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Title: An analysis of General Practitioners' perspectives on patient safety incidents using critical incident technique interviews

Running Header: GPs' patient safety incidents

Category: Health Services Research

Ciara Curran[a,c], Sinéad Lydon[b,c], Maureen E. Kelly[a], Andrew W. Murphy[a], Paul O'Connor[a,c,]

[a] Department of General Practice, School of Medicine, National University of Ireland, Galway, Galway, Ireland.

[b] School of Medicine, National University of Ireland, Galway, Galway, Ireland

[c] Irish Centre for Applied Patient Safety and Simulation, NUI Galway

Corresponding author: Dr. Paul O'Connor. Post: Department of General Practice, National University of Ireland, 1 Distillery Road, Co. Galway, Ireland. Email: paul.oconnor@nuigalway.ie. Telephone: + 353 91 49 2897

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KEY MESSAGES

- GPs have reported a difficulty in understanding how to improve patient safety.
- The approach taken allows for the identification of contributory factors to PSIs
- Identifying contributory factors to PSIs can help GPs address safety issues.

ABSTRACT

Background. General Practitioners (GPs) report difficulty in knowing what they can do to improve patient safety.

Objectives. To examine the utility of critical incident technique as a means to systematically analyse the contributory factors of patient safety incidents (PSIs) described by GPs by: i) collecting accounts of PSIs experienced by GPs; ii) identifying the contributory factors to these PSIs; iii) assessing the impact and likelihood of occurrence of these PSIs, and; iv) examining whether certain categories of contributory factors were associated with the occurrence of high-risk incidents..

Methods. Critical incident technique interviews were carried out with 30 GPs in Ireland about a PSI they had experienced. The Yorkshire Contributory Factors Framework was used to classify the contributory factors to PSIs described within the interviews. Seven subject matter experts (SMEs) rated the impact and likelihood of occurrence of each PSI.

Results. A total of 26 interviews were analysed. Almost two thirds of the PSIs were rated by the SMEs as having a major to extreme impact on the patient, and over a third were judged as having at least a bimonthly likelihood of occurrence. The most commonly described active failures were 'Medication Error' (34.6%) and 'Diagnostic Error' (30.77%). 'Situational Domain' was identified as a contributory domain in all

PSIs and within this domain ‘Service User Factors’ (84.6%) and ‘Task Characteristics’ (84.6%) were the most frequently identified contributory factors. ‘Communication’ breakdown at both practice and other healthcare-provider interfaces (69.2%) was also a commonly cited contributory factor. There was no significant difference in the level of risk associated with the different categories of contributory factors.

Conclusions. Critical incident technique interviews readily allow for the identification of contributory factors to PSIs. There is a need to explore the use of the resulting data for quality and safety improvement in general practice.

Key words. Critical incident technique; doctor-patient relationship; family practice; interviews; patient safety incidents; primary care.

BACKGROUND

It is estimated that 2-3% of all primary care consultations contain a patient safety incident (PSI)- defined as any unintended or unexpected incident(s) that could have or were judged to have led to patient harm (1). Given that 85% of all healthcare contacts occur in primary care (2), there is therefore a large potential for iatrogenic harm. Thus, there is a need to examine the contributory factors to PSIs in primary care, in order to improve the quality and safety of primary healthcare delivery.

PSI research in primary care has been dominated by analysis of data from reporting systems (3).These systems provide valuable data on threats to patient safety (4) However, they have limitations including: under-reporting of incidents (5); a failure to adequately capture the contributory factors that contribute to PSIs (6); the resources required for operation; and reluctance among many healthcare providers to report PSIs (7).

Although the data from reporting systems provides a broad overview of causes of a range of PSIs, it does not support providers to improve the specific safety issues they have in their own practices. Moreover, given that primary care providers have reported difficulty in understanding how best to improve patient safety in their practices (8), there is a need to consider how providers can be supported to reflect and learn from PSIs that have occurred within their own practice, and explore how latent factors (e.g., safety systems, policies) may have contributed (9).

