SAJEM EMERGENCY MEDICINE JOURNAL

ORIGINAL ARTICLE

Physician-led team triage shortens the length of stay of patients in the emergency department: a descriptive case series from tertiary care hospital in Pakistan

Aniqa Bano[1], Maqsood Ahmad[2]

Authors Affiliation:

Emergency department Cork University Hospital, Cork, Republic of Ireland[1]

Reliance Hospital, Islamabad[2]

Correspondence to:

aniqa.85@gmail.com

ABSTRACT

BACKGROUND

Length of stay of patients in the Emergency Department (ED) is a quality indicator for ED performance. Prolonged stay risks patient safety and reduces their satisfaction. The presence of a senior physician in triage allows rapid assessment of patients and shortens the overall length of stay of patients. The objectives of this study were first, to determine the mean length of stay of patients in the emergency department and secondly, to compare the mean length of stay of patients seen in nurse-led triage as compared to physician-led triage.

METHODS

This descriptive case series was conducted in the emergency department of Shifa International Hospital Islamabad from July 2017 to December 2017. The existing functioning of the department was such that rapid assessment by a senior physician in triage was done from 08:00 am to 11:59 pm. After 12:00 am till 08:00 am, the triage was done by the nurse only. This difference was used to collect two data sets by consecutive non-probability sampling.

RESULTS

A total of 500 patients were enrolled; 250 in each group. The mean age of patients was 44.50(±18.055) years. The mean length of stay was 102.11 ± 110.049 minutes. It showed a significant decrease of 103.31 minutes (p=0.000) from 153.76(±114.539) minutes in the nurse triage group compared to 50.45(±76.116) minutes in the physician triage group.

CONCLUSION

The presence of a senior physician in triage can shorten the length of stay of patients in the emergency department.

KEYWORDS

Emergency department, Physician, Length of stay, Triage, Emergency Severity Index

INTRODUCTION

Emergency Medicine is an emerging field of medicine and the emergency departments are going through a developmental phase in Pakistan. There is a need to identify the methods which increase the efficiency of an emergency department. Length of stay (LOS) of patients is an important quality indicator for assessing the performance of ED. The prolonged stay of patients in ED is one of the most common problems. This causes overcrowding and creates a threat to the time-critical management of patients. It also negatively affects patient satisfaction.[1, 2]

Triaging is done to make a quick objective assessment of patients to categorize them according to the acuity of their health problems. There are different models of triage in practice globally. Studies across the world have shown that the physician-led team triage has obtained better outcomes than other triage models; however, no such study has been conducted on our population. In one study, the length of stay of patients in ED was 219 (137-320) minutes when a nurse sees the patients in triage, whereas, in the physician group it was 185 (110-266) minutes (p<0.001).[3] Rapid assessment by a physician is equally effective in paediatric emergency departments.[4] Moreover, the seniority of the physician is also increasingly correlated with improved clinical outcomes.[5]

The Emergency Severity Index (ESI) is one of the validated tools for triaging. It stratifies

patients into five levels of priority, level one being the most critical.[6] This tool was being used to triage patients in the ED of Shifa International Hospital where the study was conducted.

The rationale of this study was to see the effect of the presence of a senior doctor in triage on the length of stay of patients in ED.

MATERIALS & METHODS

This descriptive case series was conducted in the ED of Shifa International Hospital Islamabad. All the patients who presented to the emergency department were prioritized using Emergency Severity Index (ESI) in triage. A senior physician-led rapid assessment was being done from 08:00 am to 11:59 pm. While, from 12:00 am to 08:00 am, nurse-led triage was in practice. Seeing the existing model, we divided the data into two groups. Group-1 consisted of patients triaged by a nurse and Group-2 comprised of patients seen by a senior physician in triage. A doctor with at least ≥3 years of clinical experience or a third-year or above postgraduate trainee in emergency medicine was considered a 'Senior physician' for this research. Registered nurse practitioners/ staff nurses on duty in triage at night from 12:00 am to 8:00 am comprised the nurse triage group. Length of stay was calculated from the time of registration to the time of documented disposition decision (discharge/admission/to be seen by specialty). Data of six months was collected from 01-07-2017 to 31-12-2017 by consecutive non-probability sampling.

The sample size of 500 was calculated by using the WHO calculator with the anticipated population mean LOS: 219 minutes (Standard Deviation: 45.7; Absolute precision: 0.225).[6] Proportionate sampling was done and the sample was divided into two groups, 250 in each group.

All adult patients (age 16-90 years) of both genders who got registered in ED during the study period were included. Patients who were seen by other than senior physicians and with incomplete data were excluded. Other excluded categories were pulseless patient, respiratory arrest or gasping, critically injured (including road traffic accidents, assaults, and occupational accidents), firearm injuries, and flaccid baby.

