

7

Risk evaluation and attitudes of healthcare professionals towards procedures in their daily work: a mixed methods approach

Submitted for publication.

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Abstract

Objective

Procedures are a cornerstone of a hospital quality system as they include all the relevant (clinical) guidelines, protocols and procedures that a hospital has in place to guide the organization and its healthcare professionals towards good quality of care. Based on the assumption that implementing and working according to procedures reduces risks for patients, it is expected that healthcare professionals working in hospitals with a more developed quality system will experience lower risk at operational failures in processes and therefore less risk at patient harm. The aim of this study was to describe how healthcare professionals evaluate risks of operational disruptions related to procedures and to describe their attitudes towards the use of procedures in their daily work.

Design

Mixed methods approach combining results from a risk assessment questionnaire and interview data. Healthcare professionals, mainly nurses, of ten departments of one general hospital in the Netherlands participated in this study. 413 prospective risk analysis questionnaires were returned by healthcare professionals and 34 interviews with nurses from the different departments were conducted.

Results

Healthcare professionals report a considerable amount of perceived risk in the procedural domain and there are large differences between hospital departments. Variation between departments can be understood by differences in the extent to which preconditions for working with procedures are met in different departments, differences in how healthcare professionals perceive the added value of a procedure, and differences in compliance with procedures.

Conclusion

Differences in preconditions, perceived added value and compliance with procedures contribute to our understanding why hospitals are not always optimally effective in translating the requirements of a quality system into effective implementation of, and compliance with procedures.

Introduction

Healthcare institutions implement quality systems in order to assure and improve healthcare delivery to patients.^{1,4} A quality system is defined as '*a set of interacting activities, methods and procedures aimed at directing, controlling, and improving the quality of care*'.^{1,4} Different types of quality systems exist, but most include at least the following five domains: (1) policy and strategy, (2) human resources management, (3) procedures, (4) cyclical quality improvement activities at the department level and (5) patient involvement.² Hospital quality systems structure the organizational processes of a hospital and aim to create a cycle of continuous quality improvement. Continuous improvement can thereby lead to a reduction in variation in processes, which in turn should lead to more predictable outcomes of treatment for patients.

During the development and implementation of quality systems in hospitals, a great deal of emphasis is often placed on effectively implementing procedures and assuring compliance with these procedures.^{2,5} Procedures are a cornerstone of the quality system as they include all the relevant (clinical) guidelines, protocols and procedures that a hospital has in place to guide the organization and its healthcare professionals towards good quality of care.^{3,4} Working according to procedures is assumed to standardize the behavior of healthcare professionals and this leads to a reduction in the variation of outcomes of this behavior.^{3,4} As such, procedures are considered to be an instrument to reduce the risks of adverse events and unintended events for patients.

Based on the assumption that implementing and working according to procedures reduces risks for patients, it would be expected that healthcare professionals working in hospitals with better developed quality systems will have a lower risk of operational failures in the processes and therefore a lower risk of patient harm. Operational failures are disruptions in the operational process that are a combination of different undesirable situations that occur at the same time and that can have consequences in terms of patient safety and quality of care.^{6,7} As procedures are part of the quality system, they are expected to reduce the risk of such operational disruptions when they are available and when there is little variation in the way healthcare professionals work and comply with them. However, it is known from the literature that compliance with procedures is often low and large differences exist between departments in their compliance with (and organization of) procedures.⁸⁻¹⁹ So far, little is known about reasons

underlying these differences. The aim of this study is to describe how healthcare professionals evaluate risks of operational disruptions to procedures and to explore their attitudes towards the use of procedures in their daily work in order to better understand differences in risk evaluation. The research questions of this study are: (1) *How do healthcare professionals assess risks in operational processes related to procedures in their daily work?* (2) *How do hospital departments differ in their risk assessments?* (3) *What are the attitudes of healthcare professionals towards the use of procedures in their daily work?*

