"Pixie dust": The moderating effect of reflexivity on patient safety culture and quality patient care

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"Pixie dust" - the moderating effect of reflexivity on patient safety culture and quality patient care.

Abstract

Objective: To test the moderating effect of reflexivity on patient safety culture and quality patient care. To gain a better understanding of patient safety culture and inform the development of strategies aimed at improving quality of patient care.

Design: Empirical hypothesis testing of quantitative scores derived from validated survey items.

Setting: A large Australian health service delivering acute and sub-acute health care.

Participants: 227 health service staff from clinical and non-clinical designations.

Intervention(s): non-interventional, correlational case study

Main Outcome Measure(s): a derived score of patient safety culture and quality of patient care.

Results: Both patient safety culture and reflexivity are positively correlated with quality of patient care at the $p < 0.01$ level. The moderating role of reflexivity on the relationship between patient safety culture and quality of care outcomes was significant and positive at the $p < .005$ level.

Conclusions: Our model shows that when combined, reflexivity and patient safety culture lead to positive levels of quality patient care. Implications for practice extend to: a) professional issues such as pre professional curriculum content and postgraduate licencing and registration requirements; and b) organisational approaches to teams and change management.

187 words

Key words: reflexivity, patient safety culture, reflection quality of patient care

"All the world is made of faith, and trust, and pixie dust."

(J.M. Barrie, Peter Pan)

Introduction

Since the publication of the seminal report "To Err is Human" (Stefl, 2001), health managers and researchers have investigated ways of creating a safer health care system. One recommendation that is frequently quoted as a way to improve quality of health care and ultimately patient outcomes is to "create a culture of safety" (Weaver et al., 2013). This all sounds like a sensible approach – create this magical "safe culture" and consequently, better patient outcomes will ensue. The second popular approach to delivering improved outcomes is to "develop a skilled workforce" (Vivekananda-Schmidt & Sandars, 2016). Clinical governance frameworks feature credentialing and regulation of the health workforce, supervision frameworks and defining minimum competencies to practice (Wittich, Reed, McDonald, Varkey, & Beckman, 2010). While progress has been made in the patient safety arena, the link between safety culture, workforce training and improved patient outcomes remains intuitive. Furthermore, there is little information to guide managers as to what ingredient (or pixie dust) they can use at an organisational level to make the most of what "patient safety culture" they have. This is a kin to the cake made without a raising agent. In the search for this mysterious ingredient, we turn to the organisational and educational literature where we explore the concept of "reflexivity". For those who have confused self-raising flour with plain flour, it is important to note that reflection and reflexion are similarly confusing. This paper aims to clarify what reflexivity (with an x) is and presents an examination of the relationship between reflexivity, patient safety culture and quality patient care in a dynamic hospital environment.

Our research proposes a simpler approach of building on the existing practices of reflection (with a ct) to develop health organisations that are reflexive to patient safety. Given that reflection is a practice familiar to health professionals, we believe that extension of these reflective skills to become reflexive practitioners may have beneficial impacts on the quality of care. This premise is because reflection is an accepted practice built into curriculum of health professional training. What is missing are models that explore the links between patient safety culture, the act of being reflexive and quality of care outcomes. We, the researchers empirically test a number of hypotheses in relation to these variables. This work adds to an emerging evidence base of known antecedents to delivering safe and

quality patient care. Our investigations extend existing understandings of the significant factors that influence delivery and the outcomes of safe quality patient care.

While there is an emergence of qualitative papers that consider the role of reflexivity on patient safety, we were unable to find any evidence of the link from a quantitative perspective. We suggest that when an organisation is reflexive a positive safety culture is enabled which leads to an environment supporting quality patient care. We extend this theory by considering how reflexivity as a moderator variable (or pixie dust), amplifies the strength of the relationship between patient safety culture (as the dependent variable) and quality of patient care (as the dependent variable). Our ultimate goal is to decrease the impact of adverse events, enhance safety climate and improve quality of patient care.

Conceptual framework

While we employ quantitative methods to pursue answers, the phenomenon of reflexivity, patient safety culture and quality patient care have a history rich with philosophical musings and academic debate of a qualitative nature. To set the backdrop we next provide a conceptual framework that underpins our research questions.

Reflection and reflexivity

Reflective practice has been the cornerstone of nursing education for decades (Caldwell & Grobbel, 2013) and nursing practitioners are exceedingly comfortable with this term and its application, particularly as a learning tool. Social workers and psychologists have also had a long acceptance of the use of reflection to improve professional practice (Mann, Gordon, & MacLeod, 2009). While some may say that other health practitioners have been slow to catch on; reflective practice now transcends across a broader group of health disciplines and has been effective in training medical students (Ambrose & Ker, 2014); junior medical staff (Ahmed, Arora, Carley, Sevdalis, & Neale, 2012); pharmacists (Pezzolesi, Ghaleb, Kostrzewski, & Dhillon, 2013); physiotherapists and occupational therapists (Morley, Smith, & Petty, 2011). Reflective practice can occur on an individual basis (Alley, Jackson, & Shakya, 2015), or as a team process (Schippers, West, & Dawson, 2015).

