Improving call bell response times

Robin Digby and colleagues studied the effects of raising awareness of call bell response on how promptly staff attend, patient falls and satisfaction.

Abstract

Aim To explore and compare call bell response times in two wards in a geriatric evaluation and management facility before and after the introduction of a suite of interventions aimed at decreasing patient falls.

Method Data on call bell response times were collected over two periods. The first were before implementation of falls prevention initiatives. Data were retrieved from the call bell system that detailed the time taken to respond to every call bell activation. A second period of data collection was conducted six months after implementation of the initiatives.

Results Prioritising call bell response and raising staff awareness improved response to patient calls. There was a slight decrease in falls although call bell activations did not decrease.

Conclusion Strong leadership is necessary from nurse managers to stress the importance of prompt call bell response. Visual surveillance of high-risk fallers is important as they are generally unable to ring for assistance when required.

Keywords Accidental falls, call bells, patient safety

THE MORNINGTON Centre is a modern, purpose-built facility, which is part of Peninsula Health in outer metropolitan Melbourne, Australia. The centre contains 60 geriatric evaluation and management beds, with either single or double rooms, all with en-suite bathrooms. The centre is equipped with a computerised call bell system, facilitating data collection relating to response to calls. The system registers the call on enunciator screens throughout the ward, on a call light outside the patient rooms and also direct to a portable phone worn by the nurse co-ordinating care for those patients. Data about call bell response times that were available through the computerised system were examined to establish practice and then to monitor changes in response to alterations in practice.

The average age of patients in this facility is 85, and the average length of stay is 25 days. Many of the patients have a degree of cognitive impairment, mainly Alzheimer's disease and vascular dementia, although it is common to see patients with Lewy body dementia as a result of advanced Parkinson's disease, and others with alcohol-related brain disease. The relationship between cognitive impairment and risk of adverse events in care facilities is well established, and many healthcare institutions are acknowledging the vulnerability, negative impact and risks associated with hospitalisation (Rohrer et al 2000, Goodall 2006, Mezey and Maslow 2007).

The change of environment that hospitalisation brings often leads to behaviour changes such as an increase in confusion and agitation (Park et al 2004) or wandering (Rowe 2008), which increases the complexity of care delivery. These behaviours require constant vigilance and heightened awareness from staff about the needs of patients with cognitive impairment (Borbasi et al 2006). The time between activation of a call bell and nurse presence may be a significant factor contributing to patient risk.

Literature review

Before embarking on the study, it was important to understand what work had already been done on the subject to establish if there was any relevant information that could be used.
To identify appropriate articles, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Ovid Medline, MediText, the Cochrane Library, PubMed, and ProQuest databases were searched using a combination of the terms ‘Call bell response’, ‘Nurse call’, ‘call bells’, and ‘patient call’. The terms were combined and 141 articles identified. All searches covered the time period January 1996 to December 2010. Of the 141 articles, ten were identified as relevant, which was defined as any article that discussed nurses’ response to patient call bell activation from any point of view, although particular attention was given to articles that discussed falls and patient satisfaction. A further two articles were identified from the reference lists of the relevant articles.

Nurse call systems
It became apparent early in the literature review that interpretation of the word ‘response’ varied depending on the system used. Deitrick et al (2006) examined the response to patient calls through a system in which the calls were relayed to a central console and answered by a unit secretary. The secretary spoke to the patient through the intercom and then contacted a nurse via a portable phone.

In this situation the patient call was considered to be answered when the secretary spoke to the patient, and there was no record of the time in which it took the nurse to actually attend to the patient. In fact it was observed by the ethnographer conducting the study that the unit secretary did not always pass on the information to the nurse, and the nurse who received the information did not always respond to it (Deitrick et al 2006). Some nurses were reluctant to carry the phones because they were heavy and bulky and sometimes not charged, resulting in further difficulty in relaying patient requests for assistance.

Few nurse call systems, particularly older ones, have the ability to record the time it takes to respond to a patient call. Examination of nurse response in earlier articles relied on either the nurse or an observer collecting information manually (Van Handel and Krug 1994, Miller et al 2001, Deitrick et al 2006, Torres 2007). The potential for mistakes and deliberate errors in self-reporting is obvious. Another disadvantage to this style of research is that it is time intensive, particularly when the data are collected by an ethnographer or assistant who observes and takes notes.

Roszell et al (2009) examined call bell response using a system similar to the one in use at the Mornington Centre. However, in this study, data were collected on the time taken for patient calls to be answered at the nurses’ station and then transferred to the nurses’ mobile phones. There was an average of 320 call bell activations a day or 2,240 a week, with response times ranging from two seconds to five minutes (mean 11 seconds). Roszell et al (2009) were not able to conclude whether these response times are considered adequate.

