Report of an audit of nurse triage in an accident and emergency department

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SUMMARY

The nurse triage process in an accident and emergency (A&E) department was audited as part of the nursing quality assurance programme. It was found that in most cases documentation was adequate and guidelines had been adhered to. Triage decisions were accurate in most cases using the discharge diagnosis as a bench-mark. Waiting time improvements were also seen. Triage audit was a useful tool in the continuous quality improvement effort.

Key words: audit, documentation, guidelines, nurse triage, waiting times

INTRODUCTION

Since the takeover of the management of public hospitals in Hong Kong by the Hospital Authority, the promise for a more efficient and higher quality service has been subjected to scrutiny by the public and the media. A&E departments are an important portal of access to the hospital system and are often under the spotlight. In his maiden policy speech on 7 October 1992 the Governor of Hong Kong categorically promised the public that the average waiting time for treatment in A&E departments should be less than 30 min.¹ The origin of such emphasis may be traced to similar charters in the United Kingdom.² Thus there is considerable pressure on the hospitals to improve the efficiency of the A&E departments.

One of the responses to this effort for greater efficiency and better organization is the introduction of triage system in local A&E departments. Similar developments are also evident in the UK.^{3,4}

In this paper the process and outcome aspects will be studied. Accuracy and completeness of documentation and adherence to guidelines will be examined with regard to the process aspect. For the outcome aspects, several indicators will be used to study the effectiveness of the triage process: (1) accuracy of triage decisions as compared with discharge diagnosis; (2) triage category

and waiting time; and (3) changes in waiting time after implementing nurse triage.

STUDY SETTING

Kwong Wah Hospital is an acute general hospital with approximately 1500 beds in the downtown area of Kowloon. It is very conveniently located in a busy district and can be accessed by various types of transport. The A&E department has approximately 140 000 patients attending per year with daily attendance ranging from 350 to 400. About 20% of the caseload comprises traumatic injuries and of the rest, medical complaints constitute the largest group. Less than 20% of the patients are brought in by the ambulance service.

All patients going through the department were triaged by a triage nurse according to guidelines. The triage decision was based on vital signs and the presenting problem. First aid treatment and simple investigations were initiated by the triage nurse.

SETTING OF STANDARDS

Before auditing the triage process, some sort of criteria/standards must be set up and made known to the participants.⁵ There are four aspects in the agreed standards: (1) standard guidelines on categorization of patients according to vital signs and presenting symptoms; (2) standards on documentation requirements. A standard triage box was used in the patient record sheet; (3) waiting time limits were set for the three categories of patients, namely, emergency (15 min), urgent (30 min) and non-urgent (45 min); and (4) discharge diagnosis of the doctor seeing the patient was used as a bench-mark by which to judge the accuracy of triage.

After the standards were agreed, didactic lectures were delivered in order to acquaint the nurses to the new system. The guidelines were posted in the triage station for quick reference. In the pilot phase, 'on-the-job' coaching was provided by senior nurses and senior medical officers. Only the more experi-

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enced registered nurses and nursing officers were assigned the triage role.

DATA COLLECTION

Between 17 September and 16 October 1992, 15 days were chosen randomly for audit. Both weekdays and weekends were included in the sample. For each sampled day, a systematic sample of 10% of the records were used in the study.

The clerk would record the registration time, the time of consultation, the triage category and the admission decision. A nurse and a doctor would decide independently whether documentation was adequate and categorization had followed guidelines. A pair of doctors would then decide independently whether triage decisions agreed with the discharge diagnosis and whether there had been over- or under-triage. Waiting time was calculated using Lotus 1-2-3. The data were then imported into a Dbase IV program for further analysis.

Average waiting time data in the preceding months of the same year were used as the basis for comparison. A day was chosen randomly each month for the purpose of calculating the average waiting time and its standard deviation.

RESULTS

A sample of 560 records were available for study out of a total of 11 670 attendances within the study period.

