ORIGINAL RESEARCH

First initiatives in prehospital care -Basing assessments on incomplete preliminary information

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ABSTRACT

Rationale and aim: Ambulance staff, i.e. registered nurses and assistant nurses, receive assignments from emergency dispatch centres including information on level of priority, address and patient's care requirements. One problem is that the preliminary information the dispatcher gives to the ambulance staff may be incomplete. The purpose of this study was to determine how ambulance staff base their assessments on incomplete preliminary information when assessing care requirements.
Methods: Fifteen ambulance staff working at seven ambulance stations were interviewed for this study. Interviews were transcribed and analysed using content analysis.
Results: Incomplete preliminary information means that ambulance staff may be misdirected. This means that if the preliminary information from the dispatcher is incomplete, the ambulance staff need to reassess, and this is perceived to be difficult. Ambulance staff tend to stick to the first initiative that is taken after they receive an alert from the dispatcher.
Conclusions: When ambulance staff receive incomplete preliminary information, they need to consider the possibility of conducting a reassessment. Based on the results, there is a need for new procedures to improve preparedness to conduct a reassessment after receiving incomplete preliminary information.

Key Words: Ambulance, Dispatch centre, Assessment, Incomplete preliminary Information, First initiative, Prehospital care

1. INTRODUCTION

Ambulance care is increasingly in demand.[1] At the same time, dispatchers are tending to triage increasing numbers of patients as the highest priority.[2] It is not uncommon for ambulance staff, i.e. registered nurses and assistant nurses, to base their initial assessments on incomplete preliminary information about the patient's care requirements.[3] Furthermore, it is well known that there are problems in the dispatch phase when it comes to retrieving, interpreting and sending out complete information.[2,4,5] Several people are involved and there is a high risk of misunderstandings.[6] If the ambulance staff have inaccurate preliminary information, it can lead to incorrect priorities and the patient receiving the wrong treatment. It can also lead to a longer time period

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before proper treatment is given.[6] Managing incomplete preliminary information requires ambulance staff to act predictively, i.e. to be prepared for the unpredictable.[7] As far as we know, no previous studies have investigated how ambulance personnel handle uncertainties due to incomplete preliminary information. The purpose of this study was to determine how ambulance staff base their assessments on incomplete preliminary information when assessing care requirements. The study's usefulness lies in describing and analysing the phenomenon and proposing new procedures that improve preparedness when faced with incomplete preliminary information.

1.1 Background

Previous research on decision-making by ambulance staff in acute situations shows that information and information management are fraught moments.[6] When an alert is issued, the information consists of a written summary report from the dispatcher based on the caller's information. This information enables the ambulance staff to prepare themselves by collecting additional information en route to the patient. Factors such as consciousness, breathing and circulation constitute important information for making decisions in emergency care situations.[6,7] A number of important decisions are initially made based on information from the dispatcher at the emergency dispatch centre, together with the ambulance staff's own assessment.[7] The assessment is often made with the ambulance travelling at high speeds, taking into consideration current radio traffic and in a limited time frame.[5] The triage performed by the dispatcher is important for how the ambulance staff act.[3] It has been found that patients who are given a low priority feel they are not taken seriously.[8] Information management also affects the quality of the report when transferring the patient to the hospital's emergency department.[4,9] An open, critical and cross-organisational approach can help ambulance staff to ask relevant questions and obtain important information to avoid making decisions that are not well thought out.[10] Bost et al.[4] have shown that the information from the dispatcher may lack important details about the patient's status and situation.[11] In order to reduce the risk of incomplete information, standardised communication models for use by the ambulance operators have been introduced.[9]

Ambulance staff transport and care for patients under time pressures and with limited information.[7] The information from the dispatcher therefore determines what actions are to be taken on arrival. Gunnarsson and Stomberg[6] describe how ambulance staff prepare for possible care scenarios, what equipment is needed, how safety is to be managed and how tasks are to be shared on arrival. This is especially important if there are long geographical distances involved.[12] According to Wireklint Sundström,[7] it is important for the ambulance staff to have a mental plan of action so that they are prepared to deal with the unexpected. Vague preliminary information has previously been perceived as frustrating.[13]

