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Perceived effectiveness and attitudes of health professionals towards the Czech Incident Reporting System

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Abstract

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Aim: The major objective of this survey was to examine the perceived effectiveness of the incident reporting system in acute hospital settings in the Czech Republic. The second objective was to determine needs for change in the electronic system from the users (on managerial positions) perspective after five years of the initial system implementation.

Method: Cross-sectional descriptive survey was used and the questionnaire survey was undertaken. Statistical analysis was conducted using the IBM SPSS Statistics 22 (statistical significance a = 0.05) by nonparametrical tests (Mann-Whitney U test for two groups and Kruskal-Wallis H test for more than two groups). Reliability of Likert scales was tested by Cronbach´s alpha coefficient.

Results: In total, 64 respondents (healthcare workers - mainly quality managers) with experience of reporting and analysing incidents – working in involved hospitals as contact persons during implementation of the reporting system on the national level were interviewed. We have not identified a statistical relationship between the overall assessment of system and age of the respondents (p = 0.55), nor by the work position (p = 0.795). As well as according to the nature of the hospital involvement to the system (voluntary or mandatory, p = 0.268) nor length of involvement in the reporting system (p = 0.345). The main barrier for using the system is lack of staff and high workload of workers.

Conclusion: The system is perceived as an important tool for developing and maintaining awareness of risks in clinical practice; however, there are issues to be solved and improved, particularly in methodology and technical support.

Keywords: quality of care, electronic incident reporting, adverse events, healthcare risk, evaluation

Introduction

Health care is provided in a quite high risk environment, because human behaviour is regarded as inherently error-prone and health care providers should decide, act and plan interventions in every moment of their professional life and not all of those activities could be used in the same way for every situation (even with using guidelines or pathways). The need to use one‘s own view brings risk of errors. In practice, the error management requires from organisations to learn from their safety threats, identify all underlying causes, and seek out opportunities for change (Anderson et al., 2013; Waring, 2005). The one of the best implementation of error management is the incident reporting system (Vincent, 2010). It is not the only one, but quite effective tool for improvement of patient safety and care quality. It is well accepted in safety critical industries, such as aviation, as a safety improving method, and is already/being well established in healthcare in many countries (Anderson et al. 2013; Vincent, 2010). The analysis of incidents (defined as adverse events and near misses) can provide information, on which to base policy and practical decisions likely reduce future occurrences (Vincent, 2004). Aggregated together, data on multiple incidents have the potential to help identify patterns, trends and categories of incidents for follow-up, creating opportunities for system improvements (Wood et al., 2005). The benefits of adverse event reporting systems are summarised also by the recent work, where special attention is paid to the five key challenges emerged to explain why incident reporting has not reached its potential: poor processing of incident reports (triaging, analysis, recommendations), inadequate engagement of doctors, insufficient subsequent visible action, inadequate funding and institutional support of incident reporting systems and inadequate usage of evolving health information technology (Mitchell et al., 2016). So, from the author´s point of view the human resources and their behaviour and attitudes are important components for functioning and effectiveness of the incident reporting system. Another systematic review proved that still little is known about the effectiveness of the incident-reporting systems. There were found some evidence of single-loop learning and there was insubstantial evidence of enabling double-loop learning, that is, a cultural change or a change in mind-set (Stavropoulou et al., 2015). Thus authors of this survey believe that is important to know about the view of users on incident reporting systems.

At the local level, there are different systems of evaluation of adverse events in the Czech health care facilities. Risk management of patient safety and early warning monitoring is for majority of hospitals managed entirely by the government (Ministry of Health) of Czech Republic (as mentioned above and also below). The staged implementation of an electronic

