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Title: The importance of the verbal shift handover report: A multi-site case study

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Abstract

Objective

Shift handover is seen as a key tool in ensuring continuity of care yet a number of studies have highlighted the role of shift handovers in adverse events. This, combined with the increased frequency of shift handovers, has led to interest in providing technological support for handover to enhance safety. The aim of this paper is to describe current practices for the conduct of shift handovers and to use this as a basis for considering the role that technology could play in supporting handover.

Methods

A multi-site case study of handover was conducted. Data included observations of 15 medical shift handovers and 33 nursing shift handovers across three case sites.

Findings

The findings highlight the way in which the verbal shift handover report is practically focused, displaying the healthcare professional's ability to know what information is required and where further explanation is needed. As well as supporting teaching and team cohesion, shift handover can provide an opportunity to reflect on the previous shift and for discussion with patients and their families.

Conclusions

The benefits provided by a face to face handover suggest that technology should focus on supporting rather than replacing the verbal shift handover report, providing a flexible solution that allows handover participants to gather more information as it is required.

1. Introduction

Handover can be described as a process that involves the passing and acceptance of responsibility for some or all aspects of care for a patient, or group of patients, and the sharing of relevant information [1]. Shift handovers are a regular feature of healthcare work, taking place between oncoming and outgoing staff when there is a shift change.

Shift handover is a key tool in ensuring informational continuity [2], which in turn is essential for continuity of care [3]. Shift handovers are becoming more frequent, due to shorter working hours for doctors, a result of regulations such as the European Working Time Directive. However, a number of studies highlight the role of shift handovers in adverse events [4-7]. This, combined with the increased frequency of shift handovers, has led to interest in providing technological support for handover [2].

1.1 Shift handover

The process of handover is influenced by organisational factors, including the design of the coverage schedule, the information technology infrastructure, and the organisational culture [8]. The absence of protected time for handover and having large numbers of patients to hand over are organisational factors considered to have a negative impact on the process of handover [9].

Handovers also respond to the local context, with what counts as necessary or essential information to hand over varying according to the medical specialty, the clinicians' certainty about the patient's condition, the severity and stability of the patient's condition, and the workload of staff members [10]. Handovers should also

be seen as situated within a particular spatial environment which has the potential to impact the communication. For example, handovers may take place in a room away from the ward or may take place in a more 'public space' such as by the bedside. One study suggests that a bedside handover allows oncoming staff to pose questions that may not arise away from the patient [11].

The information provided and the nature of the communication also depends on who is involved in the handover [12]. For example, the amount of information handed over may depend on whether or not an oncoming member of staff has previously cared for the patient [13]. Also important is the participants' place within the professional hierarchy and their level of experience and responsibility [11, 14, 15]. For example, junior doctors have been found to have a narrow definition of handover, focusing on tasks to be completed by the end of the shift [9].

While verbal face to face handovers predominate, and have been found to be preferred by clinicians [16], these do not always occur due to, for example, time constraints and patients being widely dispersed [17]. Some studies emphasise the conversational nature of handovers [10], with a two-way exchange of information between outgoing and oncoming staff [15]. However, other studies of both medical and nursing handovers have found questions being asked of the person giving the handover occurs infrequently, suggesting that, in those particular contexts, handover was more of a report and less of a conversation [8, 18].

In many ways, the content of handovers has been found to be partial, with the use of abbreviations and jargon [14, 19], missing key information such as the patient's

current clinical condition [8], and containing ‘global judgments’, evaluations that are non-specific in nature [20]. Factors associated with increased content of the verbal handover include familiarity with the patient, sense of responsibility for the patient, presence of senior staff, and comprehensive handover documentation [8]. A range of practices exist for gathering information into written form in preparation for the handover [21-24]. However, important information may be provided verbally in the handover that is not recorded anywhere else [13, 15, 18, 20].

Despite the limitations of current handover practices with regard to ensuring continuity of care, previous studies highlight other outcomes of handovers, such as providing training, team cohesion and support for staff [13, 25]. Others have pointed to the ‘surveillance’ aspect of handovers, where oncoming staff members assess the completeness of the work of those handing over [11, 26]. Shift handover can also be a time for outgoing staff to reflect on the shift [15] and a time for identifying problems due to the fresh perspective provided by oncoming staff [27].