Exercises in reflection feature in numerous curricula of health care professionals (Mann et al., 2009). Reflection is applied as a means of improving clinical practice skills and viewed as an essential attribute of a competent health practitioner (Mann et al., 2009). Records of reflection are required

evidence for the registration and licencing of medical, nursing and allied health staff and may contribute to professional development points. Common tools for reflection include journal keeping, video recordings and post event feedback. Feedback can be from teachers, peers or patients (Iedema, 2011).

Terms such as "reflective practice", "objective mindfulness" and "mindful reflective practice" feature in the health literature. The assortment of nomenclature generates some confusion when trying to separate the concepts of reflection and reflexivity. Mindfulness or mindful reflective practice has shown to be effective in reducing medication errors by pharmacists (Pezzolesi et al., 2013). Looking back and changing practice based on experience makes logical sense if practitioners set up systems or change behaviour to reduce the risk of repeating a mistake.

Reflexivity is the individual's capacity to monitor events as they occur and adjust actions to ensure a positive outcome (Iedema, 2011). The construct is predominantly referred to in qualitative research (Alley et al., 2015; Caldwell & Grobbel, 2013) and frequently confused with reflectivity with a different spelling. The literature base on reflexivity emanates largely from scholars in organisational psychology and management (Knippenberg, Hartog, Schippers, & Koopman, 2008; Schippers et al., 2015); and education (Cunliffe, 2004). Much of this research stems from the earlier work of Mezirow (1981) and Schön (1983). Group reflexivity is defined as "the extent to which group members overtly reflect on and communicate about the groups' objectives, strategies and processes and adapt these to current or anticipated circumstances" (Knippenberg et al., 2008).

A critical consideration for researchers exploring reflexivity is the notion of context. It has been attested that critical reflexivity leads to more collaborative, responsive and ethical management of organisations (Cunliffe, 2004). Cunliffe (2004) proposed that by examining assumptions we become less prone to complacency or ritualistic thoughts and actions. From an organisational perspective, reflexivity is linked to learning and innovation (Jain, Hallensleben, & Manger, 2013). Similar to quality improvement, reflexivity is characterised by a feedback loop (Jain et al., 2013) and the desire to improve and innovate the way work tasks are performed (Urbach, Fay, & Goral, 2010). Reflexivity draws on different ways of thinking such as existential thoughts, relational phenomena, and praxis. Alley et al. (2015) explored reflexivity as a tool in the knowledge translation process using reflexive journal records and found a gap in translation of knowledge to practice. Team reflexivity is the deliberate process of discussing team goals, processes and outcomes (Schippers, Edmondson, & West, 2014). Transformational leadership may motivate group members to be reflexive (Knippenberg

et al., 2008) and reflexivity is related to both subjective and objective measures of team performance (Schippers et al., 2015).

Broekhuis (2007) explored the usefulness and feasibility of a "reflexivity method" to enable change and improve clinical handover. Handover is critical to continuity of care and effective and safe clinical practice. Broekhuis (2007) state that reflection alone does not lead to change, as this is deliberation without action. Reflexivity is an iterative process comprised of a) reflection, b) planning, and c) action, all of which depend on "atmosphere" or "culture" to support active learning (Broekhuis, 2007).

To summarise, reflectivity or the act of reflection is the looking back and making sense of prior action (Iedema, 2011; Mezirow, 1981). A reflective practitioner examines their actions retrospectively, solicits feedback with the goal of continually improving their clinical practice. A reflexive practitioner has in situ awareness and introspection. While looking inward (as in reflection) a reflexive practitioner responds proactively to evaluate and adapt for immediate impact (Moreland & McMinn, 2010; West, 2000). Reflexivity is the personal view of the past, and the understanding of cause and effect and how practitioners react to a current situation. It is "reflection in action" (Iedema, 2011). Our readings on reflexivity imply a link between reducing errors and improving team outcomes. Teamwork, communication and error analysis are well accepted in the taxonomy of patient safety culture (Sammer, Lykens, Singh, Mains, & Lackan, 2010) which will now be explored.

Patient safety culture

The terms "reflective" and "reflexive" are often incorrectly used as synonyms, so too are the terms "safety culture" and "safety climate". Culture aims to address deeper values and assumptions and is a socially constructed phenomenon symbolised by artefacts, beliefs, values and assumptions (Schein, 1985). Patient safety climate assesses employee's perceptions of the presence or absence of important processes and values that underlie appropriate patient safety (Vogus & Sutcliffe, 2007). Examples include patient handover, collegial skills knowledge, a capacity to prioritise important patient factors and a willingness to face errors and problems when they occur (Vogus & Sutcliffe, 2007). For consistency, we use the term "culture" as this incorporates both constructs of climate and culture.

