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Title page

Title: Clinical handovers between pre-hospital and hospital staff. Literature review

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Clinical handovers between pre-hospital and hospital staff. Literature review

Introduction

Clinical handovers play a vital role in the delivery of patient care. Good handover is associated with improvements in patient safety¹⁻⁴ and record keeping,^{5,6} as well as continuity of patient care² and improved decision making.⁷

In the UK handovers of information between pre-hospital and hospital staff about patients may include pre-alert, by radio or phone, either via ambulance control or directly from healthcare staff or ambulance crew 'at the site' of an incident, a variety of face-to-face verbal, digital and written transfers of information between ambulance, emergency service and hospital-based personnel, and also between these staff and members of the public (such as carers or accident witnesses) and other professionals (such as general practitioners or social workers). Once the care of the patient has been transferred to the receiving hospital or care facility various written and digital documentation has to be filled in⁸ to complete handover process.

Since the publication of 'Zero tolerance – making ambulance handover delays a thing of the past'⁹ there has been particular attention paid to the need to reduce handover delays in the NHS. This followed a UK National Audit Office review of ambulance services in June 2011 which showed that only 80 per cent of handovers met the expectation that handovers from an ambulance and emergency department (ED) should take no more than 15 minutes. From April 2013, Clinical Commissioning Groups (CCGs) took responsibility for commissioning ambulance services and hospitals, ambulance services and the CCGs are expected to share ownership of the agenda for improving ambulance handovers. Our review was conducted in the context of this UK agenda and was intended to inform the policy debate and future research about the quality and effectiveness of pre-hospital to hospital handover. Two other reviews on this topic have been recently published by colleagues in Denmark¹⁰, and Australia¹¹ both were undertaken independently to the review presented here and identified some different

papers. Whilst broadly supportive of our analysis these reviews propose standardisation and training and have less to say about future research and how we might better understand the challenges to handover between pre-hospital and hospital staff.

Methods

A computerised literature search was conducted using online databases Embase, Medline and CINAHL. Published articles were retrieved using combinations of six key search terms: 'handover', 'handoff', 'pre-hospital', 'ambulance', 'paramedic' and 'emergency'. Both natural language and thesaurus terms were used in each database. The abstracts of the articles were reviewed for their relevance and inclusion in the literature review. The inclusion criteria were papers with a primary focus on pre-hospital verbal and/or written handover. Articles that focused on pre-hospital alerts or in-hospital handovers were excluded. The search was also limited to peer review journals and English language publications. We searched the literature from January 2000 - to March 2014, to maximise the literature available and to cover the period since paramedics became registered NHS professionals.¹²

Papers were read and reread by review team and the lead reviewer (KW) extracted and coded key findings. The codes and findings were discussed with the rest of the team and a thematic approach was used to structure our interpretations and discussion.

Results

Of the four hundred and one papers identified, from scrutiny of the abstracts fifty one met our initial inclusion criteria (figure 1). Full text papers were obtained and thirty papers were then excluded as secondary research, editorials or conference abstracts. The remaining twenty one papers were given a score using a six-point checklist based on Greenhalgh¹³ and CASP¹⁴ rating tools. Five papers received scores below four losing marks due to lack of details about ethical approval and/or discussions of reliability but all twenty one papers were assessed as at least providing moderate quality evidence and were therefore included in the review.

INSERT FIG 1 CONSORT DIAGRAM ABOUT HERE

Seventeen of the papers were published in the last seven years. Studies were carried out in Australia (5) and the UK (7), USA/Canada (3), Italy (1) Sweden (2), Netherlands (1, Italy (1) and Norway (2). The provenance of one paper by Manser *et al.* (2010)¹⁵ appears to be from UK/Switzerland. Eleven studies were quantitative, eight were qualitative and four used mixed method designs (table 1).

INSERT TABLE 1 SUMMARY OF STUDIES INCLUDED IN THE REVIEW

Discussion

The literature was analysed using a thematic approach. After the initial familiarisation phase in which reviewers read and re-read the papers, the team then met to identify and prioritise subthemes according to frequency of occurrence and relevance to the review. The group discussion resulted in 32 subthemes including 'active listening', 'relationships between clinicians', 'information retention' and 'environmental impacts'. Similar subthemes were then amalgamated, a process which happened with little debate between reviewers due to a great number of interlinking topics. Four major themes are used to focus the following discussion: these were communication, context, inter-professional relationships and standardisation of handover (including use of mnemonics).