1.2 Technology to support handover

Despite enthusiasm for such technology, there is limited research on the role that technology can play in supporting handover. Those systems that have been developed and evaluated have tended to focus on medical shift handovers. The introduction of a system that enabled junior doctors to enter their own notes about patients and details of tasks to be done and then produce a patient list automatically populated with recent vital signs and laboratory values was found to significantly reduce the amount of time spent on documentation to support handover [28]. The system was perceived by staff to result in better handover quality and improved continuity of care. However, this

study does not report if and how the verbal handover changed as a result of use of the system. In an evaluation of a similar tool, which generates a paper form after automatically extracting data from the electronic patient record (EPR), junior doctors reported that the system supported handover but they emphasised the importance of face to face communication as part of the handover [29].

Another technology used to support shift handover are large displays that enable summary information to be viewed during the handover. In one study a photograph of the handwritten handover summary produced by the junior doctors was projected onto the wall during the medical shift handovers [26]. Staff felt the display helped them to maintain concentration during the verbal handover and to remember the information that was handed over. The number of clarification questions asked appeared to increase, with staff asking questions about information that was written on the summary but not mentioned in the verbal handover. However, junior doctors were less comfortable with the technology, feeling that it exposed their work to scrutiny by more senior medical staff. Another study found that projecting the EPR onto the wall during the nursing shift handover resulted in a change from oral presentation to collective reading [30]. Fewer pieces of information were missing during nursing handovers and fewer messages had to be passed on after the handovers.

Other changes to shift handover practice have resulted from the introduction of EPRs. One study of the introduction of an EPR found that the EPR was increasingly used to replace the verbal communication, so that supplementary information was only passed on via informal discussions [31]. In another setting, replacing the verbal report of the nursing shift handover with written documentation contained within the EPR was an

explicit aim of introducing the EPR [15]. However, nursing staff introduced a new form of verbal report where, having read the information in the EPR, the oncoming nurses then updated each other about the state of the patients. A weekly written summary was also introduced by the nursing staff, in order to provide an overview that was not available within the EPR.

While existing research suggests that technology should be used to support the verbal report, rather than replace it, what is not clear is how best to do that. In this paper, we report a multi-site case study of shift handover, considering both medical and nursing shift handovers across three sites. The aim of the study was to identify implications for design of technology to support the verbal report that have relevance across a range of settings.

2. Study design

A multi-site case study design [32] was used, in order to generate findings that have relevance beyond a single setting [33]. As part of a larger study of clinical handover, qualitative data on medical and nursing shift handovers was collected via observations and interviews in three case sites across two National Health Service (NHS) hospital Trusts (providers) in England.

Research Ethics Committee approval was obtained for this study and written consent was gained from both staff and patients that participated in the study.

2.1 Background to case sites

Case site 1 is a 20-bed general medical ward in a District General Hospital (DGH). The majority of patients on this ward are elderly and many require palliative care. Case site 2 is a 28-bed EAU in a DGH. It is a short-stay ward where patients are assessed and either discharged from hospital or transferred to an appropriate ward. Due to the nature of the ward, patients of a wide range of ages and with a broad range of conditions are seen. Case site 3 is an 11-bed paediatric surgical ward in an inner city teaching hospital. The ward takes both elective and emergency paediatric surgical patients. Patients are transferred from the ward to theatre and then transferred back to the ward following their operations.

2.2 Data collection

Data collection involved observation and, where written consent had been obtained from patients, audio recording of shift handovers. Audio recording enabled the detail of the verbal handover to be gathered, allowing the researcher to focus on recording in fieldnotes details of the non-verbal interaction. In addition, time was spent in the setting in order to understand how shift handover fitted within the ongoing work. Informal interviews were conducted with staff members in the course of their work, in order to obtain explanations of activities that took place as well as to gather their perspectives on the handovers that they participated in. Examples of artefacts used to support shift handover were gathered, and photographs of the settings were taken. Across the three case sites, a total of 368 hours of observations were conducted between May and September 2007. Table I summarises the data collected in the three case sites.