The assessment made by the ambulance staff on arrival follows a standard procedure. It assesses consciousness, airway, respiration, circulation and neurology. However, it also includes visible injuries such as fractures, gunshot wounds and bruises.[14] Different factors are systematically assessed as possible injuries or disease conditions.[15] When there are several persons injured, triage methods are used to provide early treatment to the most serious patients.[16] The systematic methods contribute to a calm and safe atmosphere.[6,17] However, in some cases, ambulance staff have relied upon incomplete preliminary information and assessed patients' care requirements incorrectly.[18,19] In addition to unreliable information, factors such as lack of time and high expectations can lead to incorrect decisions being made.[19]

1.2 The first initiatives

The first initiatives implemented are important for how ambulance staff choose to act.[17,20,21] Ambulance staff tend to base themselves on decisions made at the initial stage.[22] This means that they are resistant to reconsidering and testing other solutions.[20] First initiatives are passed down and strengthened the longer the case proceeds.[20]

The first initiatives set the direction and govern the ability to act. The initial decisions based on information from the dispatch centre are of significance for the continued process, what is done during transportation and what results can be achieved. Another factor is that procedures are used to simplify decision-making under pressure of time. Procedures can be used reflexively and are time saving, but they ingrain behaviour and decrease staff flexibility. The staff's mental investment and prestige create a threshold. If efforts are moving in the wrong direction, the first initiatives prevent ambulance staff from restarting the patient's care from a fresh starting point.[20]

The first initiatives can be traced to theories about path dependency.[22] The modes of action used can be explained by the use of procedures, structures and established behaviour.[23] In healthcare, we can observe how queues, referrals and systems of rounds are difficult to change even though there may be more optimum options.[24] Ingrained behaviour reduces options for action and accelerates working capacity.[23] This is described in the literature as "... actors are hemmed in by existing institutions and structures that channel them along established policy paths".[25] In order to break loose

from path-dependent behaviour, Van de Ven and Poole[26] suggest three important steps. The first step, confrontation, is often induced by a lack of conformity. When discontinuity is registered due to failed decisions, an initial trigger is induced towards change. In the next two steps, a phase of dissatisfaction leads to a process of searching. After the searching phase, consensus about an alternative procedure can be reached. Below is a description of the study's data collection, analysis and research ethics.

2. METHOD

2.1 Data collection

Data were collected through semi-structured interviews of ambulance staff. The interviews were completed by the first author in February 2015. Managers at ten ambulance stations were asked if they had ambulance staff who could participate in the study, seven of whom were in favour of participating. The ambulance stations included were situated in western Sweden and based in urban as well as suburban contexts. The urban context was mainly one big city and one medium-sized town. The suburban data was collected in villages in the countryside. The dispatch centre in western Sweden is part of a national dispatch organisation and the procedures when dispatching ambulances are highly standardised, based on common guidelines for assessment and communication. The participants included in this study were registered nurses (RNs). Ambulances in Sweden are mainly staffed by RNs. The study was conducted by an ambulance nurse, with experience of prehospital clinical practice (first author), and two full professors in health management and public organisation.