The purpose of this paper is to examine the utility of critical incident technique (CIT) interviews as a means to systematically analyse the contributory factors of patient

safety incidents PSIs described by GPs. The specific objectives of this study were to: i) collect accounts of PSIs experienced by GPs; ii) identify the contributory factors to these PSIs; iii) assess the impact and likelihood of occurrence of these PSIs, and; iv) examine whether certain categories of contributory factors were associated with the occurrence of high-risk incidents.

METHODS

This qualitative narrative research study was conducted and reported in accordance with the Standards for Reporting Qualitative Research (11).

Setting and Ethical Approval

Ethical approval was obtained from the Irish College of General Practitioners' Research and Ethics Committee. Participants were GPs practicing in the Republic of Ireland.

Participants

Sampling was carried out using judgement (i.e., participants sought on the basis of their professional clinical experience in general practice) and snowballing (i.e., participants disseminated information on the study via word of mouth to colleagues who they considered would be able to usefully participate) methodologies to ensure adequate representation of the diversity of practicing Irish GPs in terms of age, position, gender and experience. Recruitment efforts were concentrated within the Western Research and Education Network (WestREN), which is broadly representative of the national profile of GPs in Ireland, and information on the study

was shared with GPs at continuing education events and the affiliated GP training scheme. However, the use of snowballing meant that information on the study was disseminated outside of the network. Participation required written informed consent, and was not incentivized.

GPs were invited by email to participate in the research project (*n*=35). Expressions of interest were received from 33 GPs, of which 30 ultimately participated (male *n*=14, female *n*=16); three GPs were not interviewed because of repeated logistical difficulties that precluded scheduling an interview time. The participants had qualified from medical school an average of 19.3 years prior (*SD*= 8.5) and spent an average of 12.65 years working as a general practitioner (*SD*= 10.2).

Interview Design and Procedure

Critical Incident Technique (CIT) interviews were used to elicit a detailed and rich description of GPs' lived experiences of PSIs, and to further explore potential contributory factors that emerged during the interview. The CIT interview is a type of cognitive interview used to identify tacit knowledge about specific events in a high-risk work environment (12). The CIT has been widely used in studies of human error and safety (12).

The CIT interview process does not include an interview schedule. Instead, the focus is on a participant's description of one specific incident and the interviewer works to enrich the initial detail by soliciting further information where necessary. There are four stages to the CIT interview process: (i) selecting an appropriate incident; (ii) developing a detailed description of specific events using probing questions to

understand the rationale; (iii) exploring cues and reasoning for the actions taken by team members; and (iv) identifying the root causes of the incident using a series of probing questions (12).

The probing questions were derived from the Yorkshire Contributory Factor Framework (YCFF), an evidence-based system for classifying the underlying contributory factors to PSIs occurring in healthcare (13). A contributory factor may be understood as any “influencing and causal factors” that contributed to a PSI occurring, and can vary in their significance, or strength, in terms of influencing the occurrence of the even and in their specificity, or whether they are unique to the PSI or occur commonly in a healthcare setting. Although a number of different frameworks to identify the latent causes of error exist, these rely on evidence from non-healthcare settings (14). The YCFF that was specifically developed on evidence collected from healthcare settings (14). It includes 20 factors divided across six domains (active failures, situational factors, local working conditions, latent/organisational factors, latent/external factors, and general factors). General Factors comprising of communication systems and safety culture. The two general factors can potentially interact with the other five domains (13). Examples of probing questions used include: "was there any features of this task (i.e. difficult, unfamiliar, monotonous) that made this incident more likely to happen?" and "on the day of the incident, how were you feeling prior to the incident (i.e. stressed, rushed, distracted, inexperienced)?".

Data Collection

Interviews were completed between September and December 2017. The interviewer was a female GP (CC). This allowed interviewees to feel comfortable disclosing PSIs given the shared understanding that existed. However, this may also have influenced the reflexivity of the interviewer who had their own prior experiences of PSIs and an interest in this area.

