Factors affecting waiting time in accident and emergency patients attending to preliminary care units in selected Base Hospital in Western province, Sri Lanka

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Abstract: **Waiting time is an emergency department is considerable issue in money countries in the world. This study aims to investigate the factors affecting waiting time (WT) in accident &emergency (A&E) units and to formulate strategies for improvement. Preliminary care units in Sri Lanka are similar to A&E department in other countries.**

Objective: To describe the factors affecting waiting time in the accident and emergency patient attending to Preliminary Care Unit of selected Base Hospital in Western Province Sri Lanka.

Methodology: This was a cross sectional observational study conducted in three Base Hospital in Western province the period of three months and total 425 patients were interviewed. This study was conducted at primary care units in three Base Hospital in Western Province Sri Lanka. Patients, consultants, medical officers, nursing officers, Health care assistance and other administrative staff participated to the study.

Results: The most congested time period was 10a, m to 1p.m. most affected age group was 15- 24yrs.There were more significant association between type of injuries and waiting time(P=0.001). Majority of the patients were registered within 15 minutes (97.6%) and the average waiting time to seeing a doctor was less than 15 minutes. Ninety-nine percentages of patients waited less than 15 minutes to get their treatment.

Conclusion and recommendation: RTA, animal bite, snake bite and falls were the commonest causes for admission. Surgical and JMO referral were delay due to un availability of medical staff. Shortage of heath staff, lack of in-service training program and poor monitoring and evaluation were noticed.

Keywords: **waiting time, primary care unit, accident &emergency.**

1. INTRODUCTION

Waiting time in Emergency department (ED) leads to increase risk of loss of lives and complications. Increased number of road traffic injuries, aging population, increase member of injuries due to other causes, occupational injuries, violence, overcrowding and climate changes are the main reasons for increased demand of ED[1] Prolong stay or wanting time in ED is crisis situation for medical personals due to increased admission, complicating injuries, handling of limited recourses, patient expectation for quick service and attitude of bystander and relations[2].ED in other country is similar to Preliminary Care Units (PCU) in Sri Lanka.[3]

Injuries are the main causes for hospital admission which may express as pain, bleeding, loss of organs and death. Patients and relations expect quick action to relief of the above condition and medical staff try to minimize farther damage to the patient. Quick treatment and intervention reduce death and disability rate by 50% **[2].** Steady rise in number of admission and overcrowding of ED also related with poor quality service, increase risk of motility and morbidity **[3].**

Justification

ED department overcrowding is common problem in worldwide to causes inability to treat all patients adequately and equitable manner. It leads to poor patient care and outcomes. Improvement of technology; aging population, occurrence of accident, complexity of life style leads high rate of accident & emergency which are the main reasons for overcrowding **[4].**

Western countries such as UK, USA, Canada and Australia which had more studies in waiting time in ED. Using that knowledge, they achieved efficient and effective A&E management and prompt attention to their patients **[5]**. High patient expectation and demand, scarcity of resource, advancement of technology and increase number of accident and injuries were led the demand of this study in Sri Lanka. On the other hand, preventive sector indicators of Sri Lanka are always highlighted nationally and internationally and that were well accepted. Most of the time health sector measurement based on preventive sector indicators and curative sector indicators are not expressed in both nationally and internationally. That waiting time or four-hour rule is the modern indicator which can be used for assess and compare the curative sector of health system. Drafted Health Ministerial A&E policy expresses the impotence of waiting time in A&E units **[6].**

There is an existing information gap on factors affecting waiting time in accident & emergency patients attending to PCUs. Therefore, this study will help to future health planning in Sri Lanka.

General Objectives

To describe the factors affecting waiting time in the Accident & Emergency patients attending to Preliminary Care Unit of selected Base Hospitals in Western Province.

