



# Paramedics' Experiences of Structured Documentation in the Finnish KEJO Electronic Patient Care Record: A Qualitative Survey Study

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**Abstract:** Structured documentation in electronic patient care records is intended to improve the consistency, retrievability and continuity of clinical information. In emergency medical services, however, documentation is performed in mobile, time-critical and clinically complex environments, which places specific demands on system usability and workflow compatibility. This study describes paramedics' experiences of structured documentation in the KEJO electronic patient care record, the national electronic patient care record used in Finnish emergency medical services. The study was conducted as a cross-sectional survey with a qualitative emphasis. Data were collected in spring 2024 using an anonymous Webropol questionnaire distributed to paramedics working in operational field duties within Oulu University Hospital Emergency Medical Services in Finland. A total of 137 paramedics responded. This article focuses on open-ended responses, which were analysed using inductive content analysis. The findings show that structured documentation in the KEJO electronic patient care record was experienced as challenging particularly because of usability problems, fragmented documentation views, technical slowness and limitations in structured data fields. Respondents described the documentation process as slow, illogical and insufficiently flexible for prehospital care. These challenges were perceived to increase workload, reduce the clarity of documented information and make it more difficult to record clinically relevant details. Shortcomings were also identified in the timing, content and practical implementation of user training. The findings suggest that the further development of the KEJO electronic patient care record should prioritise user-centred design, workflow compatibility, technical reliability and case-based training to better support information continuity, paramedic workflow and patient safety.

**Keywords:** emergency medical services, electronic patient care record, KEJO, structured documentation, usability, user experiences.

## INTRODUCTION

Structured patient documentation is a central component of health information management. Standardised documentation structures can support the consistency, retrievability and usability of clinical information across different phases of patient care. They may also support continuity of care, quality management, leadership and secondary use of clinical data for research and service development [1,2]. However, the benefits of structured documentation depend not only on the data model itself but also on how well the documentation system supports clinical work, professional judgement and information transfer in practice.

In emergency medical services (EMS), the requirements for documentation are particularly demanding. Patient information must often be recorded in mobile, time-critical and unpredictable environments, where assessment, treatment, communication and documentation occur simultaneously. Paramedics need to document the patient's condition, clinical findings, interventions and response to treatment while maintaining situational awareness and prioritising direct patient care. These documentation demands occur in a professional context already characterised by high workload, emotional strain, performance expectations and uncertainty, all of which have been identified as important job demands in Finnish EMS [3]. Occupational stressors among EMS providers may also affect wellbeing and professional practice, which further underlines the importance of documentation systems that minimise unnecessary cognitive and operational burden [4,5]. Therefore, electronic patient care records used in EMS must support both structured data entry and the practical workflow of prehospital clinicians [6,7].

In Finland, the national electronic patient care record used in EMS is implemented through KEJO, a shared field information system used by several Finnish security and public authorities. In the EMS context, KEJO provides the electronic patient care record for prehospital patient documentation. The record is stored in the national Kanta Services, which form the nationwide infrastructure for the secure storage and sharing of social welfare and healthcare data. Through the Patient Data Repository, electronic patient data can be made available to healthcare providers and to patients through the OmaKanta online service [8,9].

The data content of the KEJO electronic patient care record is based on the international NEMSIS standard, which has been adapted to Finnish national requirements and the local EMS context. NEMSIS provides a nationally standardised EMS data structure in the United States [10]. The NEMSIS Public-Release Research Dataset has also been used to support large-scale EMS data collection, assessment of data completeness and research use [11]. In the Finnish KEJO context, this standardisation aims to improve data comparability, continuity of information, secondary use and system-level development in EMS [8].

International research suggests that electronic patient care records in EMS can improve information availability, support care coordination and facilitate information transfer between EMS and other parts of the healthcare system [6,7]. At the same time, electronic documentation systems may introduce new usability and workflow-related challenges. Previous studies have reported that poorly aligned electronic health record systems can increase cognitive workload, fragment clinical workflow, create documentation delays and lead to workarounds when system structures do not adequately reflect clinical practice [12,13]. More broadly, usability problems in electronic health records have been associated with potential risks to patient safety, particularly when essential information is difficult to enter, retrieve or interpret during care [14].

