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Clinical Review

Optimizing the Interface Between Rescue Services and Emergency Departments in Germany - A Study of Handover and Management of Interface Problems for Improved Patient Care

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Abstract

Background: The handover at the interface between the ambulance service and the central emergency department is of crucial importance, as it ensures the seamless exchange of information between the two units and thus guarantees the continuity of patient care. The aim of this thesis is to analyse the quality of the handover process at this interface and to identify possible solutions.

Methods: The research question "How can the current state of quality in the handover process from ambulance staff to the nursing staff of the central emergency department be assessed and what potential measures and solutions can be identified to sustainably improve the quality of this handover process?" was answered by conducting expert interviews. The interviews were digitally recorded for the purpose of subsequent verbatim transcription. Finally, the qualitative content analysis according to Mayring and the inductive categorisation were carried out.

Results: The respondents in the sample n = 10 identified structured communication through the use of tools, scores and checklists, shock room management and interdisciplinary collaboration, the implementation of effective pre-registration and the key role of calmness during handover as best practices and successful approaches to quality improvement in the handover process.

Discussion: The results illustrate the complexity of the handover process and suggest that a combined strategic approach based on training, clear protocols and interdisciplinary collaboration could improve the quality of the handover process.

Conclusion: The results emphasise the ongoing complexity of the handover process at the interface between the ambulance service and the central emergency department. They suggest that an integrated strategic approach could improve the quality of this process. Future research could contribute to gaining practical insights for the continuous improvement of this interface.

Keywords: *Interface Problems; Ambulance Service; Emergency Department; Quality; Handover*

The handover at the interface between the ambulance service and the emergency department is of crucial importance, as it ensures the seamless exchange of information between the two units and thus guarantees the continuity of patient care [1]. A study of handover and management at this interface examines and identifies possible solutions.

For many emergency patients, the clinical treatment process begins with the handover from the ambulance staff to the nursing staff in the emergency department [1].

Note Start

In medicine, the term patient handover [1] refers to

"the transfer of responsibility and authority for some or all aspects of the care of one or more patients to another person or professional group for a temporary or extended period of time".

Note Stopp

Figure 1

The interface between the ambulance service and the emergency department is a critical point at which a break in the care strategy can occur. There is a risk of avoidable delays and loss of information, which can lead to an interruption in continuity of care [2].

Note Start

Loss of time and information can lead to potential risks in the supply chain, which can have a negative impact on patient care [2].

Note Stopp

Figure 2

Handovers are described as complex, especially in emergency departments. These are associated with an increased risk of errors due to the unpredictable patient load, the fluctuating acuity and the high stress and time pressure during the handover and professional clinical (further) care of patients [3].

Optimizing this interface is of great importance with regard to the overall quality of care for emergency patients. Inadequate attention to optimizing the interface between the ambulance service and the emergency department primarily jeopardizes the safety of emergency patients [6].

Note Start

Optimizing the ambulance-emergency department interface is crucial for the safety and quality of overall care for emergency patients [6].

Note Stopp

Figure 3

In view of this, the quality of handover and management at the interface between the rescue service and the emergency department was examined in a study with the help of expert interviews and possible solutions were identified.

Patient handover

As part of the overall treatment process, the handover concludes pre-hospital care on the one hand and must also ensure continuity and safety in the overall treatment process at the interface with the emergency department by passing on previous treatment and patient information [1].

The handover process from pre-hospital care to the emergency department is always an interprofessional handover, as at least two players from different professional disciplines are involved. These are the ambulance staff and the nursing staff in the emergency department, and often a third professional discipline, the doctors [3].

Note Start

There is usually only one opportunity for a verbal handover and thus for the transmission of patient-relevant information. For this reason, the handover is of immense importance [1].

Note Stopp

Figure 4

To date, only training concepts are offered in Germany that define standardized diagnostic and therapeutic procedures for the prehospital or early in-hospital initial care of seriously injured or seriously ill patients [4]. When these training concepts and schemes are compared with the current literature, it becomes clear that none of them can be considered a classic handover scheme for the emergency department in the conventional sense [5].

The quality of the handover is significantly reduced if it is not carried out according to standardized procedures and little attention is paid to the content of the information transfer. This can negatively affect various areas such as patient safety, staff satisfaction, teamwork, efficiency and information flow [7].

Mnemonic devices play a crucial role in handover as they serve to specifically counteract these detrimental influencing factors [5].

Note Start

Mnemonic devices are memory aids that are designed to be easy to remember and linked to a specific process by an acronym [5].

Note Stopp

Figure 5

In the specialist literature by Gräff., *et al*. and Rossi, numerous guidelines for standardizing the handover have already been published [1,5].