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occurrence/incidence reporting system (used interchangeably with "clinical/incident safety reporting system") started in 2008 in the Czech Republic. The electronic clinical/incident safety reporting system (CSRS) was designed to replace a paper-based system and especially to facilitate and promote the comparison of adverse events occurrence at national level (in primary stage for hospitals directly managed by Ministry of Health). The CSRS involves reporting on occurrences such as falls, safety/security issues, medication errors, treatment and procedural mishaps, medical equipment malfunctions, and close calls. The electronic system was modelled from the UK and also other foreign systems. Definitions and taxonomies of what constitutes a reportable incident have been used (Chang et al., 2005).The main objective of the system was to improve the reporting process with the goal of improving clinical safety on national level. Incident reporting systems remain an important and relatively new and inexpensive means of capturing data on errors and adverse events in medicine (especially in electronic systems). We should note that here is a long tradition of examining past practice with the objective to learn from the past and to understand how things might have been done differently (Bosk, 2003). So, the system cannot be used only for retrospective analysis but also for prospective risk analyses for preventive strategies to enhance incident reporting behaviour (Kessels-Habraken et al., 2010). Over five years of existence, the system did not underwent significant changes in the content, but successively, there was involved a total of 85 hospitals throughout the Czech Republic, so the system currently covers approximately 40 % of beds fund (40 % of all beds in total in the Czech hospitals). Although the system is described as national – the participation is compulsory only for hospitals which are controlled directly by the Ministry of Health (e.g. Teaching hospitals and Psychiatric hospitals) since the beginning of the system and it is still voluntary for other hospitals. The Institute for Health Informatics and Statistics (IHIS) was commissioned for system administration in 2013. Restructuring of all health care registries (including incident reporting system) into a unified technology platform was launched in 2014, in pursuit of changes in terms of contents and its quality. The main objective of those system changes is to improve the reporting processes (by promoting objective and consistent provision of information) with the goal of improving clinical safety based on international recommendations (Cheng et al., 2011; Sun et al., 2011). Concerning the reporting system, it is important to measure attitudes towards the incident reporting (Braithwaite et al., 2008; Mitchell et al., 2016; Stavropoulou et al., 2015). Therefore, we were curious how health workers, involved in the reporting processes concerning adverse events, perceive the effectiveness of the system. We also wanted to know whether they feel the need to do some changes to improve quality of the reporting on the national level.

Aim

The aim of the study was to examine the perceived effectiveness of the incident reporting system in acute hospital settings by asking managerial staff about their perceptions, experiences and opinions. The second objective was to determine the need for changes in the electronic system from the users (mainly quality managers) perspective after five years of implementation and before the start of the new unified technological system. We hypothesized that health professional attitudes towards the system would vary according to profession, years of hospital´s involvement, type of the hospital they represent.

Sample

In total sixty-four healthcare workers in managerial positions (mainly quality managers) were involved. All of them with experience in reporting and analysing incidents – working as contact persons in implementing reporting system on national level (in hospitals involved in the electronic clinical/incident reporting system). A total of 64 questionnaires were returned (75.2 % response rate from all addressed hospitals). For the final analysis, 64 completed questionnaires were used (no questionnaire was excluded because of missing data).

Methods

Design

Quantitative research design (an anonymous questionnaire survey) – Cross-sectional descriptive survey.

Setting

Initially 85 hospitals providing acute health care were approached (which are currently involved in the reporting system).

Data collection

A paper-based survey was used for data collection. The data were collected during the informational seminar organized by IHIS in order to inform participants about future changes in the electronic reporting system. The questionnaire took approximately 15 minutes to complete (24 items). The questionnaire was developed based on work in previous related research (Braithwaite et al., 2008; Kingston et al., 2004; Michael et al., 2006; Westbrook et al., 2007) and advice of professionals involved in the system's implementation. We wanted to investigate:

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1. health professionals' demographic characteristics (professional background – level of education, type of work spent on managerial duties, type of facility where most of the work conducted, type of involvement in the reporting system – voluntary, compulsory),
2. attitudes towards the system. In total seven demographic items for description of the sample and in addition 17 questions were generated to measure the perception of the electronic incident reporting system. The last was open ended question for expression of views and comments of respondents. Each evaluating item (e. i. the importance of reporting system, the key factors for reporting incidents, areas where changes are required, barriers for reporting) was rated on a five-point Likert-type item from 1 (less important) to 5 (most important).