Communication

Interviews with clinicians noted the importance attached to 'clearly stated' handovers,⁶ and the requirement that paramedics were 'confident and succinct',¹⁶ assertive and able to speak loudly.⁷ Effective handover was characterised by attentive receiving personnel⁶ who actively listened.¹⁶ This finding was supported by studies which showed that lack of active listening,¹⁷ lack of attention^{2 18} and the receiving teams' divided attention^{7 19} lead to frustration for ambulance personnel²⁰ and poorer handover.

Where handovers lacked structure^{19 21} this was felt to be a source of miscommunication.^{7 18 22} Some studies reported that clinicians found that handovers

contained irrelevant information,^{16 18 20} but this finding was contradicted by Yong *et al.*²³ One communication problem appeared to stem from the lack of feedback from receiving personnel,^{2 19 22} combined with a lack of a shared cognitive picture⁷ so that handover communication was inadequate and could not be improved.

Information loss was identified by clinicians in an interview study²² a discourse analysis of data transfer²⁴ and a separate survey.²³ In a video analysis of 96 trauma handovers in the USA only 72.9% of the key pre-hospital data points transmitted by ambulance staff were documented by the receiving hospital staff²⁵ and Australia showed that in a similar analysis only 67% of information given by paramedics to the in-hospital team was documented.²⁶ This same study noted discordance between paramedics' verbal handovers and their own documentation.²⁶ Elsewhere anomalies between pre-hospital and in-hospital documentation have been shown: a UK based study of 100 resuscitation room records, reported that 26 had at least one instance where information recorded by the ambulance crew was either omitted or altered during transfer.²⁷ A comparison of patient records conducted in Norway revealed that less than half of patient readings which were outside normal parameters were transferred to the admission documentation.²⁸ Sujan *et al.*²⁴ reported that less than 2.8% of handovers of elderly patients reported relevant psycho-social information. One USA study concluded that doctors appear to recall paramedic verbal reports about trauma patients poorly¹⁷ and this was corroborated by Sarcevic and Burd's¹⁹ video-analysis of 18 trauma resuscitations.

Although a survey showed that registrars in Norway preferred verbal handover to be combined with supporting paperwork,²⁸ written documentation provided by ambulance crews was not always perceived as useful. The same study revealed that doctors found documentation from other doctors more useful than ambulance crew documentation.²⁸ Yong *et al.*²³ reported that only 50% of ED personnel referred to ambulance documentation for patient care and Al Mahmud *et al.*²² found that receiving personnel often threw ambulance patient report forms in the bin without reading them. Bost *et al.*²⁹ suggested that ED personnel rely on memory when receiving a handover rather than written documentation. The literature suggested that paramedics often encounter difficulties recording data in the pre-hospital environment. The use of scraps of paper,¹⁹

gloves and bed linen²⁶ although common, were found to be impractical for recording patient information, but electronic systems were also regarded as impractical due to the time taken to enter data and difficulties in using these systems.^{16 19} Ambulance personnel expressed mixed views regarding the patient report form in terms of its clarity and usefulness.²⁰

Context

Evans *et al.*¹⁶ and Scott *et al.*¹⁷ indicate that the transfer of verbal information is made difficult by the noise¹⁶ and chaos¹⁷ of the emergency department settings in which handover is conducted. These problems were found to be compounded by lack of adequate space and staff³⁰ and the need for personnel to leave the room to carry out other duties.¹⁹ Handover effectiveness was associated with the availability of appropriate personnel to receive the handover.⁶ Workload²⁹ and lack of time was identified as problem for handovers,^{6 19} although 72% of ambulance personnel felt they had enough time to give an adequate handover.²

Some papers showed that handover was often further compromised by interruptions^{16 29} although Yong *et al.*²³ dispute this, reporting that 90% of handovers occurred with minor or no interruptions. Studies also show that handover is frequently repeated or duplicated. This repetition was associated with a need for clarification or new personnel entering the room²⁹ or the absence of the nurse ultimately responsible for the management of the patient.²⁰ Repetition was suggested as a cause for information loss⁷ but also, identified as a strategy for handover improvement.²⁰ Simultaneous handovers (over talking and parallel presentation of multiple cases) were shown to cause delays in patient treatment.¹⁹

Inter-professional relationships

A positive relationship between clinicians involved in handover was also a key facilitator of successful handover.^{6 29 30} Manser *et al.*¹⁵ identified shared understanding and working atmosphere as key components of safe and effective patient handover. Against this, some of the research reported unprofessional attitudes, including disinterest from ambulance crews when presenting patients with ambiguous problems;^{6 18} personnel who behaved unprofessionally during handover³⁰ and

dismissive attitudes of receiving staff causing frequent repetition of information by paramedics.¹⁶ A simulation study¹⁸ reported nurses' lack of trust in paramedic information and Knutsen²⁸ suggested that information was judged differently depending on its source - such that doctors favoured information from other doctors.