The tension between standardisation and clinical flexibility is especially relevant in prehospital care. Structured documentation can improve consistency and enable the secondary use of data, but overly rigid structures may limit the ability to describe clinically relevant nuances in complex or rapidly changing patient situations [2,12]. In EMS, this may be particularly problematic because documentation must support not only later data use but also immediate decision-making, consultation, handover and continuity of care.

Consequently, user-centred evidence is needed to understand how structured electronic documentation systems function in real prehospital workflows.

Although electronic patient care records and structured documentation have been studied internationally, less is known about paramedics' experiences of structured documentation in the Finnish KEJO electronic patient care record. This knowledge is important because KEJO represents a nationally standardised documentation environment that must support clinical EMS work, information transfer, patient safety and the secondary use of prehospital data. The purpose of this study was to describe paramedics' experiences of structured documentation in the KEJO electronic patient care record. The aim was to identify usability-related, content-related and training-related development needs in structured prehospital documentation.

### **AIM AND RESEARCH QUESTIONS**

The purpose of this study was to describe paramedics' experiences of structured documentation in the KEJO electronic patient care record. The aim was to identify usability-related, content-related and training-related development needs in structured prehospital documentation.

The research questions were:

1. What challenges do paramedics identify in structured documentation within the KEJO electronic patient care record?
2. What development needs do paramedics describe regarding usability, documentation content and training?

### **METHODS**

#### **Study Design**

This study used a cross-sectional survey design with a qualitative emphasis. The purpose was to explore paramedics' experiences of structured patient documentation in the KEJO electronic patient care record. Although the questionnaire included both structured and open-ended items, this article focuses primarily on the qualitative data derived from the open-ended responses. Quantitative background variables were used to describe the respondent group.

#### **Setting and Participants**

The study was conducted in Oulu University Hospital Emergency Medical Services in Finland. In the Finnish EMS system, emergency medical services are organised regionally by wellbeing services counties and provided as part of the public healthcare system. The target population consisted of permanent employees and temporary employees with a contract of at least three months who worked in operational field duties and had started using the KEJO electronic patient care record during 2023. In total, 450 eligible employees were invited to participate.

## Questionnaire Development

The questionnaire was developed on the basis of previous international literature, the Finnish national documentation guide for emergency medical services, previous national work on the content and structure of the electronic patient care record, and informal expert consultations [6,7,8,9,13]. Open-ended questions were included to complement the closed-ended items and to allow respondents to describe experiences, concerns and development suggestions that might not have been captured by predefined response options [15]. Expert input was obtained from an EMS working group that included a development coordinator, a supervisor, a health information system specialist and a key user of the system. These consultations highlighted issues related to system usability, fragmented documentation views, limitations of structured documentation in complex clinical situations, documentation burden during urgent missions, and shortcomings in the content and timing of training. Based on these themes, two open-ended questions were included in the survey: one question presented to all respondents concerning additional training needs and one conditional question presented only to respondents who reported that they experienced structured documentation as challenging. The questionnaire was pilot tested with eight paramedics. After the pilot test, minor revisions were made to the wording of the questions and the character limits of the open-ended items. Combining literature-based development, expert input and pilot testing was intended to support the content validity of the questionnaire by improving the relevance, comprehensiveness and comprehensibility of the items in the EMS context [16].

## Data Collection

Data were collected between 23 February and 8 March 2024 using an anonymous electronic questionnaire administered through Webropol. The questionnaire link was distributed by email together with an invitation letter, and one reminder was sent halfway through the response period. The administration and reporting of the web-based survey were guided by CHERRIES principles to support transparency in survey reporting [17]. The final questionnaire included four background variables: sex, age, education and previously used patient record system. Age was categorised into five groups: younger than 25 years, 25-35 years, 36-45 years, 46-55 years and older than 56 years. The questionnaire also included Likert-scale items and two open-ended questions. The first open-ended question was presented to all respondents and asked what kind of additional training they would have needed for the use of the KEJO electronic patient care record. The second open-ended question was conditional and was shown only to respondents who agreed with the statement “I experience structured documentation as challenging”; these respondents were asked to explain why. A total of 137 paramedics responded to the survey, corresponding to a response rate of 30.4%. All respondents answered the open-ended question concerning training needs. The conditional open-ended question was presented to 89 respondents (65.0%), and all of them answered it.

## Data Analysis

The background variables were analysed descriptively using IBM SPSS Statistics for Windows, version 28. Frequencies and percentages were used to summarise respondent characteristics.

