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Avoidance of Mortality and Morbidity in Inter-Hospital Transfers

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ABSTRACT

Introduction: The present study aimed to evaluate the quality of the inter-hospital transfers (IHTs) of the patients in a tertiary referral hospital in the United Kingdom.

Materials and Methods: This collaborative, multi-professional study was conducted in three stages. Qualitative and quantitative data were collected from a tertiary referral hospital in the United Kingdom using the case notes of the patients and surveys of junior physicians during training. The primary outcome was to examine the quality of the handover of patients during IHT.

Results: In total, 95.5% of the responding foundation year 1 doctors believed the current system of patient transfer to be unsafe. In terms of medical information handover, 62.5% of the physicians could not recall receiving a verbal handover, while 25% mentioned not receiving a written handover. In addition, 81.5% had difficulty clarifying the medications of the transferred patients, and 66%, 22%, and 26% of the physicians received the most recent results on blood tests, blood gas tests, and cultures, respectively. Also, 93% were not informed on the expected performance of the transfer team.

Conclusion: According to the results, IHT required improvement in the studied hospital, and similar findings are likely to be obtained by repeating the investigation in other health centers. Furthermore, a trainee-led collaborative research was initiated in order to develop an online transfer system to reduce the risk of poor medical information handover in the patients transferred between hospitals, which is potentially a major patient safety issue and could be mitigated through proper healthcare technology platforms.

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Introduction

Effective handover is one of the initiatives in the "Action on Patient Safety: High 5s' proposed by the World Health Organization (WHO) (1). Despite the efforts to introduce handover systems, safe patient transfer remains a sensitive issue in the process of care. Handover is a prominent concern in various national safety recommendations (2-6). Poorly conducted handovers may lead to mistreatment, delayed medical diagnosis, patient complaints, high healthcare expenditure, and increased length of hospital stay (7).

Handover has long been acknowledged as a risky process (8), and organizations such as the British Medical Association (BMA) and the Royal College of Physicians (RCP) in the United Kingdom have attempted to develop safer handover systems. Nevertheless, patient transfers between and within hospitals are often carried out without formalized handovers, with the incomplete or inadequate transfer of medical information between healthcare teams.

While extensive research has focused on the inter-hospital transfer of critically ill patients (9-11) or transfer between shifts within a hospital (intra-hospital transfer) (12, 13), few studies have addressed the potentially adverse outcomes and solutions in non-critical, inter-hospital transfers (IHTs).

The present study aimed to assess the quality of IHT and concerns of physicians regarding its efficacy. Additionally, a system design strategy has been proposed to address the other possible failures in the patient transfer process.

Materials and Methods

This collaborative, multi-professional study was conducted in three stages at a large tertiary teaching hospital in the Northwest of England, which receives approximately 1,300-1,400 patient transfers per year. The objectives of the study were as follows:

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- Collecting the qualitative and quantitative data on the perceptions of junior physicians toward the safety and quality of IHT;
- Collecting the data on the quality of handovers and documentation in patient IHT cases;
- Designing and implementing a strategy to improve patient safety by addressing the failures in the IHT process

Questionnaires used for the junior physicians

Junior physicians, especially the newly-qualified, provisionally-registered, foundation year 1 doctors (FY1s) (engaged in the first year of clinical practice) were responsible for the clerking of the patients transferred into the hospital. A researcher-made questionnaire was used with 21 items (scored with 2-3 points) and five free-text narrative fields to collect the required data. The items focused on the perceptions of the FY1s toward the safety and quality of patient transfer. The questionnaire was distributed among the entire cohort (n=55), and the respondents remained anonymous. By the time of completing the questionnaires, the surveyed junior physicians would have finished eight months of clinical practice.

Case note analysis

After establishing the assessment of the perceptions of the FY1s toward IHT, case notes of IHTs were evaluated in terms of the lack of crucial information and potential harm. The institutional approval for a service improvement project consisted of a retrospective analysis of 150 case notes, which were coded as transfers into the studied hospital from other healthcare centers. Exclusion criteria for the case notes were inaccurate coding of the transfers and missing crucial information for adequate analysis. In total, 48 sets of case notes were further evaluated in the study.

A consequential data collection was performed on the case notes. Moreover, the extracted data were matched to the items in the questionnaires completed by the FY1s, such as the transferred and clerked times, documentation of the causes of transfer, accurate recording of the devices and medications by the transfer team, and presenting the pro-forma handover in the case notes. Additional narrative data were also recorded and used to contextualize the cases and submit the adverse outcomes (e.g., unplanned admission to level II or III of care arrival at the hospital, significant adverse outcomes in the patients).