The informants consisted of 10 men and 5 women working in ambulance care in Sweden (N = 15). Interviewees had extensive experience of the phenomena covered by this study. The age spread was 25–52 years, and length of professional experience was 3–25 years. Fourteen of the informants were RNs and 1 was an assistant nurse. The aim was to have a wide range of participants with regard to gender, age, professional experience, background and area stationed. Managers were not interviewed. The individual interview started with a brief presentation and the ambulance staff subsequently described how they experienced encounters with patients where the preliminary information was incomplete. The interviews addressed the ambulance staff's considerations, assessments, perceptions and attitudes towards incomplete preliminary information.[27] The interviewees were given the opportunity to speak freely, based on semi-structured interview questions. The questions posed were: "Tell me about your experience of receiving incomplete preliminary information from the dispatch centre?" "How do you feel about receiving incomplete preliminary information?" The answers were followed by "What do you mean?" "Can you explain further?" "What did you do then?" "What do you mean?" "Why did you do that?".[27] The interviews were recorded, listened through and transcribed by the first author. Each interview lasted an average of 30 minutes (tot: 450 minutes).

2.2 Analyses

Content analysis was conducted of the three authors (MH, EC and JB) in a step-by-step process, with theoretical concepts and interview transcripts repeatedly compared in order to identify patterns in how ambulance staff managed incomplete preliminary information. After reading all of the interviews three times, analysis was conducted according to the four steps described by Hsieh and Shannon.[28] The study consequently started with an inductive approach and continued deductively, searching for explanatory frameworks based on preliminary findings.[29] The first step was to find meaningful units, i.e. meaningful words or sentences that were perceived as key. In the second step, these units were condensed, with an abbreviation of the meaningful units in which we retained the key content and created different categories.[28] In the third step, the units of meaning were abstracted and compared with the theoretical concept of path dependency, e.g. first initiative effects, procedures, structures and established behaviour. The interviewees carefully described their experiences of receiving incomplete preliminary information and what they did to manage these situations. Incomplete preliminary information occurred daily, which made it easy for interviewees to give examples of different situations.

2.3 Research ethics

The Swedish ethical review authority assesses research, including sensitive data regarding participants, i.e. race, ethnicity, political views, religion, membership of movements, sexual habits or health.[30] This study does not include sensitive personal data. The authors consequently decided not to apply for ethical approval. However, ethical research principles of informed consent, voluntary participation, data usage and confidentiality were important starting points.[30] The study is based on interview data from individuals who freely contributed their views on the prehospital organisation. Participants meeting the inclusion criteria were included with help from senior managers and human resources departments. They were informed before the interviews that they were free to withdraw at any time. They were also assured of confidentiality and secure data storage.

3. RESULTS

The study's results have been sorted into three categories, which are divided in turn into three dimensions. In presenting

the results, quotes from the interviews with accompanying descriptions have been sorted into three categories. The categories and dimensions are presented in Table 1.

3.1 Misdirection

Misdirection means that the ambulance staff receive incomplete preliminary information from the dispatch centre. Misleading information could be certain diagnoses that were used frequently when dispatching. The recurring diagnoses were based on a simplified analysis that steered the ambulance staff's preparation down an incorrect path. It also affected assessment, treatment and reporting upon handover to the hospital emergency department. The ambulance staff sought to form an opinion based on the state of illness/diagnosis as early as the dispatch stage and during the journey to attend to the patient. If the alert concerned chest pain, the ambulance crew prepared carefully and was quick to reach the patient. They performed an EKG, sent data to the emergency hospital and put in an IV. However, the descriptions of disease condition communicated by the dispatcher could be incomplete, leading to hasty conclusions and critical decisions. One of the interviewees described how he misunderstood the information about chest pains, which instead turned out to be a trauma.

I was all prepared for chest pain, but it was a rib fracture. However, the computer in the ambulance said "pain in the chest" and nothing about the patient having fallen. (Ambulance nurse 1)

Table 1. Categories and dimensions

Categories	Dimensions
(1) Misdirection	a) Poor analysis b) Hasty conclusions c) Uncritical decisions
(2) Inability	a) Frustration b) Information overload c) Reject
(3) Reconsideration	a) Alertness b) Self-criticism c) Responsiveness

A misunderstanding occurred when the ambulance staff expected the chest pain to be related to heart disease and not to the broken ribs. Some of the details were included in the dispatch information, while other essential information was missing. This led to complications and the wrong actions being initiated. The ambulance staff described how they were "deceived" into regarding the incomplete preliminary information about the causes of the patient's problem as "true". They felt it was difficult to restart when the information was updated upon arrival. One of the interviewees described an event when the information diagnosed a stroke, but it was then discovered that the patient suffered from diabetes.