It is frequently quoted that one in ten inpatients will experience an adverse event during their hospital stay (Australian Commission on Safety and Quality in Health Care, 2014). Health managers are

constantly searching for programs that will improve patient safety and safety culture. The literature abounds with theoretical models developed with the goal of better understanding the complex phenomena of patient safety culture. We will not describe these models in detail; however provide a summary of patient safety models that link well with the ideas of reflexivity and quality of patient care. The model of choice is that proposed by Vogus, Sutcliffe, and Weick (2010) who described patient safety culture as "enabling, enacting, and elaborating". This model attests that reducing hospital errors requires a multifactorial approach that addresses a number of key activities. The Vogus et al. (2010) model describes "enabling" activities as policies and practices that motivate the pursuit of safety. Enabling is characterised by directing attention to patient safety and secondly by creating environments where clinicians feel able to speak up and feel psychologically safe. Actions that enable staff to practice safely include open and candid discussions, safety forums and walk arounds (Weaver et al., 2013).

The translation of safety ideas into safe action is called "enacting" and examples include frontline actions such as teamwork, incident reporting and handover. Enacting a safety culture requires identifying safety risks and the implementation of guidelines for safe clinical practice (Vogus et al., 2010). The concept of third concept of "elaborating" includes learning; monitoring and improvement activities used to reinforce safe clinical practice, and is a similar idea to "reflexivity" (Ahmed et al., 2012; Vogus et al., 2010). Elaborating involves the rigorous reflection on safety outcomes and the use of feedback to modify practices and enable processes.

While the relationship between reflexivity and patient safety culture seems obvious, empirical evidence is limited. To date the practice of reflection and reflexivity have been viewed as methods to develop clinicians who are self-aware and active learners. Recent publications on reflexivity and patient safety present plausible models, but lack empirical testing (Hu & Little, 2015; Iedema, 2011). We argue that reflexivity supports a positive culture of patient safety. Where employees working in teams are reflexive, they will be better able to respond to patient safety incidents. The benefits of reflection have been reported to assist in making meaning of complex situations; stimulate learning from experience; and help with complex clinical problem solving (Mann et al., 2009). We accept this to be true, however extend the benefits to include a direct benefit to patient safety culture. Our reasoning is that the ability to reflect and be reflexive is not a passive element of clinical competence but rather has a direct positive relationship with patient safety culture. The reason we are concerned with patient safety culture rests on our second assumption being that patient safety culture is related to the quality of patient care. We now explore the concepts of quality of patient care more closely.

Quality of Patient Care

Quality of patient care has become an important factor in the assessment of the value of health services. In Australia, quality of health care has been a major driver of systems reform since the seminal work of Wilson et al. (1995) reported that 16.5% of patients experienced an adverse event and estimated that of these, 13.7% resulted in permanent disability and 4.9% in death. While it is little wonder that improving quality and safety in health care is a major priority for health care providers, the challenge is knowing how to define quality, and in finding ways to achieve improvement. Quality standards are variable, and often context specific. Good care is becoming increasing associated with individualised, patient centred care (Berger, Flickinger, Pfoh, Martinez, & Dy, 2014). Our argument follows that reflexivity, or the ability to discuss team goals, processes and outcomes and adapt these to the situation will support a philosophy of patient centred care. While reflexivity has been described as "reflection in action" (Iedema, 2011), we propose that when patient safety culture and reflexivity combine, the result is "quality improvement in action".

The central defining principles and practices of quality improvement include customer focus, continuous improvement, and team work to solve a problem (Lemieux-Charles et al., 2002). Safety and quality can be measured by many things from process indicators that consider waiting times and access; outcome measures such as mortality and morbidity rates to experience based measures such as patient satisfaction and experience. Quality theories prevail and the most commonly applied model is the plan, do, check, act (PDCA) model as promulgated by Deming (Varkey, Reller, & Resar, 2007). Comparable to reflexivity, the PDCA model is active and contributes to a continued cycle of learning and improvement. We know that reflexivity leads to enhanced safety behaviour in medical students, nurses and pharmacists (Ahmed et al., 2012; Caldwell & Grobbel, 2013; Pezzolesi et al., 2013). Based on these findings we propose that reflexivity may be a special ingredient (or pixie dust) that moderates the relationship between patient safety culture and quality of patient care. The act of reflexivity stimulates patient safety into action and consequently leads to better quality of patient care. From this background, we articulate the following hypothesis to be tested.

H1a: Patient safety culture is related to quality of patient care

H1b: Reflexivity is related to quality of patient care

H2: Reflexivity amplifies the relationship between patient safety culture and quality of care outcomes.

The research model is shown in Figure 1.