Methods

In this study, a mixed methods approach was used. Combining quantitative and qualitative methodologies increases the depth of understanding of the risk evaluations and attitudes of healthcare professionals towards procedures in their daily work.²⁰⁻²² We conducted this study in a general hospital in the Netherlands. The hospital's participation was based on a convenience sample. The hospital's quality system was accredited by the Dutch healthcare accreditation body NIAZ. All procedures and protocols in this hospital are entered into a digital system and could be found by all healthcare professionals on the intranet using a digital search engine. The procedures and protocols in this database were indexed according to title. The Tripod Delta HC questionnaire was administered to assess risks in operational processes in the procedural domain and differences in this risk evaluation between departments. Semi-structured, face-to-face interviews were conducted to explore attitudes to the use of procedures in daily work in order to better understand differences in risk evaluation. The Dutch Medical Research Involving Human Subjects Act does not apply to this research. Approval was therefore not needed from the Medical Ethics Committee.

Questionnaire: Tripod Delta HC

Tripod Delta HC is a generic prospective risk management instrument that measures Basic Risk Factors (BRFs) in five organizational domains. According to Tripod, there are latent failures in every work environment and these can be categorized into BRFs. Each of the BRFs may contribute to adverse events in different ways, and when a combination of different undesirable situations emerge at the same time, this will lead to disruptions in the operational process, which may or may not have consequences.^{6,7,23} The five BRFs are (1) Procedures, (2) Training, (3) Communication, (4)

Incompatible Goals and (5) Organization. Each BRF is covered by 15 items that form a scale. The definitions of the various BRFs and some example items are described in Table 1. Items are measured on a five-point Likert scale ranging from 'totally disagree' to 'totally agree'. Respondents were asked to answer the questions with the last six months in mind. The reliability, validity and the items of the questionnaire are described elsewhere.²³ At the individual level, the reliability coefficients ranged from 0.78 to 0.87. This indicates good to excellent internal consistency at the individual level.²³ The internal consistency at the departmental level ranged from 0.55 to 0.73. For the BRFs Procedures and Incompatible Goals, the internal consistency of the scales at the departmental level was less than 0.70, which is below the minimum preferred value.²³

Table 1 Definitions of the five Basic Risk Factors of Tripod Delta HC.

<i>Basic Risk Factors</i>	<i>Definition</i>	<i>Example item</i>
BRF Procedures	Insufficient quality or availability of procedures, guidelines, instructions, and manuals (specifications, administration, use in practice).	<i>"Because procedures are insufficiently clear, I sometimes have to act according to my own discretion."</i>
BRF Training	No or insufficient competence or experience among healthcare professionals (not sufficiently suited to their tasks, inadequately trained).	<i>"There are always sufficiently experienced healthcare professionals present in the department."</i>
BRF Communication	No or ineffective communication between the various sites, departments or healthcare professionals of an organization or with the official bodies.	<i>"Important information is often sent to the wrong department in the hospital."</i>

Table 1 Definitions of the five Basic Risk Factors of Tripod Delta HC.
(Continued)

BRF Incompatible Goals	The situation in which healthcare professionals must choose between optimal working methods according to the established rules on one hand , and the pursuit of production, financial, political, social or individual goals on the other.	<i>“Necessary maintenance work has been postponed due to high costs.”</i>
BRF Organization	Shortcomings in the organization’s structure, organization’s philosophy, organizational processes or management strategies, resulting in inadequate or ineffective management of the organization.	<i>“The tasks are not properly coordinated between departments so that work is carried out twice.”</i>

From: *Controlling the controllable*²⁸

Data collection and analysis

The Tripod Delta HC questionnaire was administered at all ten departments of one general hospital in the Netherlands. The data were collected in March and April 2012. All healthcare professionals working in the departments were approached to fill out the online questionnaire. The healthcare professionals were invited by e-mail and informed about the purpose of the study, the procedure and privacy protection. As participation was voluntary and anonymous, no written informed consent was obtained. The e-mail contained a link that led to the questionnaire. Reminder e-mails were sent to non-respondents after two and four weeks. The questionnaire took approximately 15-20 minutes to complete. Negatively worded items were recoded in the analyses so that a higher score reflected a higher potential risk for all items.