The interviews were conducted either in person (*n*=10) or via telephone (*n*=20) and were recorded using a digital audio recorder. The study information sheet that participants received read: "Prior to the interview you will be asked to think about a specific incident or incidents (as identified by you) in which you were involved with (while working) as a general practitioner, where you felt patient safety was, or had the potential to be compromised" and these instructions were repeated immediately prior to the interview in order to guide participants in their selection of an appropriate incident for discussion. Participants were also cautioned that they should anonymise the PSI described, and that they should not describe dangerous or negligent practices as interviewer confidentiality could not be guaranteed in such instances. Finally, participants were offered two examples of PSIs, these included a medication error and a failure to follow up on a blood test that resulted in a near miss.

Throughout the interview, the interviewer generated field notes relating to the PSI and these notes were relayed to the participants for further clarification or correction during the interview. This process allowed the events to be put into chronological order and repetitions omitted. These field notes also offered a useful platform to generate probing questions from and improve the richness and depth of the interview.

The mean duration of interviews was 24.5 minutes (*SD*=8.7). The interviewing continued until new categories, themes or explanations stopped emerging and data saturation had been reached.

Data Analysis

Of the thirty interviews collected, four were discarded from further analysis because the PSI did not originate in primary care environment (*n*=3) or the interviewee was not directly involved in the PSI (*n*=1). The unit of analysis was each of the remaining 26 scenarios.

The recording and field notes were used to develop a single, rich description of the PSI, essentially the "story" of the PSI which varied from 1-3 pages in length. In this way, the transcript was not verbatim but instead comprised a chronological account of the incident and included mention of any contributory factors that had arisen. This approach is typical of how CIT interviews are transcribed (12). The interviews descriptions were 'edited' into a standard format that was concise, clear and comparable across the interviews for content analysis.

Content Analysis

To address the potential issue with credibility arising from the interviews being conducted by a GP with an interest in patient safety, another researcher (POC; a human factors psychologist) read all of the interviews, and was an equal participant in the content analysis.No software was used to support the analysis and the researchers

annotated printed copies of each scenario as they worked through the content analysis process. The YCFF was used as the initial framework for classifying the factors that contributed to the PSIs. Although a protocol was published in 2015 describing an approach to adapting the YCFF for primary care based upon a systematic review, the adapted version of the YCFF (14) has yet to be published. Therefore, a deductive content analysis approach (15) was taken to analysing the interview data in order to make adaptions to the published YCFF (13).

It was found that the YCFF was appropriate for analysing the data, with only two adaptions required to classify the factors from identified in the CIT interviews: (i)'scheduling and bed management' was changed to 'scheduling'; and (ii) 'support from other departments' was changed to 'support from other service providers'.

In order to ensure the classifications were adequately internally homogenous and externally heterogenous, the factors and definitions were exemplified with sample behaviours extracted from the interview data. For each scenario, the two coders discussed each PSI and consensus was reached on the categorisation of the contributing factors for the incident.

Ratings of impact and likelihood

Seven subject matter experts (SMEs) rated the risk to patients associated with each of the 26 scenarios and the likelihood of other GPs encountering a similar scenario. SMEs were selected on the basis of their substantial clinical experience and an expressed interest in quality and safety in general practice. The SMEs were all

qualified GPs practicing in Ireland (*n*=4 male; *n*=3 female) with a mean of 14 years working as a GP (*SD*=9.18). Four served as GP principals in their practice (57.1%), two as GP assistants (28.6%) and one as a lecturer in general practice (14.3%).

Each PSI "story" was reduced in length to a half of a page summaru prior to distribution to the SMEs. The scenarios were presented to the SMEs in a random order. For each scenario, the SMEs rated the potential impact of the scenario on patient safety on a five point scale from 'negligible' [1] to 'extreme' [5], and the likelihood of other GPs encountering a similar scenario from 'rare/remote' [1] to 'almost certain' [5].

The 'impact' and 'likelihood of occurrence' ratings from each scenario were multiplied together to give an overall risk score. A risk rating of less than 5 was considered 'low risk', between 5 and 12 'medium risk' and greater than 12 'high risk'. The modal risk score of the seven SMEs was then calculated for each scenario. Fisher's exact test was utilized to compare the frequency with which the categories of contributing factors (i.e., latent organizational factors, local working conditions etc.) were identified based upon level of risk.

