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Nurse perceptions of the impact of nursing care on patient outcomes: An exploratory study

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The aim of this research was to explore registered nurses' perceptions of the relationship between nursing care and clinical outcomes. We conducted an exploratory survey using a convenience sample of nurses attending a 3 day nursing practice conference. Nurses with postgraduate degrees and those with a clinical main work role had higher mean scores for the impact of nursing care on patient outcomes. Nurses reported that pressure ulcers and surgical wound infection were most affected by nursing care. Falls, medication errors, pain management, and patient education were some of the clinical indicators suggested as additional appropriate measures of nursing care. Our results suggest that nurses' educational background and work role may influence their perception of the impact of nursing care on patient outcomes.

Keywords: nursing sensitive outcomes; nurse perceptions; nursing

For almost a decade researchers have investigated the relationship between the quality and/or quantity of nursing care and adverse patient outcomes (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Kane, Shamliyan, Mueller, Duval, & Wilt, 2007; Lankshear, Sheldon, & Maynard, 2005; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Interest in quantifying this relationship emerged in response to a trend of reducing numbers of Registered Nurses per patient in an effort to curb rising health care costs (Aiken, Clarke, & Sloane, 2000; McCloskey & Diers, 2005; Shindul-Rothschild, Berry, & Long-Middleton, 1996). Some of the challenges in this field of research are yet to be fully resolved, for example, defining and accurately measuring nursing care (Reinier et al., 2005) and deciding upon suitable and measurable indicators of quality nursing care (Doran et al., 2006; Jennings, Staggers, & Brosch, 1999; Spetz, Donaldson, Aydin, & Brown, 2008). In 2002, a team of researchers constructed fourteen clinical indicators (listed in Table 1) that could be both conceptually linked to nursing care and feasibly measured using routinely collected hospital discharge information from administrative data sets (Needleman et al., 2002).

Following on from the work of Aiken, Smith, and Lake (1994) and Needleman, Buerhaus, Mattke, Stewart, and Zelevinsky (2001) there has been growth in the literature in the field. A systematic review of studies relating to hospital nurse staffing and patient outcomes was commissioned by the Agency for Healthcare Research and Quality, published in 2007 (Kane et al., 2007). Of the 94 eligible studies included in the meta-analysis, the pooled results showed that: every additional registered nurse full-time equivalent (FTE) per patient day was associated with a 'relative risk reduction in hospital-related mortality by 9% in intensive care units and 16% in surgical patients' (Kane et al., 2007, p. 2); the death rate decreased 1.98% for each additional nurse hour per patient day (95% CI 0.96–3.0%; Kane et al., 2007); and there was a significant negative correlation between the percentage of nurses with Bachelor of Nursing Science degrees and the incidence of death related to health care ($r = -0.46$, $p = 0.02$; Kane et al., 2007). The systematic review concluded that increased nurse staffing in hospitals is associated with better patient outcomes, but acknowledged that the relationship does not necessarily imply causation (Kane et al., 2007).

Despite the concept of nursing sensitive outcomes (NSO) being embraced internationally (International Council of Nurses, 2007) and a growing research focus in Australia there is limited evidence to support the conceptual validity of Needleman's 14 NSOs for practising nurses in Australia (Duffield et al., 2007; Twigg,

Table 1: Overall responses to impact of nursing care on clinical indicators

Clinical indicator	Mean response for impact of nursing care on clinical indicator	SD	Percentage of participants ranking clinical indicator in top three
Pressure ulcers	4.6	0.74	84
Length of stay	4.2	0.96	39
Surgical wound infection	4.2	0.94	48
Deep vein thrombosis	4.0	1.03	26
Hospital acquired pneumonia	4.0	1.07	25
Urinary tract infection	3.9	1.05	23
Sepsis	3.8	1.09	30
Death in hospital or within 30 days of discharge	3.6	1.07	7
Shock and myocardial infarction	3.4	1.14	12
Pulmonary failure	3.4	1.10	1
Physiologic or metabolic derangement	3.3	1.08	3
Central nervous system complications	3.3	1.08	1
Upper gastrointestinal tract bleed	2.8	1.16	0

Duffield, Bremner, Rapley, & Finn, 2011). There is a lack of research elucidating practising nurse's perceptions of how NSO have been defined and how NSO may be affected by measures of nursing care. Moreover we were interested in whether characteristics of the nurse, such as age, education level or job description, influence a registered nurse's perception of the impact of nursing care on NSOs. Aiken et al. (2002), argue that nurses are at the front line of patient care delivery and as such are well placed to influence patient outcomes, but is this potentially compromised if nurses do not recognise the effect of their care on patient outcomes? In addition, nurses at the 'front line' of patient care may have novel ideas about additional indicators that might reflect the quality of nursing care delivered.