Standardisation of handover

There have been many attempts to standardise handover practice, notably by using mnemonics, an alphabetical listing technique that aids information retention. Common mnemonics in the pre-hospital setting include MIST (mechanism, injury, signs, treatment) and ICE/ASHICE (injury, condition, time to hospital, with Age, Sex and History). Three papers focused on the use of mnemonics to standardise handover.^{16 31 32} One revealed only 20% of Australian paramedics and 53% of trauma team members were familiar with MIST.¹⁶ In contrast 86.7% of ambulance personnel in the UK were familiar with ASHICE.²¹ The use of mnemonics was observed to improve handover consistency, increase the frequency of necessary information transfer and reduce questioning by ED personnel³¹ and to increase in elements communicated during handover¹⁸. However Talbot and Bleetman³² found that using a mnemonic did not improve information retention by ED staff (56.6% data retention using unstructured handovers vs 49.2% using structured handovers) or information recall. In addition handover was not improved by an intervention to enhance paramedic communication skills.¹⁷

Studies indicated that there was a lack of training in presenting handover^{2 18 19} and in the use of mnemonics.¹⁶ However, paramedics were more likely to be given training than in-hospital personnel, but it appears that many staff learnt by observing peers.^{20 29}

Conclusions

The handover studies reviewed here were conducted in diverse settings and refer to handovers before, and at the point of transfer between pre-hospital and hospital staff. Recurring themes were identified across the literature from different countries that provide knowledge which could inform handover practices and improve ambulance services. Whilst many authors continue to advocate the use of mnemonics in handover,

the evidence for their usefulness is inconclusive. Moreover these technical 'solutions' to the problem of handover are predicated on an assumption that standardisation will resolve the inherent complexity found in healthcare settings and communication tasks. A key finding of this review is the apparent poor communication practices rooted in behaviours such as not listening and relational problems founded on mistrust, and misunderstandings between different personnel. These are social factors. In addition the studies reviewed here point to the challenges presented by the context such as noise, chaos, interruptions - which while not unique to the pre-hospital environment - clearly make communication more difficult, with or without a mnemonic. Non-technical skills that impact on patient safety are becoming an important focus in healthcare, with anaesthetists and emergency physicians using the crew resource management (CRM) approach used in the aviation industry to improve competencies. The challenging and pressured environment of pre-hospital care increases the danger that miscommunication and failures to listen or recall information will occur and this is evidenced in our review. Through observational research and high fidelity simulation we need to understand the complexity of handover better, to grasp the challenges of context and inter-professional relationships before we reach for tools and techniques to standardise part of the handover process. Future research will need to harness qualitative and reflexive approaches which can analyse these social and contextual factors and may be better placed to help us understand complexity. This work would need to comprehensively consider the pre-hospital environment, organisation and relationships, but also attend to other gaps in the evidence base - for example looking in more detail at the interaction between technologies (such as computerised records and monitoring) and communication. The utility of the Electronic Patient Report Forms (EPRFs)³³ that are currently being rolled out across ambulance services should be explored in the context of accuracy and perceived benefit of digital information transfer in the handover process. Future research should include exploring how teams are rapidly formed during resuscitations and how hierarchies and positional power influence information exchange. Given the continued focus on the use of mnemonics in some settings such as the military, research should explore the factors that contribute to their effective use and the lessons to be learned for civilian practice. Our review concurs with a recent literature review which has proposed a need for studies to identify relevant paramedic non-technical skills which could lead to the development of rating

systems linked to paramedic registration with potential benefits for the profession and patient safety.³⁴

This review has demonstrated that there is a limited amount of research on handover at the interface between pre-hospital and hospital clinicians. Most of the empirical studies have been conducted in non-UK and therefore non-NHS settings. While the themes discussed should have relevance to NHS services more high quality research is needed to provide a greater understanding of the challenges to effective handover. In the context of the new NHS commissioning arrangements designed to put patient needs at the heart of decision making³⁵ it may also be worth noting that patients' views and experiences of ambulance handover should also be investigated. Further studies on pre-hospital handover could lead to improvements in efficiency of care and service delivery, one of the emerging principles of the recently published Urgent and Emergency Care Review.³⁶

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