The ambulance computer said stroke (...) the symptoms reinforced the image of a stroke. It turned out to be about low blood sugar. (Ambulance nurse 2)

If the ambulance staff acted solely in accordance with the information from the dispatch centre, their options could be reduced. The amount of equipment they brought with them to the patient might also be reduced. However, if the preliminary information turned out to be wrong, it was difficult to change direction and begin treating for a diagnosis other than that which was conveyed from the beginning. Some staff described the fact that they might let the information received from the dispatcher determine the work they performed simply for the sake of convenience. The information from the dispatcher influenced their level of engagement, pace and choice of examinations. One of the interviewees described their experiences through the following situation.

One colleague told them how they once responded to an alert about an "unconscious diabetic". They arrived at the patient's home, which was on the third floor. Carrying someone three floors requires quite a lot of effort, so they went there on the basis of the information supplied by the dispatch centre and did not take a stretcher with them. They assumed the person was unconscious due to low blood sugar and that such a person can usually be treated and then walk down the stairs by themselves. However, the patient had had a cardiac arrest. (Ambulance nurse 8)

The perception was that being misdirected through incomplete preliminary information was difficult to manage. One way was to create procedures that required less consideration than would otherwise be required. Once initial information was in place, there were well-established procedures for which measures to take to ensure action proceeded smoothly. It was common practice for the staff to choose not to test the correctness of the information, but to continue working on the basis of the information they received initially from the dispatch centre. Misdirection was seen as difficult to manage, leading to poor analysis with premature conclusions.

3.2 Inability

It was found that misdirection contributed to inability. Inability means that respondents experienced frustration, distraction and inadequacy. The flow of patient care was disrupted and took more time.

... if the information was still correct. Otherwise, you have to start again and be as clueless as if you have not received any information. It becomes a gap in the flow. (Ambulance nurse 4)

To reassess, start again and try to do what is right was perceived as frustrating. Ambulance staff knew that they lost valuable time, reducing their ability to provide the patient with proper care. If they had the right information from the beginning, they could have provided better and faster treatment. Respondents also reported that they were able to provide more accurate reports during the transfer at the hospital. The respondents felt that inadequate efforts contributed to the frustration of ambulance staff.

... I have to be on my toes because the patient shouldn't notice my frustration. (Ambulance nurse 15)

The frustration makes it more difficult to think logically. (Ambulance nurse 1)

Being frustrated could lead to action paralysis, an impasse and less thoughtful decisions. In the event of incomplete preliminary information, the ambulance staff could also perform incorrect work. When the patient's condition was perceived to be less serious, the person with the most experience and expertise drove the ambulance, while the one with less experience and expertise took care of the patient.

There were also examples of the dispatcher providing background information that was not relevant to the patient's acute problems. For example, an ambulance crew was informed of the details of a previous appendicitis operation when the patient had slipped on ice and broken his ankle. In one of the interviews, an ambulance nurse described the phenomenon as follows.

The most important factors should be shared when we receive the alert. What happened, where we should go, the reason why an ambulance was called and the symptoms. No diagnoses and long accounts of the person's health that do not contribute to the analysis. It just complicates things. (Ambulance nurse 7)

Information overload was perceived to have the same negative effect as incomplete information. Ambulance staff felt that it took the focus away from patient care, making it difficult to choose the right treatment.

All information affects my thinking. (Ambulance nurse 13)

Too much information makes it easier to miss the problem. You have to reject or confirm the information. (Ambulance nurse 6)

The amount of information was perceived as making a difference to what the staff needed to relate to. The more incomplete the information, the longer it took to respectively confirm and reject. It took longer to tackle the problem than if the information was accurate and correct from the outset. Changing treatment methods made it difficult for the ambulance staff to manage the actual problem.

