared test. CTAS: Canadian triage and acuity scale

Table 2 - Objectives of the study (N=7,826).

Characteristic	Overall (N=7,826)	Months			*P*-values*
		August (n=2,854)	September (n=2,321)	October (n=2,651)	
Left without being seen, n(%)	140 (1.8)	64 (2.2)	53 (2.3)	23 (0.9)	<0.001
Time to physician (mins)	30 (16-52)	31 (16-59)	31 (18-53)	27 (15-46)	<0.001
Time to disposition decision (mins)	133 (59-230)	135 (60-238)	130 (62-223)	132 (55-228)	0.5
Length of stay (mins)	140 (60-256)	142 (62-263)	137 (64-245)	139 (57-260)	0.9

Values are presented as numbers and precentages (%) or median interquartile range (IQR). *Kruskal-Wallis rank sum test; Pearson's Chi-squared test. mins: minutes

appointment of a triage physician, as explained in our findings, the number of unattended patients also tends to decrease.

Fraser et al,[17] through a survey, compared the characteristics and circumstances of a group of patients that left without being seen with those of a group of patients that stayed in the ED to receive their treatment. They found that 79% of patients who left without being seen complained of longer waiting times. Abdul Wahid et al,[18] in a pooled analysis of 2 randomized controlled trials, reported that waiting times were significantly reduced if a senior doctor was present in the triage area (weighted mean difference: 26.17 minutes, 95% CI: [31.68 to -20.65]). Oliviera et al,[19] in their retrospective before-after study, observed an average decrease of 27.7 minutes (95% CI: [25.9-29.5]) in waiting time to first physician contact. Our study further corroborates these findings. Intuitively, one can presume the waiting times to be shorter if patients encounter a physician in the earliest phase of emergency care.

Abdul Wahid et al,[18] in a meta-analysis of 16 studies, reported a median decrease of 26 minutes (interquartile range [IQR]: [6 to -56]) in length of hospital stay with the addition of a physician. This shorter stay could be attributed to a shorter waiting period and physicians meeting the needs of patients earlier. Another cause for the shorter length of stay could be the higher level of expertise of a senior physician as compared to other healthcare professionals working in the triage area.[20,21] In our study, however, we found no statistically significant decrease in the length of hospital stay with the addition of a physician in the triage area. This discrepancy can be explained by the fact that throughput factors such as the presence of a physician in the triage area tend to be less important in determining the length of stay compared to output factors like hospital bed occupancy rate, staffing levels, and the availability of diagnostic and ancillary services for inpatient care.[10,21]

Patient overcrowding is shown to increase the time to disposition decisions owing to the saturation of healthcare services in the ED.[22] As one might expect, the presence of a triage physician should shorten the time to disposition due to a decrease in emergency room crowding. Soremekun et al[23] gave support to this theory when they reported a significant median decrease of 17 minutes in time to disposition decision with the inclusion of a triage physician.

Contrary to this, we found no association between the time taken for a disposition decision and the presence of a triage physician. Similar findings were reported by Imperato et al[24] in their study. The time to disposition decision is influenced by a number of other factors in addition to overcrowding, such as the availability of medical resources, physician attendance, delays in consultation by other medical staff, the level of experience of the attending physician, and the ease of staff and patient communication.[25,26] These factors might explain the distinct findings in our study.

Study limitations. The study was carried out for a short time in a single hospital in Saudi Arabia. The ability to generalize our findings to other regions may be constrained by potential variations in the way health care services are organized, as well as by regional variations in the proportion of patients' demographics (gender, age, citizenship, and place of residence), their medical conditions (previous comorbidities, triage score), their propensity to leave the ED (number of uncompleted ED visits in the previous year), and the characteristics of ED visits (waiting time and crowding). Although gender, age, triage score, and the condition of the ED at the time of their admission were taken into account in the models of health outcomes, one cannot rule out the possibility of unmeasured residual confounding that could affect the outcomes.

In conclusion, overcrowding in emergency rooms (EDs) is a significant strain on the healthcare system. The appointment of a triage physician not only speeds up patient flow in the ED but also reduces the likelihood of patients leaving the facility early in the course of treatment. More research in this area utilizing robust techniques should be carried out, given the intervention's catalytic potential in lowering ED crowding.

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