

Comparative Analysis of Simple Clinical Assessment vs. Systematic Triage to Decrease the Length of Stay in Emergency Medicine

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ABSTRACT

Objective: Comparison of effectiveness of eyeball triage and Canadian triage and acuity scale (CTAS) in decreasing time of assessment and length of patients stay in emergency of hospital.

Methods: A quasi experimental research on ninety-two patients of age ≥ 18 years presented with general complaints in emergency department were carried out at Ziauddin University Hospital Karachi. Consecutive patients were selected for seven months period from June-December 2020 and randomly distributed into two equal groups (forty-six patients in each group) of eyeball triage and CTAS triage. Patients of both groups were evaluated with respective triage and researcher note down the level of triage, time required for triage, patient's management, and their stay in emergency.

Results: In evaluated patient, majority of them were in level II 28 (60.9%) and 22 (47.8%) followed by level III 14 (30.4%) and 17 (37.0%) and level IV 4 (8.7%) and 7 (15.2%) in eyeball and CTAS triage group respectively. Time required for completion of triage was significantly different in triage level of both groups i.e., 1.3 ± 0.5 and 2.4 ± 1.6 minutes ($p=0.001^*$). Majority of the patients were admitted in emergency 20 (43.5%) and 18 (39.1%) followed by 11 (23.9%) and 17 (37.0%) patients who were discharged with medication and follow-up advice in eyeball and CTAS triage group respectively with significantly different length of stay i.e., 75.3 ± 53.5 and 98.4 ± 51.8 minutes ($p=0.039^*$).

Conclusion: Eyeball triage is more simple, effective, and rapid system of clinical assessment than CTAS that significantly decreased the time of patient's assessment and patient's stay in emergency.

Key words: Effectiveness, Eyeball triage, Time, Emergency.

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INTRODUCTION

Emergency departments are the first place of hospitals where patients are managed in case of immediate need of medical treatment. Emergency is the busy place of hospital with persistent increase in flow of patient, high risk of admission and mortality annually throughout the world [1,2]. Overcrowding in emergency department is among the biggest challenges faced by hospitals and emergency physicians [3].

Rapid and appropriate decision regarding patient status is essential aspect of patient management visited emergency of hospital that includes stabilization of vital functions, admission either in emergency department or intensive care unit or in ward or discharged from emergency with medications and medical advice [4]. These are disposition decisions of experience physicians on their clinical judgments depends upon critical condition and clinical

factors like disease diagnosis, disease severity, selection of medications and patient response towards medications. Unfortunately, errors in emergency are much common because of patient's overflow, shortage of time, lack of physicians and other medical staff and missing patient's clinical information [4,5].

In last few decades, latest development in medical filed including emergence of new medications, diagnostic tools and approaches for patient assessment and management improved the emergency department outcomes [6,7]. But still patient flow is increasing such as according to CDC, 130.0 million annual visits with 40.4 visits per one hundred persons in United States [8]. In addition to increased patient flow, length of stay, morbidity, mortality, and cost of treatment also increasing. Therefore, patient overflow is considered as most critical problem in emergency that need patient's appropriate division according to their medical needs [9].

Triage is a well-defined systematic approach utilized in emergency for rapid clinical assessment and categorization of patients according to their urgency of

medical treatment [10]. Different triage systems have been developed and used for subsiding overflow of patient and unnecessary delay in treatment. Basically, triage system is approach of patient categorization on their criticalness and optimization of available resources. Triage approaches used the vital signs along with presenting complaints for patient categorization for providing treatment [11,12].

Use of triage in emergency department helps the physicians to place the patients at right position and treat them at right time for decreasing the risk of morbidity, mortality as well decreasing burden of overflow on physicians. Selection of effective triage is very critical for avoiding delay in early diagnosis and receiving treatment. Therefore, current study compares the eyeball triage and CTAS in emergency of hospital and measuring both systems effectiveness for decreasing time of assessment and length of patients stay in emergency.