	Days of observation	Hours of observation

General medical ward	10	104
EAU	14	172
Paediatric surgical ward	10	92
Total	**34**	**368**

Table I: Summary of data collection

Following each period of observation, fieldnotes were written up and audio recordings transcribed. These were then entered into the software package Atlas.ti for the purpose of organising and analysing the data.

2.3 Data analysis

Data from each case site were analysed separately, so as to allow themes that were unique to particular case sites to emerge. Initial indexing of the data identified all shift handovers that were observed. Prior to more detailed indexing, all shift handovers for the case site were carefully read and annotated by hand, asking questions of the data and paying attention to what was occurring and in what order, what was being accomplished and what strategies were used to achieve this on the basis that handover is a practical accomplishment [34].

From this, a series of codes were developed, capturing different aspects of the shift handovers, such as who was involved, the location, the content and the ordering of the content, and the nature of the communication. These codes were then applied to the data within Atlas.ti. Indexing the data was treated as a way of engaging with the data on a line by line basis, using the constant comparative method to enable similarities and differences within settings to become apparent [35]. From this, for each setting, we produced a rich description of the different processes of handover that were

observed. Our analysis can be described as ethnomethodologically-informed [36], maintaining a commitment to the preservation of the detail of work practices within each setting.

Having undertaken this initial analysis, we returned to the data, again using the constant comparative method but this time identifying similarities and differences between settings.

3. Findings

Table II summarises the number of medical and nursing shift handovers observed in each case site. In case site 1, only shift handovers between the nursing staff were observed; although the hospital management expected them to take place, no handovers to the on call medical team were identified when the ward medical team went off duty at 5 p.m.

	Number of medical shift handovers observed	Number of nursing shift handovers observed	Total number of shift handovers observed
General medical ward	-	9	9
EAU	7	15	22
Paediatric surgical ward	8	9	17
Total	**15**	**33**	**48**

Table II: Summary of observed handovers

To introduce the shift handovers observed, general features of handovers in each of the sites are described in Table III. We then draw on data from across the three case sites to explore the content and nature of the verbal shift handover report.

	General medical ward nursing	EAU medical	EAU nursing	Paediatric surgical medical	Paediatric surgical nursing
Location	Nurses' station	Not restricted to particular location – staff would hand over wherever they met e.g. in the corridor	At bedside or at door of patient's room for patients in individual cubicles	Main paediatric ward – either in office behind nurses' station (for morning handover and handover to on call team) or room used as a waiting room during the day (for handover to night team)	Staff room then at bedside
Timing	7 a.m. and 7 p.m., although evening handovers often started late because outgoing nurses were busy with other tasks	Approx. 10 p.m. – would begin later if members of staff were busy with other tasks	7 a.m. and 7 p.m., although evening handovers would sometimes start late because outgoing nurses were busy with other tasks	8:30 a.m., 5 p.m., and 8 p.m., although all often started late	7:15 a.m. and 7:15 p.m.
Participants	Normally organised by team, with outgoing blue team nurse handing over to oncoming blue team nurse and outgoing pink team nurse handing over to oncoming pink team nurse	Made up of various one to one conversations	Each nurse would hand over patients she had looked after to two oncoming nurses for that team	On call team and night team covered all three paediatric wards, so handovers involved staff from all three wards, although variation in who was present	Handover in staff room between outgoing charge nurse and all oncoming nurses and health care assistants; bedside handover was one to one, between outgoing nurse and oncoming nurse
Structure	Handovers for each teams typically concurrent or overlapping; each patient being looked after by team	Generally outgoing staff handed over to their equivalent roles, although outgoing junior doctors sometimes found it necessary to also hand over	Order in which nurses handed over determined by which nurse was nearest and/or available; sometimes handover would begin with patient that the outgoing	Morning handover was most structured; handover to on call team involved outgoing staff individually speaking to member of the on call team; in all handovers, variation in	In handover in staff room, outgoing charge nurse handed over all patients; as each oncoming nurse was to be responsible for

	discussed, ordered by bed number	to specialist registrar; only patients of concern or where there were tasks to be done were discussed	nurse was with when oncoming nurses were ready to receive handover, or the handing over of patients would be ordered by bed number	level of involvement of participants; paediatric surgical patients only discussed where there were tasks to be done or some concern	multiple patients, she would typically need to receive bedside handovers from multiple nurses
Duration	30 mins – 1 hr, evening handovers typically longer	Each conversation typically lasted no more than a few mins	Approx. half an hour, with approx. two mins spent discussing each patient	30 – 45 mins to discuss patients in all three paediatric wards; discussion of paediatric surgical patients typically took just a few mins	Approx. 30 mins
Interruptions	Frequent	None observed	More frequent in evening, when patients and relatives would take advantage of opportunity to ask questions of nursing staff	Frequent	None observed

