

An Analysis of the contributing factors to Paediatric Patient Safety Incidents in Emergency Departments

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Abstract

Aim

Patient safety incidents (PSI) are events that may or do cause unintended harm to patients. The ED is particularly susceptible to PSI. We explored the factors contributing to PSI involving paediatric patients in the ED, as they are a high-risk group.

Methods

A qualitative descriptive study was undertaken using the critical incident interview technique to explore paediatric PSIs in the ED. Interviews were coded using the Yorkshire Contributory Factor Framework (YCF) to guide the identification of causes using a deductive methodology. The YCF is an evidence based framework that describes five domains encompassing 19 potential contributory factors.

Results

In total, eight individuals participated, providing a total of 12 paediatric PSI. Analysis revealed 51 explanatory labels which mapped directly to the YCF contributory factors. The most common contributing factors included communication difficulties, deviations from policies and a busy ED.

Discussion

Multiple factors contribute to paediatric PSI in the ED. All contributing factors identified in this study are consistent with what has been discovered previously. However, certain factors such as deviation from protocol occurred more frequently than previously reported in the literature. Importantly, this study provides meaning and context to the domains and sub-factors of the YCF as it applies to paediatric care in the ED.

Introduction

Hospitals are high-risk organizations. The rate of adverse events (AE) in adult hospitalized patients is reported as between 3-12%^{1, 2}. AE are classified as events where harm is caused to a patient as a result of medical management and not due to the underlying disease¹.

Emergency Departments serve the needs of large numbers of patients who present with undifferentiated medical conditions or injuries. This can result in the Emergency Department (ED) being a high-risk location. The majority of studies focusing on AE in the ED look at adult only departments. Staff shortages, overcrowding and distractions have been highlighted as contributing factors to AE in the ED³⁻⁵.

Within the ED, children seen there are a high-risk group as they may be unable to communicate their complaint, require weight-based medication dosing and their physiology can affect their presentation. Medication errors, diagnostic issues and management issues are the most common AE to affect the paediatric population^{6, 7}.

Data exists on the factors that lead to AE in the ED⁸ but none focus on the paediatric population. Furthermore, evidence suggests that much can be learned from exploring not just AEs but also near miss events that *could have* led to harm to patients. Near miss events can be powerful indicators of major adverse events. Therefore the focus of this study is on Patient Safety Incidents (PSIs) which are events that could have or did lead to unintended or unanticipated harm to a patient during the provision of a health service^{9, 10}. The aim of this study was to identify the factors that lead to paediatric PSI in the ED.

Methods

A qualitative, descriptive research study was conducted and reported in accordance with the Standards for Reporting Qualitative Research¹¹. Ethical approval was obtained from the clinical research ethics committee in the participating hospital.

Participants were emergency medicine (EM) nurses or doctors or paediatric doctors who worked in the ED of a large Irish teaching hospital which had a mixed adult and paediatric ED. All participants had to have been involved in the PSI they discussed. This PSI did not have to have occurred in the hospital the study was undertaken in. Those excluded from the study were ED staff with less than 6 months of clinical experience.

Participants were recruited by convenience and judgement sampling. Convenience sampling involved emailing all healthcare staff in the ED and all paediatric doctors with an invitation to participate in the study. Judgement sampling involved an in-person invitation to participate to healthcare workers with over five years' experience working in an ED. The participant information

sheet advised participants to think about a specific PSI that they were involved in, that did or may have caused patient harm.

The critical incident technique (CIT) interview was used to elicit a detailed description of the healthcare workers' experience of the PSI and to explore potential contributory factors. This technique involves successive recounts of an event from the participants perspective and the use of probing questions to discover behavioural, attitudinal and cognitive precursors to the events¹².

In this case the focus of probing questions was to uncover the contributing factors to the PSI, using the categories of the Yorkshire Contributory Factor Framework (YCFF)¹³ as a guide. The YCFF is an evidence-based system for classifying the underlying contributory factors of healthcare adverse events¹³. Active failures are at the centre of the framework these are shown to be caused by four contributory factor domains (situational factors, local working conditions, latent organisational factors and latent external factors). There are also two general factors – communication systems and safety culture which are contributing factors that have an influence across the domains. In total the YCFF includes 19 separate contributory 'factors'.

Examples of probing questions asked include:

- a. Were there any issues with written or verbal communication in this situation?
- b. Are you aware of any policy in your department to deal with this presentation?
- c. Were there any aspects of the task that made it particularly difficult or challenging?

Interviews were conducted in-person or via Zoom by an EM doctor. Participants were asked to recount a PSI that they were involved in. Participants were reminded to anonymize the PSI so that no individuals were identifiable and only to discuss events that were reported through the incident reporting system in the hospital they worked in at the time. Data was collected between March-May 2022 and interviews lasted approximately 20 minutes. Interviews were recorded using an audio recorder on an iPhone and notes were taken.

