

Quality improvement of triage accuracy in the emergency department

Sunil Adhikari, Suraj Rijal

Lecturer, Department of General Practice and Emergency Medicine, Patan Academy of Health Sciences, Lalitpur, Nepal

ABSTRACT

Introduction: Triage is the sorting of patients into priority groups according to their need and severity of clinical condition. The study aims to present outcome of complete audit cycle of triage by the triage nurse for quality improvement of triaging in Emergency.

Method: 150 patients were randomly selected over 2 weeks who were triaged by the Emergency triage nurse into Emergency (Red), Priority (Yellow) and Queue (Green) in the Emergency Department at Patan Hospital. We followed the WHO quick check triage and assessed those who were accurately triaged, over triaged and those who were under triaged. The necessary changes were done after analysis of data from first cycle and same process was repeated for second cycle. In the second cycle, 150 patients were selected randomly over 2 weeks who were triaged by the Emergency triage nurse. Plan-Do-Study-Act (PDSA) cycle was used for quality improvement cycle.

Result: Data were collected from 150 patients in the first cycle and 150 patients in the second cycle. In the first cycle, 48.7 % of patients were correctly triaged, 48.7% were over triaged and 2.7% were under triaged. After the second PDSA cycle, it was found that 65.3% of patients were correctly triaged, 33.3 % were over triaged and 1.3% were under triaged.

Conclusion: Accuracy of triage can be improved by continuous quality improvement audit and necessary interventions. Plan-Do-Study-Act (PDSA) cycle is a useful tool for quick detection of problems and acting on necessary interventions for improvement

Keywords: audit, emergency department, triage

CORRESPONDENCE

Dr. Sunil Adhikari

Lecturer, Department of General Practice and Emergency Medicine
Patan Academy of Health Sciences, Lalitpur, Nepal

Email: suniladhikari@pahs.edu.np

INTRODUCTION

The Emergency Department of the hospital addresses immediate interventions for those patients seeking urgent and critical needs. Triage is the first encounter between patient and the health care provider when patient comes to the emergency.¹ It is the sorting of patients into priority groups according to their need and the severity of their condition. Currently, at Patan Hospital, we follow the WHO quick check triage and triage patient into Emergency (Red), Priority (Yellow) and Queue (Green).²

The Emergency Department at Patan Hospital receives about 150-200 patients per day. The process of triage is done by the triage nurse and the Emergency cases (Red) are handed over directly by the triage nurse to the observation medical officer. Although the aim of the triage nurse is to accurately triage the patient, there still remains a risk that patient could be erroneously triaged. If the patient is over triaged, scarce resources could be wasted and if patient is under triaged, it can have serious clinical consequences.^{3,4}

The study aims to present the outcome of complete audit cycle of triage by the triage nurse for quality improvement of triaging in the emergency.

METHOD

We randomly selected 150 patients over 2 weeks who were triaged by the Emergency triage nurse into Emergency (Red), Priority (Yellow) and Queue (Green) in the Emergency Department at Patan Hospital. We followed the WHO quick check triage and assessed those who were accurately triaged, over triaged and those who were under triaged. This data collection cycle was called first cycle.

Plan-Do-Study-Act (PDSA) cycle which is a standard method of quality improvement cycle was used for this study.⁵ The study was conducted in Emergency department at Patan Hospital from November 18, 2019 to December 17, 2019. The permission to conduct this audit was taken from the department. The necessary changes were done after analysis of data from first cycle and same process was repeated for second cycle. In the second cycle, 150 patients were selected randomly over 2 weeks who were triaged by the Emergency triage nurse into Emergency (Red), Priority (Yellow) and Queue (Green)

Plan

1. Barrier identification: The barriers identified in the first cycle were
 - Increased flow of patients at triage
 - Failure of triage nurse to update themselves in skills or knowledge
 - Non-compliance by patient or their visitors
2. Identifying indicators: On the basis of possible barriers, indicators were identified and data were obtained from patient's chart and interview with triage nurse in Emergency department. The indicators were patients who were over triaged, patients who were under triaged and patients who were correctly triaged. The identified indicators were aimed for both first and second cycle.
3. Standard setting: In a multi-center study done using retrospective review to examine the triage accuracy, they found triage accuracy of 58.7 %.⁶ We set the standard target for triage accuracy of 80 %. This standard was considered for both first and second cycle.

Do

We collected the data over two weeks in Emergency department. The variables included those who were accurately triaged, over triaged and those who were under triaged.

Study

The collected data was used to compare with the standard. The frequency and percentage of all variables were calculated. Subgroup analysis according to various category was done. Recommendations were formulated after completion of first cycle. The same process was used for second cycle.

Act

We talked with the triage nurse and updated them on proper triaging. We explained them about the new Triage chart and provided them photocopies of the WHO quick check triage so that it would be easier for them to access and follow. The necessary changes were done after analysis of data from first cycle and same process was repeated for second cycle.