The data was analysed using SPSS version 21. Frequency and percentages were calculated for gender and ESI triage levels. Mean ± SD were calculated for age of patients, LOS measured in groups triaged by nurse and physician, and experience of nurse and doctor. Effect modifiers like age and gender of patients, the experience of the senior physician and triage nurse were controlled by stratification. Post-stratification Independent sample t-test was applied to compare the mean LOS between two groups. P-value ≤ 0.05 was taken to be significant.

RESULTS

A total of 823 files were reviewed and, after applying exclusion criteria, 500 patients were enrolled. The mean age of patients was 44.50 (SD±18.055) years. Among 500 patients, 246 (49.2%) were males and 254 (50.8%) were females. Gender distribution of male vs female in Group 1 was 133 (53.2%) vs 117 (46.8%); and Group 2 was 113 (45.2%) vs 137 (54.8%) as shown in Table 1.

TRIAGE BY NURSE (Group 1)		TRIAGE BY SENIOR PHYSICIAN (Group 2)	
MALE	FEMALE	MALE	FEMALE
133	117	113	137

Table 1: Frequency of gender distribution in Nurse and Physician groups

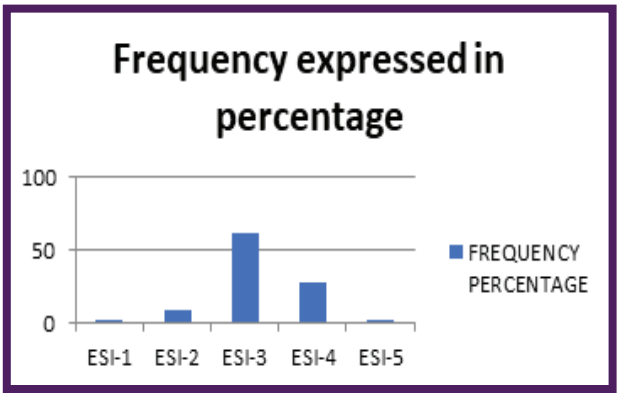

Fig 1: Frequency expressed as percentage of Patients according to ESI Level

The frequency and percentages of several patients in ESI level 1-5 were as follows: 1 (0.2%), 41 (8.2%), 310 (62%), 140 (28%), and 8 (1.6%) patients respectively as shown in figure 1.

The mean length of stay (LOS) of all patients (N=500) in ED was 102.11 ± 110.049 minutes [CI=95%] as shown in Table 2. Categorically, the LOS of patients who were triaged by the nurse was 153.76 ± 114.539 minutes [CI=95%; Std. error mean=7.244] and that of triaged by a senior physician was 50.45 ± 76.116 minutes [CI=95%; Std. error mean=4.814]. Hence mean LOS was numerically shortened by 103.31 minutes due to the presence of a senior doctor in triage. To test if this difference was statistically significant, an independent samples t-test was performed and was found to be associated with p-value=0.000.

Triage Group	Mean LOS (minutes)	Number of Patients (n)	STD. Deviation	*t*-test Difference Mean LOS (minutes)	p-value
TRIAGED BY NURSE	153.76	250	114.539	103.308	0.000
TRIAGED BY SENIOR PHYSICIAN	50.45	250	76.116		
TOTAL	102.11	500	110.049		

Table 2: Mean ± SD Length of Stay

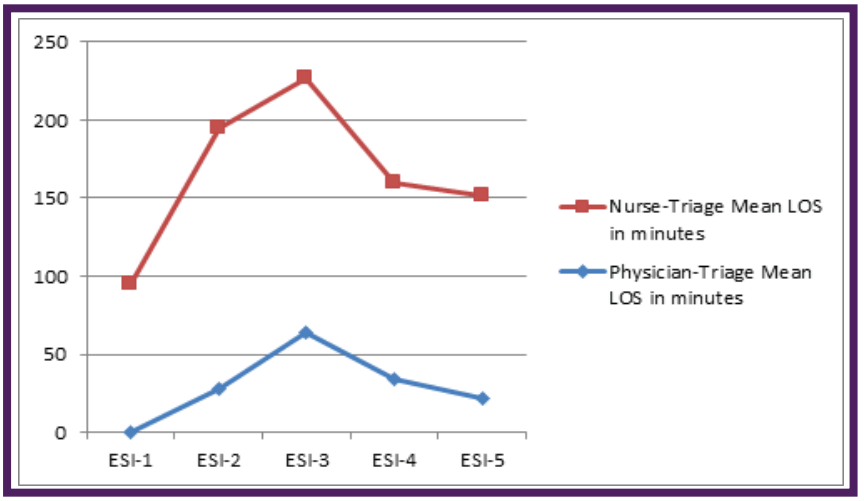

Figure 2: Graph illustrating the mean LOS in Nurse and Physician Triage Groups according to their ESI level

The data were stratified into two age groups, patients ≤ 65 years of age (n=419) and >65 years (n=81) with mean LOS of 98.89 ±108.007 and 118.77 ±119.388.