RESULTS

Participants

Scenarios contributed by 26 participants during CIT interviews were used during this study. Of these participants, 13 were female (50%) and 13 were male (50%). Twelve served as a principal GP in a practice (46.2%), 10 served as an assistant GP in a practice (38.5%), 3 served as locum GPs (11.5%), and 1 was a GP trainee (3.8%).

Mean years of since qualification as a GP was 12.6 (SD=10.2). Twenty-two (84.6%) of the participants were currently based within WestREN practices while four (15.4%) worked at practices elsewhere in the Republic of Ireland.

Content analysis

The description of the findings from the content analysis is described using the using the six contributory factor domains of the YCFF (active failures, situational factors, local working conditions, latent/organisational factors and latent/external factors, and general factors).

Active Failures. Table 1 outlines the initial active failure that led to the PSI in all of the included scenarios. Of the 26 scenarios, the most common failures identified included medication errors (*n*=9*;* 34.6%;) and diagnostic errors (*n*=8*;* 30.77%).

Table 1. Active Failures (*n*=26)

Types of Error	**Definitions**	**N=26**
Medication Error	Any error that occurred in the medication management system in primary care	9 (34.6%)
- Prescribing	Errors in prescription or prescribing	3 (11.54%)
- Dispensing	Dispensing error identified by GP or pharmacist prior to patient receipt of medication	2 (7.7%)
- Administration	Any deviation between medication as prescribed and that administered or potential adverse drug event due to patient errors during medication use	3 (11.54%)
- Monitoring	Medication not monitored in way that would be considered to be routine general practice	1 (3.84%)
Diagnostic Error	Error made in diagnosis	8 (30.77%)
- Missed	No diagnosis ever made	3 (11.54%)
- Delayed	Diagnosis was unintentionally delayed	2 (7.7%)
- Wrong	Another diagnosis was made before a correct one	3 (11.54%)

Failure to follow up on result	Failure to follow up on result of investigation (e.g. blood, histology, urine etc.)	6 (23.1%)
Patient non-compliance	Patient not following prescribed course of medication or treatment	2 (7.7%)
Failure to monitor patient	Failure to check on a patient's condition	1 (3.84%)

Table 2 provides definitions, and identified examples, of each the remaining five contributory factor domains of the YCFF (13). Specific examples for each factor, and illustrative quotes from the interviews, are provided in Supplementary Material 1.

Table 2. Contributing Factors to PSIs with identified examples.