METHODOLOGY

A quasi-experimental research on ninety-two patients of age ≥ 18 years presented with general complaints in emergency department were carried out at Ziauddin University Hospital Karachi. Consecutive patients were selected for seven months period from June-December 2020 and randomly distributed into two equal groups (forty-six patients in each group) of eyeball triage and CTAS triage. Patients of both groups were evaluated with respective triage and researcher note down the level of triage, time required for triage, patient's management,

Table 1: Triage level and reassessment time.

S.No	Level	Time for reassessment (minutes)
1	1 (Blue) Resuscitation	Continuous nursing care
2	2 (Red) Emergent	15
3	3 (Yellow) Urgent	30
4	4 (Green) Less urgent	60
5	5 (White) Non-urgent	120

RESULTS

In this study, ninety-two patients of general complaints who visited the emergency department were selected with consecutive sampling technique and randomly distributed into two equal groups (forty six patients in each group) of eyeball triage and CTAS triage. In both groups, patients with similar demographics characteristics and medical history (Table 2), vital signs (Table 3) and presenting complaints were selected (Table 4) for equal comparison to avoid the difference of interest.

Similarly, no significant difference was observed in triage level of both groups ($p=0.401$). Majority of the patients were in level II 28 (60.9%) and 22 (47.8%) patients followed by level III with 14 (30.4%) and 17 (37.0%) patients and level IV with 4 (8.7%) and 7 (15.2%) patients in eyeball and CTAS triage group respectively (Table 5).

and their stay in emergency.

A quasi-experimental research on patients of years presented with general complaints in emergency department were carried out at Ziauddin University Hospital Karachi. Study was completed on ninety-two patients during the period of six from 00-00-0000 to 00-00-0000. Consecutive patients of either gender with age of ≥ 18 years suffering from common complaints were included in research whereas patients of age < 18 years, pregnant women or not interested in research were excluded.

Patients with general complaints were consecutively selected and randomly distributed into two equal triage groups. First group of triages was eyeball triage with forty six patients and second group of triage was CTAS with forty six patients. In eye ball triage initial clinical evaluation of patients was performed by experienced nurse by just giving a quick look whereas in CTAS triage initial clinical evaluation of patients was performed by experienced physician by inquiring patient about presenting complaint, pain level with the help of numeric rating scale (NRS), vital signs including blood pressure (120/80 and 90/60 mmHg), respiratory rate (12-18 breaths/min), pulse (60-100 beats/min) and temperature (97.8-99.1 °F) and Glasgow Coma Scale (GCS) score. Patient were categorized from level 1 to level 5 with reassessment time ranging from 15-120 min (Table 1). Patients stay in emergency was calculated from total stay of patient in emergency. Statistical package for social sciences (SPSS version 25) was used for data interpretation.

Time required for completion of triage was significantly different in triage level of both groups i.e., 1.3 ± 0.5 and 2.4 ± 1.6 minutes ($p=0.001^*$). In eyeball triage group, most of the patient's triage was completed within one minute 32 (69.6%), whereas only 14 (30.4%) patient's triage was completed in more than one minute. In CTAS triage group, most of the patient's triage was completed in more than one minute 29 (63.0%), whereas only 17 (37.0%) patient's triage was completed within one minute ($p=0.002^*$) (Table 5).

Similarly, no significant difference was observed in management of both group patients ($p=0.569$). Majority of the patients were admitted in emergency department 20 (43.5%) and 18 (39.1%) followed by 11 (23.9%) and 17 (37.0%) patients who were discharged with medication and follow-up advice in eyeball and CTAS triage group respectively (Table 5).