Results

FY1 questionnaires

In this study, 32 FY1s completed the questionnaires (total: 55) with the response rate of 58%. Among the completed questionnaires, 27 had clerked a transferred patient while working in the hospital.

According to the responses, the participants unanimously believed IHT to be unsafe in the studied hospital (95.5%). In terms of information handover, 62.5% of the physicians could not recall receiving a verbal handover, and 25% mentioned not receiving a written handover. Additionally, 81.5% of the FY1s had difficulty clarifying the medications of the transferred patients, while 66%, 22%, and 26% received the most recent results on the blood tests, blood gas tests, and cultures, respectively. Also, 93% of the respondents were not informed on the expected performance of the transfer team.

Although level II or III care transfers were not considered in the analysis, 56.7% of the FY1s stated that they had clerked unstable patients. Transfer clerking mostly occurred out of hours, with 54.5% occurring at 5-10 pm and 31.8% occurring at 10 pm-8 am. Furthermore, 75% of the physicians claimed that they clerked a patient at the weekend.

In total, 48 sets of case notes were analyzed in the study. According to the results, updated medication charts were missing in 37% of the cases. Among 73% of the patients receiving critical medications (Table 2), drug administration was delayed in 48%. In addition, 27% had no documented cause of transfer in the notes, and 68.7% arrived without a referral letter or had no pro-forma transfer in the notes.

Although the patients were invariably admitted by senior physicians, the plan was often not documented clearly in the notes or communicated to the clerking junior physician by the senior physician in 48% of the cases; this finding indicated the lack of communication within the admission team or hospital, which is in congruence with the responses provided in the questionnaires.

According to the results of the questionnaires, a large number of transferred patients arrived at the hospital outside normal working hours, while 63% arrived before or after 8 am-5 pm or were clerked by physicians outside the hours of 8 am-5 pm. In addition, 35% of these patients were clerked during night shifts (10 pm-8 am).

Mean delay between admission and physician's visit was two hours and 55 minutes, and the grade of clerking the patients by the physician was approximately 30% for F1, F2 or registrar. The free-text data on the outcome of the transfer process were collected (e.g., unplanned admission of the patient to level II or III of care). Some excerpts of the narrative data are as follows:

- Referral included a faxed letter from the registrar, ERCP scan and reports, and blood test results. Without explaining the antibiotic treatment, the clerking F1 seemed to know the antibiotics the patient received. It is possible that the list was not filed.

No medical notes, medication charts, and observation charts were sent with the patient. In addition, the microbiology reports were faxed a few days later, which were positive for resistant organisms. It took four days for the scans to be transferred to the system from the referring trust, which were vital to the ongoing management plans.

- The patient presented with no urine output, retaining 500 ml in the bladder. The transfer team was concerned about the deterioration of the renal function and tacrolimus therapy. They contacted the renal specialist registrar, who advised them to check the levels, and the decision was made to transfer the patient. However, the process was delayed due to missing the slot on the intended day of transfer. The patient was found to have norovirus on admission to the hospital, as well as a progressive decline in the clinical conditions as an inpatient. The patient died 28 days later.

IHT system

As mentioned earlier, one of the key results of the handover questionnaires and case note analysis was the lack of thorough communication between the transfer teams during the handover process, especially in terms of the documentation of an ongoing plan or agreed procedure between the teams. Although patient records were often transferred via photocopies or physical handover of notes, it was unclear whether the transfer of the medical information was complete, and the ongoing plan and clinical 'gestalt' of patient care was often higher than the sum of the written data, which could be interpreted without verbal or written handover. A dedicated HIS system should improve this deficiency with adequate evidence to confirm that only 2.5% of the information from the first handover is retained in the final handover in the absence of written records. The rate may increase to 99% with the use of a standard pro forma (14).

A comprehensible area for the interventions in this process would be the introduction of an inclusive exchange of information between the transfer teams during the handover process. The BMA advocates the development of 'system responsibility' for the continuity of clinical information (5). In accordance with the guidelines (3, 15, 16) and using the WACHS iSoBAR (17) format as the basis of the design, we collaborated with information technology department of the studied hospital in order to develop an IHT system to address the associated problems. The iSoBAR format (identify, situation, observations, background, agreed plan, read back) has been developed by the Western Australian Country Health Service, and its implementation has proven successful (17).