Figure 1: Hypotheses model exploring relationships between patient safety culture, reflexivity and quality of patient care outcomes.
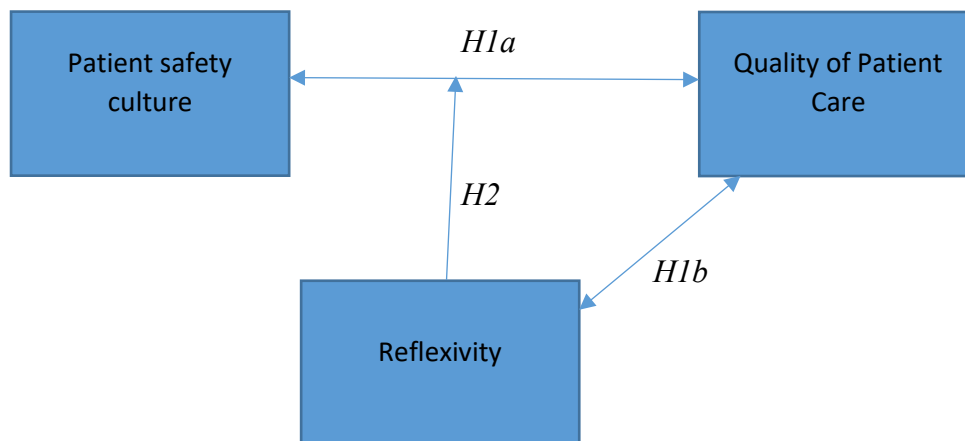
Measures

The researchers made the assumption that organisational collectives have a particular culture and that these can be assessed. Culture is behaviourally oriented; hence, research frequently uses questionnaires that assess behaviour (Patterson & West, 2005). The resulting questionnaire focused on recognised dimensions of patient safety culture. This research used a domain specific approach to allow a more precise and targeted collection of information that enables the testing of discrete relationship between variables (Patterson & West, 2005). Five standardised questions sourced from Patterson and West (2005) were used to measure organisational reflexivity. The nine patient safety items included were from the Safety Organising Scale (SOS) developed by the authors of the "enabling, enacting, elaborating" model of patient safety culture (Vogus et al., 2010). Our dependent variable, quality of patient care was assessed by validated questions based on the Deming model of PDSA and the emphasis given to quality procedures (Patterson & West, 2005).

Data Collection

This research has full human research ethics approval and meets the research governance requirements of the institution under study.

A survey was conducted within a large Australian health service in September 2015. The health service delivers acute and sub-acute healthcare to a population of approximately 600,000. At that time, the health service employed approximately 7,000 staff. The staff spanned all categories including support staff (catering, maintenance etc.), clinical staff (health care professionals) and management. Survey respondents, were invited through a targeted district-wide health service email broadcast (for the online survey) and by hard copy in selected sites of the district-wide health service where availability of the internet was limited. The survey included 14 sections and a section for comments. It has been shown that distribution of hard copy surveys result in a higher return rate than on line surveys (Hohwü et al., 2013). Our experience supports this as the overall return rate was much less than for what anticipated with a yield of 227 useable surveys.

A five point Likert scale was used for each question and data entered and coded into an excel spreadsheet by an external research assistant to ensure that all information remained confidential. The data was uploaded into SPSS for descriptive and statistical analysis. We cleansed our data and checked assumptions to ensure suitability for parametric statistical analysis. Teamwork has an important role in delivering quality patient care, and we amalgamated results across disciplines. A score for each construct of patient safety, reflexivity and quality of patient care was calculated by totalling the responses for each set of questions and dividing by the number of items.

Sample

The survey respondents were broadly representative of the staff profile in the annual report of the health service being studied with nurses under represented. The demographic of our sample is shown in table 1.

Table 1: Demographic of sample

	Participant number	Percentage of sample
Nursing	74	33%
Administrative staff	61	27%
Allied Health	43	19%

Medical	19	7%
Operational (kitchen, cleaners, porters)	9	4%
Professional (legal, finance, library)	6	3%
Other (volunteers, chaplains)	15	7%
TOTAL employees	227	

Results

To test Hypothesis 1a and 1b: *Patient safety culture and reflexivity are positively related to quality of patient care*; we conducted a preliminary analysis for correlation.

The relationships between the three variables of patient safety culture, reflexivity and quality of patient care were tested using Pearson product-moment correlation coefficient. Preliminary analysis were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. As shown in table 2, there was a strong positive correlation between our three variables that was significant at the $p < 0.01$ level.

Table 2: Pearson Product Moment correlations between patient safety culture, reflexivity and quality of patient care

		Reflexivity	Patient Safety Culture	Quality Patient Care
Reflexivity	Pearson Correlation	1	.462[**]	.572[**]
	Sig. (2-tailed)		.000	.000
	N	156	148	148
Patient Safety Culture	Pearson Correlation	.462[**]	1	.431[**]
	Sig. (2-tailed)	.000		.000
	N	148	160	142

Quality Patient Care	Pearson Correlation	.572**	.431**	1
	Sig. (2-tailed)	.000	.000	
	N	148	142	149

**. Correlation is significant at the 0.01 level (2-tailed).

While we predicted a relationship between our variables, our next step was to test for an interaction and explore the strength of reflexivity as a moderating variable as stated in our second hypothesis.

H2: Reflexivity amplifies the relationship between patient safety culture and quality of care outcomes.