Tzeng and Yin (2009a, 2009b) examined the relationship between call bell use and response time with patient falls and satisfaction, using data from a nurse call system in acute wards at a Michigan Hospital. While they were able to demonstrate a relationship between call bell response times and falls rates in surgical patients, they recommended that a larger multi-hospital study be undertaken to validate this relationship. They did not recommend an optimal call bell response time.

Van Handel and Krug (1994) analysed data generated by nurses who manually recorded the time of day and reason for patient calls. They found that patients were most likely to call at meal times and when waking or settling for sleep. As a result of the limitations of the manual data collection process, however, Van Handel and Krug (1994) were not able to measure call bell response times. To improve patient outcomes, and minimise adverse events, they used their data as rationale for developing a new position, the unit assistant. This staff member assisted with call bell response and patient care duties similar to a healthcare assistant. While the effect of this position on call bell response time was not measured, positive patient feedback via satisfaction surveys was received after the unit assistant was appointed.

Meade et al (2006) examined the amount of calls and the reasons for patient calls across a number of hospitals and correlated the outcomes with consumer satisfaction and falls. They compared standard care against an interventional cohort where ‘hourly rounding’, a visit to each patient hourly, was introduced. While the length of time taken to answer calls was not measured, their study found a direct correlation between hourly rounding, reduced number of patient calls and patient satisfaction.

Torres (2007) examined patient satisfaction with care and call bell use. Anticipation of patient needs through hourly rounding reduced the number of call bell activations. This finding was supported by Culley (2008). Call bell response times were not discussed by either of these authors.

Little has been written about patient call bell response and only one article was retrieved that specified a call bell response time (Tzeng and Yin 2010a). They mention this in relation to a falls prevention programme where it is proposed that a response time of less than one minute is a potential
aim. American nurse call systems generally rely on a unit secretary answering the calls at the staff station and relaying the information to the appropriate staff member via a pager, wireless device or mobile phone. The call is considered to be answered once the unit secretary has responded, not when the nurse attends, making the exact timing of response difficult to measure in most situations.

Only the most recently installed call bell systems have the facility to measure data such as the number of calls, bed numbers, time taken to respond and so on. Where older systems are in use, lack of computerisation means that any data collection about call bell response must be done manually and relies on the individual to maintain accurate records.

Consequences of call bell response
The correlation between call bell response, falls and patient satisfaction is not definitively established. While Roszell et al (2009) could not determine a link between call bell response times and adverse patient events such as falls, others have found a positive link between hourly rounding and patient satisfaction and falls reduction (Meade et al 2006, Torres 2007). Tzeng and Yin (2009a) concluded that more studies were required before this could be determined. Tzeng and Yin (2010b) assume that the relationship between call bell response and patient falls is clearly established.

None of the articles defined best practice for call bell response. The majority of the literature instead reported on the number and frequency of calls. However, it is important for hospital managers and nursing staff to develop standards for expected response times (Deitrick et al 2006). Given the absence of such recommendations in the literature, there is little against which to benchmark.

The study reported here was initially undertaken as part of a patient falls prevention initiative at the facility because it was thought that there was an opportunity to improve call bell response times and help to prevent adverse events and patient falls. A group of staff including nurse unit managers, falls prevention portfolio holder nurses and allied health staff representatives were assembled to develop ideas to improve the response rate to patient calls, and hence improve patient safety. Consequently some of the interventions were aimed at pre-empting patients’ requirements to decrease the need to ring for assistance.

Aim
The aim of this study was to explore and compare call bell response times in two wards in a geriatric evaluation and management facility before and after the introduction of a suite of interventions aimed at decreasing patient falls.

Method
Data on call bell response times were collected over two time periods. The first time period was the ‘control’ period, before implementation of a suite of falls prevention initiatives. Data were retrieved from the call bell system which detailed the time taken to respond to every call bell activation. A second period of data collection was conducted six months after implementation of the suite of falls prevention initiatives and was considered ‘post-intervention’.

Data were collected electronically via the computerised call bell system. The reports delineate each call that was made over the specified time, including the time the call remained unanswered. General calls from the patient’s bed, calls made from the bathroom and those which were the result of bed sensor activation, emergencies (code blue), and ‘cord out’ were itemised for each patient room. The reports were then summarised to illustrate the number of calls over the period, the percentage of calls answered in less than five minutes, less than ten minutes and more than 20 minutes, and the mean call response time. Data were collected and analysed for the two time periods to ascertain if there was a difference in the timeliness of call bell response after implementation of interventions aimed at improving patient safety and reducing falls.