The recording and field notes were used to create a case summary for each PSI. A case summary is a rich and ordered account of the incident and the details surrounding it. This was written on a password protected computer. Following this, the recording was deleted. Member-checking was used to increase study rigour whereby participants were invited to read the case summary to ensure they were represented accurately¹⁴.

Content analysis is a way of analyzing written, verbal and visual communication that has been used in many studies¹⁵. This study took a deductive content analysis approach which is where the analysis is guided by an earlier model or theory¹⁶. Here, the YCFF provided the structure for the analysis and this has also been done in other studies¹⁵

Each case summary was analyzed and statements that represented potential contributory factors were highlighted and labelled using the categories of the YCFF as the coding framework. To ensure rigour and trustworthiness of the data, content analysis was performed by two researchers from different professional backgrounds: MR (an EM doctor with an interest in patient safety) and AOD (a human factors psychologist). Cases were reviewed multiple times to ensure that all contributing factors were identified. Labels attributed by each researcher were compared, discrepancies were discussed and a final set of labels agreed. Researchers added additional explanatory labels which provided context and explanation to the YCFF domains and contributory factors.

Results

In total, eight participants (two paediatric EM nurses, one EM doctor and five paediatric doctors) were interviewed as part of this study providing a total of 12 PSI. All PSI discussed took place in hospitals in Ireland.

A total of 108 statements were highlighted and coded into the domains and sub factors of the YCFF (see Table 2). All of the statements were represented within the domains and sub-factors of the YCFF. Each statement was then given an explanatory label which describes the specific nature of the cause. In total 51 separate explanatory labels were created which map to the 19 subcategories of the YCFF. 18 labels corresponded to 'Situational factors', 14 to 'Organizational factors', 10 to 'Local working conditions', 8 to 'Communication & Culture' and one label to 'External factors'.

Table 1 provides the active failures that were identified per scenario. There was more than one active failure identified in some PSI. The most common failures seen were in relation to a diagnosis being delayed and patients not being monitored appropriately.

Table 1: Active failures identified

Active Failures		
Type of error	Definition	No. of PSI error occurred in
Medication error	Any error that occurred in relation to medication	
Prescribing	Errors in prescribing or the prescription	1
Diagnostic error	Error made in diagnosis	
Delayed	Diagnosis could have been or was unintentionally delayed	4
Wrong	Initial diagnosis made was incorrect	1
Test not performed	An investigation that should have occurred given the clinical context that didn't	2

Failure to monitor patient	Failure to check on a patients' condition	3
Failure to follow up on a result	Not following up on the result of an investigation	2
Incorrect labelling of samples	Mislabeling of blood or other samples	2

Table 2: YCFF domains, subfactors, explanatory labels & frequency of occurrence

YCFF Domain	Sub factor	Explanatory label	Frequency of occurrence (no. of times the label appeared in PSI)
Situational factor	Patient factor	Complex medical needs	1
Situational factor		Language barrier	1
Situational factor		Similar names	1
Situational factor	Individual factor	Inexperience with paediatric patients	4
Situational factor		New healthcare system	1
Situational factor		Advice not followed	1
Situational factor		Poor history taking	2
Situational factor		Uncomfortable with unwell child	1
Situational factor		Distracted	1
Situational factor		Rushing	2
Situational factor		Stress	1
Situational factor	Task characteristics	Painful procedure	2
Situational factor		Increased task difficulty	3
Situational factor		Weight based medication dosing	1
Situational factor	Team factor	Lack of patient centred care	3
Situational factor		Lack of respect by colleague	1
Situational factor		Lack of planning	3
Situational factor		Poor task delegation	1
Local working conditions	Lines of responsibility	Responsibility of triage	2

Local conditions	working		Poor supervision of senior over junior	3
			Lack of access to senior support	1
Local conditions	working	Staff workload	Increased ED workload	7
Local conditions	working		Delay in triage	3
Local conditions	working		Short-staffed	4
			Nursing staff busy	3
Local conditions	working	Supervision & leadership	Inappropriate task delegation	3
Local conditions	working	Management of staff & staffing levels	Lack of appropriately skilled nurse	2
Local conditions	working	Equipment & supplies	Equipment broken	2
			Equipment missing	2
Organizational factors		Physical environment	Noisy	1
Organizational factors			Crowded	1
			Inappropriate location	4
Organizational factors		Scheduling & management	bed No appropriate bed available	2
Organizational factors		Training & education	Lack of training	3
Organizational factors			Inappropriate triage	2
Organizational factors			Lack of recognition of a sick child	3
Organizational factors			No induction training	1

