A simple prioritisation system to improve the electronic handover

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Abstract

The General Medical Council (GMC) states, "A well managed, thorough and organized handover is crucial for ensuring the quality and safety for patient care," and in their guidance on safe handover the British Medical Association (BMA) advised that "clinically unstable patients are known to the senior and covering clinicians; tasks should be prioritised; plans for further care are put in place; unstable patients are reviewed."

The orthopaedic department at King's College Hospital, a busy major trauma centre in London, UK, has a significantly reduced workforce during the weekend. The general consensus was that the ward round was taking too long, giving the foundation year one (FY1) doctor very little time to commit to other ward jobs and reviewing unstable patients, making it a stressful and challenging environment.

The electronic patient record (EPR), an electronic programme available on all Trust computers, is already a very reliable way to allow safe handover of information via a central electronic database. However it has limitations in clearly prioritising more unstable patients from those needing routine review.

We created an easily identifiable traffic light coding system that could be simply incorporated into the electronic handover that was re-reviewed and finalised in order to improve the ability to prioritise patients for senior review. This in turn would directly impact the efficiency of the ward round and improve patient safety.

Our immediate results demonstrated the efficiency of the ward round improved in all parameters: time to complete the ward round improved from 7.1% to 50%; prioritisation and ability to highlight the clinical urgency for patient review improved from 15.4% to 100%; and more notably, the clinician's impression of patient safety improved from 38.5% to 100%.

Overall the introduction of an uncomplicated traffic light system provided an effective addition to the electronic handover structure aimed to allow patient prioritisation and improved efficiency during weekend hours.

Problem

King's College Hospital is a major trauma centre serving the London boroughs of Southwark and Lambeth and the South East of England. The orthopaedic department has approximately 70 to 80 inpatients on an average day. During the week adequate cover is achieved between eight foundation year one (FY1) doctors and their respective consultant lead teams. However, during the weekend there is a reduced workforce and inpatients are predominantly covered by one FY1 who would not have always been directly involved in every patient's care, and one junior clinical fellow (JCF). The JCF's priority is the accident and emergency (A&E) department and the FY1's priority is to the ward. This includes seeing new patients on the post take ward round, reviewing all the current inpatients, managing unwell patients, and occasionally supporting in theatres.

The current handover for the weekend utilises the already very useful electronic patient record (EPR), an electronic programme available on all Trust computers. FY1s are able to enter the handover for any patient on any ward onto this central electronic database and allocate the patient specifically to an "orthopaedic weekend handover" list. Presently the standardised clinical information included in the handover is in an SBAR (situation, background, assessment, recommendation) format. The FY1 covering the weekend hours would then be able to print the orthopaedc weekend handover list to enable them to do the ward round for all orthopaedic inpatients. This list is usually five to eight pages long and although it includes crucial patient details and handover information about every patient, the EPR does not electronically prioritise sick patients over others, nor does it immediately highlight outstanding jobs for the weekend.

Consequently the FY1 would have to read through the entire handover sheet in order to pick out the more urgent jobs and patients to see. Furthermore, this makes it difficult to ensure more senior members see certain patients in a timely manner, especially when there is limited cover both in theatre and in A&E.

Due to the volume of inpatients to be seen including post take patients from the previous day there is generally a lack of quality and completeness of the ward round. It is also stalled by the FY1 answering bleeps about sick patients, clerking in elective weekend patients, and the JCF being called to A&E.

Despite being time efficient for doctors to input the large volume of patients to be handed over in a relatively safe manner, the method of handover in its current state is still very inadequate in firmly distinguishing and prioritising unwell patients and highlighting
The planned intervention was to create a system for prioritising patients and jobs to be done. This provided us with a baseline ward cover and effectiveness of the handover in highlighting sick patients that we could easily incorporate into the current electronic handover system, in order to highlight the clinical urgency for patient review by either a senior doctor (JCF or above) or an FY1. The aim was ultimately to improve the efficiency of the weekend ward round and patient safety.

"Traffic light" coding systems have previously been shown to strengthen surgical handover in previous quality improvement audits.[5,6] Thus, a traffic light system was proposed with positive reaction. We decided it would be easy enough to label each computerised handover summary with a capitalised title of the specific traffic light category to visually prioritise patients on the handover sheet. Following analysis of the questionnaire the finalised traffic light coding system was created (see figure 1).

During a four month period we evaluated whether the handover change made any improvement. We investigated after this period whether further improvements could be made. We ensured sustainability by publicising the criteria on large posters around the FY1 orthopaedic office. FY1s and JCFs were also given detailed explanations of the proposed traffic light codes by email. Furthermore we were able to ensure the handover of this system during the next induction of new FY1s. This evidently ensured sustainability and a year after implementation the system is still being used in its previous state.

**Strategy**

**PDSA Cycle 1**

We designed and distributed a pre-intervention questionnaire to the FY1s currently in the orthopaedic department and those who had previously had a rotation in orthopaedics. The questionnaire aimed to establish three main categories: patient safety, time and efficiency of the current weekend ward round, and adequacy of the current handover system.

With regards to time and efficiency, responders were asked about the number of patients they were covering, length of time taken to complete the ward round, and whether they felt they had sufficient time to do this as well as answer bleeps about unwell patients and complete ward jobs. We asked about average finishing time and reasons for staying late.

With regards to adequacy of the handover we asked about how the current system prioritises the unwell patient, identifies outstanding jobs, and post operative patients needing wound review not being seen by a senior member appropriately.