Complex statistical analysis of the large number of calls collected electronically was beyond the scope of the study, however, a two-proportion z test was calculated for each time interval to determine if the differences observed were significant. The two-proportion z test was used instead of an independent samples t-test because individual raw call data results were not made available, only monthly data. In addition, the analysis of more than 40,000 sets of data for pre and post-intervention was beyond the scope of this study.

Call bell response times were grouped and the percentage variation between pre and post-intervention was calculated. The z values were calculated using an online two-proportion z test calculator (www.dimensionresearch.com). With such a large data set small differences may be statistically different, therefore, in addition to statistical analysis, the percentage of calls positively and negatively affected by the intervention was also calculated to determine its success in actual call numbers.

Interventions
A number of interventions were introduced. Call bell response data including the number of calls
and the percentage of calls answered in less than five minutes, less than ten minutes and more than 20 minutes were accessed through the computerised system and summarised weekly. This was displayed in the staff rooms so that the team could be kept aware of the ward’s performance. The data summaries were also presented as graphs to show trends over time so that the team could achieve a sense of satisfaction with the improvements.

Call bell response times were discussed at every opportunity, for example, clinical handover, team meetings and ward meetings to increase awareness.

Staff who had not previously been involved in call bell response; that is, support staff, services staff, medical officers and allied health staff such as social workers, dieticians and speech pathologists, were encouraged to respond to patient calls if they were nearby. Much of the time patients call about trivial matters that do not require a nurse, for example, to change the TV channel, minor queries or help needed to find glasses. If the patient required a nursing intervention, staff were instructed to locate a nurse, not to undertake these interventions themselves.

Nursing meal breaks were rescheduled so that only two were absent from the ward at any one time. The nurses work in teams so that another nurse is responsible for the patient calls when they are on a break.

Hourly rounding was introduced to try to pre-empt patients’ requirements and negate the need for them to ring the bell. In this initiative patients would be approached each hour by the nurse caring for them to check if they required anything, for example, pain relief, change in position or toileting.

A bedside model of nursing handover replaced the previous lengthy ‘meeting room’ model, resulting in a greater nursing presence on the ward. After a 15-minute group handover from the nurse in charge of the previous shift, the handover between one shift and the next was then conducted at the bedside with the discussion involving the patient. The patient and the charts were visually checked at the time and any shortfalls addressed.

Physiotherapy assistants were rostered for ward duty during the morning peak time (8am-9.30am) to help answer call bells, and assist patients who required the toilet or set up for breakfast.

Ethical considerations

Given that falls are a significant risk for this patient population, this study formed part of ongoing quality improvement work, endorsed by senior management. As a result, it was not necessary for the authors to obtain additional formal ethical approval to undertake the study. The data collected related to call bell response times, and at no time was any patient information collected that may have affected privacy or confidentiality.

Results

Call bell response for the control period showed that a total of 41,460 calls were activated during this time, with 85.36 per cent responded to in less than five minutes. In comparison, the post-intervention period demonstrated that despite having an increased total number of calls of 47,478, the wards improved the call response rate so that 90.57 per cent of
calls were answered in less than five minutes. The number of calls that went unanswered for longer than five minutes decreased markedly.

Call bell response times are shown in Table 1. The two-proportion z test results show that the increase in calls answered in less than five minutes and the decrease in calls answered in more than five minutes are significant, at a confidence level of 99 per cent.

Table 1 shows that from the control period to the post-intervention period there was an increase in the total number of calls by 14.52 per cent. This represents an increase in activity in the wards.

Despite this increase in activity, the number of calls lasting longer than five minutes decreased across all time periods:
- 2.09 per cent decrease in calls answered within five to ten minutes.
- 1.44 per cent decrease in calls answered within ten to 15 minutes.
- 0.63 per cent decrease in calls answered within 15 to 20 minutes.
- 1.04 per cent decrease in calls answered after more than 20 minutes.

This decrease correlates with the 5.21 per cent increase in calls answered in less than five minutes. This equates to 2,474 more calls answered in less than five minutes.

In summary, there were more calls in the post-intervention period than the control period, but call bells were answered more promptly.

During the two time periods, the rate of falls in one ward remained constant at 50 and 51 respectively and falls in the other ward decreased from 69 in the control period to 54 in the post-intervention period. The number of ‘falls with harm’ also decreased from seven to three. All ‘falls with harm’ were correlated with the call bell data, and no association was found between call bell activation and ‘falls with harm’; that is, none of those who had fallen and sustained significant injury had rung their call bell in the period immediately before the fall.