Organizational factors		Lack of clinical experience	2
Organizational factors	Support from central functions	Inappropriate clinical advice	2
		Delay in review of patient	1
Organizational factors	Policies and procedures	Deviation from protocol	7
		Departmental policy limitations	1
External factors	Design of equipment & supplies	Design of triage card	1
Communication systems		Poor communication between nurse & doctor	6
		Poor communication between nursing staff	1
		Delay in communication to doctor	1
		Unable to contact relevant person	5
		Poorly written notes	1
		Poor handover	1
		Communication difficulties with specialties	3
		Poor communication between doctor & patient	2

The 'situational factors' domain was identified as a contributing factor in all PSIs. Individual and team factors were noted multiple times throughout PSI to contribute to active failures. Stress, distraction and being rushed were all highlighted as individual factors - "*I was rushing as there was a lot of children to be seen*" (Int12), "*They had similar names and I was distracted (labelling blood bottles) which resulted in the error*" (Int9).

The 'local working conditions' domain was present in a large number of PSI. In particular, issues with staff workload appeared seven times throughout incidents - "*Department was full of children and was very busy*" (Int2), "*Department was busy with four resuscitation bays full and 25 patients to be seen in the morning*" (Int6).

13 labels fell under the domain of “Organizational factors’ with the most common issue surrounding policies and procedure. One incident involved a delay in care as policy regarding the handover of patients wasn’t followed - *“The patient hadn’t been handed over to the night staff and was waiting for a number of hours until it was realized”* (Int4). Another involved a deviation from the ED procedural sedation policy which stipulated that sedation procedures needed to take place in resus and a nurse had to be involved as part of the team, neither of which occurred. *“I didn’t know it (a sedation procedure) was occurring until I was asked to help as a complication had arose”* (Int11).

Communication deficiencies were seen in 7 incidents. This included poor communication between doctors and nurses, poor communication between ED doctors and specialties, scanty written notes and inadequate handover.

One doctor stated, *“I only became aware of this child and how sick they were when I passed by the cubicle and glanced in, no one had highlighted them to me”* (Int2). Another incident involved a long delay in a patient being reviewed because the patient hadn’t been handed over as per protocol and written documentation was lacking (Int4).

Overall, 51 explanatory labels were identified from 108 statements. Many labels are consistently seen across incidents such as ED overcrowding, deviation from protocol and communication difficulties. These 51 labels map onto the 19 contributory factors and five domains of the YCFF. The explanatory labels provide context and perspective to the contributory factors that are contained in the YCFF. These labels show the specific issues and problems that pertain to care for paediatric patients in the ED in the PSIs described in these interviews.

Discussion

This study aimed to discover the contributing factors to paediatric PSI in EDs. Our results highlighted multiple contributing factors and many of them are consistent with what has been seen in the literature previously. Factors such as increased workload, policy deviation, inappropriate advice and communication difficulties were shown to contribute to PSI. This study adds a unique perspective by focusing on paediatric care in the ED. It also provides context to help illuminate meaning to the 19 factors contained within the YCFF for paediatric care in the ED.

The YCFF provides broad categories of contributory factors to PSI. This study helps establish contributing factors to PSI in the paediatric ED while using the YCFF to categorize them. The value of knowing these specific causes is they can be focused on to bring about system change.

Communication difficulties were highlighted in this study. This included problems with both written and verbal communication between staff and with patients. From a patient perspective, issues with

communication cause huge distress and are one of the main reasons for complaints in the ED¹⁷. Ineffective communication between healthcare professionals is thought to be a leading causes of AE^{18, 19} and this study would support that finding. It occurs due to stress or hierarchical culture²⁰ and results in misunderstandings about a patient's condition, reduced quality of care and poor patient outcomes²¹.

In this study, individuals reported deviating from policies due to rushing, feeling under pressure because the department was busy and also reported not being aware that policies existed. Deviation or difficulties with hospital policy was a causative factor in half of the AE discussed which is higher than what is reported in the literature. It was a recognized factor in 3.0% of the studies looked at during the creation of the YCFF¹³. This highlights multiple other problems such as short staffing and lack of training and education. Generally, policies are put in place to help healthcare workers do their job more effectively – they should focus on managing medical conditions and medication safety²² but also look at healthcare working wellbeing, training and monitoring²³.

This study had a number of limitations. The sample size in the study is small and participants were recruited from one hospital which may mean the results lack generalizability.

Overall, multiple factors are known to contribute to PSI occurring; however, previous studies have failed to identify what factors lead to paediatric PSI in the ED occurring. In this study we identified the specific casual factors that are related to paediatric PSI occurring in the ED. The YCFF while a generic tool was suitable for categorizing the causes of paediatric PSI and this research supports the use of the YCFF when analysing PSIs involving paediatric patients in the ED. In addition, this study highlighted differences in the frequency of occurrence of certain factors such as issues surrounding policies and procedures compared to the current literature¹³ Further research on this area may be able to help with reducing the occurrence of paediatric PSI in the ED.

Declaration of Conflicts of Interest:

None declared.

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