FACTORS & DEFINITIONS	IDENTIFIED EXAMPLES
SITUATIONAL FACTORS (*n*=26, 100%)	
Service User Factors (*n*=22, 84.6%) Features of the patient that make caring for them more difficult and increase the likelihood of error.	Difficult Historian; Frequent Attender; 'Doctor-Shopper'; "Door-stepper"; Complex Medical History; Polypharmacy; Recently Discharged from Hospital; Paediatric Patient; Infrequent Attender; New or Unfamiliar Patient; Upset Patient; Language Barrier; Poor Access to GP
Task Characteristics (*n*=22, 84.6%) Specific patient-related tasks, which may increase the likelihood of error occurring.	Monotonous Task; Difficult Task; Unfamiliar Task
Individual Staff Factors (*n*=17, 65.4%) Characteristics of the person delivering care that may contribute in some way to active failure.	Stressed; Rushed; Distracted; Inexperienced; Isolated; Overconfident; Gatekeeper; Managing Patient Expectations
Team Factors (*n*=9, 34.6%) Any factor related to the working of different professionals within a group.	Delegation to Inappropriate Staff; Conflicting Team Goals
LOCAL WORKING CONDITIONS (*n*=14, 53.8%)	
Workload & Staffing Issues (*n*=11, 42.3%) Level of activity and pressures on time during shift.	High Unit Workload; Insufficient Staff; Staff Sickness
Leadership, Supervision & Role (*n*=9, 34.6%) The availability and quality of direct and local supervision and leadership.	Remote Supervision; Inappropriate Delegation; Unclear Responsibilities
Drug, Equipment & Supplies (*n*=5, 19.2%) Availability and functioning of drugs, equipment and supplies.	Inadequate Maintenance of Drugs; Unavailable Drugs; Equipment not Working or Available; Inappropriate Storage of Drugs or Equipment
LATENT ORGANISATIONAL FACTORS (*n*=21, 80.8%)	
Support from Other Service Providers (*n*=11, 42.3%) Availability and support from other service providers.	Lack of support from Laboratory; Lack of Support from Secondary Care Team (e.g., psychiatry, medical or surgical departments); Lack of Support from Pharmacy; Lack of Support from Primary Care Provider.
Scheduling (*n*=10, 38.5%) Appropriate scheduling to manage patient throughput, minimising delays and excessive workload.	"Walk-ins"; House-call Request; Emergency Department Referrals; Lack of Access to Secondary Care Teams
Local Policies or Protocols (*n*= 10, 38.5%) The existence of local formal and written guidance for the appropriate conduct of work tasks and processes.	No Protocol Existed; Protocol was too Complicated
Physical Environment (*n*=6, 23.1%) Features of the physical environment that hinder safe practice.	Unfamiliar Practice Set-up; Out-of-hours; Practice Location; Poor Set-up
Staff Training or Education (*n*=1, 3.8%) Access to correct, timely, and appropriate training.	Staff were not Trained to Perform the Task
LATENT/ EXTERNAL FACTORS (*n*=9, 34.6%)	
Design of Equipment, Supplies & Drugs (*n*=6, 23.1%) The design of equipment and supplies to overcome physical and performance limitations.	Similar Drug Names, but Different Dosages per Volume; Ambiguous Labelling and Packaging; Results from Laboratory which were Abnormal, but Were not Flagged in Red
National Policies (*n*=4, 15.4%) The existence of national formal and written guidance for the appropriate conduct of work tasks and processes.	National Guideline Protocol; Irish Government Drug Reimbursement Scheme (Government-funded incentive to Prescribe Generically)
GENERAL FACTORS (*n*=19, 73%)	
Communication (*n*=18, 69.2%) Effectiveness of the processes and systems in place for the exchange of information.	Poor Communication between Practice Staff; Poor Communication between Practice/Pharmacy; Poor Communication between Practice/Patient; Lack of Information in Patient Notes; Poor Communication between Primary-Secondary Care
Safety Culture (*n*=5, 19.2%) Organisational values, beliefs, and practices surrounding the management of safety and learning from error.	Poor attitude to risk management

Situational factors. The 'situational factors' domain was identified as a contributory factor in all scenarios (*n*=26, 100%; see Table 2). Within this domain, there were two commonly identified factors: 'service user factors' and 'task characteristics' (see Table 2). There were thirteen identified examples of 'Service User Factors'. These included both 'frequent attender'

"*patient was a frequent attender of Out-of-Hours Services and medical outpatients, which resulted in a lot of correspondence and prescriptions"*(GP6),

and 'infrequent attender',

"this patient was a frequent non-attender despite needing increased medical input because of his co-morbidities."(GP27).

For the 'task characteristic' factor, monotonous tasks were the most frequently identified factor.

"There are lots of minor abnormalities in blood tests. It is a monotonous task."(GP2).

Latent/organisational domain. This domain was also a commonly identified contributory factor and within this domain 'support from other providers' was the most frequently identified contributory factor (see Table 2). Examples of providers from which lack of support was noted include the laboratory, secondary care, community pharmacies and primary care. To illustrate,

"I was disappointed the pharmacy hadn't picked up on it"(GP14).

Latent external factors. The 'latent external factors' domain was the least frequently identified and encompasses external factors such as 'national policies' or the 'design of equipment, supplies or drugs' (see Table 2). To illustrate,

"the containers themselves are in similar looking and similar sized plastic bottles. Only from the front can the containers be identified as different"(GP13).

Local working conditions. The 'local working conditions' domain was identified in approximately half of the interviews (see Table 2). Within this domain, 'workload and staffing issues' was the most prevalent contributory factor. For example,

" (I) *see more than 40 patients per day…strong tradition of house calls at lunch…lunch consisted of a sandwich in the car"*(GP9).