3.3 Reconsideration

Experienced personnel developed strategies to deal with misdirection. One strategy was to think unconditionally and try to reconsider the situation and ignore the information received from the dispatcher. This meant that they tested the information from the dispatcher critically and were cautious. Ambulance staff regarded the initial information from the dispatch centre as potentially incomplete. This meant that they brought more equipment with them from the ambulance than the condition actually required. The patient was given additional attention. A strategy articulated by the staff was to try to identify alternative preliminary diagnoses based on the information provided by the dispatcher. It required staff to be alert and responsive. But with increased experience, the ability to handle incomplete preliminary information improved. It was also about being self-critical and prepared for something unexpected to happen.

Not having preliminary information requires me to be prepared in my thoughts and to not exclude anything initially. To be prepared for the unexpected. (Ambulance nurse 11)

Several respondents described the fact that they developed a more structured way of working to ascertain the patient's care requirements. The structure led to better assessments, reducing the stress experienced by ambulance staff when the information was incomplete. They learned to use their overall experience and skills to make the right assessments. Ambulance staff endeavoured to have an open approach, working methodically and avoiding preconceptions.

I'm more open and go slowly when I take the medical history. I listen with less preconceptions. You have to start again from scratch without thinking about diagnosis. (Ambulance nurse 11)

The pursuit of correct assessments was likened to detective work. It was about working openly and unconditionally and trying to dismiss the initial information. Relatives, passers-by and witnesses were used to a greater extent to gather information and to obtain a correct picture of the patient's condition. The ambulance staff felt that they asked more nuanced questions and found it easier to notice subtle circumstances. It concerned interpreting skin colour, registering state of mind and embracing the patient's experience. The risk of medical mistakes decreased.

I feel that the patient gets total attention. I give them time to talk and time to listen properly. You do not hurry. (Ambulance nurse 1)

When you arrive, listen carefully. Be more prepared and

open. (Ambulance nurse 12)

However, this working method was tiring. It would have been easier to turn on the autopilot and listen solely to the information provided by the dispatcher. Actively searching for information increased complexity, which meant that their senses were on full alert. The ambulance staff described the fact that had to use all their skills and abilities to make good judgments. With numerous alerts, not many breaks and a high tempo, the ambulance staff sometimes felt worn out.

4. DISCUSSION

The study shows that the ambulance staff studied tended to stick to the first initiatives taken after receiving the alert from the dispatch centre. The initial initiatives thus guided the initial assessment, which means that if the preliminary information from the dispatcher is incomplete, the ambulance staff need to reconsider and make a new assessment. This process is time consuming and requires self-criticism. It creates a threshold effect that has not been studied in this context before. The first initiative effect causes decisions to be reinforced in a particular direction as the course of events unfolds. The phenomenon has previously been highlighted as an explanation for difficulties in cross-border collaboration between police, rescue services and ambulance.[20,31,32] The procedures of ambulance staff simplify and speed up work in time-stressed situations. The use of procedures required less reflection than if the decisions were reassessed on the basis of the individual case. Van de Ven and Poole[26] describe the challenge of developing new procedures that contribute to performing a reassessment. When the ambulance staff receive incomplete preliminary information, they need to consider the possibility of doing a reassessment. This is weighed against simply following procedures and making decisions along the same path as before. However, reassessments can take place in a variety of ways, ranging from a minor adjustment to more extensive correction and to completely restarting from the beginning.[32] It requires experienced ambulance staff who have the capacity to reconsider the situation and manage the unforeseen.[33,34] For ambulance staff, it is about unconditional thinking, reconsidering the situation on a continuous basis, and being prepared to reassess if the dispatch information was misleading.[32,35,36,36,37]

The outcome from the article is summarised in Figure 1. When the dispatcher passes on information perceived as misleading, staff can immediately reconsider the information in order to identify alternatives. Inability requires a preparedness to identify the lack of progress and enter a phase of reconsideration. If ambulance staff are trained to manage incomplete or misleading preliminary information, they can develop procedures for reconsideration without getting caught in a state of inability.