Table III: Summary of shift handovers in each site

3.1 The verbal shift handover report

While the content of the verbal shift handover reports varied considerably, depending on whether the handover was medical or nursing, the clinical specialty, and the condition of the particular patient being discussed, a feature consistent across all case sites was the apparent ability of those giving the handover to select, from all the available information about a particular patient, the information that was relevant for the oncoming healthcare professional. For example, in the nursing handover in case site 2 (EAU), information provided about the presenting complaint was brief, normally summarised in a few words. Similarly, details of the patient's past medical history were brief, listing conditions and with only occasional inclusion of information such as dates. For the nursing shift handover in case site 1 (general medical), while analysis of the data shows that information about medications was frequently included in the handover, far from being a summary of all medications that the patient was on it focused on intravenous (IV) medications and changes to a patient's medication. In the nursing shift handovers in case site 3 (paediatric surgical), details of feeding were given where relevant, but this simply involved highlighting those patients on nasogastric feeds (referred to by staff as simply 'NG feeds') and total parenteral nutrition (referred to by staff as simply 'TPN'). In this case site, if the patient had already had surgery, information about this and any post-operative care required were given. However, the amount of information given was limited, often not saying what the surgery actually was, for example, simply saying that the patient is 'day two post-op'. If the patient was due to have surgery either during the shift that was just starting (for the morning handovers) or on the following shift (for the evening handovers), this was noted but again was brief, simply stating where on 'the [theatre] list' the patient was.

However, with other types of information, the person giving the handover appeared to be able to judge where further information and explanation was necessary. For example, in the nursing shift handover in case site 2 (EAU), the amount of information given about a patient's medication varied quite a lot, from the simple statement that 'he's had all his tablets' to more detailed accounts of particular drugs, quantities and reasons for the patient taking them. In the nursing shift handover in case site 1 (general medical), sometimes additional information, particularly 'hard' data, would be given in the context of explaining why something was done or why something needs to be done:

'…on 4 litres of oxygen because his SATS were down to 80…hasn't had warfarin yesterday, 5.2 INR…

...

…abdo x-ray done last night because query obstruction…'

While previous studies have focused on what information is included in handover, and distinctions between hard and soft data [37], what we start to see here is how these pieces of information are interweaved within the handover.

As found in previous studies, in all case sites the handovers contained many abbreviations and much jargon, such as SOB (shortness of breath), COPD (chronic obstructive pulmonary disease), etc. These abbreviations and jargon are not unique to handover but permeate conversation within all case sites that we studied.

3.1.1 Practically focused

We can describe the content of the handovers as being practically focused. For example, in the nursing shift handover in case site 3 (paediatric surgical), the first topic to be discussed was typically any staffing issues, before moving on to brief details of expected admissions.

One aspect of this practical focus was a focus on tasks. For example, in case site 1 (general medical), by far the most frequent type of information reported during the nursing shift handover was tasks to be done. Tasks to be done that were highlighted in the handover were predominantly to be carried out by the nurse herself, e.g. specimens (stool, sputum) and blood samples to be sent to the lab, observations beyond the standard observations (fluid balance, daily weights, lying and standing blood pressure), and wound swabs. However, reviews that were needed by other health professionals, such as the medical team, the dietician and the speech and language therapist (SALT), were also noted so that the nurse could ensure that these tasks were done. Similarly, in case site 2 (EAU) in the handover from the day ward cover to the night ward cover, the information focused on the task that the night ward cover was being asked to do, so that the information given was that which supported their ability to complete that task.