Data analysis- Frequency and percentage of patients who were triaged as Emergency, Priority and Queue as per WHO quick check triage was calculated. The frequency and percentage of patients who were accurately triaged, over triaged and those who were under triaged was also tabulated.

RESULT

Data were collected from 150 patients in the first cycle and 150 patients in the second cycle. As per WHO quick check triage, the triage nurse triaged 10% of patients into Emergency, 85.3% of patients into Priority and 4.7% into Queue in the first cycle (Table 1). It was found that 48.7 % of patients were correctly triaged, 48.7% were over triaged

and 2.7% were under triaged. In the second cycle, 13.3% of patients were triaged into Emergency, 84% of patients into Priority and 2.7% into Queue (Table 2). After the second PDSA cycle, it was found that 65.3% of patients were correctly triaged, 33.3 % were over triaged and 1.3% were under triaged.

Table 1. Comparison of patients in triage categories in first and second cycle as per WHO quick check triage

Triage category	First cycle		Second cycle	
	Frequency	Percentage	Frequency	Percentage
Emergency	15	10	20	13.3
Priority	128	85.3	126	84
Queue	7	4.7	4	2.7

Table 2. Comparison of accuracy of triage in first and second cycle as per WHO quick check triage

Accuracy of triage	First cycle		Second cycle	
	Frequency	Percentage	Frequency	Percentage
Over triage	73	48.7	50	33.3
Correct triage	73	48.7	98	65.3
Under triage	4	2.7	2	1.3

DISCUSSION

After analysis of data of first and second cycle, it was observed that accuracy of triage improved from 48.7% to 65.3%. It was still below our standard target of 80%.

According to a study carried out by Mostafa, et al. in Iran, they found that the challenges faced in triage were mostly related to nursing personnel and management challenges. The challenges related to nursing personnel were lack of clinical competency and lack of psychological capability. The management challenges were challenges related to human resources, structural challenges and performance challenges.⁷ In our study, we found that increased flow of patients in triage area, failure of triage nurse to update themselves in skills or knowledge and non-compliance were major barriers that hindered accuracy of triage. Studies suggested that regular triage training, collaboration between emergency departments and continuous monitoring were crucial to improve the nurse's triage performance.^{1,8}

We used Plan-Do-Study-Act (PDSA) cycle for this quality improvement audit but concerns have been raised on the complexity and appropriateness.⁹ However, it can be used for quick detection of problems for desired intervention for improvement. This quality improvement audit needs to be continued for making it sustainable. Studies have shown that quality improvement cycle improves various aspects of care in clinical practice.¹⁰

CONCLUSION

Accuracy of triage can be improved by continuous quality improvement audit and necessary interventions. Plan-Do-Study-Act (PDSA) cycle is a useful tool for quick detection of problems and acting on necessary interventions for improvement.

REFERENCES

1. Tam HL, Chung SF, Lou CK. A review of triage accuracy and future direction. *BMC Emerg Med.* 2018;18(1):58.
2. World Health Organization. Quick check and emergency treatments for adolescents and adults [internet]. World Health Organization. [Weblink](#)
3. Malmström T, Harjola VP, Torkki P, Kumpulainen S, Malmström R. Triage quality control is missing tools—a new observation technique for ED quality improvement. *International Journal for Quality in Health Care.* 2017 Feb 23;29(2):295-300. [Weblink](#)
4. Rahmani F, Sepehri Majd P, Ebrahimi Bakhtavar H, Rahmani F. Evaluating the accuracy of emergency nurses in correct triage using emergency severity index triage in Sina hospital of Tabriz: a cross-sectional analysis. *Journal of Emergency Practice and Trauma.* 2018 Jan 1;4(1):9-13.
5. Taylor MJ, McNicholas C, Nicolay C, Darzi A, Bell D, Reed JE. Systematic review of the application of the plan-do-study-act method to improve quality in healthcare. *BMJ Quality & Safety.* 2014 Apr 1;23(4):290-8.
6. Martin A, Davidson CL, Panik A, Buckenmyer C, Delpais P, Ortiz M. An examination of ESI triage scoring accuracy in relationship to ED nursing attitudes and experience. *Journal of Emergency Nursing.* 2014 Sep 1;40(5):461-8.
7. Bijani M, Khaleghi AA. Challenges and barriers affecting the quality of triage in emergency

- departments: a qualitative study. *Galen Medical Journal*. 2019 Oct 12;8:1619.
8. Goldstein LN, Morrow LM, Sallie TA, Gathoo K, Alli K, Mothopeng TM, Samodien F. The accuracy of nurse performance of the triage process in a tertiary hospital emergency department in Gauteng Province, South Africa. *South African Medical Journal*. 2017;107(3):243-7.
 9. Reed JE, Card AJ. The problem with plan-do-study-act cycles. *BMJ Quality & Safety*. 2016 Mar 1;25(3):147-52.
 10. Gabbay J, McNicol MC, Spiby J, Davies SC, Layton AJ. What did audit achieve? Lessons from preliminary evaluation of a year's medical audit. *British Medical Journal*. 1990 Sep 15;301(6751):526-9.