The qualitative data consisted of responses to the two open-ended questions and were analysed using inductive content analysis. First, all responses were read several times to gain an overall understanding of the data. Meaning units relevant to the study aim were then identified and condensed while preserving their core meaning. Similar condensed expressions were coded and grouped into subcategories. These subcategories were further organised into generic categories and main categories describing the challenges and development needs related to structured patient documentation in the KEJO electronic patient care record.

Initial coding was conducted by one researcher and subsequently reviewed by a second researcher. The second researcher reviewed the coding structure, category formation and interpretation of the data. Differences in interpretation were discussed until consensus was reached. The analysis was conducted manually using Microsoft Word to organise meaning units, condensed expressions, codes and categories. The final category structure, including subcategories, generic categories and main categories, is presented in Tables 2 and 3.

### Ethical Considerations

Research permission was obtained from the Wellbeing Services County of North Ostrobothnia before data collection. Formal ethical review was not required because the study involved adult healthcare professionals, participation was voluntary, the data were collected through a fully anonymous online questionnaire, and no identifiable personal data were collected. The invitation letter informed potential participants about the purpose of the study, voluntary participation, anonymity and the use of the data for research purposes. Completion of the questionnaire was taken to indicate informed consent to participate. The study was conducted in accordance with the principles of good scientific practice and the Finnish national ethical principles for human sciences research [18,19].

## RESULTS

### Respondent Characteristics

A total of 137 paramedics participated in the study, corresponding to a response rate of 30.4%. Respondent characteristics are presented in Table 1. The largest age group was 25-35 years (42.3%), and most respondents were paramedics or nurses with an additional 30-credit advanced-level EMS qualification (79.6%). The previously used patient record systems were mainly Codea (54.7%) and Merlot Medi (44.5%).

**Table 1: Respondent characteristics (N = 137)**

Variable	Category	n (%)
Gender	Male	69 (50.4)
	Female	66 (48.2)
	Other	2 (1.5)
Age group	<25 years	8 (5.8)
	25-35 years	58 (42.3)
	36-45 years	50 (36.5)
	46-55 years	16 (11.7)

	>56 years	5 (3.6)
Education	Paramedic or nurse with an additional 30-credit advanced-level EMS qualification	109 (79.6)
	Practical nurse or ambulance attendant	20 (14.6)
	Registered nurse	8 (5.8)
Previously used patient record system	Codea (sv210)	75 (54.7)
	Merlot Medi	61 (44.5)
	Other	1 (0.7)

Note: In this study, paramedic refers to Finnish advanced-level EMS personnel. The 30-credit advanced-level EMS qualification refers to additional Finnish EMS education for registered nurses working at advanced life support level.

## Overview of the Qualitative Findings

The qualitative data derived from the open-ended responses were organised into two main categories: challenges in structured documentation within the KEJO electronic patient care record and training needs and development recommendations related to the KEJO electronic patient care record.

**Table 2: Challenges of structured documentation in the KEJO electronic patient care record**

Sub-categories	Generic category	Main category
Unclear documentation	Patient safety concerns	Challenges in structured documentation within the KEJO electronic patient care record
Paramedics' workload and stress		
Limitations of structured documentation	Usability and structural limitations	
Confusing user interface		
Slow and cumbersome documentation process		
Lack of training or orientation	Technical and implementation-related barriers	
Technical problems		

**Table 3: Training needs and development recommendations related to the KEJO electronic patient care record**

Sub-categories	Generic category	Main category
The importance of timing	Timing and opportunities for hands-on practice	Training needs and development recommendations for the KEJO electronic patient care record
Hands-on training and simulations		
Content-related priorities	Training content and teaching methods	
Guidelines and teaching methods		
System immaturity	System-related challenges	
No perceived need for training		

The first main category, challenges in structured documentation, consisted of three generic categories: patient safety concerns, usability and structural limitations, and technical and implementation-related barriers (Table 2). The second main category, training needs and development recommendations, consisted of three generic categories: timing and opportunities for hands-on practice, training content and teaching methods, and system-related challenges (Table 3).

## Challenges in Structured Documentation

The first main category describes the challenges that respondents identified in structured documentation within the KEJO electronic patient care record. These challenges were related to patient safety concerns, usability and structural limitations, and technical and implementation-related barriers. Although these categories are presented separately, respondents' descriptions often showed that usability problems, documentation burden, technical issues and insufficient orientation were closely connected in everyday prehospital work.