Aim

The aim of our study was to explore registered nurses' perceptions of the impact of nursing care on 13 of the 14 clinical outcomes defined by Needleman et al. (2001). We targeted Registered Nurses attending a nursing practice conference where the keynote speaker was an international researcher into nurse sensitive outcomes. We hypothesised that nurses with a higher level of education would be more likely to identify the potential for the quality of nursing care to impact on patient outcomes.

Methods

Design

This is an exploratory survey using a convenience sample of Registered Nurses attending a 3 day nursing practice conference in Perth (Western Australia) in 2011. Participants visiting one of the conference trade booths were invited to complete a short questionnaire about their perceptions of the impact of nursing care on NSOs.

The questionnaire

The questionnaire was developed by the authors, piloted by six volunteer nurses (colleagues of the authors), and amended based on their feedback. One of the original 14 indicators developed by Needleman et al. (2001), 'failure to rescue' (FTR), was not included as it is a more complex concept than the other clinical indicators and could not be adequately explained within the limitations of a short survey form. As FTR has only lately been defined and explored within the research literature, understanding across nurses might be variable and consequently the responses would be difficult to interpret.

Part A of the questionnaire contained demographic questions about the participant including

age, years of nursing experience, educational attainment and main work role. Participants were asked to indicate their highest level of educational attainment from a list of six options: hospital diploma, bachelor's degree, postgraduate certificate, postgraduate diploma, master's degree, and doctor of philosophy or professional doctorate. For analysis purposes, responses of hospital diploma or bachelor's degree were grouped together as 'qualifying degree' and other responses were grouped as 'postgraduate degree'. Participants also selected their main work role from four options: clinical, education, management or research. Responses of education, management, research or a combination of these were grouped as 'non-clinical main work role' and responses of clinical on its own or combined with any other role were grouped as 'clinical main work role'.

In Part B participants were asked to indicate on a five-point Likert scale how much of an impact they thought nursing care had on each of the thirteen clinical indicators. One represented a 'Very small impact' and five represented a 'Very large impact'. Participants were then asked to select the three clinical indicators for patient outcomes most influenced by nursing care. Finally, they were asked to list additional clinical indicators they thought were influenced by nursing care.

Data analysis

Statistical analyses were completed using Statistical Package for the Social Sciences (SPSS) Version 19.0 software. Demographic data and survey responses were described using medians and/or means and standard deviations (SD) for continuous variables, and percentages for categorical variables. Likert scale responses were treated as continuous variables for descriptive purposes, but were treated as ordinal for the multivariable modelling. An odds ratio (OR) of one indicates that the reported average impact of nursing care is just as likely in both groups, an OR greater than one indicates that a larger score is more likely in the comparison group than the reference group (listed first). The *p* value indicates whether the OR is significantly different from one and the 95% confidence interval indicates the possible range of the population OR. Associations were tested at the 5% level of significance. Rather than only presenting a subset of our results or decreasing the significance level to adjust for multiple tests, all results have been reported with 95% confidence intervals. This approach is consistent with the advice of Perneger (1998). Mann Whitney *U* tests were used to compare overall nursing impact scores and ordinal regression (Norusis, 2010) was used to compare age adjusted responses to the impact of nursing care for each clinical indicator between different groups.

Participant suggestions for additional clinical indicators influenced by nursing care were analysed qualitatively. Responses were recorded verbatim from the questionnaire, distilled to the essential components while still retaining the original meaning of the text, and themes were abstracted from the condensed text by coding common responses and grouping them together (Graneheim & Lundman, 2004). The major themes and their descriptions are reported.

Ethical considerations

Individuals were not subjected to any prejudice or adverse consequence as a result of their refusal or agreement to participate. Identifying information was removed from the responses prior to analysis. Ethics approval for this research was granted by The University of Western Australia Human Research Ethics Committee (RA/4/1/4665).

Results

Participant group characteristics

Approximately 100 conference delegates were invited to participate and 73 returned questionnaires, providing a 73% response rate. Participants were all registered nurses with an average age of 44.8 years (SD = 10.23 years). The average length nursing practise was 22.5 years (SD = 10.95 years). The majority of participants were from Western Australia (85%) but a small proportion were from other Australian states or territories (8%) or overseas (7%). Their highest levels of educational attainment were hospital diploma (17%), bachelor's degree equivalent (22%), postgraduate certificate (13%), postgraduate diploma (16%), master's degree (21%) and PhD or professional doctorate (11%).

Participants reported their main work role as either clinical (24%), education (33%), management (18%), research (9%) or a combination of these roles (16%).