This task focus meant that in the medical shift handovers in case sites 2 (EAU) and 3 (paediatric surgical), information was typically only given about those patients that needed to be seen or might need to be seen, as in this fieldnote extract from a handover to the on call team in case site 3:

[Ward senior house officer (SHO)] and I go over to [paediatric medical ward] for the doctors' handover. We get there at 5:20 p.m. and it has already started. The oncoming specialist registrar [SpR] asks [ward SHO], 'Surgery patients are okay?' [Ward SHO] responds, 'They're all fine apart from one.' He tells her about the baby with the bloated tummy but then says, 'She's not worrying for you, I'm just letting you know in case they phone you.' The SpR asks [ward SHO] for a copy of the doctors' list - he hands it to her and then we leave.

This meant that in some cases very little information about patients was given, with the absence of tasks being noted, as in this fieldnote extract from a handover to the night team in case site 3:

[On call SHO] hands over the [paediatric surgical] patients. This takes about thirty seconds. He looks at the doctors' list for the paediatric surgical ward and says 'There wasn't anything really. [patient name]'s orthopod. Orthopaedic patient, liver patient, nothing for us to do' (as he points at the different names on the list).

Being practically focused meant that the handovers covered a narrow time frame. For example, in the nursing shift handover in case site 1 (general medical), information focused on what happened on the previous shift, what the nurse needed to know for the current shift and what she needed to pass on to the next nurse at the end of this shift. In the nursing shift handover in case site 2 (EAU), beyond details of planned investigations little information was given about planned medical care, as this care would not be undertaken within the EAU.

A number of handovers included practical information and advice, either relating to the work of the ward or sometimes to specific patients, as the following fieldnote extract from a nursing shift handover in case site 1 (general medical) describes:

Talking about the [patient's] wife, who is worried because he's not getting his feed due to the NG tube being pulled out, [outgoing nurse] says 'Need to watch your Ps and Qs.'... [outgoing nurse] also gave [oncoming nurse] practical advice about caring for the patients - how to get one to take his tablets, how to get one to eat.

Similarly, in case site 2 (EAU) in the handover from the day admitting SHO to the night admitting SHO, information given about patients waiting to be admitted not only prepared the oncoming in terms of what to expect regarding the patient's condition but also the patient's mood and manner. This was sometimes given along with advice about the order in which to see patients:

She hands over 4 patients. She tells him about a patient who complained - he came in via his GP [general practitioner] and didn't realise he'd have to stay the night; his wife is coming back from Majorca tomorrow and he's anxious to get home. [...] 'I would start seeing this one first [the man that complained], this one next', pointing to the names on the patient list.

In the nursing shift handovers in case sites 1 (general medical) and 3 (paediatric surgical), information about family members would often be given where relevant. For example, in case site 1, the outgoing nurse would say whether the family had been in to visit or were with the patient now and also what the family had been told about

the patient's condition. In case site 3, information about family was most often concerned with whether or not the parents were currently on the ward, although also included comments about 'snappy' parents and the parents' level of involvement in caring for the child while in hospital.

3.1.2 Problem focused

As well as being practically focused, the handover reports could also be described as problem focused. For example, in case site 1 (general medical), nurses typically did not say the patient's diagnosis or past medical history. Instead, the emphasis was on changes to the patient's care (e.g. drugs that are no longer being given), aspects of the patient state that were concerning, aspects of the patient state that they were monitoring (e.g. the fluid balance), aspects of the patient's care needs that were deviations from the norm or problematic (e.g. if the patient was only to have pureed food), events that happened during the previous shift (falls, vomiting, behaviour such as shouting), and, as already described, tasks to be done. This focus on problems meant that there could be significant variation in the amount of information given about particular patients, as shown in this fieldnote extract from a morning nursing shift handover:

'[bed number]: ..[patient name] [age] 29.6 temperature, shouting, very chesty, needs a review this morning, had IV fluids, IV paracetemol, practically no urine output, right leg very demititus, cannot keep on left side because right shoulder hurts…bottom very bad, scrotum new catheter… Very chesty, on 4litres of oxygen because his SATS were down to 80, only got full blood count, waiting for result, hasn't had warfarin yesterday 5.2 INR, wasn't bled yesterday…Venflon in one (right) arm. Temperature

37.6, so noisy that everybody was complaining…shouting he was unwell…for day 3 of swabbing. For [Intermediate Care Team at another hospital in the Trust], [ward sister] thinks he doesn't because his wife washes him, has been talked to about it. Still awaiting a dietary review'

…

'[bed number]: [patient name] [age] abdo x-ray done last night because query obstruction, checked x-ray "just wind", may need…want CT on pelvis … transfer with assistance…very uncooperative'

3.1.3 Summarising the information

Another way in which the amount of information that needed to be handed over was reduced was by summarising the information in different ways. For example, in the nursing shift handovers in case site 1 (general medical), we observed the use of general statements, what have been described as 'global judgments' [20], about a patient's condition:

'She doesn't look too good this afternoon.'