Length of stay of patients in emergency department was significantly different in triage level of both groups i.e., 75.3 ± 53.5 and 98.4 ± 51.8 minutes ($p=0.039^*$). In eyeball triage group, most of the patient's triage was completed within one hour 31 (67.4%), whereas only 15

(32.6%) patient's triage was completed in more than one hour. In CTAS triage group, approximately half of the patient's triage was completed in more than one hour 24 (52.2%) and remaining half 22 (47.8 %) patient's triage was completed within one hour ($p=0.058$) (Table 5).

Table 2: Patient demographics and medical history presented in emergency department.

Variables	Eyeball (n=46)	CTAS (n=46)	P-value
Gender			
Male	25 (54.3)	23 (50.0)	0.676
Female	21 (45.7)	23(50.0)	
Age			
Mean \pm SD	42.3 \pm 16.7	41.4 \pm 16.4	0.797
17-30	15 (32.6)	12 (26.1)	0.734
31-45	13 (28.3)	18 (39.1)	
46-60	9 (19.6)	10 (21.7)	
61-75	7 (15.2)	4 (8.7)	
76-90	2 (4.3)	2 (4.3)	
Diabetes Mellitus			
Yes	10 (21.7)	8 (17.4)	0.599
No	36 (78.3)	38 (82.6)	
Hypertension			
Yes	13 (28.3)	10 (21.7)	0.47
No	33 (71.7)	36 (78.3)	
Chronic Liver Disease			
Yes	6 (13.0)	7 (15.2)	0.765
No	40 (87.0)	39 (84.8)	
Smoking			
Yes	5 (10.9)	6 (13.0)	0.748
No	41 (89.1)	40 (87.0)	
Ischemic Heart Disease			
Yes	2 (4.3)	1 (2.2)	0.557
No	44 (95.7)	45 (97.8)	
P-values are calculated on Independent sample t test and Chi-square test.			
* P-values are significant \leq 0.05			

Table 3: Patient descriptive variables presented in emergency department.

Variables	Eyeball (n=46)	CTAS (n=46)	P-value
Blood Pressure (mmHg)			
Systolic Blood Pressure	138.7 \pm 25.6	131.2 \pm 22.7	0.142
Diastolic Blood Pressure	84.1 \pm 16.6	83.7 \pm 17.6	0.702
Respiratory Rate (breaths / min)	19.9 \pm 1.5	20.1 \pm 1.5	0.672
Pulse (beats/min)	93.0 \pm 16.9	91.6 \pm 15.2	0.665

Temperature (°F)	98.5 ± 1.4	98.5 ± 1.1	0.935
GCS Score	14.5 ± 1.9	14.6 ± 1.9	0.834
Pain Score	3.9 ± 2.4	3.9 ± 2.2	0.964
P-values are calculated on independent sample t test.			
* P-values are significant ≤ 0.05			

Table 4: Patient presenting complaint presented in emergency department.

Presenting Complaints	Eyeball (n=46)	CTAS (n=46)
Fever+Sore throat+Cough+Pain	4 (8.7)	4 (8.7)
Fever+Nausea+Vomiting+Pain	5 (10.9)	5 (10.9)
Loose motion+Decrease appetite	4 (8.7)	4 (8.7)
Abdominal pain+Nausea	6 (13.0)	6 (13.0)
Fever+Dyspnea+Cough	5 (10.9)	5 (10.9)
Pain+Pus in foot	2 (4.3)	2 (4.3)
Polyuria+Oliguria	3 (6.5)	3 (6.5)
Fever+Abdominal pain	7 (15.2)	7 (15.2)
Flu+Loss of taste & smell+Pain	2 (4.3)	2 (4.3)
Fever+Lose motion+Cough	3 (6.5)	3 (6.5)
Fever+Abdominal pain+Polyuria	2 (4.3)	2 (4.3)
Nausea+Vomiting+Pain	3 (6.5)	3 (6.5)
Total	46 (100.0)	46 (100.0)

Table 5: Triage of patient and management presented in emergency department.