Our transfer system shares the same pattern and headings for information, while containing various specific details. Furthermore, it is an electronic system rather than a paper-based system. We needed to ensure that the system was accessible from any referring hospital; to this end, the pro forma was designed as a web-based system, so that it would be accessible anywhere in the United Kingdom with a National Health Service server.

Once the referring team has populated the data fields on the electronic transfer system, a unique reference number is generated, which is provided for the accepting team. A key feature of our transfer pro forma is the ability to require the referring and receiving transfer teams to write and confirm an 'ongoing plan' within the pro forma for patient care, allowing shared decision-making among the teams. The referring team documents their suggested plan, as well as any ongoing management issues. After completion, the unique login code generated by the system is provided for the receiving team, who will be able to view, amend, reject or accept the suggested plan. It is hoped that the proposed system will diminish improper transfers and build trust across transfer teams through introducing shared decision-making and improving communication. Moreover, it will enhance efficiency in the case of the junior physicians clerking the patients as they will realize the expectations they must meet in this regard.

The proposed IHT system in the present study contains the data on medications, allergies, medical devices, recent observations, and medical history of patients. The data could be imported from electronic health records systems and easily exported into the IHT system of our hospital. The headings are also included, and the required information is broadly compatible with the standards of the Academy of Medical Royal College for the contents of patient records (18). Furthermore, the online transfer system is compliant with the local policies on information governance and web security.

Discussion

The current study presents two sources of evidence on poor patient handover, offering a potential solution to the problem in the form of a novel IHS system. Inter-hospital patient transfer in the studied hospital lacked adequate documentation and had the potential for harm. Additionally, the overall quality of handover would not meet the standards in the United Kingdom (e.g., missing medication data, causes of handover). Many of these areas are likely to lead to patient harm, such as the discrepancies in prescribed medications during transfer (19). Although our findings are not unique, the evidence-based literature in this regard is limited, and similar results support our findings (8, 10-13, 20). Tremendous effort has been made to review HDU/ITU transfers, and our research could increase the evidence on the fact that in ward-to-ward patient transfers, information is likely to be lost; however, data is scarce in this regard. Due to the exclusion criteria and coding errors in the present study, our analysis of the case notes was performed on a smaller set than anticipated in the selected period. On the other hand, we only evaluated the perceptions of FY1 physicians although the case note analysis indicated that the physicians of other grades were occasionally involved in the process of patient transfer as well. Therefore, it is unclear whether there are systematic differences in the experiences of higher-ranking physicians in the clerking of transferred patients.

In the current research, the data obtained from the questionnaires were anecdotal and relied on the abilities of the FY1s to accurately recall their experiences in the clerking of transferred patients during an eight-month period. Nonetheless, the overwhelming opinions denoted that patient transfer was an unsafe process in the studied hospital. The response rate was favorable, and correlations were observed between the results of the questionnaires and case note analysis. In both processes, there was a clear lack of communication between the accepting transfer team members, receiving junior physician, and referring transfer team.

According to the results of the questionnaires and case note analysis, sufficient evidence warrants further investigation, encompassing the comprehensive analysis of individual 'patient journeys' within the transfer process, as well as the involvement of patients and their companions within the process in order to assess the impact of poor or favorable transfer.

Hospital transfer is considered to be a challenging and disruptive process for patients (21). Although a robust transfer system may partly improve the quality of handover, the process still depends on several organizational factors (20, 22), such as transportation difficulties and delays, which must be addressed properly. The operation of the proposed system in the present study should be further assessed and compared with varied electronic health records systems. As discussed by Riesenberg, large-scale, robust studies are needed to examine various contributing factors to poor handover and use the evidence to inform structured handover protocols (23).

Conclusion

We believe that our project has identified further research questions:

- How widespread is the IHT problem in healthcare systems, such as the UK National Health Service?
- Is it time to consider a single solution in the United Kingdom rather than the fragmented approach that is prevalent?
- How should we approach this issue nationally?

The current research was a three-stage, multi-professional project regarding the improvement of quality and safety, in which we assessed the perceptions of physicians toward IHT and actual cases of patient transfer. The results demonstrated two common viewpoints, confirming the unsafe process of patient transfer and providing the evidence to support this view. Moreover, a trainee-led collaborative project was initiated in order to develop an online transfer system, which is hoped to address the concerns regarding poor patient care. Detailed analysis of the non-critical IHT process is required for the proper implementation of structured, evidence-based handover systems.

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