'God, she's poorly, she's really poorly…'

Similarly, staff would give assessments of the data rather than the raw data. For example, nurses in case sites 1 (general medical) and 2 (EAU) would describe the observations as 'fine' or 'okay' rather than reporting the actual numbers.

3.1.5 Handover as two-way communication

Apparent in the data is not only the way in which the outgoing healthcare professionals are able to identify the relevant pieces of information, providing further detail and explanation where necessary, but also the way in which the oncoming healthcare professionals easily seek further information and clarification. In the nursing shift handovers in case site 1 (general medical), questions appeared to focus on gathering further detail on information already provided, being interspersed at relevant points in the conversation:

Outgoing nurse: '…no diarrhoea over night… he uses the bed pan.'
Oncoming nurse: 'Did he have his bowels open over night?'
Outgoing nurse: 'No, no bowels.'

Another strategy used by the person receiving the handover was that of contradicting the information that was given, as described in the following fieldnote extract taken from an account of a nursing shift handover in case site 1:

The outgoing nurse says that the patient is 'for echo' [echocardiogram] but the oncoming nurse disagrees. The outgoing nurse says that the patient is for 'repeat echo' but still the oncoming nurse disagrees. To resolve the issue, they get the patient's medical record out of the trolley. In it, the SpR has written a note saying that they have agreed that a repeat echo is not needed. The oncoming nurse knows this from having looking through the medical notes before the handover.

Interestingly, the extent to which the communication could be described as two-way varied across case sites. For example, in the nursing shift handovers in case site 2

(EAU), the oncoming nurses did ask questions but these were generally brief questions, interspersed throughout the handover and seeking clarification and confirmation. In case site 3 (paediatric surgical), there were not many questions asked within the medical shift handovers, and those that were asked tended to be asked by more senior staff such as the consultant in the morning shift handover. However, the medical shift handover appeared to sometimes be used to question the decisions that had previously been made, as in this handover from the on call SHO to the night SHO:

He [oncall SHO] only tells her [night SHO] about one patient on [paediatric surgical ward] - bloods need to be chased. She asks why they are doing it when it is a hepatology (liver) patient (she is familiar with the patient because she was on last night as well). He says the surgeons asked for post-op bloods. She says yes they should take the bloods but then tell hepatology so they can chase it because they 'don't know anything about this patient'. She says it would be different if it was an orthopaedic patient - she can see why they need paediatric involvement - but hepatology is largely paediatric anyway. She says the SHO should have handed over to hepatology not the on call.

Also noticeable in the medical shift handovers in case site 3 was the way in which the person(s) 'receiving' the handover would sometimes provide information about patients. On call and night staff often had some knowledge of paediatric surgical patients if the patient had been on the ward for some time. On one occasion, not only was the communication two-way but the person receiving the handover corrected the person giving the handover:

[Outgoing SHO] says when the patient came in but [oncoming SHO] corrects him, saying that the patient came in over the weekend.

In contrast to the medical shift handovers, the nursing shift handovers in case site 3 did not display the same amount of two-way communication and oncoming staff took a more passive role with few questions being asked.

3.1.6 What handover achieves

Like previous studies of handover [11, 13, 25-27], our findings highlight the other roles that the verbal shift handover report plays, beyond supporting continuity of care. One of these is the social role that handover plays. In case site 2 (EAU) in both the handover to the admitting SHO and the ward cover, the discussion appeared informal and chatty. Handover seemed to be a chance to share experiences and complain about the workload. Similarly, in case site 3 (paediatric surgical), the handover to the on call team appeared to provide the junior doctors with an opportunity to chat. In case site 1 (general medical), the nursing shift handovers appeared to vary in their content depending on who was present. When the ward sister was not present, the handovers had a more 'chatty' feel to them.