We derive three scores; one for patient safety climate (as the primary independent variable), one for reflexivity (as the moderator) and one for quality of patient care (as the dependent variable). In order to explore the strength of a moderating effect we used the PROCESS tool for SPSS by Andrew Hayes (Hayes & Ebscohost, 2013). The advantage of this tool is that it centres predictors, computes the interaction of the variables and does simple slope analysis. Our findings support our second hypothesis that *Reflexivity amplifies the relationship between patient safety culture and quality of care outcomes.* Moderation is shown by a significant interaction *b - .118, 95% CI (0.004, 0.233), t = 2.05, p< .0001.* This indicates that the relationship between patient safety culture and quality of patient care is moderated by reflexivity. Our model demonstrates that when reflexivity is low, there is a non-significant relationship between PSC and quality of patient care; *b = .146, 95% CI (-.0016, .295), t = 1.955, p = .053.* At the mean value of reflexivity, there is a significant positive relationship between PSC and quality of patient care; *b = .252, 95% CI (.091, .413), t = 3.097, p = .002.* When reflexivity is highest, the positive relationship between PSC and quality of patient care is amplified *b = .358, 95% CI (.133, .583), t = 3.143, p = .002.* Additional data for the linear model predictors of quality patient care are shown in Table 3.

Table 3: Linear Model of predictors of Quality Patient Care				
	b	*SE B*	*t*	*p*
Constant	3.7555 (3.66, 3.85)	0.0490	76.5964	*p<.0000*
Reflexivity	0.3324 (0.22, 0.45)	0.0575	5.7794	*p<.0000*

Patient Safety Culture	0.2521 (0.91, 0.14)	0.0814	3.0970	*p*<.0024
Reflexivity x Patient Safety Culture	.1183 (0.004, 0.23)	0.0577	2.0493	*p*<.0423

Note. R^2 = .38

Our model in Figure 2 shows that reflexivity and patient safety climate improve quality of patient care. We find support for our hypothesis of the moderating effect of reflexivity on the relationship between patient safety culture and quality of patient care, which is significant at the p < .005 level.

There is a significant relationship between patient safety culture and quality of patient care such that when reflexivity is high, the relationship is significant and positive the lines diverge. The optimum level of quality of patient care is when both reflexivity and patient safety are high. While patient safety on its own leads to quality of patient care, a workforce that is reflexive will amplify these benefits.

Figure 2: Moderating effect of reflexivity (RFX) on the relationship between patient safety culture (PSC) and quality of patient care
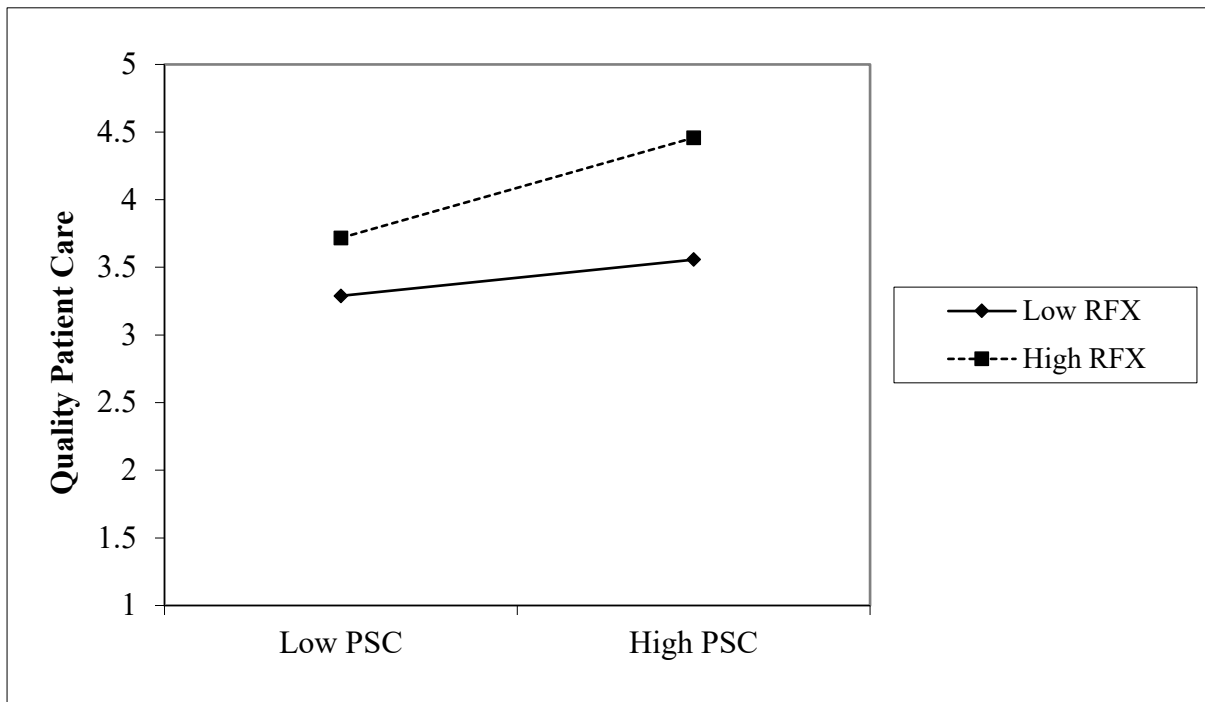
Questionnaires are the most commonly used methodology in patient safety studies (O'Connor, Buttrey, O'Dea, & Kennedy, 2011). A number of limitations accompanies the use of surveys as a means of data collection, particularly where constructs are assessed from the same sample. Non-random response bias has been identified as a major consideration when using survey methodology (Chang, Witteloostuijn, & Eden, 2010; O'Connor et al., 2011). A limitation of analysing survey data based on the same respondent groups is the risk of common method variance. For this reason, a number of post hoc statistical tests have been employed to try to reduce this error. As our study focuses primarily on assessing the significance of third order effects, there is less susceptibility to common variance bias than would be the case for studies examining only primary or secondary effects (Chang et al., 2010). All items were loaded onto a single factor as per Harmans test (Morrison, 1961). Our results provided a result of 43% which is under the benchmark of 50%.