### *Patient Safety Concerns*

Patient safety concerns were related to unclear documentation and the workload and stress experienced by paramedics during documentation. Respondents described that the structured format did not always allow them to document clinically relevant information in a sufficiently clear or nuanced way. In their view, this could make the interpretation of patient information more difficult during further care and reduce the usefulness of the patient care record in supporting continuity of care.

One respondent described the challenge of documenting neurological findings in a structured format:

*"...When assessing neurological status, it would be important to document how pain is elicited and describe verbally how the patient reacts. A checkbox 'no' does not provide much prior information for patient care, and this is a major challenge especially for neurologists in further treatment..."*  
(Respondent 18)

Respondents also associated unclear documentation structures and excessive searching with increased workload. Documentation was described as taking attention away from direct patient care, especially when the system was perceived as illogical or cumbersome:

*"Illogical. Too much work and searching, calls take longer and it gets on your nerves. Poor and badly functioning boxes. Patient safety is compromised. Documentation should be as simple as possible, and the focus should be on patient care!"* (Respondent 29)

Overall, the respondents' accounts suggest that patient safety concerns were not only related to the content of documentation but also to the cognitive and practical burden created by the documentation process. When essential information was difficult to enter, retrieve or express accurately, respondents perceived that this could weaken the clarity and clinical usefulness of the patient care record.

### *Usability and Structural Limitations*

Usability and structural limitations were related to the way in which the KEJO electronic patient care record organised information and guided the documentation process. Respondents described the system as unintuitive, fragmented and time-consuming. In particular, they perceived that clinically relevant information was distributed across

multiple views, which made documentation and later information retrieval difficult during prehospital work.

Several respondents considered the structured format too rigid for complex clinical situations. They described that predefined fields and documentation pathways did not always support the logical description of the patient's condition, clinical findings, treatment and response to treatment. Some respondents felt that free-text documentation would allow them to describe the patient's condition more clearly and in a more clinically meaningful order:

*“The order is illogical; you always have to search for where to document each item. It requires workarounds and still wastes time. It would be easier, clearer, and faster to document using free text, for example in the ‘condition on encounter’ section, starting from breath sounds and describing the findings. It also helps in consultation and when giving a report, as the patient record follows a logical order: personal details, incident information, condition on encounter/findings, treatment, response to treatment, and outcome.”(Respondent 76)*

The user interface was also described as fragmented, with too many separate windows, clicks and sections. Respondents reported that this made documentation slower and encouraged selective use of the system rather than comprehensive structured documentation:

*“Too many different places to click and write; that’s why I only use two sections: background information and condition on encounter.” (Respondent 14)*

Respondents also described the documentation process as slow and cumbersome. Information needed for reporting or reviewing the patient record was not always easily accessible, and respondents felt that the system did not sufficiently support common documentation and communication practices used in emergency care:

*“Structured documentation does not support paramedics when reviewing the report afterwards. KEJO does not provide FPSS and NEXUS scores in a practical way. The ISBAR structure cannot be applied through structured documentation to facilitate reporting and readability. Retrieving measurements takes 1-5 minutes per measurement. During this time, you cannot document.” (Respondent 99)*

Overall, usability and structural limitations were described as reducing the fluency of documentation and weakening the fit between the electronic patient care record and the practical workflow of prehospital care. Respondents' accounts suggest that the structured format was not experienced as problematic only because it required more documentation, but because it did not always follow the clinical logic of assessment, treatment, reporting and continuity of care.

### ***Technical and Implementation-related Barriers***

Technical and implementation-related barriers were related to system performance, technical reliability and insufficient orientation during implementation. Respondents

described that structured documentation was difficult to use effectively when the system was slow, technically unstable or when users had not received sufficient and timely orientation before using the system in operational field duties.