Specific Objectives

1. To describe the patient factor affecting waiting time in PCUs.

2. To describe the staff factors affecting waiting time in PCUs.

3. To describe the managerial process affecting waiting time in PCUs.

2. METHODOLOGY

This is descriptive cross-sectional study, conducted in Selected PCUs of the Base Hospitals in the Western Province in Sri Lanka. were B. H. Homagama, B. H. Panadura and B.H. Horana. The patients who were admitted to PCUs after accident and emergency and those who were above fifteen years of age were the categories taken into study. All patients who attended to the PCU during July 2015 to August 2015were included in the study except for those who were critically ill, psychiatric illness; bellow 15 yrs of age, obstractics and gynecology.

Major injuries were loss of organs, bone fractures, internal organs damage, Deep penetrating laceration or body surface burns more than 5% of body **[7].**

The sample size is calculated based on the formula given below **[8].**

$$N = \frac{2^2 \times P(1-P)}{d}$$

P- The expected prevalence of patient's attended to within 4 hours. Set at 50%

Z- The standard normal deviation for a two tailed a set at 1.961

D-Absolute precision required on either side of the proportion set at 0.05 Therefore,

$$N = \frac{1.96^2(0.5(1-0.5)}{0.05} = 384$$

Adding an allowance of non-response (10%) the final sample size will be 425.

	BH Horana	BH Homagama	BH Panadura	Total
No of Accident & Injury	10800	11254	12365	34419
Percentage	31.37%	32.69%	35.92%	100%
Sample Size	133	139	153	425

The sample size was calculated proportionate to patients attending to PCUs during the last year. The interviewer administered questionnaire, Self-administered Questionnaires, checklist, focal group discussion and key informant interviews were used as study instrument. The pre-test was done on base hospital Pimbura. Responded rate was 98%. Data was analyzed by using SPSS software.

3. RESULTS

Socio-demographic characteristics of patients.

Table 1 - Distribution of patients according to their age.

Age (Years)	Frequency	Percent	Cumulative Percent
15-24	121	29.1	29.1
25-34	65	15.6	44.7
35-44	84	20.2	64.9
45-54	49	11.8	76.7
55-64	40	9.6	86.3
>65	57	13.7	100

Mean (SD), Median,Range 40.08(19), 37, 76

SD = Standard Deviation

Table: 1 shows the distribution of patients according to their age groups. Majority patients were 121 (29.1%) between15-24yrs.

Table 2- Distribution of injuries among patients.

Type of injury	Frequency	Percent
Superficial injury	125	30.0
Open wound	119	28.6
Fracture / Dislocation	57	13.7
Soft Tissue Injury	93	22.4
Suspected Internal Injury	22	5.3
Total	416	100.00

Table: 2 shows the distribution of injuries among patients. The majority of patients 125 (30%) were superficial injury and open wounds were119 (28.6%).

Table 3 - Distribution of mode of injury among patients

Mode of injury	Frequency	Percent
Road Traffic Accident	102	24.5
Fall	55	13.2
Hit on object	22	5.3
Stab/ accidental	63	15.1
Foreign Body in ear	6	1.4
FB eye	15	3.6
FB nose	9	2.2
Animal bite	50	12
Insect stings	3	0.7
Snake bite	26	6.3
Head injury	4	1
Burn	9	2.2
Assault	46	11.1
Electrocution	6	1.4
Total	416	100.0

RTA   =   Road traffic accident; FB = Foreign body

Table:3 shows Distribution of mode of injury among patients**. The** majority of patients 24.5% (102) were admitted with Road Traffic Accidents. Others were with fall (13.296) and animal bites (12%-63%).

Table 4 - Time taken to registrations (WT for registration)

Time (minutes)	Frequency	Percent
0 -15	406	97.6
16 -30	10	2.4
Total	416	100

Table 4 shows Waiting time for registrations. The majority (97.6%) of patients were registered within 15 minutes.

Table 5 - Time taken to meet admission Medical officer - (Waiting time for registrations).

Time (minutes)	Frequency	Percent
0 -15	410	98.6
16 -30	6	1.4
Total	416	100

Table 5 shows- time taken to meet admission Medical officer -(Waiting time for registrations). The majority (98.6%) of patients were seen within 15 minutes and rests were seen within 30 minutes.