Interviews

The topic list for the additional, in-depth and semi-structured, face-to-face interviews was designed on the basis of the Tripod Delta HC results and structured around several themes: hospital-wide and department-specific changes in the past 12 months, communication and procedures. The themes communication and procedures were chosen because the hospital scored

lowest on the BRF Communication (lowest potential risk) and highest on the BRF Procedures (highest potential risk) in the Tripod Delta HC measurement and requested more information about these two topics. The current study focuses on the interview fragments from the questions about procedures, as hospitals reported significantly higher risks in this domain. This was also the case in the other hospital that participated in the pilot study²³, and three other hospitals in a pre-pilot study (data not published). The interview questions concerned: procedures in daily work, the characteristics of an understandable and workable procedure, areas for improvement in procedures, non-compliance with procedures and communication about non-compliance, procedures and the relationship with quality of care.

Data collection and analysis

The semi-structured interviews were conducted in April and May 2013 which was about one year after administration of the Tripod Delta HC. To capture the diversity of attitudes and perceptions within the hospitals, the goal was to interview three participants from each department with a balance between junior and senior healthcare professionals. Every head of department was interviewed and selected at least two other healthcare professionals from their department. In addition, the quality coordinator of the hospital was interviewed. In total, 34 healthcare staff participated in the interviews. Participants received information about the study prior to the interview, an outline of the topic list, estimated duration of the interview (one hour) and privacy issues. Two researchers conducted the interviews (SVS = 5, MG = 29) using the same topic list. During the first two interviews, both researchers were present in order to discuss and verify the topic list to make sure that there was a shared understanding of the purpose of the questions. The interviews were conducted in a private room in a quiet part of the hospital. Interviews were audiotaped with consent of the participants. The researchers gave an assurance that no reported information could be traced to the respondent. All interviews were recorded and transcribed by the researchers. Participants were sent a transcript of their interview to validate the content. Two participants requested minor changes, which were made accordingly. The researcher sent the participants confirmation of the requested amendments. Thematic content analyses were performed by two researchers independently (SVS and JT). Both researchers analyzed all interviews. The extracted themes were discussed until consensus was reached.

Results

Tripod Delta HC: BRF Procedures

In total 683 healthcare professionals were invited to participate. Of these, 413 returned the questionnaire (60.5% response rate). The characteristics of the sample who filled out the Tripod Delta HC questionnaire are described in Table 2. The Tripod Delta HC results show that the hospital scored significantly higher on the BRF Procedures, compared to the mean of the other BRFs, indicating a higher potential risk in this domain (see Table 3). The scores for the individual items of the BRF Procedures are also shown in Table 3. Table 4 also shows the percentage of healthcare professionals who indicated a high risk for the individual items. A high risk means that the healthcare professional chose 4 or 5 on the answer scale. The hospital obtained the highest score (highest potential risk) on the items related to the availability and interpretation of procedures. This indicates that about one third of healthcare professionals perceive risks for the hospital because procedures are not available when they need them or procedures are so ambiguous that they cannot be applied in the real working situation. Furthermore, differences were found between hospital departments on the perceived risk for the individual items of the BRF Procedures. For example: *'There are rules in the hospital which can be interpreted in different ways'* in one department had 50% of the healthcare staff indicating a high risk, whereas the figure in another department was 2.3%. Overall, healthcare professionals working in the internal medicine department indicated the highest risks and professionals working in the pediatric department indicated the lowest risk.

Table 2 Characteristics of the Tripod Delta HC sample and the sample of interviewees.