Also apparent in the medical morning shift handovers in case site 3 (paediatric surgical) was the role of the handover as providing an opportunity for teaching:

There then follow two brief conversations, related to particular patients but through which the consultant appears to give the other doctors more general advice. Firstly,

she talks about lead poisoning, saying it is something they will often come across in this hospital because of problems with local housing. Then she talks about aggressive parents - distinguishing between middle class, well-educated parents who come across as very polite but can be very demanding and less educated parents who are more obviously aggressive. She says that she thinks that in some ways the middle class parents are harder to deal with.

Previous studies have suggested that handover can provide an opportunity to identify errors, with oncoming staff providing a fresh perspective [27]. The following example from a morning medical shift handover in case site 3 also suggests that the handover can be an opportunity for the outgoing staff to reflect on the shift and, through doing so, identify error:

As [outgoing SpR] talks about one patient, she realises there must have been some miscommunication with the nurse on [paediatric medical ward] the previous night - she had been told that a patient had been admitted but the mother was upset but she wasn't given the patient's name. When she went to the ward, she asked about the patient whose mother was upset and the nurse told her that she's fine, they are both sleeping now – [outgoing SpR] now thinks that the nurse must have been referring to another patient.

A fourth additional role that we identified was in providing an opportunity for the oncoming staff to meet the patients. This was visible in the nursing shift handovers in case sites 2 (EAU) and 3 (paediatric surgical) where there was a bedside handover. In the evening bedside handover, we observed both the oncoming and the outgoing nurse

attempting to include the patient in the discussion, as in this fieldnote extract from case site 2:

Outgoing nurse: 'He's 90.'

Oncoming nurse (to patient): 'Looking good for 90.'

The patient doesn't seem to hear or understand and so the nurse projects her voice and repeats her compliment, he seems to have heard and remarks 'I'm nearly 91.'

On a couple of occasions where the outgoing nurse did not have all the necessary information the patient was able to contribute information and on one occasion we observed a patient providing information without being asked for it, contradicting the information being given by the outgoing nurse:

Outgoing nurse: 'Um, now, the plan for him is, he's awaiting 24 hour tape, his INRs need checking.'

Patient: 'I've got the tape on already.'

Oncoming nurse: 'When did you start this?'

Patient: 'This afternoon.'

Outgoing nurse: 'Oh right, okay. (Pause) Who put that on for you, [patient name]?'

Patient: 'Um, a young lad came round with a gadget in his hand and poked it in.'

Outgoing nurse: 'Um, okay, so he's um for an echo and dopplers.'

The nursing bedside handover in case site 3 (paediatric surgical) provided an opportunity for the oncoming nurse to speak to the children that she would be looking after, as well as other children on the ward:

[patient name] is awake and his mum is there. [outgoing nurse] says about [patient name] vomiting that day. [patient name] expands on the details - he went out with his mum and had a Subway sandwich, lists the ingredients and then describes in great detail what the vomit looked like! [oncoming nurse] pretends to be disgusted and puts her fingers in her ears which [patient name] seems to enjoy. [outgoing nurse] and [oncoming nurse] go through [patient name]'s drug chart but include [patient name] in this by asking if he knows how many milligrams of a particular drug they give him. He says it comes in a red syringe. He then says that he doesn't need warfarin: 'I'm mobilising.'

The bedside handover in these case sites also provided an opportunity for the patient and their relatives to ask questions.

4. Discussion

We have provided a description of medical and nursing shift handovers across three varied case sites. The description of the general features of the handovers in each case site highlights some of the challenges of having a face to face handover. Shift handovers often start late, not all staff may be present for all of the handover, and interruptions are likely. This is due to a contradiction inherent in handover that has long been acknowledged; that, while trying to ensure continuity of care, handover often results in a disruption of care as members of staff leave their duties [38]. When providing awareness of the condition of and plans for all patients is essential for continuity of care but is difficult to ensure, technological support for shift handover appears as an obvious suggestion.