Lack of training or orientation was described as one factor that made the use of structured documentation more difficult in practice. Some respondents reported that no sufficient orientation had been provided, while others felt that training had been poorly timed or difficult to apply when actual system use began later:

*“No training or orientation on the subject has been provided.” (Respondent 26)*

*“The in-person training was given almost a year before implementation. The online training contains an overwhelming amount of material that should be absorbed.” (Respondent 37)*

Technical problems were also described as a major barrier to fluent documentation. Respondents reported system slowness, malfunctions and irrelevant or poorly functioning features that made documentation more laborious. In their accounts, these problems diverted attention from patient care to managing the system itself:

*“Slow. Laborious. Illogical. Technical problems. You end up treating the system instead of the patient. Lots of unnecessary features...” (Respondent 7)*

One respondent described technical problems as particularly problematic during emergency missions, where documentation and patient care must be managed simultaneously:

*“The technical problems are massive. Extremely slow, especially with emergency patients (you treat the system, not the patient). A huge number of unnecessary menus and functions... There is an enormous amount of typing, searching for the correct documentation fields, adjusting timestamps, and frustration...” (Respondent 40)*

Overall, technical and implementation-related barriers were experienced as reducing the usability of structured documentation and increasing the practical burden of documentation in prehospital work. These findings suggest that the successful use of structured documentation depends not only on the documentation structure itself but also on technical reliability, timely orientation and implementation support.

### **Training Needs and Development Recommendations**

The second main category describes respondents' views on training needs and development recommendations related to the KEJO electronic patient care record.

These findings were based primarily on responses to the open-ended question concerning what kind of additional training respondents would have needed. The responses concerned the timing of training, opportunities for hands-on practice, training content and methods, and the need to improve the system itself as a prerequisite for effective training.

### ***Timing and Opportunities for Hands-On Practice***

Timing and opportunities for hands-on practice were central in respondents' descriptions of training needs. Respondents reported that training was less useful when it was provided too early before implementation or too late after the system had already been introduced into operational use. In their view, training should be closely connected to the actual start of system use and based on the version of the software used in practice.

*“More concrete training, rather than theory. Training closer to implementation and using the latest software version.” (Respondent 2)*

Some respondents described that a long delay between training and system implementation made it difficult to remember the details of structured documentation when the system was later used in real EMS missions:

*“...Too long a gap before starting to use KEJO. It is impossible to learn and remember every detail and where to document everything in a single day.” (Respondent 46)*

Respondents also emphasised the importance of practical exercises and simulations. They described a need for concrete opportunities to practise structured documentation before using the system in operational field duties:

*“More practical instruction on how to use structured documentation.” (Respondent 82)*

Overall, respondents considered training most useful when it was timely, practical and closely connected to real documentation situations. The findings suggest that hands-on practice and scenario-based exercises may be important for supporting the adoption of structured documentation in prehospital care.

### ***Training Content and Teaching Methods***

Training content and teaching methods were described as important for supporting consistent and clinically meaningful use of the KEJO electronic patient care record. Respondents emphasised the need for concrete guidance on how structured documentation should be completed in different types of EMS missions and patient situations. In particular, they highlighted the need for examples related to common recurring conditions, problem situations and the use of X-codes.

*“Preparation for problem situations. Use of structured documentation, for example in cases of general deterioration and other minor common conditions.” (Respondent 64)*

Some respondents described a need for more detailed instruction on specific documentation practices, including which sections of the patient care record should be completed in different situations. Case-based tasks were considered useful because they would allow users to practise documentation in a way that resembles real prehospital work:

*“More case-based tasks to be documented in KEJO and clear information on which sections must be completed.” (Respondent 127)*

Respondents also referred to the need to process and document complete EMS missions during training. This suggests that training should not focus only on isolated technical functions, but also on the documentation of whole patient care processes from assessment to treatment, reporting and outcome:

*“Processing tasks and documenting them.” (Respondent 92)*

Overall, respondents’ descriptions suggest that training should be practical, case-based and focused on the clinical logic of documentation. In addition to technical system use, training should support shared documentation practices and clarify how structured fields should be applied in common and complex prehospital situations.

### **System-related Challenges**

System-related challenges were described as factors that limited the perceived usefulness of additional training. Some respondents considered that the main problems were not related to users’ competence, but to the technical and functional maturity, usability and logical structure of the KEJO electronic patient care record. From this perspective, further training alone was not seen as sufficient if the system itself did not adequately support prehospital documentation.