Table 6 - Waiting time for admission and clerking

Time (minutes)	Frequency	Percent
0 -15	409	98.3
16 -30	3	0.7
31-45	4	1
Total	416	100

Table 6 shows - Waiting time for admission and clerking**.** The majority 98 3% (409) of patients examine within 15 minutes.

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Table 7 - Waiting time for treatment.

Time (minutes)	Frequency	Percent
0 -15	389	93.5
16 -30	17	4.1
31-45	3	0.7
46-60	7	1.7
Total	416	100

Table 7 shows- Waiting time for treatment. The majority (93.5%) of patients were treated within 15 minutes.

Table 8 - Waiting time for opinion of General Surgeon.

Time (minutes)	Frequency	Percent
0 -15	4	9.8
16 -30	10	24.4
31-45	6	14.6
46-60	21	51.2
Total	41	100

Table 8 shows waiting time for opinion of General Surgeon. The majority (51.2%) of patients waiting at least 60 minutes for general surgeons' opinion.

Table 9 - Waiting Time for opinion of Judicial Medical Officer.

Time (minutes)	Frequency	Percent
16-30	3	4
31-45	3	4
46-60	45	60
> 60	24	32
Total	75	100

Table 9 shows Waiting Time for opinion of Judicial Medical Officer The majority of patients (60%) waited at least 60 minutes to obtain opinion of JMO.

Table 10 - Waiting time for X-Ray investigation.

Time (minutes)	Frequency	Percent
0 -15	32	19.5
16 -30	82	50
31-45	40	24.4
46-60	10	6.1
Total	164	100

Table 10 shows waiting time for X-Ray investigation. Majority (50%) of patients waited 30 minutes to get their X-ray,

Table 11 - Total waiting time at PCU.

Time (minutes)	Frequency	Percent
< 1 hrs.	70	16.8
≥ 1 to < 2 hrs.	84	20.2
≥ 2 to < 3 hrs.	74	17.8
≥ 3 to < 4 hrs.	93	22.4
≥ 4 to < 5 hrs.	56	13.5
≥ 5 to < 6 hrs.	28	6.7
≥ 6 to < 7 hrs.	3	0.7
≥ 7 to < 8 hrs.	8	1.9
Time (hrs.)	**Frequency**	**Percent**
4 or less than 4	321	77.2
More than 4	95	22.8
Total	416	100

Mean (SD)   3.25(0.08) hrs.

Maximum   8 hrs.

Minimum   1 hr.

Table 11 shows   Total waiting time at PCU. According to the Table 11 the highest number of patients 321 (77.2) stay less than four hours and 95 (22.8%) patients more than four hours. Maximum waiting time was eight hours and minimum were one hour.

Factors associated with waiting time.

Waiting time was categorized in to 4-hour rule, according to 4-hour rule of NHS in UK **[4]**.

Table 12 - Association between mode of injury and Waiting Time

Waiting time	4 or < 4hr No (%)	> 4 hr No (%)	Total No (%)
Mode of injury			
RTA	70(68.6)	32(31.4)	102 (100)
Non-RTA	251(79.9)	63(20.1)	314 (100)
Total	321(77.2)	95(22.8)	416 (100)

P = 0.001 RTA = Road Traffic Accident

Table 12 shows association between mode of injury and Waiting Time**.** RTA patients, (68.6%) had stayed less than four hours and 31.4% patients had stayed more than four hours. Non-RTA patients (79.9%) had stayed less than four hours.

Mean (SD)   3.25(0.08) hrs.

Maximum   8 hrs.

Minimum   1 hr.

Table 13 - Specialist referrals associated Waiting Time

Waiting time (hrs.)	4 or < 4hr No (%)	> 4 hr No (%)	Total No (%)
Referral done	97 (70.8)	40 (29.2)	137 (100)
Not referred	224 (80.3)	55 (19.7)	279 (100)
Total	321 (77.2)	95 (22.8)	416 (100)

   P = 0.03

Table 13 shows non-referral for specialist (80.3%) had spent less than four hours while referrals (19.7%) had spent more than four hours. There was significant association between specialist referrals and Waiting Time.