Data analysis

Standard descriptive statistics were used to describe the sample characteristics. Categorical variables were described using absolute and relative frequencies of categories (percentage). Continuous variables were described using mean and standard deviation. Statistical significance of differences among groups of respondents was tested by nonparametrical tests (Mann-Whitney U test for two groups and Kruskal-Wallis H test for more than two groups). Reliability of Likert scales was tested by Cronbach´s alpha coefficient. Statistical analysis was conducted using the IBM Statistical Package for the Social Sciences – SPSS Statistics 22. Alpha 0.05 was taken as the level of statistical significance in all analyses.

Results

Characteristics of respondents

The majority of respondents have had professional background in nursing and worked as quality managers with academic education. Average age of respondents was 45 years (min. 25 and max. 67). The interesting results were identified concerning the length of hospitals involvement in the reporting system. The average length of involvement was reported 3.5 years, but 4 respondents (6.3 %) declared more than 6 years – which is not possible, because the national system works for six years until now. In total 8 respondents (12.5 %) did not know the number of years of involvement. The concrete demographic characteristics of respondents are shown in Tab. 1.

Tab. 1. Demographic characteristics of sample of health professionals in survey (N = 64)

Characteristic	N	%
Age		
45 and less	34	531
More than 45	30	469
Education		
Secondary school for nurses	13	203
Academic – university (college)	51	797
Type of representing hospital *		
Small hospital (to 349 beds)	21	32.8
Medium size hospital (350 to 749 beds)	10	15.6
Large hospital (more than 750 beds)	16	25
Long term care hospital (without bed limitations)	4	6.3
Psychiatric hospital (without bed limitations)	10	15.6
Other (i.e. special inpatients centres)	3	4.7
Work position/type of job		
Top management (director, assistant director for quality, head nurse)	23	35.9
Quality manager (nursing professional background)	34	53.1
Line manager (ward sister)	2	3.1
Physician	1	1.6
Other (risk manager)	4	6.3
Length of involvement in the reporting system		
0-2 years	13	20.3
3-5 years	39	60.9
6-8 years	3	4.7

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Tab. 1. – continued

Characteristic	N	%
More than 9 years	1	1.6
Do not know	8	12.5
Type of involvement in the reporting system		
Voluntary	37	57.8
Compulsory	27	42.2

Legend: * – the stratification of hospitals corresponds with the actual classification in the system for reporting adverse events (AE)

The views on adverse event reporting system - clinical safety reporting system

Respondents had to express opinions on adverse event (AE) reporting system (Clinical Safety Reporting System – CSRS) at the national level using a five-point Likert item (scale) and indicate what kind of circumstances and factors in connection with the reporting and recording of adverse events are regarded as crucial (see Tab. 2).

Tab. 2. Evaluation of clinical safety reporting system (CSRS)

Characteristic	Mean	SD
Evaluation/assessment of adverse event reporting system*		
Important	4.3	0.9
Effective/useful	4.0	1.1
Beneficial	4.0	1.2
Unnecessarily burdening	2.2	1.2
Meaningless/ insignificant	1.6	1.1
Hazardous/risky	2.0	1.2
Summation index – assessment	24.4	4.5
Crucial circumstances in the reporting system / Key factors*		
The correct terminology – defining the type of AE	4.6	0.8
The correct terminology – defining the severity of AE	4.5	0.8
The necessity of valid data – an objective assessment of the AE situation /condition of the patient, place of origin, etc./	4.3	0.9
Collection of information – current information about number of AE	4.1	1.0
Collection of information – summary of AE in time (the trend)	4.0	1.1
Possibility to add comments	3.6	1.2
Summation index key factors	25.1	4.0

Legend: SD – standard deviation; * – evaluation was rated on a five-point Likert-type scale from 1 (least important) to 5 (most important)