Variables	Eyeball (n=46)	CTAS (n=46)	P-value
Triage Level			
II	28 (60.9)	22 (47.8)	0.401
III	14 (30.4)	17 (37.0)	
IV	4 (8.7)	7 (15.2)	
Time to Complete Triage (min)			
Mean ± SD	1.3 ± 0.5	2.4 ± 1.6	0.001*
≤ 1	32 (69.6)	17 (37.0)	0.002*
> 1	14 (30.4)	29 (63.0)	
Management			
Admission	20 (43.5)	18 (39.1)	0.569
Discharged	3 (6.5)	1 (2.2)	
Discharged+Medication	11 (23.9)	8 (17.4)	
Discharged+Medication+Follow-up Advice	11 (23.9)	17 (37.0)	
Leave against medical advice	1 (2.2)	1 (2.2)	
Referred	0 (0.0)	1 (2.2)	
Length of Stay (minutes)			

Mean ± SD	75.3 ± 53.5	98.4 ± 51.8	0.039*
≤ 1 Hour	31 (67.4)	22 (47.8)	0.058
> 1 Hour	15 (32.6)	24 (52.2)	

P-values are calculated on independent sample t test and Chi-square test.

* P-values are significant ≤ 0.05

DISCUSSION

In this study, two commonly used triage approaches were compared for finding out the best triage that can be implemented in emergency of our setting for decreasing time of assessment and length of patients stay in hospital emergency. Because appropriate triage selection can be helpful in decreasing the wastage of time in waiting area or in diagnosis that can immediately initiate the appropriate treatment, resulting in decline in morbidity and mortality.

First important aspect of this study was time that taken by nurse or physician to complete triage. In patients of eyeball triage group, triage was completed in 1.3 ± 0.5 (1-2) min, whereas in CTAS triage group, triage was completed in 2.4 ± 1.6 (1-5) min. There was significant difference in mean time of both triage groups (p-value=0.001*). In eyeball triage group, approximately 70% patient's triage was completed in a minute, whereas in CTAS triage group, only 37% patient's triage was completed in a minute with significant difference (p-value=0.002*).

Second important aspect of this study was categorization of patients by using either eyeball triage or CTAS triage. Patients of similar presenting complaints were evaluated in both triage group and non-significant difference was observed (p-value=0.401). In patients of eyeball triage group, majority of the patients were in level II 28 (60.9%) followed by level III 14 (30.4%) and level IV 4 (8.7%). Almost similar categorization was reported in patients of CTAS triage group, majority of the patients were in level II 22 (47.8%) followed by level III 17 (37.0%) and level IV 7 (15.2%).

Third important aspect of this study was management of patients by using either eyeball triage or CTAS triage. As we discussed earlier, patients of both groups have similar presenting complaints, so management was also similar with non-significant difference (p-value=0.569). In patients of eyeball triage group, majority of the patients were admitted 20 (43.5%) followed by discharged with medication 11 (23.9%) and discharged with medication and follow-up advice 11 (23.9%). Almost similar management was observed in CTAS group, where majority of the patients were also admitted 18 (39.1%) followed by discharged with medication and follow-up advice 17 (37.0%) and discharged with medication 8 (17.4%).

Fourth and last important aspect of this study was length of stay of patients of both group in emergency department. In patients of eyeball triage group, length of stay was 75.3 ± 53.5 min, whereas in CTAS triage group,

length of stay was 98.4 ± 51.8 min. There was significant difference in mean length of stay of both triage groups (p-value=0.039*). In eyeball triage group, approximately 67% patient's length of stay was less than an hour, whereas in CTAS triage group, approximately 48% patient's length of stay was less than with non-significant difference (p-value=0.058) [13-15].

CONCLUSION

Eyeball triage is more simple, effective, and rapid system of clinical assessment than CTAS that significantly decreased the time of patient's assessment and patient's stay in emergency. Eyeball and CTAS triage are equally effective in categorizing patients in different triage levels and their management, whereas eyeball is more effective in taking less time to complete and less length of stay in emergency of hospital.

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