		<i>Tripod Delta HC</i>	<i>Interviews</i>
		<i>n=413</i>	<i>n=34</i>
Gender	Female	384	34
	Male	29	0
Age	<30	81	unknown
	30-50	228	
	>50	101	
	Unknown	3	
Department	Pediatric department	47	4
	Emergency room	31	3
	Gynecology	64	3
	Intensive care department	47	2
	Internal department	28	3
	Lung diseases & cardio department	34	5
	Neurology	43	3
	Operating rooms	55	3
	Short-stay nursing department	40	4
	Surgical department	24	3
	Quality and safety department		1
Experience	0-5 years	131	16
	6-20 years	181	16
	>20 years	101	2
Profession	Nurse	271	29
	Physician	5	2
	Other (intern, theater assistant etc.)	137	3

Table 3 Descriptive statistics of the Basic Risk Factors of Tripod Delta HC and descriptive statistics of the items of BRF Procedure on a scale from 1 to 5

<i>Tripod Delta HC</i>			
<i>Basic Risk Factor</i>	<i>mean (SD)</i>	<i>Range</i>	<i>n</i>
BRF Procedures	2.70 (0.52)	1.0-5.0	395
BRF Training	2.27 (0.45)	1.0-3.7	412
BRF Communication	2.22 (0.40)	1.1-3.6	412
BRF Incompatible Goals	2.53 (0.45)	1.1-3.9	408
BRF Organization	2.35 (0.42)	1.0-3.4	411
<i>BRF Procedures Items</i>			<i>mean (SD)</i>
I have sometimes not been able to find a procedure which I needed at that time.			3.39 (1.00)
There are rules in the hospital which can be interpreted in different ways.			2.99 (0.83)
I have sometimes ended up in a situation whereby it was unclear if a procedure existed about how to act in such a situation.			2.99 (0.93)
I sometimes have had extra work for a relatively simple task because I had to follow a cumbersome procedure.			2.94 (0.96)
I have sometimes searched for information which I subsequently found spread over different places.			2.91 (1.00)
Because procedures are insufficiently clear, I sometimes have to act according to my own discretion.			2.85 (0.93)
I sometimes work with instruments or equipment for which a clear manual is lacking.			2.62 (0.94)
I sometimes have had to deal with procedures the authors of which clearly had no understanding of how it would function in practice.			2.61 (0.87)
There have sometimes been procedures concerning my work which had been changed without me being informed about this.			2.58 (0.91)
I have sometimes been confronted with a procedure, the meaning of which was completely unclear to me.			2.55 (0.81)
I have sometimes had to use a procedure which was so unclear that I had to determine myself how I had to act.			2.50 (0.81)
I have sometimes been confronted with new procedures which were not workable.			2.46 (0.75)
It has happened that I did not understand a procedure due to the unclear lay-out.			2.38 (0.78)
I have sometimes been confronted with a procedure which was formulated in such a complex way that I could not oversee what would happen if I would follow the procedure.			2.31 (0.72)
The procedures which I need for my work link up with practice.			2.29 (0.66)

Table 4. Percentage of healthcare professionals who indicated a high risk on the items of the BRF Procedures of Tripod Delta HC, per department.

Item	Departments*										TOTAL
	1	2	3	4	5	6	7	8	9	10	
1 I have sometimes not been able to find a procedure which I needed at that time.	40.9	56.0	44.7	34.3	38.7	31.7	32.6	16.3	27.5	39.3	34.3
2 There are rules in the hospital which can be interpreted in different ways.	9.5	50.0	32.4	28.6	37.5	35.0	2.3	20.5	28.0	26.7	31.4
3 I have sometimes ended up in a situation whereby it was unclear if a procedure existed about how to act in such a situation.	14.3	26.1	18.4	21.2	12.9	16.7	13.6	12.2	12.5	24.1	16.6
4 I sometimes have had extra work for a relatively simple task because I had to follow a cumbersome procedure.	20.0	39.1	37.8	33.3	43.3	42.4	36.4	39.5	28.0	46.7	37.1
5 I have sometimes searched for information which I subsequently found spread over different places.	25.0	60.9	51.4	41.2	46.7	35.0	34.1	21.0	25.5	40.0	36.7
6 Because procedures are insufficiently clear, I sometimes have to act according to my own discretion.	0	18.2	9.1	10.4	10.0	7.1	7.0	2.7	0	13.3	7.3