Triage categories

In the study sample, the distribution of triage categories was as shown in Fig. 1. Of the 534 cases with a known triage category, only about 2% belonged to the group with a life-threatening con-

Fig. 1. Case distribution by triage categories.

dition. This was a slight underestimation as some cases in the undocumented category should actually belong to the emergency patients category and in the fervent action during resuscitation the triage decision was not documented. About 30% of the patients belonged to the urgent category. As expected the majority of patients were non-urgent cases.

Documentation

For the majority of the records, documentation was judged to be adequate by two independent assessors. In over 10% of records, documentation was unsatisfactory or equivocal. Seven cases did not have documentation at all (Table 1).

Adherence to guideline

In the records where triage categories were documented, the majority were considered to have followed the standard guidelines. In 50 records (about 9%), the assessors disagreed as to whether the triage nurse had followed instructions. Only a small fraction were considered to be deviating from the guidelines (Table 2).

Accuracy of triage

Triage categorization was judged using the discharge diagnosis as a bench-mark to see whether proper priority had been assigned to patients. Again in most of the cases, the categorization was considered to be correct in light of the discharge diagnosis (Fig. 2). Of the 27 cases where assignment of

Table 1. Adequacy of documentation

Documentation	No. of patients (%)
None	7 (1.2)
Adequate	487 (87)
Equivocal	41 (7.3)
Inadequate	25 (4.4)

Table 2. Adherence to guidelines

Adherence to guidelines	No. of patients (%)
No documentation	26 (4.6)
Followed	471 (84)
Equivocal	50 (9)
Deviated	12 (2.1)

Fig. 2. Accuracy of triage.

priority was considered to be inaccurate, 18 cases were judged to have been under-triaged. No case was considered to represent over-triage (Figure 3).

Triage category and waiting time

The emergency category patients were all seen within 15 min. In fact, seven out of the nine patients were seen within 10 min. For the urgent cases, four out of 156 patients' waiting times exceeded the standard of 30 min. Most patients however were seen well within that limit.

For non-urgent cases only six out of 369 patients were seen beyond the standard of 45 min (Table 3). As expected the waiting time for the emergency

Fig. 3. Triage error analysis.

Table 3. Triage category and waiting time limit

Triage category	Outside limit (%)
Emergency	0
Urgent	2.5
Non-urgent	1.6

category patients was shortest while the non-urgent group had to wait longer (Table 4).

In order to test whether there was any significant improvement in the overall waiting time, this result was compared with random average waiting time in the preceding months. The result was subjected to hypothesis testing for large samples using the Z statistics and a significant difference was found with a significance level of 1% (Table 5). As there was no available data on waiting times for different groups before the triage system was implemented there was no way to ascertain whether there was significant improvement in those areas.

DISCUSSION

In this study we have set out to evaluate some aspects of the triage process and its outcome. The structural elements as suggested by Rice,⁶ e.g. space, staffing, policy etc., are important, however,

Table 4. Waiting time and triage categories

Category	Average waiting time (min)	Standard Deviation (min)
Emergency	5.89	3.18
Urgent	11.39	7.92
Non-urgent	14.28	10.22
Overall	13.23	9.64

Table 5. Average waiting time before and after triage

	Average waiting time (min)	Standard deviation (min)
Before triage	15.34	10.98
After triage	13.23	9.64

Z-statistics = 2.74

a sound structure does not guarantee satisfactory performance and outcome.

In our sample there were only about 2% of patients who were classified as being in the emergency category. This is similar to a previous study by the Department of Community Medicine of Hong Kong University and the Hospital Service Department.⁷ The high proportion of non-urgent patients was not surprising. All over the world, A&E departments are swamped by patients with primary care problems. This is a complex issue which is outside the scope of the present study.

Although the proportion of records with no or inadequate documentation is small (5.6%), there is no place for complacency as zero defect should be the aim. There is a tendency to forget about documentation when the patient is acute and in need of immediate aggressive treatment, e.g. cardio-pulmonary resuscitation. The documentation can, of course, be completed after the major resuscitative effort. At other times when there are few patients, e.g. in the early hours of the morning, documentation may be neglected as patients can be seen by the duty doctors without delay. Education and reminders to new staff may help to reduce this problem.