Table 14 - Association between X-Ray investigation and Waiting time.

Waiting time (hrs.)	4 or < 4hr No (%)	> 4 hr No (%)	Total No (%)
X-ray not done	218(86.5)	34 (13.5)	252 (100)
X-ray done	103 (62.8)	61 (37.4)	164 (100)
Total	321 (77.2)	95 (22.8)	416 (100)
P = 0.001			

Table 14 shows association between X-Ray investigation and Waiting time. The patients who had referred to X-Ray department, (62.8%) had spent less than four hours. There were significant associations between waiting time and time taken to get X-ray.

4. DISCUSSION

Waiting time in an Emergency Department is critical and deciding factor for survival of patients. This study has revealed that the most affected accident and injury victims felt into the age group between 15 years to 24 years. This is the most energetic age group in the life span.

RTA was the commonest cause for injuries 102 (24.5%), accidents 55 (13.296), falls 55(13.2%), animal bites 50 (12%), snake bite 26 (6.3%) and assaults 46 (11.1%). Superficial and soft tissue injuries were the commonest admissions to the PCU. Fractures and suspected internal injuries were the most serious cases.

It was revealed that the patients over 65 years, were referred to more than one consultant (p <0.001). Patients undergoing radiological tests (p<0.001) were more likely to have longer Waiting Time. The highest number of patients 321 (77.2%) stay less than four hours while 95 (22.8%) patients stayed more than four hours. Maximum waiting time was eight hours and minimum was one hour. Study in Western Australia demonstrated that the improvement in ED overcrowding after the introduction of the 4-hour rule in three tertiary hospitals were associated with fewer deaths and a reduced mortality rate. Increased mortality was associated with junior medical staff working at ED in (Western Australia 2011). After starting PCUs in Sri Lanka, mortality, morbidity and economic burden of patient were reduced [3].

9.00 am to 12.00 Noon was the most congested time period in ED according to North Indian Study [5]. In this study also, it was identified that the most congested time period was the same. Rushing to school and vehicle congestion at the office time were few reasons identified.

Trained A&E staff with good physical health and standard quality medical equipment's are required for better out come from PCU. According to 80% of medical staffs were in the active age group of 30 to 50 years of age [9].

A delay in the X-Ray department during the day time was noted as the X-Ray referral time was another leading cause which results in the longer waiting time. There was a significant association between X-Ray referral and results longer waiting time than four hours too <0.001.

During this study, 235 (56.5%) patients were properly discharged from the PCU after completing their treatment while 33 (7.976%) patients left against Medical Advice (LAMA). Most of LAMA patients were treated completely but they left due to delay in the discharge process.

Waiting time of bad and critically ill patients was very less as they were transferred to the ward immediately. Minor surgical cases had to spend more time due to poor attention by the staff.

There was a significant association between the total Waiting Time and the age (<0.16) as well as RTA and 4-hour rule (<0.01). As most RTA patients were complicated than others, they were needed specialist referrals and their waiting time was more prolonged (p<0.03). As a result of inadequate medico-legal professionals at PCU, prolong waiting time was noted in RTA patients who needed their opinion. Referrals to the specialists were more time-consuming part in the process. Delay in specialist referral (53%) and delay in investigation (34%) were the common reasons for prolong waiting time.

5. CONCLUSION

PCUs in all three hospitals were highly congested in peak hours with casualties. Shortage of health care workers were noticed and inadequacy of in-service training on regular basis were identified. Access to the latest protocol and guide lines to the medical officers were not freely available in the PCU.

Delay in consultant referrals were identified in this study. Most of the surgical referrals, JMO referrals, X-Ray referrals were delayed due to shortage of the staff.

6. RECOMMENDATION

- Skill development training programs to all categories.

- Strengthening of the supervision, monitoring and evaluation.

- Ensure availability of the updated protocol. National as well as international.

- Provision of continuous in-service programs to the health staff.

- Ensure the availability of the human resource in the peak hours of admissions.

- Ensure the quick investigations and laboratory services.

- Re-orientation of consultant referral systems.

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