- table 4 continues -

Item	Departments*										TOTAL
	1	2	3	4	5	6	7	8	9	10	
7 I sometimes work with instruments or equipment for which a clear manual is lacking.	31.8	16.0	7.9	5.7	12.5	8.2	4.6	4.3	5.6	6.7	7.0
8 I sometimes have had to deal with procedures the authors of which clearly had no understanding of how it would function in practice.	50.0	37.5	25.6	22.6	38.7	22.0	34.9	6.8	11.5	31.0	25.3
9 There have sometimes been procedures concerning my work which had been changed without me being informed about this.	36.8	45.5	38.9	31.0	50.0	46.7	58.5	26.3	15.7	39.3	38.4
10 I have sometimes been confronted with a procedure, the meaning of which was completely unclear to me.	11.1	19.1	17.1	22.2	10.3	6.6	9.5	2.6	11.8	10.7	11.1
11 I have sometimes had to use a procedure which was so unclear that I had to determine myself how I had to act.	68.4	88.0	75.7	48.5	78.1	66.7	75.0	48.8	38.8	70.0	64.0

-table 4 continues-

Item	Departments*										TOTAL
	1	2	3	4	5	6	7	8	9	10	
12 I have sometimes been confronted with new procedures which were not workable.	15.8	28.6	19.4	16.7	22.6	20.3	11.4	0	10.0	16.7	15.3
13 It has happened that I did not understand a procedure due to the unclear lay-out.	30.0	47.8	8.3	45.5	20.0	21.7	18.2	9.3	20.4	23.3	22.6
14 I have sometimes been confronted with a procedure which was formulated in such a complex way that I could not oversee what would happen if I would follow the procedure.	16.7	30.4	36.1	29.0	16.1	15.3	16.7	7.5	22.0	26.7	20.8
15 The procedures which I need for my work link up with practice.	11.1	13.0	10.5	23.3	23.3	8.3	11.6	4.7	8.2	33.3	11.5

*Departments: 1= Surgical department; 2= Internal department; 3= Neurology; 4= Short-stay nursing department; 5= Lung diseases & cardio department; 6= Gynecology; 7= Intensive care department; 8= Pediatric department; 9= Operating rooms; 10= Emergency room.

Interviews

Table 2 describes the characteristics of the sample of interviews. All participants were female and the majority (29 of 34 participants) worked in the hospital as a registered nurse. On average, the participants had been working at the hospital for ten years. All participants indicated that they use procedures in their daily work. The majority of participants indicated that there are enough procedures to cover their daily work and that the number of procedures did not need to be expanded. Several participants indicated that there are too many procedures. Three themes and several sub-themes were identified in the interviews by the two researchers (SVS and JT): preconditions, added value and compliance. The results for each theme are described below. Figure 1 describes the themes and sub-themes.

Preconditions

The participants indicated several preconditions for following procedures in their daily work of which the *availability* of procedures was most often mentioned. According to the participants, the search engine should be designed in a way that it is easy to find and access the procedures, as this was currently not the case. In order to find the appropriate procedure, a very specific search term needed to be entered; otherwise the search results would give too many hits resulting in lost time. The name of the procedure should be suitable and should cover the content of the procedure. Several participants stated that procedures should be available from home so that they can be accessed outside working hours.

“The search engine needs to be improved; the names of the procedures are difficult to figure out. The search terms we have in our minds often don’t match the names of the procedures.”

Other preconditions were related to the *form* of the procedure. Most often mentioned was the fact that a procedure should be a chronological description of all the necessary steps of the task. Furthermore, a procedure should be clearly written, the length should be appropriate (a balance between limited length and providing enough detail), the layout should support the text and provide structure, abbreviations should be avoided and illustrations should be used when appropriate, with the aim of simplifying the content. Participants named several characteristics of what they believe makes an understandable and workable procedure. Participants stated that a procedure should be short and simple, unambiguous, feasible and should describe the responsibilities and prerequisites (for example people, materials/equipment or forms).