On the whole, it was not difficult for triage nurses to follow the guidelines. It is disquieting that, in 9% of the sampled case records, the two assessors could not agree on whether the guidelines had been followed. As a result of the disagreement, vague areas of the guidelines were highlighted for discussion and amendments. Guidelines could never be exhaustive and a certain degree of interpretation is required by the triage nurse. Nevertheless, it is useful to detect areas where disagreement commonly arises e.g. a child with a fever.

The purpose of triage is to categorize patients according to the urgency of the problem. The effectiveness of the triage process must be measured against its power to discriminate between the acute and the non-acute. The bench-mark should ideally be the final outcome of the illness episode.⁸ However, this piece of information is difficult to obtain in many instances. It was only possible to use the discharge diagnosis from the A&E department record as a proxy to the final outcome. In most instances this would be adequate because triage concerns the urgency of the condition and not the exact diagnosis.

Using this approach, 5.1% of the cases were considered to be misclassified and 3.4% were considered to be under-triaged. In any triage system it is very important to avoid under-triage which may

mean unnecessary delay for urgent conditions. Because all patients are eventually seen by a doctor, the significance of wrong triage will depend on how long the delay is. If the delay is short, then there may not be any difference in terms of the final outcome. The overall waiting time for this department is quite short and no harm had resulted from the wrong assignment.

Another purpose of triage is to improve waiting time so that urgent cases are seen earlier. Our internal limits are, of course, arbitrary but they are in keeping with standards used in other centres.

All of the emergency category patients were seen within 15 min, which was the internal limit. For most emergency cases, the waiting time was less than 10 min. In very critical conditions, the patient may be attended by doctors before registration or triage documentation. This is sometimes not reflected by the statistics because registration and the time of consultation were estimated after the main thrust of the resuscitation effort.

Most urgent cases were seen at an average of 11 min after registration and only 2.5% of cases fell outside the 30-min limit for urgent cases.

Not only was the waiting time shorter for the more urgent cases, the variation as measured by the standard deviation of the mean was also less. This was also an indirect indicator that the triage system had achieved its goal in positively discriminating the more urgent patients.

An attempt has also been made to assess the impact of the triage process by comparing the overall waiting time with the average waiting time in the months preceding the study. The improvement was about 2 min which was statistically significant. This is in contrast to the study of George *et al.*⁹ who found deterioration of waiting time with nurse triage. The results are not comparable because this study is a before and after study which is unlike their concurrent study.

Triage could improve flow and optimize use of space and human resources in the A&E departments. It was the impression of the authors that this was achieved to a certain extent, however this aspect was not the main aim of this study.

Another interesting area would be to investigate the relevance of triage nurse initiated investigations. Some authors have reported on the appropriateness of radiograph ordering by triage nurses.^{10,11} In this department, triage nurses are empowered to initiate investigations such as blood tests, urinalysis, pulse oximetry and ECG. It would be useful to include the appropriateness of such arrangements in the audit

cycle to assure the best use of limited resources.

Finally, we must not forget our client — the patients and their accompanying persons. Patient satisfaction surveys should be an integral part of a quality assurance program because, after all, they are the best judges of the overall performance of the A&E department.

CONCLUSIONS

For most patients the triage documentation was adequate and standard guidelines were followed. However, there were some vague areas where assessors could not agree on the guidelines and this audit process presented the opportunity to clarify or amend the guidelines.

The triage process was successful in most instances of differentiating degree of urgency using the discharge diagnosis as a bench-mark. Triage was also successful in reducing waiting time for the more urgent cases. The overall average waiting time improved slightly when compared with the preceding months.

In future, it would be useful to include the appropriateness of nurse initiated investigations and patient satisfaction in the audit exercise. Structural aspects of the triage system should also be reviewed from time to time to ensure that things are in line with changes in the practice environment.

In conclusion, this audit feedback exercise is useful for the continuous improvement in the quality of service to patients.

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