The mean LOS for patients (n=57) in the <5-year experience nurse group was 136.23 minutes as compared to 158.94 minutes in ≥the 5-year experience nurse group (n=193) [p-value 0.189].

The mean LOS for patients (n=69) in <5-year doctor group was 62.51 minutes as compared to 45.86 minutes in ≥5-year doctor group (n=181) [p-value=0.122].

When comparing means of LOS of patients triaged by nurse vs doctor of <5-year experience; it was 62.51 in doctor group (n=69) versus 136.23 in nurse group (n=57), P-value=0.000.

The mean LOS of patients triaged by nurses with ≥5 years' experience (n=193) was 158.94 minutes as compared to 45.86 minutes in ≥5-year experience physician group (n=181), p-value=0.000. minutes respectively. The difference of 19.880 minutes longer stays of elder patients had P value= 0.137 meaning that the age of patient did not affect LOS.

Experience (years)	Triage category	Number of patients (n)	Mean LOS (minutes)	Independent *t*-test	
				p-value	Mean difference
<5	Nurse	57	136.23	0.000	73.721
	Physician	69	62.51		
≥5	Nurse	193	158.94	0.000	113.081
	Physician	181	45.86		

Table 3: Independent sample t-test for LOS after meaning experience stratification in both groups

In ≤65 years group, the mean LOS in nurse vs physician triage was 148.73 ±112.873 & 51.60 ±78.011 minutes respectively. Mean Difference was 97.130 minutes, p-value=0.000 (<0.05).

In the>65 years group, mean LOS in nurse vs physician triage was 176.09 ±120.393 & 43.43 ±63.764 minutes respectively. Mean Difference was 132.658 minutes, p-value=0.000 (<0.05).

The mean LOS of female patients (n=117) in the nurse group was 159.44 ±118.791 minutes as compared to 54.55 ±83.604 minutes in the physician group (n=137). The mean difference of 100.890 minutes had a p-value of 0.000 (<0.05).

The mean LOS of male patients (n=133) in Group-1 was 148.76 ±110.873 minutes as compared to 40.63 ±64.925 minutes in Group-2 (n=113). Mean difference was 108.131 minutes, p-value=0.000 (<0.05).

The experience of both the triage nurses and senior physicians ranged from 3 to 8 years with the mean of 5.24 and 5.12 years respectively.

Experience in ER	Triage	N	Mean	Std. Deviation	t-test	
					p-value	Mean Difference
3 years	Nurse	3	217.00	116.013	0.298	187.000
	Physician	1	30.00			
4 years	Nurse	54	131.74	98.483	0.000	68.755
	Physician	68	62.99	92.250		
5 years	Nurse	101	172.40	128.157	0.000	121.822
	Physician	101	50.57	72.483		
6 years	Nurse	68	156.47	112.311	0.000	14.849
	Physician	66	41.62	69.033		
7 years	Nurse	21	111.86	74.287	0.006	87.571
	Physician	7	24.29	38.396		
8 years	Nurse	3	91.33	52.176	0.087	52.048
	Physician	7	39.29	33.014		

Table 4: Mean LOS as seen when triaged by nurses and physicians differing in experience working in ER

DISCUSSION

One of the basic concepts that belong to emergency medicine is "TRIAGE". We conducted this study intending to gather evidence about the effect of "Physician-Led Triage" on the patients' ED length of stay. We expect that implementing the most efficient model will improve the outcomes in the emergency departments of Pakistan.

Our study has established a significant reduction in the total length of stay of patients in ED when they are seen

early by a senior physician on the front line for example in triage. The difference of 103.308 minutes shorter stay in the physician triage group was statistically significant (p<0.000; CI=95%). This difference was present across all categories of clinical acuity as determined by ESI and is shown in Figure 2.

In our research, conditions that could lead to triaging of a patient in ESI Level 1 were excluded with the rationale that such critically ill patients are seen by senior physicians early and decision of admission is not affected by physicians' presence thus reducing selection bias and increasing the strength of the study. A single patient in ESI category 1 was included in the data which was probably a sampling error.

After excluding critical patients; the majority (62%) comprised of ESI-level 3. This group of patients is important for two reasons. First of all, it comprises the majority number of patients attending an emergency department, and reducing the length of stay of ESI level-3 patients will create the maximum effect on ED throughput. Secondly, these patients present with conditions that have diagnostic and therapeutic dilemmas. ESI level-1,2 are relatively critical patients and the decision of admission is usually inevitable. While on the other hand, ESI level-4,5 have either minor injuries or non-emergency conditions. Hence, early assessment of ESI level-3 patients by a physician reduces the risks involved with delayed decision making and improves patient safety.

