Human factors: emergency department suspected heart attack process

Frances Ives & Deborah Jackson

University Hospitals Birmingham NHS Foundation Trust, UK

ABSTRACT

Early recognition of a heart attack is essential as delayed treatment can result in death. A Human Factors (HF) review of the process for treating suspected heart attack patients in a busy inner-city Emergency Department (ED) was completed to help decrease risk, improve patient safety, care and patient and staff experience. To provide timely treatment for a heart attack, a diagnostic electrocardiogram (ECG) must be performed within 15 minutes of arrival at ED. However, concerns had been raised by staff relating to patient experience and delayed ECG, due to the number of process steps the patient had to complete from arrival at ED reception to the ECG being taken. Observations of the process were carried out along with multidisciplinary staff focus groups to understand the patient journey. A Hierarchical Task Analysis (HTA) and Failure Modes Effects Analysis (FMEA) were also completed to identify process failures and impact. The FMEA and observations identified that the patient journey was complex due to: the distance they were required to walk; having to enter the department through the ambulance entrance; and the requirement to speak to a specific member of staff in the department to obtain further directions. The process was changed to: reduce the distance the patient had to walk; decrease the likelihood for them to get lost; improve patient visibility for staff; and to facilitate more timely ECGs. As result of the Human Factors review, ED staff felt empowered to make immediate, no-cost and sustainable improvements.

KEYWORDS

Heart attack, FMEA, human factors

Introduction

The scope of this Human Factors (HF) review was to decrease the risk of patient harm and improve safety for patients attending an inner-city Emergency Department (ED) with chest pain and therefore a suspected heart attack. When a patient attends an ED with chest pain, it is essential to determine quickly whether the chest pain signifies a heart attack. Prompt diagnosis and early treatment for heart attack patients are vital as delays could result in complications or ultimately death. The department asked for an HF review of the process steps because it was felt there were inherent risks with the existing system for patients arriving at ED via the non-999 route. The ED staff aim to assess the patient suffering from chest pain and perform an electrocardiogram (ECG) within 15 minutes of arrival. The ECG is an investigation to establish whether the patient is experiencing a heart attack or whether there is another cause for the chest pain. Once completed, the ECG is immediately reviewed by a senior doctor to identify the likelihood of a heart attack and to make a timely treatment plan. If the patient is experiencing a heart attack, the desired treatment to open or stretch an artery to allow blood flow in the heart should be achieved within 120 minutes (NICE 2013, 2014). As performing an ECG within 15 minutes assists staff achieving the target

treatment time of 120 minutes; any risk of ECGs being delayed should therefore be eliminated or reduced.

The problem

On arrival at the ED reception, all non-999 patients reporting with chest pain were booked in by reception staff, handed an A5 size red card and given directions into the main department. The purpose of the red card was to enable any ED staff member to recognise that the patient had chest pain and was therefore a priority. To enable patients to enter the department, they were directed along a corridor to the ambulance entrance as this did not require security pass access. Once in the main ED, patients were then asked to contact the Registered Nurse (RN) in charge of co-ordinating the busy department. From there, if seen, patients would then be directed to the assessment area of ED where they would make themselves known to the assessment staff and an ECG would be carried out. This system was inherently risky e.g. from the suspected heart attack patient walking into the department unrecognised. Through observing patients entering the department with a red card, multidisciplinary focus groups and completion of an FMEA, points in the system where delays and failures could occur were identified. For example: patients may not find their way into the department; they may fail to identify themselves to the co-ordinating nurse; patients may fail to show the red card; they may collapse before they received treatment or staff in the assessment area may not be aware that a chest pain patient has arrived in the department due to the volume of other patients.

Investigation and analysis

Observations of the assessment area of the ED were carried out by the HF Team (Ergonomics Adviser and Registered Nurse with previous ED background and HF experience). The journeys of patients with suspected heart attacks and carrying a red card were observed within the department i.e. the routes the patients took and the staff they interacted with until the point of arriving in the assessment area for an ECG.

As well as these observations, the HF Team carried out information-gathering through one-to-one conversations and small focus group discussions with staff from a range of grades and disciplines (including Health Care Assistants, Emergency Care Technicians, Registered Nurses and Doctors) to: establish what they felt the strengths and weaknesses of the process were; understand what areas could be improved upon; and what ideas the staff themselves had. The ED staff were very forthcoming with the HF Team, providing lots of valuable information and were eager to participate by reviewing the potential problems and considering practical solutions.