In addition there were accounts from FY1s describing for example: inabilities to discharge patients efficiently over the weekend due to lack of senior review causing discharge delays; failures in reviewing blood results in a timely fashion due to the sheer enormity of patients and workload; and post operative patients needing wound review not being seen by a senior member appropriately.

**PDSA Cycle 2**

The traffic light system was implemented initially as an indicator for priority to be seen on the ward round; however, a number of issues arose with regards to which patients fit each criteria. We created a short questionnaire asking for suggestions on suitable criteria to
categorise patients.

After analysing the results of the questionnaire we implemented the traffic light system with more detailed subheadings and included a "weekend discharge" category as this was commonly suggested in the questionnaire results.

This new traffic light system replaced the previous handover method. The criteria was publicised around the FY1 orthopaedic office in the form of posters. Additionally FY1s were given detailed explanation of the proposed traffic light codes by email, and were made aware that further feedback and review would take place at a later time to evaluate the new system.

PDSA Cycle 3

After a period of three months of the intervention we distributed a further questionnaire to compare the new system of handover against the former. We asked responders the same questions as we did previously on safety, efficiency of work, adequacy of the system, and what could be improved.

A common view on what should be further implemented in the categories was the weekend discharge category highlighting that discharge summaries must be completed prior to the weekend. There was also some confusion with regards to the "yellow" and "green" categories, and so examples were added to the criteria eg "requires drug dosing" and "awaiting repatriation." An emphasis was made to the fact that weekend admissions were not highlighted on the handover list. This lead us to title a new category called "weekend admissions." Another common suggestion was to add colour to the text of each category on EPR; however, this was not possible on the EPR software.

PDSA Cycle 4

A year after implementation we sent out an online questionnaire to the FY1s using Survey Monkey. This questionnaire echoed similar questions to those posed immediately post-intervention in order for us to establish the sustainability of the current system.

Results

We had 14 responders pre-intervention and eight responders during the four months of intervention. We had 10 responders one year post-intervention.

One hundred percent of responders post intervention felt that it was a safe handover system, a vast improvement from 38.5% pre-intervention.

In terms of efficiency of the weekend ward round, post intervention measurements established significant improvement across all efficiency measurements: the percentage of FY1s who felt they had sufficient time to complete the ward round improved from 7.1% to 50%; sufficient time to answer ward bleeps improved from 14.3% to 100%; sufficient time for post ward round jobs improved from 7.1% to 87.5%; and being able to finish on time improved from 14.3% to 50%.

The ability of the intervention to prioritise the handover was also demonstrated: the ability to identify and prioritize unwell patients improved from 15.4% to 100%; identifying outstanding jobs improved from 30.8% to 87.5%; and ease of interpreting the handover improved from 38.5% to 100%. Refining our handover also gave us positive feedback in the comments section.

In the long term our results demonstrated improvement across all parameters but not as much as the immediate results (see table 1 for further details).

See supplementary file: ds6626.docx - “Table 1. Results: Comparative Tables and Graphs”

Lessons and limitations

One limitation of this project was that the study commenced at the beginning of the rotation and re-audit was assessed at the end of the rotation, leading to a potential bias. FY1s would likely be more confident and efficient with handling their workload at the end of a rotation than at the beginning, and for some FY1s the orthopaedic attachment was their first surgical job so it would have been a large learning curve.

The outcome measures were based on what the FY1s thought of the handover system, and even though the FY1 delivers the handover, senior members of the team could have been asked specifically on their views on handover limitations and opinions on how to create an improved system. Another potential bias is that the cohort of FY1s who responded immediately post intervention experienced the extremities of having no organised system in place, followed by the stratified traffic light system, and so may have overemphasised their opinions about it in their questionnaire as being a significant improvement. This is reflected by the fact that the long term post intervention results did not imitate the immediate post intervention results.

In addition we had less responders after the interventions, although this could not be avoided as only those who were current FY1s in the orthopaedic department could comment on the intervention.

Conclusion

Overall incorporating the traffic light system into the current electronic handover structure on EPR was extremely successful. It improved the quality of patient handover and ensured that prioritisation of specific patients was achieved: clinically urgent patients were not only being reviewed first but also by an appropriate senior member of the team. It improved the ability to identify outstanding jobs and ensured time efficiency at the weekend. Ultimately it was effective in improving patient safety. We also demonstrated the improvement to be sustainable in the long term. These conclusions were shown both anecdotally by the positive response we received from our colleagues and consultants, and evidentially by our findings of improvement across all
parameters assessed by the questionnaire.

Handover can always further be improved, and after presentation and discussion of the results in the department governance meeting the limitations to the EPR software were highlighted and ways to incorporate the traffic light code formally were reviewed. Further feedback from doctors in the department year on year should be implemented by the department audit lead to aid additional improvement in the form of repeat surveys.

Finally, it is important to note that information technology (IT) is a useful tool in clinical effectiveness and has vast potential in assisting with the handover process, specifically being time efficient compared to a paper or verbal handover.[4,6,7] In addition human factors such as poor communication of both written and verbal information, which may be detrimental to patient care, are avoided.[6] However a number of electronic systems within the NHS do have their own restrictions and sometimes it can be very difficult to overcome this when a rigid integrated IT system is already established across the Trust, especially when it will take a protracted length of time to adjust it. Thus a combination of both a human initiative and IT tools can allow for faster adaptations. We have demonstrated a very modest approach to overcome these restrictions in a complimentary and effective way. This adds to the already high number of quality improvement reports on traffic light stratification and electronic systems by combining the two together. In time we hope this system could be incorporated to other departments across the Trust that require it.

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Declaration of interests

Nothing to declare

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Ethical approval

This study was deemed a clinical improvement project and therefore did not require local ethical approval.
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