General factors. Within the 'general factors' domain 'communication' was a commonly identified factor (see Table 2). Examples of poor communication were identified both within the practice and with other organisations (e.g. pharmacy), among practice staff, practice and pharmacy, practice and patient, practice and secondary care and also written communication in terms of medical records. To demonstrate,

"*notes were variable. It was difficult to see when the drugs were started and stopped and the reasons why"*(GP29).

Ratings of impact and likelihood

Inter-rater reliability between the seven SMEs was moderate (Cohen's kappa 0.57). The majority (62.6%) of PSIs were rated by subject matter experts as having a major to extreme impact on the patient (see Table 3). Almost a third of PSIs (30.87%) were rated as having a bimonthly or 75% probability of likelihood of occurrence (see Table 3).

The modal risk score was 'high' for eight of the scenarios, and 'medium' for 18 of the scenarios. None were judged to be 'low' risk. The frequency with which different categories of contributory factors were identified for high and medium-risk scenarios were compared via Fisher's exact test to ascertain if there were any differences. No significant differences emerged (i.e., all p's>.05).

Table 3. Distribution of subject matter expert ratings relating to the impact of incidents on patient safety and likelihood of occurrence in general practice.

Impact	Percentage (proportion of ratings)	Likelihood	Percentage (proportion of ratings)
Negligible (Adverse event leading to minor injury not requiring medical intervention; No impaired psychosocial functioning)	0.07% (12/182*)	**Rare/Remote** (Occurs >5 years or more; 1% probability)	0.01% (2/182)
Minor (Minor injury or illness, medical intervention required; impaired psychosocial functioning <1 month)	12.1% (22/182)	**Unlikely** (Occurs every 2-5 years; 10% probability)	0.1% (18/182)
Moderate (Significant injury requiring medical intervention or hospital stay or impaired psychosocial functioning >1 month; Impaired psychosocial functioning capacity > 6 months)	18.7% (34/182)	**Possible** (Occurs every 1-2 years; 50% probability)	51.6% (94/182)
Major (Major injuries or long term incapacity requiring medical treatment and or counseling; Permanent psychosocial functioning incapacity)	39.0% (71/182)	**Likely** (Bimonthly; 75% probability)	30.8% (56/182)
Extreme (Incident leading to death or major permanent incapacity)	23.6% (43/182)	**Almost Certain** (At least monthly, 99% probability)	0.07% (12/182)

*The denominator is derived from the 7 subject matter expert ratings for each of the 26 scenarios (total *n* for analysis= 182).

DISCUSSION

The purpose of this paper is to examine the utility of critical incident technique (CIT) interviews as a means to systematically analyse the contributory factors of patient safety incidents PSIs described by GPs . The resulting data elucidate the nature of PSIs occurring in primary care, indicate the factors that appear to commonly contribute to the occurrence of PSIs, and suggest that CIT interviews used in this manner may be of use in informing quality and safety improvement efforts.

Consistent with previous research, the most commonly identified active failures identified from the PSI interviews were medication and diagnostic errors (16). It has been recommended these types of errors should be addressed (16). However, there is a lack of awareness of the causes (5). Our study has identified many contributory factors to PSIs in primary care, which may offer educational opportunities and targets for the design and implementation of patient safety strategies to reduce avoidable patient harm. It is suggested this could be done at the level of a practice, or group/cluster of practices, by sharing the accounts, and analysis of these types of PSIs.

Primary care has become increasingly vulnerable to error due to the increasing complexity of patients (16). The most challenging patient factors identified in our study included treating 'new or unfamiliar patients'. Although an ongoing therapeutic relationship between patient and a specific GP has been shown to improve patient care (17), increasing patients visit multiple GPs either within the same practice or across different practices (18). Future research should explore the impact of continuity of care on patient safety.

Communication failures were a commonly described contributory factor to PSIs in our study. Communication between healthcare providers relies on accurate medical record-keeping or 'informational continuity'. However, accurate medical record is often given a low priority (19). Barriers to 'informational continuity' include GPs not recording information shared by patients in the medical records, which is often due to time pressures and patients not disclosing important details due to a lack of knowledge about what GPs perceive as important (20). Future research should focus

on the quality and methods of maintaining informational continuity from GPs' and patient's perspective in order to maximise consistent, coherent and safer patient care.