Discussion and implications for practice

This paper provides empirical evidence of the relationship between patient safety culture, reflexivity and quality of patient care. Furthermore, we demonstrate that when combined, reflexivity and patient safety culture lead to heightened levels of quality patient care. The moderating effect of reflexivity is significant at the $p < .005$ level; our "pixie dust" has a measurable effect. The first finding, that patient safety culture is related to quality of patient care is reassuring. One would hope this to be the case as many improvement projects have been delivered with this one goal in mind. Demonstrating that reflexivity is related to quality of patient care is tangible evidence that reflexivity is worth studying and that it requires further attention as a phenomena in the patient safety arena. We consider the implications of our findings and make suggestions under the themes of a) professional issues and b) organisational approaches.

a) Professional issues

The review of patient safety curriculum guidelines to include concepts of reflexivity and a link to patient safety and quality of patient care warrants consideration (Vivekananda-Schmidt & Sandars, 2016). We interpret our findings to indicate that training health professionals in reflexivity techniques may improve patient safety culture and benefit quality of patient care. The current practice of using reflection activities in undergraduate training programs could be extended to include skills in reflexivity. We are not dismissing the importance of reflection; but suggesting that adding a reflexivity component may lead to improved benefits.

Despite the widespread use of reflection as a method of assuring clinical competence, there is limited empirical evidence linking the act of reflection with patient care outcomes. For some health

professionals records of reflection are vital evidence for continued licencing and registration. Our findings suggest an opportunity to expand this process to recognise reflexive practice. Investigating methods of capturing reflexivity requires further research. Our model shows that while patient safety culture relates to higher perceptions of the quality of patient care, this association strengthened when reflexivity is high.

b) *Organisational approaches*

Attempts to improve patient safety culture rely heavily on change management methods. Future efforts to develop team skills should consider targeted interventions aimed at stimulating reflexivity. Additional research would assist in a better understanding of the context and types of teams that are reflexive, and identify an effective reflexivity "dose". To date efforts at improving reflection and subsequently reflexivity have focused on direct learning outcomes for the clinicians. We propose that there is more to this, and that a reflexive workforce will lead to better outcomes for patient care by enabling broader organisational change. Teams are critical and effect quality improvement by internal processes and by output. Teams that use quality improvement have been found to be more effective (Lemieux-Charles et al., 2002).

We have previously defined reflexion as reflectivity in action; and view this as an activity that happens on a group or team level. Reflexivity is more than contemplation; it includes an active response or adaption (West, 2000). We describe it as the continued calibration of team behaviours in the delivery of patient care. The level of patient safety culture will set the tone within which patient care is delivered. A reflexive work force will respond nimbly as events unfold and adjust care behaviours to achieve better patient outcomes.

Teams have been described as information processing systems, and reflexivity reduces information-processing failures (Schippers et al., 2014). An information processing error is a failing of communication and communication errors contribute to a disproportionate number of clinical errors and adverse events. Schippers et al. (2014) present a framework whereby teams high in reflexivity are more likely to have reduced errors and failures. We provide empirical evidence of a significant relationship between reflexivity and patient safety culture. Furthermore, our findings show that

patient safety culture on its own is not enough as the moderating role of other phenomena such as reflexivity leads to magnified perspectives of patient quality of care.

The notion of pixie dust may appear naïve, but reflexivity offers a simple theory to improving patient outcomes. Clinicians and managers face a smorgasbord of programs aiming to enhance clinical practice and improve patient care. Such programs target teamwork, communication skills, compliance models and accreditation. A simplification of theories and approaches to patient safety and quality might yield cost effective benefits, and better inform practice. An enhancement of reflexivity skills may lead to better results across a number of areas. Organisational culture is pervasive, and not quickly adjusted. We argue that the act of reflexivity enhances the influence of patient safety culture and is positively related to better quality of patient care. Our findings also raise the prospect that reflexivity is a marker for quality improvement. To use our pixie dust analogy, patient safety culture exists, and when reflexivity increases, perceptions of quality outcomes are improved. There is an interaction that we have identified in an empirical model, and demonstrated in a graph. This magical effect requires further exploration.