At the same time, the findings presented here regarding the content and nature of the verbal shift handover report give further evidence of why technology should not replace the verbal handover report. They show what the healthcare professional can provide that technology cannot: the ability to identify the relevant pieces of information, providing further detail and explanation where necessary, and presenting this within a coherent story. They also show what is potentially lost by removal of the verbal report: the opportunity for two-way exchange of information and the other benefits that are achieved by having a face to face handover, such as supporting team cohesion, the opportunity for teaching, the opportunity for outgoing staff to reflect on the shift, and, when there is a bedside handover, the opportunity to interact with patients and respond to their queries.

Certainly, there are failures in the process and that is where technological support for handover can provide benefit. For example, in the medical handover from the day ward cover to the night ward cover in case site 2 (EAU), it was apparent how patchy the information could be, with the oncoming on one occasion having to ask for the name of the patient that she had been told about. Similarly, when having a face to face handover proves challenging due to the need to attend to the ongoing work, information technology can be used to provide healthcare professionals with multiple opportunities to gather information, so that the verbal shift report is not a single point of failure.

4.1 Implications for design

The answer to the question of what such technological support for handover should look like will only be determined by evaluation of a range of approaches. However, we conclude this paper by reflecting on some possible solutions.

One possible response to the findings presented here might be to suggest a technology that does what healthcare professionals do in the verbal report: to present information that is practically focused and problem focused, covering a narrow time frame and highlighting patients that might need to be seen, with assessments of patient data rather than the raw data, summary statements about the condition of patients, 'to do' lists, and practical information on how to deal with patients and their families. However, it is unlikely that the technology would be able to produce a coherent story regarding the patients being handover that is circumstantially sensitive and relevant in the way that healthcare professionals are able to. Even if the technology could do this, it would add nothing to the verbal report that it is meant to be supporting.

We would instead suggest that what is needed is a solution that is flexible, that allows the participants in the handover to pull up further information when they feel it is necessary, in the same way that the person receiving the verbal report is able to ask questions in order to gather more information. Ultimately what is needed, as hospitals in developed countries move increasingly to the use of EPRs, is access to the EPR, but with a view of the data that provides a high level summary of all patients on the ward, with the ability to drill down for more information when it is required. It appears to be the lack of such an overview that has limited the ability of EPRs to previously provide adequate support for shift handovers [15]. How best to provide such an overview, whether in graphical or textual form, is an important area for further research.

There also needs to be a range of options in terms of the hardware on which to access this information. On the basis of the results of previous studies [26, 30], large displays should be one option but also personal digital assistants (PDAs), tablet PCs, and computers on wheels in order to support both bedside handovers and those handovers with ad hoc locations, and also desktop PCs for those handovers that take place at the nurses' station.

5. Conclusion

We have reported findings from a multi-site case study of medical and nursing shift handover. The findings highlight the way in which the verbal shift handover report is practically focused, displaying the healthcare professional's ability to know what information is required and where further explanation is needed. As well as supporting teaching and team cohesion, shift handover can provide an opportunity to reflect on the previous shift and for discussion with patients and their families. The benefits provided by a face to face handover suggest that technology should focus on supporting rather than replacing the verbal shift handover report, providing a flexible solution that allows handover participants to gather more information as it is required.

Authors' contributions

Rebecca Randell was involved in the design of the study and data collection, undertook the analysis and interpretation of the data, and drafted the article. Stephanie Wilson contributed to the conception and design of the study and critically revised the article. Peter Woodward was involved in data collection and critically revised the article. All authors have given final approval of the version to be submitted.

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Statement on conflicts of interest

The authors have no conflicts of interest in undertaking or reporting this research.

Summary Table

What was already known on the topic

- In nature and content, shift handovers respond to the local context.
- Information passed on in the handover may not be recorded elsewhere.
- Shift handovers serve a variety of purposes, such as training and team cohesion.
- Technology can both support and hinder the verbal shift handover report.

What this study adds to our knowledge

- In conducting the shift handover, healthcare professionals use strategies that attempt to balance the need to hand over with the needs of the ongoing work.
- The verbal shift handover report is practically focused and displays the healthcare professional's ability to know what information is required and where further explanation is needed.
- As well as supporting teaching and team cohesion, handover can provide an opportunity to reflect on the previous shift and for discussion with patients and their families.
- Technology should not try to duplicate the information contained within the verbal report but instead provide a flexible solution that allows handover participants to gather more information as it is required.

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