Age of patients (≤/>65 years), gender of patients (male, female), and experience of triaging person (3-8 years) were effect-modifiers. Post-stratification independent t-test showed that p-value was statistically significant in all strata when the nurse triage group was compared to the physician triage group except the 3- and 8-years' experience groups, where the sample size was extremely small as shown in Table I.

There was no statistically significant difference in the LOS of patients triaged by <5 and ≥5 years' experience within the same triage group. But the difference was significant between the nurse vs physician group showing that the assessment in triage by a physician significantly reduced mean LOS.

Our data included all senior physicians, with no significant difference among them. Whether or not, the experience <3 years has any adverse effect needs evaluation in a separate study.

The findings of our study are similar to other studies e.g. found by Burström L, Engström ML, and co-researchers.[3] Another meta-analysis of comparative studies published from 1994 to 2014 showed a significant reduction in LOS of medium acuity patients (weighted means difference (WMD) -26.26 min, 95% CI -38.50 to -14.01) by placing a senior physician in triage.[7]A systematic review of 102 studies evaluating the causes, consequences, and solutions of crowding in the emergency department has found a reduction in ED length of stay when patients are seen early by a senior physician.[8] Similar results were found by Soremaku OA and et al.[9] Another prospective interventional study performed in a Level III trauma centre ED in the United States also showed reduced LOS when residents based triage model was introduced.[10]

We have recognized few limitations in our study. One was to determine the endpoint of the study. As decision making is a dynamic process changing according to repeated assessments of patients, hence it carried a potential risk of bias. Secondly, we only measured delay to reach a clinical decision but many other factors contribute to delays e.g. involvement of multiple specialties, laboratory, and radiological investigations, financial issues, non-availability of beds, family counselling, and inadequate number or incompetency of staff. These factors need evaluation in separate studies. One of the limitations was that nurse-led triage only occurred at night time, where patients might differ in their clinical severity and would have required a greater length of stay but we accounted for it by comparing it against standardized ESI severity index score. Consultations from different specialties and different radiological interventions are also delayed at night time due to less staff as compared to day time.

Despite the limitations, our study served the purpose of finding a significant reduction in an important ED quality indicator. We recommend implementing the Physician-Led Triage model in emergency departments of Pakistan. It may improve emergency department functioning and can also ensure efficient treatment of time-critical issues.

CONCLUSION

We conclude that the presence of a senior physician in triage statistically significantly shortens the length of stay of patients in the emergency department.

REFERENCES

1. Yang KK, Lam SSW, Low JM, Ong MEH. Managing emergency department crowding through improved triaging and resource allocation. *Operations Research for Health Care*. 2016;10:13-22.

2. Abolfotouh MA, Al-Assiri MH, Alshahrani RT, Almutairi ZM, Hijazi RA, Alaskar AS. Predictors of patient satisfaction in an emergency care centre in central Saudi Arabia: A prospective study. *Emergency Medicine Journal*. 2017;34(1):27-33.

3. Burström L, Engström ML, Castrén M, Wiklund T, Enlund M. Improved quality and efficiency after the introduction of physician-led team triage in an emergency

department. *Upsala Journal of Medical Science*. 2016;121(1):38-44.

4. Tsai VW, Sharieff GQ, Kanegaye JT, Carlson LA, Harley J. Rapid medical assessment: improving pediatric emergency department time to provider, length of stay, and left without being seen rates. *Pediatric Emergency Care*. 2012;28(4):354-6.

5. Harvey M, Al Shaar M, Cave G, Wallace M, Brydon P. Correlation of physician seniority with increased emergency department efficiency during a resident doctors' strike. *New Zealand Medical Journal*. 2008;121(1272):59-68.

6. Mirhaghi A. Most patients are triaged using the emergency severity index. *Journal of Nuclear Cardiology*. 2017;24(2):738.

7. Abdulwahid MA, Booth A, Kuczawski M, Mason SM. The impact of senior doctor assessment at triage on emergency department performance measures: Systematic review and meta-analysis of comparative studies. *Emergerency Medicine Journal*. 2016;33(7):504-13.

8. Imperato J, Morris DS, Binder D, Fischer C, Patrick J, Sanchez LD, et al. Physician in triage improves emergency department patient throughput. *Internal and Emergency Medicine*. 2012;7(5):457-62.

9. Soremekun OA, Capp R, Biddinger PD, White BA, Chang Y, Carignan SB, et al. Impact of physician screening in the emergency department on patient flow. *Journal of Emergency Medicine*. 2012;43(3):509-15.

10. Svirsky I, Stoneking LR, Grall K, Berkman M, Stolz U, Shirazi F. Resident-initiated advanced triage effect on emergency department patient flow. *Journal of Emergency Medicine*. 2013;45(5):746-51.

* *