Limitations

A practitioner's personal value system and habitus are essential parts of reflexivity and we have not explored the importance of these in our research. Our method used survey methodology and as such derived a score for each of our variables of patient safety culture, reflexivity and patient care outcomes. These scores are based participant "perceptions" collected from a survey tool. Safety culture surveys give a broad measure of the safety climate at the organisation at a particular point in time. While self-administered tools are widely used in patient safety research, they provide a perception at a point in time and can be affected by non-random error (O'Connor et al., 2011). This is one argument for the triangulation of quantitiave and qualitative methods for assessing safety climate (O'Connor et al., 2011). Our study relies only on quantitative data; and we recognise this limitation. The aggregation of data from all participants inhibits the ability to stipulate what type of team and in what circumstances reflexivity is aroused.

Conclusion

This paper finds a significant moderating effect of reflexivity on the relationship between patient safety culture and quality of patient care that is significant at the $p < .005$ level. We acknowledge the

limitations of survey-based methodology; however believe that the findings presented here provide evidence of the importance of developing a health workforce that is nimble and reflexive to patient safety climate. This research adds further to the understanding of organisational factors that may enhance the quality of patient care, and ultimately lead to better patient care outcomes.

"The moment you doubt whether you can fly, you cease for ever to be able to do it."
(J.M. Barrie, Peter Pan)

References

Ahmed, M., Arora, S., Carley, S., Sevdalis, N., & Neale, G. (2012). Junior doctors' reflections on patient safety. *Postgraduate Medical Journal, 88*(1037), 125-129. doi: 10.1136/postgradmedj-2011-130301

Alley, S., Jackson, S. F., & Shakya, Y. B. (2015). Reflexivity: a methodological tool in the knowledge translation process? *Health promotion practice, 16*(3), 426. doi: 10.1177/1524839914568344

Ambrose, L. J., & Ker, J. S. (2014). Levels of reflective thinking and patient safety: an investigation of the mechanisms that impact on student learning in a single cohort over a 5 year curriculum. *Advances in Health Sciences Education, 19*(3), 297-310. doi: 10.1007/s10459-013-9470-8

Australian Commission on Safety and Quality in Health Care. (2014). *Australian Commission on Safety and Quality in Health Care Annual Report 2013/14*. Sydney.

Berger, Z., Flickinger, T. E., Pfoh, E., Martinez, K. A., & Dy, S. M. (2014). Promoting engagement by patients and families to reduce adverse events in acute care settings: a systematic review. *BMJ Quality & Safety, 23*(7), 548-555. doi: 10.1136/bmjqs-2012-001769

Broekhuis, M. (2007). The usefulness and feasibility of a reflexivity method to improve clinical handover. *Journal of Evaluation in Clinical Practice, 13*(1), 109-115. doi: 10.1111/j.1365-2753.2006.00675.x

Caldwell, L., & Grobbel, C. C. (2013). The Importance of Reflective Practice in Nursing. *International Journal of Caring Sciences, 6*(3), 319-326.

Chang, S.-J., Witteloostuijn, A. v., & Eden, L. (2010). From the Editors: Common method variance in international business research. *Journal of International Business Studies, 41*(2), 178-184. doi: 10.1057/jibs.2009.88

Cunliffe, A. L. (2004). On Becoming a Critically Reflexive Practitioner. *Journal of Management Education, 28*(4), 407-426. doi: 10.1177/1052562904264440

Hayes, A. F., & Ebscohost. (2013). *Introduction to mediation, moderation, and conditional process analysis: a regression-based approach*. New York: Guilford Press.

Hohwü, L., Lyshol, H., Gissler, M., Jonsson, S. H., Petzold, M., & Obel, C. (2013). Web-based versus traditional paper questionnaires: a mixed-mode survey with a Nordic perspective. *Journal of medical Internet research, 15*(8), e173.

Hu, W., & Little, M. (2015). So what's the problem? Reflection and reflexivity as agents of change. *Medical Education, 49*(12), 1181-1183. doi: 10.1111/medu.12890

Iedema, R. (2011). Creating safety by strengthening clinicians' capacity for reflexivity. *BMJ Quality & Safety, 20 Suppl 1*(Suppl_1), i83-i86. doi: 10.1136/bmjqs.2010.046714

Jain, A. K., Hallensleben, T., & Manger, D. (2013). Reflexivity and innovation: conflicting counterparts? . *International Journal of Innovation and Technology Management, 10*(6). doi: 10.1142/S0219877013400269

Knippenberg, v. D., Hartog, d. D. N., Schippers, M. C., & Koopman, P. L. (2008). The role of transformational leadership in enhancing team reflexivity. *Human Relations, 61*(11), 1593-1616. doi: 10.1177/0018726708096639

Lemieux-Charles, L., Murray, M., Baker, G. R., Barnsley, J., Tasa, K., & Ibrahim, S. A. (2002). The effects of quality improvement practices on team effectiveness: a mediational model. *Journal of Organizational Behavior, 23*. doi: 10.1002/job.154

Mann, K., Gordon, J., & MacLeod, A. (2009). Reflection and reflective practice in health professions education: a systematic review. *Advances in health sciences education : theory and practice, 14*(4), 595-621. doi: 10.1007/s10459-007-9090-2

Mezirow, J. (1981). A Critical Theory of Adult Learning and Education. *Adult Education, 32*(1), 3.