A hierarchical task analysis (HTA) was completed by the HF Team after closely examining the process of a suspected heart attack patient booking at reception and then making their way through ED to the assessment area for an ECG. The purpose of the HTA was to fully understand the steps involved and was used by the HF Team when carrying out an FMEA. The FMEA was completed and reviewed by ED staff to understand the ways in which the process could fail and to understand the consequences of the failures. Each failure identified in the FMEA is assigned a severity score (the severity of the effect of the failure); detection score (how likely the failure will be detected) and occurrence score (what is the likelihood of the failure occurring). Each of these scores is multiplied to calculate a Risk Priority Number (RPN). The failures in the suspected heart attack process with the highest RPN numbers included: the patient being directed through ambulance entrance into the main treatment area of ED; the patient identifying themselves to the RN coordinator to receive further directions and the patient then identifying themselves to a member of staff in the assessment area where the ECG would take place. A failure in any of these steps could result in patient harm including death.

Resolution of the problem

To reduce the likelihood of delays in patient ECGs, the process of presenting at ED reception with chest pain to receiving an ECG was changed. The part of the process identified from the FMEA as being of most concern was the route patients took from reception into the main department through the ambulance entrance. This route had been chosen as the ambulance entrance did not require swipe access whereas the entrance closest to the assessment area did. Steps were therefore put in place to enable chest pain patients to have direct access through a swipe door into the assessment area. Reception staff were asked to continue to give the patient a red card and direct the patient to the closer door that lead straight into the assessment area. The patient was then instructed to knock on the door showing the red card to gain access to the department; one of the staff of RNs, Emergency Care Technicians and Health Care Assistants, could then open the door. This new route: reduced the distance that patients had to walk, so benefiting any patient with chest pain; and helped identify patients with a suspected heart attack. It also removed the need for patients to identify themselves to the RN co-ordinator as the patient would bypass the need for this step by entering ED through the alternative door. Also, on entering the department patients would immediately be greeted by a member of staff who would either direct them to a cubicle for an immediate ECG (if available) or to the new dedicated chest pain seated area where an ECG could be urgently organised and completed.

Impact and implications

The aim of the study was to improve safety, care and patient experience. By changing the process, the distances patients had to walk were reduced and the simpler route reduced the risk of patients becoming lost. Removing the need for patients to make themselves known to the RN co-ordinator would eliminate the risk of patients not speaking to and making themselves known to the member of staff and remove additional delays in the ECG being carried out. Directing the patient to the short access point and to knock on the door displaying the red card allowed timely access and ensured quick identification of the suspected heart attack patient. A designated seating area was newly created solely for suspected heart attack patients. This was placed immediately outside the assessment room and assessment cubicle staffed by a registered nurse and an Emergency Care Technician, both of whom were able to carry out an ECG. Patients sitting on the designated chairs were visible to all staff and the reason for them being in ED immediately clear, this also encouraged timely ECG and assessment.

One of the aims of the study was to decrease the time from booking in at reception to ECG. After implementing the new process, an audit of notes pre- and post-process change identified the time of booking in and of ECG. The audit was intended to assess the impact of the new process but found that: the machines and the quality of printing varied; times were not reliably recorded on ECGs; and those that were logged were either not accurate or hard to read. So, an FMEA was carried out to establish what impact the new process would have. This showed that the steps identified as being of most concern previously had either been eliminated or had reduced RPN scores.

To assess the impact of the work further, a staff satisfaction questionnaire was undertaken to determine staff opinions on the change in process. All staff who took part in the survey viewed the change positively. The review process enabled ED staff, through observations and group discussions, to recognise the potential problems with the original suspected heart attack process; and all were committed to make improvements. As a result, ED staff felt ownership of the process changes which, with minimal intervention, have remained in place. It is hoped that moving forwards, staff feel motivated and empowered to make further improvements to the department. The costs of implementing the new process were negligible as no equipment was purchased; the associated costs were therefore limited to the staff time required to complete the review.

References

Institute for Healthcare Improvement, (no date). *Failure Modes and Effects Analysis (FMEA) Tool.* [online] Available at:

www.ihi.org/resources/Pages/Tools/FailureModesandEffectsAnalysisTool.aspx [accessed 9 August 2017]

- National Institute for Health Care and Excellence (NICE). (2013). Myocardial infarction with STsegment elevation: acute management Clinical guideline [CG167]. *NICE*, [online]. Available at: https://www.nice.org.uk/guidance/cg167 [accessed 27 September 2017]
- National Institute for Health Care and Excellence (NICE). (2014). Acute Coronary Syndromes in Adults. Quality Standard (QS 68) Quality Statement 6: Primary PCI for acute STEMI. *NICE*, [online]. Available at: www.nice.org.uk/guidance/qs68/chapter/Quality-statement-6-Primary-PCI-for-acute-STEMI [accessed 27 September 2017]