Several respondents emphasised that the system should be developed before or alongside additional user training. They described the system as unfinished, illogical or difficult to use in operational field duties:

*“No training would have been sufficient for the implementation of a completely unfinished system. Using a system like KEJO is a risk to patient safety.” (Respondent 98)*

Some respondents did not identify a need for more training, but instead argued that the system itself should be improved:

*“There was no need for additional training. The KEJO system itself should simply be better before implementation.” (Respondent 73)*

Overall, these responses suggest that training needs and system development needs were closely connected. While respondents identified a need for more timely, practical and case-based training, they also indicated that training cannot fully compensate for usability problems, technical limitations or documentation structures that do not fit the workflow of prehospital care. Therefore, effective implementation of structured documentation requires both user training and user-centred system development.

Taken together, the findings indicate that the challenges associated with structured documentation in the KEJO electronic patient care record were multidimensional. Respondents described difficulties related to patient safety concerns, usability and structural limitations, technical and implementation-related barriers, and the timing and content of training. Although additional training was considered important, the responses also suggest that training alone cannot fully address the identified challenges if the system’s usability, technical reliability and documentation structures do not adequately support the workflow of prehospital care.

## **DISCUSSION**

### **Main Findings**

This study explored paramedics' experiences of structured documentation in the Finnish KEJO electronic patient care record. The findings show that the challenges associated with structured documentation were multidimensional and related to patient safety concerns, usability and structural limitations, technical and implementation-related barriers, and training needs. Respondents described the documentation process as slow, fragmented and insufficiently flexible for the clinical realities of prehospital care. Although additional training was considered important, the findings also suggest that training alone cannot fully address the identified challenges if system usability, technical reliability and documentation structures do not adequately support the workflow of emergency medical services.

The findings indicate that the main challenges were not limited to individual users' competence. Instead, respondents' descriptions emphasised the interaction between the documentation system, the prehospital work environment and the implementation process. This is important because structured documentation in EMS must support not only retrospective data recording but also real-time clinical work, handover, consultation and continuity of care.

### **Findings in Relation to Previous Research**

The results are consistent with previous research showing that structured and standardised documentation can improve the quality, consistency and secondary use of clinical information, but that its benefits depend on successful implementation and usability in clinical practice [1,2]. In this study, respondents recognised the importance of documentation but experienced the structured format and system design as insufficiently aligned with the practical demands of prehospital work.

Previous studies on electronic patient care records in EMS have reported that electronic documentation can improve information availability, support care coordination and facilitate information transfer between EMS and other parts of the healthcare system [6,7]. However, similar to the present findings, earlier studies and professional surveys have also identified usability problems, workflow disruption and documentation burden as important barriers to effective use of electronic patient care record systems in prehospital care [13,20-22]. The present study adds to this evidence by describing these challenges in the context of the Finnish KEJO electronic patient care record, a nationally standardised documentation environment.

The tension between standardisation and clinical flexibility was a central finding. Respondents described that structured fields did not always allow clinically relevant details to be documented clearly or in a logical order. This is consistent with previous research suggesting that overly rigid documentation structures may limit the ability to capture clinically meaningful nuance, even when standardisation improves the consistency of data recording [2,12]. In prehospital care, this tension is particularly important because documentation must support immediate clinical interpretation, consultation and handover in addition to later data use.

## Usability, Workflow and Cognitive Burden

Usability and workflow compatibility emerged as central issues in the respondents' descriptions. The system was experienced as fragmented, slow and unintuitive, and respondents reported that essential information was distributed across several views. These findings are consistent with previous evidence showing that electronic health record usability problems may increase cognitive load, cause frustration and contribute to potential patient safety risks when information is difficult to enter, retrieve or interpret during care [12,14].

The prehospital context makes these usability issues especially relevant. EMS documentation is often performed while clinicians are simultaneously assessing the patient, making treatment decisions, communicating with other professionals and preparing for transport or handover. Previous Finnish research has shown that paramedic work is characterised by high workload, emotional strain, performance expectations and uncertainty [3]. Occupational stressors among EMS providers may also affect wellbeing and professional practice [4,5]. In this context, documentation systems that require excessive searching, repeated navigation or workarounds may add to the cognitive and operational burden of prehospital care.

The respondents' patient safety concerns should be interpreted as perceived risks rather than objectively measured adverse events. Nevertheless, these concerns are important because they relate to the clarity, accessibility and clinical usefulness of patient information. Previous research has linked electronic health record usability issues with potential contributions to patient harm, particularly when essential information is difficult to enter, retrieve or interpret [14]. In this study, respondents described similar mechanisms: unclear documentation structures, fragmented information and technical slowness were perceived to weaken documentation quality and the usefulness of the patient care record in further care.