“It needs to be clear what benefit there is to working in a certain way, the advantage. It should be feasible, easy to fit into your daily work. It should be short and clearly written and it must summarize who should be doing what.”

Figure 1 Themes and sub-themes extracted from the interview data.

<i>Preconditions</i>	<i>Added value</i>	<i>Compliance</i>
<i>Availability of search engine, name, up-to-date, from home.</i>	<i>Uniformity everyone works in the same way, patients know what to expect.</i>	<i>Patient characteristics no two patients are identical.</i>
<i>Form clearly written, appropriate length, layout, illustrations, language, abbreviations.</i>	<i>Evidence-based according to latest scientific research.</i>	<i>Work conditions acute situation, time constraints, physician, other department.</i>
<i>Relates to practice applicable in practice, possibility for providing feedback. and suggest changes.</i>	<i>Confidence that work gets done in the right way.</i>	<i>Experience vs. guideline following guideline by heart.</i>
	<i>Education/training for new employees</i>	<i>Justification in case of non-compliance yourself, colleague(s), physician, head of department.</i>
	<i>Backup for uncommon circumstances, in case of incidents.</i>	<i>Documentation of non-compliance oral or written, patient record, multi-disciplinary record, activity plan.</i>

Lastly, the *relationship with practice* of a procedure was mentioned as a precondition. Participants stated that the procedure should be applicable in practice in the sense that the procedure must describe the practical working situation. There should be possibilities for providing feedback and suggesting changes in cases where there was a gap between the description in the procedure and practice. Participants mentioned that there is often a mismatch between procedure and practice, making it impossible to follow it. Changes were made regularly to procedures and these changes lead to confusion and contradictions in the way tasks were carried out. Participants also indicated that more education/training in the use of procedures is needed.

“When just a single sentence gets changed in a procedure, I get the whole procedure in my e-mail. I’d like to see just the change. If it’s something important, it will be much clearer if it is explicitly highlighted.”

Added value of procedures

Participants named a wide range of added value of working with procedures. The aspect listed most often was the objective of creating uniformity in the care delivered to patients. When everyone works in the same way, this reduces variation in the processes and patients know what to expect. Another important aspect was the evidence-base of procedures and the fact that they are based on the latest scientific insights. This should, in their opinion, result in the best possible care for specific clinical conditions. Furthermore, healthcare professionals mentioned that procedures give them the confidence that they are doing their job as they are supposed to do it. For new healthcare professionals, procedures work as a form of education and for other healthcare professionals as a backup in uncommon circumstances or in cases where an accident has happened.

Compliance

The participants stated that non-compliance with procedures occurs regularly and there was a shared acceptance that this was unavoidable. Reasons for non-compliance could be related to *patient characteristics*, not all patients are alike and different patient characteristics ask for different approaches. Certain *working conditions* could lead to deviations from procedures such as acute situations and time constraints. Or the physician could demand deviations from procedures for clinical reasons. Non-compliance could also be initiated by healthcare professionals from other departments in the case of multi-disciplinary treatment of a patient. Participants mentioned that over time and when tasks become more routinized, healthcare professionals know the procedure by heart they don’t

have to look up the procedure anymore. Participants used several reasons to justify non-compliance. In cases of intentional small deviations they did this according to their own insight or discussed it with colleagues. When the deviation was for a medical reason, it was discussed with the physician before the task was performed. In more complex cases or when incidents happened, the deviation was discussed with the head of the department. Participants described several ways to communicate about non-compliance, this could be verbally or in writing. In the case of written communication it was recorded in the patient record, the multi-disciplinary record (when information needed to be available to others) or in an activity plan.

“In the end, it’s about the healthcare professional’s clinical view. You want to provide good care that is tailored to the patient. The procedures describe the main aspects of what is needed, they describe 80-90% of the situations. But there will always be exceptions. You have to be aware of that; you have to keep on thinking for yourself.”

Discussion

In this study we found that healthcare professionals report a considerable amount of perceived risk related to procedures in their daily work. Furthermore, results showed that there are large differences between hospital departments in those perceived risks.