Incident reporting system was perceived by the most staff as important (N = 54; 84.4 %), beneficial (N = 45; 70.4 %) and effective (N = 68.6 %). The most common reasons for using the system by our respondents were: to evaluate the quality of care in the hospital (N= 30; 46.9%), to improve the quality of care through the preparation of new recommendations for practice (N = 14; 21.9 %), to increase the safety of patients (N =19; 29.7 %) and for the recurrence of adverse event risk assessment only (N = 5; 23.4 %). The questions and possible answers for the evaluation of the system, key factors, main barriers and areas with need for changes were represented with using Likert scale (consisting of 6-8 five point Likert items). For these Likert scales were created comprehensive summation indexes. The internal consistency (reliability) of the summary index was tested using Cronbach's alpha coefficient. The responses were consistent – Cronbach´s alfa was p = 0.759 for overall assessment of the system. For the key factors was Cronbach´s alfa 0.765. The CSRS was rated as important (average 4.3 points), beneficial and effective (both average points 4). Only a few respondents rated the system as risky (average points 2.0). What should be emphasized that the average points score for the possibility that the system is meaningless or insignificant reached 1.6 points. We have not identified a statistical relationship between the overall assessment of CSRS (importance, benefits, and usefulness etc.) and age of the respondents (p = 0.55), nor by the work position (p = 0.795). We also did not find statistical relationship according to the nature of the hospital involvement to the CSRS – voluntary or mandatory (p = 0.268) and length of involvement in the reporting system (p = 0.345). A more detailed analysis of individual responses indicated that managers from hospitals involved for shorter time (less than 3 years) in the electronic system evaluated him as more effective and useful than from hospitals involved for longer time (p = 0.005). The same situation was found in relation to the key factors evaluation, which corresponds to a consistent overall evaluation. Correct terminology both in types of AE evaluation (average points 4.6) and their severity assessment (average points 4.5) have been identified as the most important/crucial circumstances of the system.

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The barriers to the use of CSRS and areas with possible need of changes in the CSRS

As we wanted to know not only the opinions on the current electronic system from the end users viewpoint we also wanted to recognise the possible barriers and suggestions in which areas would be appropriate to make changes in the system. Summary of replies are shown in Tab. 3.

Tab. 3. Barriers to the use of CSRS and areas of possible changes

Characteristic	Mean	SD
Barriers*		
Economical / financial limits	2.3	1.4
Existing legislation	2.5	1.5
Local policy in the workplace	2.7	1.5
Problems with the technical achievement in the workplace	2.6	1.3
Lack of staff	3.0	1.4
High workload of workers	3.6	1.1
Fear of reprisal of individuals	2.1	1.3
Fear of reprisal of the team	2.0	1.3
Summation index – barriers	20.6	6.5
Areas with need of changes*		
Technical management and support	3.3	1.4
Methodological safeguarding/assistance and support	3.4	1.5
Changes in the contents – the type of AE	3.0	1.3
Changes in the contents – objective assessment of the patient, situation	2.8	1.3
Changes in the contents – causes/etiology of AE	2.8	1.2
Changes in the contents – the consequences of AE	2.8	1.2
Changes in the contents – involved person	2.3	1.2
Summation index – need of changes	20.1	6.3

Legend: SD – standard deviation; * – evaluation was rated on a five-point Likert-type scale from 1 (less important) to 5 (most important)