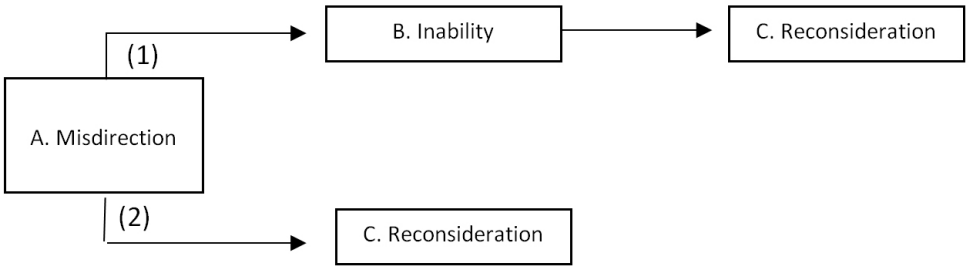

Figure 1. In case of inability as a result of misleading information, a readiness to identify possible shortcomings and to enter a phase of reconsideration is required. If the ambulance staff are trained to handle incomplete preliminary information, they can develop procedures to go straight from misdirection to reconsideration without getting caught in a state of inability

The challenge is to go straight from (A) misleading to (C) reconsideration without ending up with (B) inability or identifying (B) inability in order to (C) reconsider. As previously described, the staff have strategies to avoid being misdirected and ending up not being able to function. It concerned trying to act unconditionally, reassessing the situation and trying to ignore the information previously received from the dispatcher. The critical approach made it possible to reassess and find alternatives. At the same time, this way of working was tiring, with intense periods of work with high priority assignments. One assumption is that a methodology for analysing information under pressure of time can facilitate the situation for ambulance staff and increase patient safety. Previous research has largely been focused on how dispatchers' assessments and provision of information can be improved.[11,38] Based on the results of this study, there is justification to do in-depth studies on the ambulance staff's ability to handle incomplete and misleading preliminary information. In particular, to develop and implement new procedures for reconsideration and reassessment.

5. Conclusion and practical implications

The results show that ambulance staff have difficulty managing incomplete preliminary information. Provided it is correct, the initial information the ambulance staff receive from the dispatch centre contributes to saving time, however, information may also be misleading. Furthermore, they might stick with the first initiatives taken after they receive the alert from the dispatcher. The first initiative effect causes the decisions to be reinforced in a single direction as the course of events unfolds. When ambulance staff receive incomplete preliminary information a reassessment is required. Reassessments can take place in a variety of ways, ranging from a minor correction to a comprehensive adjustment to completely restarting. Based on the results, there is a need for new procedures. A methodology for analysing information under time pressure can facilitate the situation for ambulance staff and increase patient safety in ambulance care.

Limitations of the study

In order to fulfil the purpose of the study, ambulance staff have been interviewed. The questions have addressed descriptions of how ambulance staff perceive their encounters with patients in cases with incomplete preliminary information, thus apprehending the respondents' experiences, thoughts and experiences. The study is limited to 15 informants. A limitation of this method is that the study is not generalisable to the experiences of all ambulance staff. Another limitation of this approach may be that incomplete preliminary information is perceived differently by different individuals and occupations. A third limitation of the approach is that the interviewees describe how they feel the ambulance staff should relate, not how they actually relate, to incomplete preliminary information. However, the consistent outcome shows that it might be possible to distinguish a similar response pattern in a larger study. The present study therefore provides important suggestions for future research questions on the effects of incomplete preliminary information in prehospital care.

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Conflicts of Interest Disclosure

The authors declare that there is no conflict of interest.

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