## Training and Implementation

Training and orientation were also important findings. Respondents described shortcomings in the timing, content and practical implementation of training. Training was perceived as less useful when it was delivered too early before implementation, too late after implementation, or based on content that did not sufficiently reflect real system use. These findings are consistent with earlier research showing that implementation of electronic documentation systems requires adequate training, leadership support and practical integration into everyday work [6,20,23].

The findings suggest that training should be timely, practical and case-based. Respondents emphasised the need to practice documentation through realistic EMS missions and common clinical scenarios. This indicates that training should not focus only on technical system functions, but also on how structured documentation supports clinical reasoning, reporting, consultation and continuity of care. Practice-oriented training may therefore help users understand not only where information should be entered, but also how structured documentation can be used meaningfully in patient care.

At the same time, the findings indicate that training cannot compensate for all system-related problems. Some respondents considered that the main barriers were related

to the maturity, usability and logical structure of the system itself. This suggests that user training and user-centred system development should be treated as complementary, not alternative, solutions. Effective implementation of structured documentation requires both competent users and a system that fits the clinical workflow of prehospital care.

### **Strengths and Limitations**

A strength of this study is that it provides empirical user-centred evidence from paramedics who had direct experience of using the KEJO electronic patient care record in operational field duties. The respondent group was relatively large for a qualitative survey study, and the open-ended responses enabled participants to describe their experiences and development suggestions in their own words. The use of inductive content analysis allowed the findings to be grounded in the respondents' descriptions. Credibility was supported by the respondents' direct experience of the phenomenon, and confirmability was strengthened by a transparent description of the analysis process and by involving a second researcher in reviewing the coding structure, category formation and interpretation of the data. However, the study also has limitations. The data were collected from one Finnish university hospital EMS area, which may limit transferability to other regions, organisations or countries. The response rate was 30.4%, and it is possible that paramedics with particularly strong positive or negative experiences were more likely to respond. The data were collected using open-ended survey questions rather than interviews, which limited the possibility to ask follow-up questions and explore respondents' experiences in greater depth. In addition, the KEJO electronic patient care record had been in use for a relatively short time, and user experiences may change as system familiarity, training and technical development progress.

The study describes respondents' experiences and perceptions. Therefore, the findings cannot be used to determine the objective impact of the KEJO electronic patient care record on patient safety, documentation quality or clinical outcomes. Future studies should combine user experience data with observational, technical and patient safety data to examine how structured prehospital documentation affects workflow, information continuity and quality of care over time.

### **Implications for Practice and Future Research**

The findings have practical implications for the further development and implementation of structured documentation in EMS. First, the usability of the KEJO electronic patient care record should be evaluated systematically from the perspective of prehospital workflow. Particular attention should be paid to the clarity of documentation pathways, the accessibility of essential information, the flexibility of structured fields and the reduction of unnecessary navigation. Second, training should be organised close to implementation and include hands-on practice with realistic EMS scenarios. Third, structured documentation should be developed in collaboration with end users to ensure that standardised data requirements do not undermine clinical expressiveness, reporting or continuity of care.

Future research should examine the long-term development of user experiences as the system matures and paramedics gain more experience. Further studies should also investigate how structured documentation affects information transfer between EMS and

emergency departments, documentation quality, patient safety and the secondary use of prehospital data. Comparative studies between different electronic patient care record systems could provide additional knowledge on which system features best support prehospital workflow and clinically meaningful documentation.

## **CONCLUSIONS**

This study shows that paramedics experienced structured documentation in the KEJO electronic patient care record as challenging, particularly because of usability problems, fragmented documentation views, technical slowness, limitations in structured data fields and insufficiently timed practical training. These challenges were perceived to increase workload, reduce the clarity of documented information and weaken the fit between the documentation system and the workflow of prehospital care.

The findings suggest that further development of the KEJO electronic patient care record should prioritise user-centred design, technical reliability, clearer documentation pathways and greater flexibility in structured documentation. Training should be timely, practical and case-based, but training alone cannot compensate for system-level usability problems. Future research should examine the long-term effects of structured prehospital documentation on workflow, information continuity, documentation quality and patient safety, particularly as national electronic patient care record systems continue to develop.

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