It is noteworthy, however, that in Germany there is still no uniform standardization or clear guidelines that specify which mnemonic should be used uniformly for the handover at the interface between the ambulance service and the emergency department. The authors of the consensus paper on structured handover deliberately refrained from naming or recommending one of the many untested guidelines published in the literature. In their view, the known mnemonic devices lack a firm integration of crew resource management aspects on the one hand, and on the other hand there is a lack of sufficient evidence as to which information should be represented by individual letters or elements in the mnemonic devices [1,8].

Since 2007, the World Health Organization has recommended the use of the SBAR scheme to improve patient safety during handover [9].

Figure 6

The AT-MIST scheme is taught in the European Trauma Course for a focused trauma handover in the trauma room [4].

Figure 7

According to Thies., *et al*. the xABCDE algorithm is used for the structured and rapid detection of potentially life-threatening injuries and vital function disorders [4].

Figure 8

The SAMPLER scheme is used to take a structured medical history [4].

Figure 9

Interface issues between emergency services and the emergency room

The handover process in healthcare is a crucial step that requires effective communication and collaboration between different stakeholders to ensure continuity of patient care. The key players include paramedics and emergency department nurses, who together play a key role in this process [1].

Paramedics are the first line of pre-hospital care and are responsible for initiating life-saving measures during transportation to the hospital. Their in-depth medical knowledge and skills significantly influence the quality of initial patient care and efficient handover to hospital staff [5].

Emergency department nurses, on the other hand, provide care in the hospital and play a crucial role in the admission and follow-up of patients. Clear and concise communication during handover between the pre-hospital and clinical teams is vital to ensure that important information about the patient's condition, actions taken and resources required are conveyed without loss or misunderstanding [10].

The interaction and collaboration of these interprofessional actors are crucial for an efficient and high-quality handover process, which ultimately improves patient safety and care [11].

In most cases, ambulance services and hospitals are independent entities and operate separately from each other. As a rule, ambulance service staff do not work in the hospital and emergency department nursing staff do not work in the ambulance service. In order to further develop internal and external emergency structures in the ambulance service and emergency departments, both hospitals and the ambulance service could benefit from an interdisciplinary exchange of ambulance specialists in the emergency departments and nursing staff in the ambulance service [12].

In the context of quality improvement, this would represent significant progress. Potential difficulties in communication could be reduced or avoided as the various professional disciplines would be more closely networked [13].

The German Professional Association of Emergency Medical Services (Deutscher Berufsverband Rettungsdienst e.V.) advocates uniform, nationwide standards for the pre-registration and handover of patients by emergency medical personnel. The main aim of these efforts should be to establish and ensure a patient-oriented, professional, objective and seamless registration and handover process. An ideal interface would be "no" interface [13].

There are various dependencies when it comes to optimizing the interface between the rescue service and the emergency department. From the patient's point of view, this is seamless access to optimal treatment. From the point of view of the ambulance service, this is a seamless, rapid handover to the clinical facility ready for admission and treatment. From the perspective of the emergency department, this means timely advance information about the arrival, comprehensive information about the (suspected) diagnosis and previous pre-hospital interventions [2].

As the handover at the interface between the ambulance service and the emergency department ensures the continuity of patient care, optimizing the quality of the handover is of crucial importance. To date, there has been no extensive research into improving this interface problem. In order to give this aspect the attention it deserves, a study was conducted on the quality of the handover process at the interface between the ambulance service and the emergency department.

Study on the quality of the handover process from ambulance staff to emergency department nursing staff

For this study, expert interviews were conducted with ambulance service staff and nursing staff in an emergency department on the quality of the handover process at the interface between the ambulance service and the emergency department. The study sample comprised a total of ten test subjects, half of whom were ambulance service staff and half of whom were emergency department nursing staff. The aim of the study was to analyze the current state of quality in the handover process from ambulance staff to emergency department nursing staff. The interviews were digitally recorded for the purpose of subsequent verbatim transcription. Finally, the qualitative content analysis according to Mayring and the inductive category formation [14] were carried out. The following table presents the identified category system with the associated subcategories.

Main category (C)	Subcategory (C')	Response frequency
1) Evaluation of the current quality of the handover process in school grades		
2) Factors influencing the current quality of the handover process	1) Qualification of rescue service personnel 2) Qualification of emergency room staff 3) Lack of application of schemes 4) Circumstances and general conditions 5) Age and generational differences 6) Interpersonal influences on handover quality	4 4 2 2 2
3) Possible challenges and difficulties in the handover process that could affect the quality of patient care	1) Lack of time, stress and high workload 2) Incorrect prioritization 3) Condition of the patients 4) Communication difficulties 5) Spatial and organizational challenges 6) Interpersonal influences 7) Lack of rest	8 2 2 2 7 4 2
4) Criteria and standards worthy of consideration to ensure quality	1) Application of standardized schemes and checklists 2) Need for a controlled environment and calm for an effective handover process 3) Responsibilities and clarity of roles 4) Appreciative communication, active listening, team presence 5) Closed-loop communication	8 5 2 2 2
5) Experiences and observations of best practices and successful approaches to quality improvement in the handover process	1) Structured communication through the use of tools, scores and checklists 2) Shock room management and interdisciplinary collaboration 3) Implementation of effective pre-registration 4) The key role of calmness in effective handover processes	4 3 2 2
6) Suggestions for improving coordination and cooperation between the rescue service and the central emergency department to increase handover quality	1) Establishment of a central registration software 2) Introduction of rotational internships 3) Implementation of training and further education and expansion of specialist knowledge 4) Promotion of teamwork	6 5 4 2