Scheduling of appointments was another commonly identified organisational contributory factor. Managing requests for 'same-day' appointments has been shown to be a significant cause of stress for GPs (21). Despite doctor fatigue increasing the potential for error (22), there is a paucity of research around "safe" levels of working. In Ireland, most GPs see 30 or more patients a day (24). There is an urgent need to balance patient expectations with research required to identify a realistic safe limit to individual GP workload in order to ensure delivery of high quality and safe patient care.

The data collected in this study suggests that CIT interviews- used in conjunction with a structure such as the YCFF- provide an approach for capturing, and understanding the less visible social processes of inquiry, investigation and improvement that unfold around incidents (25). Our study has demonstrated that, with minor adaptations, the YCFF can be adapted to identify the factors contributing to PSIs in primary care settings. It could provide a structured approach for primary care practices, and regulators, to investigate and learn from PSIs, as well as drawing comparisons between primary and secondary care. Future research exploring its use in the analysis of PSIs occurring in General Practice settings is warranted.

This study has provided useful data for better understanding the nature and causes of PSIs in general practice and future research might usefully establish whether this data is valuable in informing quality and safety improvement efforts.. The next stage is to

evaluate whether the information could be used by GPs to then identify strategies to improve patient safety (7). Prior research suggests that this is something that GPs are competently able to do once the issues have been identified (26,27). It is suggested that the approach to collecting and analysing CIT used in this paper could be used by GPs in a particular practice, or group of practices, to identify areas for improving safety. However, it is recognised that this study was conducted as a research project. There is a need to consider how our approach could be used as a quality improvement method within a specific GP practice, or group of practices. Some training and guidance would be required on how to conduct and analyse the CIT interviews. However, there is not a clearly identified model for how to train practice members carry out and analyse the CIT interviews (e.g. who should conduct the CIT, what triggers the need for a CIT, the willingness to share the findings from the CIT interviews). Therefore, there is a need to consider how to train GPs to use this approach, and evaluate whether the data led to improvements in patient safety in the practice.

A key strength of this study is the use of qualitative approach to allow for the elaboration of contextual contributing factors, rather than merely how often they occur- as is typically reported in incident monitoring systems that are commonly used in General Practice settings internationally (28).

However, a number of limitations should also be noted. The CIT interview could be criticized due to the potentially biased nature, of participants' reports. However, Macrae argues that although such biases are a weakness in terms of epidemiological measurement, they can be strengths in terms of safety management by allowing

specific issues to be subjected to increased scrutiny (29). There is also the potential for subjectivity in the reporting and analysis of the data. In order to address these potential issues, a rigorous approach was taken to both the data collection, and analysis. Since the CIT interviews were based on specific incidents as recalled by the GPs who participated, it is possible that they may not be representative of typical PSIs in primary care. However, the ratings of the likelihood of the PSIs by the SMEs would suggest that these are not atypical or uncommon occurrences.

CONCLUSION

Due to the large volume of primary care consultations there is considerable potential for iatrogenic harm. However, although GPs have expressed difficulty in identifying safety issues, once they have been uncovered, GPs are adept at addressing these issues. The approach described in the paper to identifying contributory factors to PSIs has the potential to provide GPs with the information they need to address the most common and most serious errors in their practice in order to maximise learning from these incidents and improve patient safety and quality of care.

Declarations/Acknowledgements

Ethical approval. Ethical approval was obtained from the Irish College of General Practitioners' Research and Ethics Committee.

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Conflict of interest. The authors report no conflict of interest.

REFERENCES

1. Panesar SS, deSilva D, Carson-Stevens A, *et al*. How safe is primary care? A systematic review *BMJ Qual Saf* 2016;25:544-553.

2. Hill AP, Freeman GK. Promoting continuity of care in general practice. London, UK: RCGP 2011.

3. Makeham M, Dovey S, Runciman W, *et al*. Methods and measures used in primary care patient safety research: results of a literature review on behalf of the methods and measures working group of the WHO world alliance for patient safety. Geneva, Switzerland: WHO; 2007.

4. Dovey, SM, Wallis KA. Incident reporting in primary care: epidemiology or culture change? *BMJ Qual Saf* 2011 20: 1001-3.