When assessing barriers to the use of CSRS from the perspective of users there was reported as the most important high workload of workers (average 3.6 points) and a lack of staff (average 3.0 points). Overall evaluation (summation index) of barriers was rated as 20.6 (±6.5) and Cronbach alfa 0.741. What could be considered as positive finding, that fears of reprisal individual neither team were not reported/cited as the most important (2.1 respectively 2.1 points). We did not confirm relationship between age ($p = 0.080$), work position of respondents ($p = 0.317$), length ($p = 0.082$) and type of involvement ($p = 0.225$) of hospitals and overall evaluation of barriers in the system. Technical barriers were statistically significantly more frequently reported in compulsory involved hospitals ($p = 0.05$). What is interesting that younger respondents (45 years old and less) significantly more frequently mentioned the lack of staff as the barrier ($p = 0.013$) for reporting the adverse events in the electronic system. The most often mentioned area which has to be improved is methodological (average points 3.4) and technical support (average points 3.3) for health care providers in the clinical practice. This finding is consistent with the fact that the majority of respondents (62.6 %) would appreciate the opportunity to use the services of terrain methodologist – a person who would help them with the records and settlement of the adverse events. Cronbach´s alfa for the summation index for the suggested changes is 0.817. We also did not confirm relationship between age ($p = 0.385$), work position of respondents ($p = 0.100$), length ($p = 0.998$) and type of involvement ($p = 0.417$) of the hospitals and overall evaluation of needed and suggested changes in the system. We statistically verified differences in the need for methodological support according to the type of hospital involvement (compulsory, voluntary) to the CSRS. Hospitals participating compulsorily reported methodological support as important more frequently ($p < 0.001$). In contrast, the time of hospitals involvement in the system did not affect views of respondents on needed methodological improvements and changes in the CSRS system ($p = 0.663$).

Discussion

The overall aim of this study was to examine how is the incident reporting system in an acute care hospital evaluated in practice by examining staff perceptions and experiences. The survey was not focused on evaluation of the influence of the electronic reporting system on safety and learning from those incidents. We have identified some important issues which should be used not only for the improvement of the reporting system itself, but these changes should lead to improved care and safety for patients.

Firstly, it should be mentioned that there were several limitations to this study: it is possible that views of interviewed participants (mainly quality managers) are not representative sample of the common hospital staff, because we did not in-

volve a random sample of health practitioners. They volunteered to participate and so may have had a more positive attitude to the incident reporting than other members of staff, although our questionnaire still elicited information about problems associated with the incident reporting as we needed respond from the final users – managers involved in the system. A final limitation of this study is the relatively small number of respondents. We have to emphasize that there were 75 % of all representatives of hospitals, which are involved in the monitoring system. After the data analysis, there are some important contributions to results of this study. Firstly, majority of respondents were quality managers with nursing professional background. This finding fully corresponds to the current situation in clinical practice in the Czech Republic and also with some studies where nurses are the most frequent reporters (McKaig et al., 2014).

Secondly, the study found evidence that incident reporting system was perceived by the most staff as important which corresponds with quite recent study made in the UK (Anderson et al., 2013). We could not assume that the existing system allowed or lead to conceptual changes including changes in risk and perceptions awareness of the importance of good practice because even we recognised positive finding that only the minority of respondents rated the system as risky or meaningless on the five point scale (Tab. 2.). We could expect that more positive safety culture will correlate with increased reporting rates as it was confirmed in other studies (Hutchinson et al., 2009; Kingston et al., 2014; McKaig et al., 2014) and we verified it also in another study which was made by IHIS concerning the trends in adverse events occurrence in five years (not published in printed version yet, under the review). We also could not predict that the system had a positive effect by changing staff attitudes and knowledge. Nevertheless the way in which the system was introduced and training supporting its introduction could contribute to cultural change. We identified that respondents did not feel fear of reprisal of individuals or fear of reprisal of the team when reporting incidents even they are the most often reported reason or barrier to discourage reporting on the basis that reporting could damage professional reputations or lead to unjustified reprisals (Waring, 2005).