According to healthcare professionals important preconditions for the use of procedures in terms of availability, form and the relationship with practice are not always met and not met to the same extent in every department. This is the first study in healthcare that gathered information about preconditions for the use of procedures, and is important because it gives insight in reasons why procedures are not always being used or cannot always be used as intended.

Healthcare professionals specified multiple objectives for following procedures: uniformity, evidence-based treatment, increase of healthcare professionals’ confidence, education of new healthcare professionals and a library to look up information. These objectives show that in general, healthcare professionals do perceive an added value to working with procedures and that this goes beyond the original objective of procedures: a reduction in the variation of outcomes for patients by standardizing the behavior of healthcare professionals. This shows that healthcare professionals are not reluctant to the use of procedures in general, but that

this reluctance is related to procedures that, in their opinion, do not contribute to these objectives.

Non-compliance is accepted amongst healthcare professionals and depends on patient characteristics, work conditions and experience. This is consistent with studies in healthcare that found low compliance rates with clinical guidelines, for example.^{9,13,19} However, most of these studies focused on compliance with specific clinical guidelines and not on the more broad concept of procedures as referred to in hospital quality systems. This study showed that non-compliance is not just restricted to narrowly defined clinical guidelines, but also occurs with more general procedures.

This study provides a better understanding of the constraints that healthcare professionals experience in working with procedures and why hospitals are not always optimally effective in translating the requirements of the management system into effective implementation and compliance with procedures. For the quality system to operate optimally, these constraints need to be acknowledged and dealt with by hospital managers and policy makers in order to obtain the desired effect: to reduce the variation in processes and outcomes. This can be achieved for example by using uniform clinical terms in procedures, clearly highlighting changes in amended and updated procedures or by using the input of healthcare professionals to build search engines that reflect their search strategies. Furthermore, hospitals could perform 'rule management', in order to determine which standards and procedures are superfluous or need to be revised to close the gap between the practical working situation and the written standards and procedures. The framework of Hale and Borys (2013)²⁴ that was adapted from Larsen (2004)²⁵ provides a categorization of steps that are necessary for rule management. The framework is cyclical and reflects a dynamic process of adapting the rules to the existing working environment.

Strengths and Limitations

This study used a mixed methods approach, combining data from a prospective risk analysis questionnaire and interviews with healthcare professionals. Despite the call for more mixed-method research in health services research literature^{26,27}, such studies are, to date, scarce. Several limitations must however be mentioned. Firstly, the results of this study were based on data from one general hospital in the Netherlands. Although the attitudes and perceptions obtained might not be present to the same extent in other hospitals, we believe that they can be meaningful in understanding why and under what conditions healthcare professionals use

procedures in their daily work and how these attitudes relate to risk perceptions about procedures. The hospital in this study worked with a database of procedures and protocols, which is common in most Dutch hospitals. Secondly, the selection of the interviewees was made by the head of department. Every head of department was asked to approach one senior and one junior healthcare professional from their department. No additional criteria for selection were set by the researcher and this could have resulted in more positive answers. To constrain this potential selection bias, participants were informed at the beginning of the interview that there were no right or wrong answers and that results from the interviews would not in any way be traceable to individual respondents.

Conclusions

Healthcare professionals report a considerable amount of perceived risk for patient safety in the procedural domain and there are large differences between hospital departments in this risk evaluation. Differences in preconditions, perceived added value and compliance with procedures contribute to our understanding why hospitals are not always optimally effective in translating the requirements of a quality system into effective implementation of, and compliance with procedures. Understanding how healthcare professionals evaluate the risk of operational disruptions related to procedures and how they perceive procedures in their daily work is important, as procedures play an important role in the reduction of variation in outcomes for patients. Future research should examine the link between risk evaluations and attitudes towards procedures and actual behavior of healthcare professionals in order to understand how healthcare professionals make different risk assessments and how they use them as the basis for deciding whether or not to comply with a procedure.

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