5. Elnitsky C, Nichols B, Palmer K. Are hospital incidents being reported? *J Nurs Admin* 1997; 27:40-46.

6. Vincent C, Neale G, Woloshynowych M. Adverse events in British hospitals: preliminary retrospective record review. *BMJ* 2001; 322: 1395.

7. O'Beirne M, Sterling PD, Zwicker K, *et al*. Safety incidents in family medicine. *BMJ Qual Saf* 2011;20:1005-10.

8. Samra R, Bottle A, Aylin P. Monitoring patient safety in primary care: an exploratory study using in-depth semistructured interviews. *BMJ Open* 2015;5:e008128.

9. Fischer G, Fetters MD, Munro AP, *et al*. Adverse events in primary care identified from a risk management database. *J Fam Pract* 1997; 45(1):40-6

10. Flin R, Winter J, Sarac C, *et al*. Human factors in patient safety: review of topics and tools. Geneva: World Health Organization, 2009.

11. O'Brien BC, Harris IB, Beckman TJ, *et al.* Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014; 89: 1245–1251.

12. O'Connor P, O'Dea A, Melton J. A methodology for identifying human error in US navy diving accidents. *Hum Fac* 2007; 49:214-26

13. Lawton R, McEachan RRC, Giles SJ*, et al.,* Development of an evidence-based framework of factors contributing to patient safety incidents in hospital settings: a systematic review. *BMJ Qual Saf* 2012;21:369-380.

14. Giles S, Panagioti M, Hernan A, *et al.* Contributory factors to patient safety incidents in primary care: protocol for a systematic review. *Systematic reviews* 2015;4(1):63.

15. Elo S, Kyngas H. The qualitative content analysis process. *J Adv Nurs* 2008; 62:107-15.

16. Ely J, Levinson W, Elder N, *et al*. Perceived causes of family physician errors. *J Fam Pract* 1995; *40*(4), 337-344.

17. Wallace E, Lowry J, Smith SM, *et al*. The epidemiology of malpractice claims in primary care: a systematic review. *BMJ Open* 2013; 3: e002929.

18. Levene L, Baker R, Walker N *et al*. Predicting declines in perceived relationship continuity using practice deprivation scores: a longitudinal study in primary care. *Br J Gen Pract* 2018; 68(671): e420-e426.

19. Freeman GF, Olesen F, Hjortdahl P *et al*. Continuity of care: an essential element of modern general practice? *Fam Pract,* 2003; 20(6): 623-7.

20. Abdelrahman W, Abdelmageed A. Medical record keeping: clarity, accuracy and timeliness are essential. *BMJ* 201; 348: f7716.

21. Agarwal G, Crooks VA. The nature of informational continuity of care in general practice. *Br J Gen Pract* 2008; 58(556): e17-e24.

22. Luthra M, Marshall MN. How do general practices manage requests from patients for ‘same day’ appointments? *Br J Gen Pract* 2001; 51(462): 39-41.

23. Kostopoulou O, Delaney B. Confidential reporting of patient safety in primary care: results from multilevel classification of cognitive and system factors. *Qual Saf Health Care* 2007; 16(2): 95-100.

24. Buckman L, Griffiths, M. Should GPs’ daily number of consultations be capped? *BMJ* 361: k1947.

25. Carson-Stevens A, Hibbert P, Avery A *et al*. A cross-sectional mixed methods study protocol to generate learning from patient safety incidents reported from general practice. *BMJ Open* 2015; 5: e009079.

26. Madden C, Lydon S, Cupples M, *et al.* The Safety in Primary Care (SAP-C) Study: A randomised, controlled feasibility study.

27. De Wet C, Black C, Luty S, *et al.* Implementation of the trigger review method in Scottish general practices: patient safety outcomes and potential for quality improvement. *BMJ Qual Saf* 2017;26 :335-42.

28. Bhasale AL, Miller GC, Reid SE *et al* .Analysing potential harm in Australian general practice: an incident-monitoring study. *Med J Aust* 1998; 169: 73-76.

29. Macrae C. The problem with incident reporting. *BMJ Qual Saf* 2016; 25: 71-7.