Moreland, R. L., & McMinn, J. G. (2010). Group reflexivity and performance (Vol. 27, pp. 63-95): Emerald Group Publishing Limited.

Morley, M., Smith, J., & Petty, N. (2011). Advancing Reflective Practice: An Evaluation of an Observed Practice Workshop for Occupational Therapists and Physiotherapists. *The British Journal of Occupational Therapy, 74*(4), 181-184. doi: 10.4276/030802211X13021048723255

Morrison, D. F. (1961). Modern Factor Analysis (Vol. 56, pp. 444-446): American Statistical Association.

O'Connor, P., Buttrey, S. E., O'Dea, A., & Kennedy, Q. (2011). Identifying and addressing the limitations of safety climate surveys. *Journal of Safety Research, 42*(4), 259. doi: 10.1016/j.jsr.2011.06.005

Patterson, M. G., & West, M. A. (2005). Validating the Organizational Climate Measure: Links to Managerial Practices, Productivity and Innovation. *Journal of Organizational Behavior, 26*(4), 379-408. doi: 10.1002/job.312

Pezzolesi, C., Ghaleb, M., Kostrzewski, A., & Dhillon, S. (2013). Is Mindful Reflective Practice the way forward to reduce medication errors? *International Journal of Pharmacy Practice, 21*(6), 413-416. doi: 10.1111/ijpp.12031

Sammer, C. E., Lykens, K., Singh, K. P., Mains, D. A., & Lackan, N. A. (2010). What is patient safety culture? A review of the literature. *Journal of Nursing Scholarship, 42*(2), 156-165. doi: 10.1111/j.1547-5069.2009.01330.x

Schein, E. H. (1985). *Organizational culture and leadership*. San Franciso: Jossey-Bass Publishers.

Schippers, M. C., Edmondson, A. C., & West, M. A. (2014). Team Reflexivity as an Antidote to Team Information-Processing Failures. *Small Group Research, 45*(6), 731-769. doi: 10.1177/1046496414553473

Schippers, M. C., West, M. A., & Dawson, J. F. (2015). Team Reflexivity and Innovation: The Moderating Role of Team Context. *Journal of Management, 41*(3), 769-788. doi: 10.1177/0149206312441210

Schön, D. A. (1983). *The reflective practitioner: how professionals think in action*. New York: Basic Books.

Stefl, M. E. (2001). To Err is Human: Building a Safer Health System in 1999. *Frontiers Of Health Services Management, 18*(1), 1-2.

Urbach, T., Fay, D., & Goral, A. (2010). Extending the job design perspective on individual innovation: Exploring the effect of group reflexivity. *Journal of Occupational and Organizational Psychology, 83*(4), 1053-1064. doi: 10.1348/096317909X479394

Varkey, P., Reller, M. K., & Resar, R. K. (2007). Basics of quality improvement in health care. *Mayo Clinic proceedings, 82*(6), 735-739. doi: 10.4065/82.6.735

Vivekananda-Schmidt, P., & Sandars, J. (2016). Developing and implementing a patient safety curriculum. *The Clinical Teacher, 13*(2), 91-97. doi: 10.1111/tct.12528

Vogus, T. J., & Sutcliffe, K. M. (2007). The Safety Organizing Scale: Development and Validation of a Behavioral Measure of Safety Culture in Hospital Nursing Units. *Medical care, 45*(1), 46-54. doi: 10.1097/01.mlr.0000244635.61178.7a

Vogus, T. J., Sutcliffe, K. M., & Weick, K. E. (2010). Doing No Harm: Enabling, Enacting, and Elaborating a Culture of Safety in Health Care. *Academy of Management Perspectives, 24*(4), 60-77.

Weaver, S. J., Lubomksi, L. H., Wilson, R. F., Pfoh, E. R., Martinez, K. A., & Dy, S. M. (2013). Promoting a culture of safety as a patient safety strategy: a systematic review. *Annals Of Internal Medicine, 158*(5 Pt 2), 369-374. doi: 10.7326/0003-4819-158-5-201303051-00002

West, M. (2000). Reflexivity, revolution, and innovation in work teams. In M. B. D. Johnson (Ed.), *Product development teams* (pp. pp. 1-29). Stamford: JAI Press.

Wilson, R. M., Runciman, W. B., Gibberd, R. W., Harrison, B. T., Newby, L., & Hamilton, J. D. (1995). The Quality in Australian Health Care Study. *The Medical Journal Of Australia, 163*(9), 458-471.

Wittich, C. M., Reed, D. A., McDonald, F. S., Varkey, P., & Beckman, T. J. (2010). Perspective: Transformative learning: a framework using critical reflection to link the improvement competencies in graduate medical education. *Acad Med, 85*(11), 1790-1793. doi: 10.1097/ACM.0b013e3181f54eed