Findings from our survey do not completely correspond to the recent study where fear, overload of workers and apologizing colleagues when they make a mistake were mostly reported as the biggest obstacles (Haw et al., 2014). According to our respondents fear is not so big problem, but we have to confirm that the main identified barriers of the reporting system were lack of staff and high workload of staff. This may also be associated with the fact that the majority of respondents indicated the importance of verbal description of the incident because they need it for the root analyses. After an error has happened, an employee can disclose it by filling out a reporting form. Subsequent causal analysis can bring about learning to enhance the safety and quality of care proactively by eliminating failure factors before a real accident occurs, enhancing their ability to intercept errors in time, improving their safety culture (Evans et al., 2007; Kessels-Habraken et al., 2010). Younger respondents significantly more frequently mentioned lack of staff as the barrier for reporting the adverse events in the electronic system. It may be affected by poor digital literacy of older respondents or habits of older respondents in practice. In the past it was even less nurses on duty and therefore older respondents do not perceive their lack so much. Another explanation may be the availability of computer equipment which is also mentioned in one study (Braithwaite et al., 2008), because the second most important area with the need of changes was technological management support. The most important need of changes was reported according the methodological support especially concerning the type of adverse events and their severity description. This fully corresponds to scientific sources which emphasize taxonomies for patient safety events (Chang et al., 2005; Mitchellet al., 2016, Stavropoulou et al., 2016; Fukuda et al., 2010; Holden et al., 2007; Thomson et al., 2009) and the design of incident reporting systems (Anderson et al., 2013; Stavropoulou et al., 2015). Lack of orientation in terminology and lack of knowledge about severity of adverse events is common among health professionals which confirm Braithwaite´s et al. study (Braithwaite et al., 2008). In this study only 42 % respondents always knew what severity rating to assign to an incident they report. The resolution between adverse events and near miss could be also significant problem in the clinical practice and should be evaluated (Collins et al., 2014; Kessels-Habraken et al., 2010; McKaig et al., 2007). Methodical support should be provided at both local and national levels. It is likely that a local incident-reporting procedure increases willingness to report and facilitates faster implementation of improvements. In contrast, the central procedure, by collating reports from many settings, seems better at addressing generic and recurring safety issues. The advantages of both approaches should be combined (Zwart et al., 2011). Concerning this, we have to highlight logical finding that representatives from hospitals participating compulsorily in the system (managed directly by Ministry of Health) reported methodological support as an important more frequently. The representatives from hospitals involved voluntarily did not recognise it as important. But it could have some other consequences in relation to the accreditation process for them (despite the benchmarking among hospitals is made anonymously). One third of respondents stated the use of reporting system for adverse events as important for accreditation and reaccreditation processes and they were mostly compulsorily involved. Finally, it should be noted in this context that in the Czech Republic there are not yet available national best practices (guidelines or pathways) of care. Monitoring of adverse events at the national level is one of the bases for their preparation and implementation and subsequent verification of their effectiveness in clinical practice. In the subsequent preparatory phase is the assumption that it will be used “Ten guiding principles for safety measurement and monitoring“ (Vincent et al., 2014).

Conclusion

The findings provided evidence that frontline staff and managers (mainly quality managers with nursing professional background) from involved 64 hospitals support the CSRS on the national level. The identified both benefits and areas for improvement (especially need for technical and methodological support). The implementation process encountered challenges related to customizing the software and the development of the classification system for coding occurrences/adverse

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events and there is still lot of to do. Identified issues and suggestions for improvements to the system itself would be shared in the expert group which is preparing the new version of some parts of reporting system in relation to the uniform electronic registries in the health sector in Czech Republic. Those changes will be made to the system before the roll out. Findings from this study will be used before the rollout to internal electronic system in other clinical settings, and before the implementation of the system in other health care facilities (inpatient settings) in the Czech Republic. While measuring the long term impact on clinical safety was beyond the scope of this survey, we have identified by the participants' expressions that if the employees continue to be engaged with the new system, then it will lead to improved clinical safety, as long as all identified issue are followed through with action plans. There is a plan/schedule to repeat this study after 6 months of system running in the uniform technological platform.

Ethical aspects and conflict of interest

The protocol (questionnaire) was designed and administered according to ethical principles of the Helsinki Declaration (World Medical Association, 2016). Completing the questionnaire was taken as indicating consent to participation in the study. The participants could withdraw from the survey at any time during the data collection. They did not have to answer each question.

The authors declare that there is no conflict of interest. The authors declare that they meet the authorship criteria defined by ICJME and are in agreement with the content of the manuscript.

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