The introduction of hourly rounding did not decrease the number of call bell activations in this small study.

Discussion
The main limitation of this study was the small size of the facility in which it took place. The average age of the patients was 85 and dementia was a common comorbidity which limited the ability of patients to use their call bells. A further study assessing the outcome on a range of patient cohorts over a longer period of time would make the results more generalisable. A further limitation was that it was not possible to compare the outcomes with those before implementation of the computerised system as equivalent data were not kept.

Timely response to patient calls is important to monitor from many perspectives including customer satisfaction and patient safety. The relationship between call bell response and falls at this facility remains subtle, despite a slight decrease in falls since the implementation of these initiatives. Although a definitive relationship between call bell response and patient safety could not be established, a statistically significant increase in the number of calls answered in less than five minutes, and a decrease in the number of calls answered in more than five minutes was found. When this is considered in terms of people, the result is that 2,474 more calls were answered in less than five minutes after the interventions were introduced.

From a practice development standpoint there are also lessons to be learnt. Many of the patients at the Mornington Centre are cognitively impaired and have poor insight into their own personal safety – a significant factor for patient safety. Duffy et al (2005) reported that patients with dementia are often unable to use their call bells due to the difficulty in learning new tasks and associated poor environmental adaptive ability. This has also been the case with patients at the Mornington Centre.

Close surveillance of ‘at-risk’ patients who have limited insight into their own safety is a crucial factor as clearly many do not have the cognitive capacity to ring the call bell when they need assistance or indeed identify that they need assistance. Electronic sensor alarms on beds and chairs can help with this problem, however, when a large number of patients who are restless, high-risk fallers have these devices, the number of calls significantly increases as the sensors are connected to the nurse call system. This is not a problem in itself, as it alerts nurses to an ‘at-risk’ patient on the move, however, expecting the same number of staff to respond to all these calls within optimal time frames is problematic. In some situations an extra staff member to assist with responding to the calls was able to be employed, or physiotherapy assistants were redeployed to assist.

Staff at this facility had not previously received feedback on the issue of call bell response, and it is interesting to note that the response times improved markedly within a short time of the start of the awareness drive. Nurses reported that until that time they had not thought it urgent to turn off the call bells once they were answered, and that it was not uncommon to have a bell left on in the
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bedroom when they were in the bathroom with the patient. There were occasions when a bell was left on because the cognitively impaired patient was fixated with pressing the button and the calls bells cannot be removed from the bedside. It was not uncommon to see an allied health staff member, support staff or medical officer attending a patient whose call light was on, without the staff member being aware that the call needed to be cancelled. Turning off the bells was seen, consciously or unconsciously, as a nursing duty rather than a shared responsibility.

Deitrick et al (2010) cited leadership style as a determining factor in ability to change ward culture to involve all staff in call bell response. This aspect was not examined, however, it is an interesting assertion that could be followed up in this facility in the future and has some anecdotal support. Despite examining call bell response times and searching the literature for evidence of best practice, an acceptable quantifiable time for call bell response was not established. However, optimising response times will always benefit patients because their needs are being addressed as promptly as possible.

Conclusion

Prioritising call bell response and raising staff awareness improved the response to patient calls at this facility. A team approach spread the load among all staff, and the initiatives introduced to keep nurses at the bedside and improve patient surveillance resulted in a slight decrease in patient falls, although call bell activations did not decrease. Strong leadership is necessary from the nurse unit managers to stress the importance of prompt call bell response. Working with a large percentage of cognitively impaired patients means that maintaining visual surveillance of high-risk fallers will always remain important as they are generally unable to ring for assistance when it is required. Consumer satisfaction is difficult to measure in this group and was not considered as part of this study.

Implications for practice

An awareness drive to improve clinical staff’s understanding of call bell response times alone significantly improved performance in this area. It is important to display monthly call bell response times to staff and discuss with them.

Adapted opportunities for surveillance of patients with dementia remain a priority due to their unpredictability.

An approach to call bell response that involves all health professionals working at the site improves the ability to attend to patients in a timely manner. There was some initial resistance from medical officers and food services assistants at this facility; however perseverance from the nurse unit managers improved this situation.

Patients with significant cognitive impairment may have limited or no ability to use their call bell when they require assistance, so other measures must be used to anticipate their needs and keep them under close observation.

Improving call bell response has the potential to improve patient satisfaction with their care, although due to the prevalence of patients with dementia in this facility, this was unable to be demonstrated.

References


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