Table 1: *Identified category system.*

The current quality of the handover process was rated by the test subjects with a school grade of 3.

Four of the test subjects identified the qualifications of the ambulance staff, the qualifications of the emergency department staff and the circumstances and framework conditions of the handover as the main factors influencing the current quality of the handover process. The lack of use of schemes, age and generational differences and interpersonal influences on handover quality were each named by two of the test subjects as important factors influencing the current quality of the handover process.

When asked about possible challenges and difficulties in the handover process, a lack of time, stress and high workload were considered particularly critical by eight of the respondents. Spatial and organizational challenges were mentioned by seven of the test subjects, while incorrect prioritization, patient condition, communication difficulties, interpersonal influences and lack of rest were each mentioned by two of the test subjects as possible challenges and difficulties in the handover process.

The use of standardized schemes and checklists was considered particularly relevant by eight of the subjects in the context of criteria and standards worthy of consideration to ensure quality. The need for a controlled environment and calmness received the attention of five of the respondents, while responsibilities and role clarity, appreciative communication, active listening and team presence and closed-loop communication were each mentioned by two of the respondents.

Structured communication through the use of tools, scores and checklists was highlighted by four of the respondents in relation to experiences and observations of best practice and successful approaches to improving quality in the handover process. Shock room management and interdisciplinary collaboration were mentioned by three of the subjects, while the implementation of effective pre-registration and the key role of calmness in effective handover processes were each mentioned by two of the subjects.

The establishment of central registration software was supported by six of the test subjects when asked about suggestions for improving coordination and cooperation between the ambulance service and the central emergency department in order to increase handover quality. The introduction of rotational internships was mentioned by five of the test subjects, while the implementation of training and further education and the expansion of specialist knowledge were each approved by four of the test subjects. The promotion of teamwork was mentioned by two of the test subjects.

In summary, it can be stated that the current quality of the handover process from ambulance staff to the nursing staff in the central emergency department can be assessed as satisfactory. Structured communication through the use of tools, scores and checklists, shock room management and interdisciplinary collaboration, the implementation of effective pre-registration and the key role of calmness in effective handover processes were identified as measures to sustainably improve the quality of this handover process.

Criticism and Limitations of the Study

As the sample size of the study is only 10 subjects, the results are not representative and cannot be generalized. For future studies on this topic, a larger sample should be selected or more subjects should be recruited for expert interviews. With regard to content analysis according to Mayring (2015), reliability can be increased by using a standardized analysis process and by using several coders [14]. By using a standardized analysis process in which clearly defined categories and coding rules are established, it can be ensured that the analysis is carried out in a reproducible manner and that the results are comparable. If the study is expanded in the future, the interview guide used could be used to ensure that the interviews are conducted in a reproducible manner and that the results are comparable. By selecting test subjects who have the relevant knowledge and experience, it was possible to ensure that the findings obtained are valid.

Conclusion and Outlook

There is clear potential for improvement in the current handover quality at the interface between the ambulance service and the emergency department. The study results emphasize the ongoing complexity of this handover process. An integrated strategic approach based on training, clear protocols and interdisciplinary collaboration could improve the quality of this process. An in-depth consideration of this strategic approach in future research could help to provide practical insights for the continuous improvement of this critical interface.

The results of the study highlight the ongoing complexity of the handover process at the ambulance - emergency department interface. They suggest that an integrated strategic approach could improve the quality of this process. Future research must help to identify practice-relevant findings for the continuous improvement of this interface.

Key Messages

- Optimizing the ambulance-emergency department interface is critical to the safety and quality of overall care for emergency patients [6].
- The handover process in healthcare is a crucial step that requires effective communication and collaboration between different stakeholders to ensure continuity of patient care [1].
- The effectiveness of handover is significantly reduced if it is not carried out according to standardized procedures and little attention is paid to the content of information transfer [7].
- When comparing the training concepts and schemes with the current literature, it becomes clear that none of them can be considered a traditional handover scheme for the ambulance-emergency department interface in the conventional sense [5].

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