Impact of nursing care on clinical indicators

Table 1 shows the mean and SD of responses for the overall group when asked to quantify the impact of nursing care on the each of the clinical outcomes using the scale of 'one' to 'five', and the percentage of participants who ranked that particular clinical indicator in the top three most affected by nursing care. On average, participants responded that nursing care had a moderate to large impact on each of the clinical indicators. The majority of participants (84%) listed pressure ulcers in the top three indicators most affected by nursing care. Opinions were divided on which of the other clinical indicators were most affected by nursing care but there were several indicators that were scored in the 'top three' by less than 10% of nurses and no-one listed upper gastrointestinal tract bleed as being related to nursing care (see Table 1).

Group comparisons of impact of nursing care on clinical indicators

Nurses with postgraduate degrees had significantly higher mean scores for the effect of nursing care on patient outcomes overall (median = 4, mean = 3.8, SD = 0.79) compared with nurses who had not completed postgraduate degrees (median = 3, mean = 3.6, SD = 0.53; $p = 0.005$). Likewise, nurses in non-clinical roles had significantly higher mean scores (median = 3, mean = 3.9, SD = 0.61) than nurses in clinical work roles (median = 3, mean = 3.4, SD = 0.78; $p = 0.013$).

Nurses' responses to the impact of nursing care on each clinical indicator were compared for nurses with different levels of education and nurses with different main work roles. Table 2 reports the OR for the likelihood that nurses with certain characteristics would report larger impacts of nursing care on clinical indicators. Nurses with a postgraduate degree were significantly more likely to report that nursing care had a larger impact on urinary tract infection and sepsis (Table 2). Nurses whose work role included management, education, research or any combination of these non-clinical roles were more likely to report nursing care had a larger impact on seven out of thirteen clinical indicators (see Table 2).

Comparisons of clinical indicators most impacted by nursing care

All respondents agreed that nursing care had the most impact on pressure ulcers, length of stay and surgical wound infection. All nurses listed pressure ulcers and surgical wound infection as the two clinical indicators that nursing care had the most impact on. Five indicators, death in hospital or within 30 days of discharge, physiologic or metabolic derangement, central nervous system complications, pulmonary failure and upper gastrointestinal tract bleed, were least likely to be suggested by all groups as being in the top three indicators most impacted by nursing care.

Additional clinical indicators impacted by nursing care

Of the 73 people who completed the questionnaire, 32 suggested one or more additional clinical indicators they thought were related to nursing care, yielding a total of 72 individual suggestions. Broader definitions of hospital acquired infections, mental wellbeing, falls and patient education were among the most common themes. Table 3 outlines the 12 themes and gives examples for each.

Discussion

Impact of nursing care on clinical indicators

We surveyed a convenience sample of registered nurses to explore their views about the impact of nursing care on a number of clinical indicators that are purported in the literature to be associated with the quantity and/or quality of nursing care. We found that nurses with different educational backgrounds and work roles had different opinions about how much of an impact nursing care has on thirteen clinical indicators but agreed on the indicators most affected by nursing care. Despite an increasing body of literature regarding the relationship between nursing care quality and quantity on patient outcomes, there is a dearth of

Table 2: Age adjusted odds ratio for reporting a larger impact of nursing care on clinical indicators

Clinical indicator	Postgraduate degree versus qualifying degree			Non-clinical role versus primarily clinical		
	OR	95% CI	*p* value	OR	95% CI	*p* value
Death in hospital or within 30 days of discharge	1.76[a]	(0.74, 4.15)[a]	0.20[a]	1.87	(0.77, 4.54)	0.17
Central nervous system complications	1.52	(0.64, 3.66)	0.35	1.88	(0.76, 4.64)	0.17
Surgical wound infection	1.43	(0.59, 3.49)	0.43	**3.20**	**(1.25, 8.17)**	**0.02**
Pulmonary failure	2.46	(0.99, 6.09)	0.05	**2.77**	**(1.08, 7.10)**	**0.03**
Urinary tract infection	**2.66**[a]	**(1.11, 6.38)**[a]	**0.03**[a]	**3.73**[a]	**(1.49, 9.32)**[a]	**0.01**[a]
Pressure ulcers	1.23	(0.44, 3.39)	0.69	2.11	(0.75, 5.92)	0.16
Hospital acquired pneumonia	2.12	(0.88, 5.14)	0.10	**3.09**	**(1.23, 7.78)**	**0.02**
Deep vein thrombosis	1.69	(0.69, 4.10)	0.25	2.14	(0.86, 5.33)	0.10
Upper gastrointestinal tract bleed	2.04	(0.81, 5.12)	0.13	2.47	(0.94, 6.46)	0.07
Sepsis	**3.09**	**(1.26, 7.54)**	**0.01**	**3.96**	**(1.56, 10.05)**	**<0.01**
Physiologic or metabolic derangement	2.24	(0.89, 5.69)	0.09	**3.41**	**(1.26, 9.24)**	**0.02**
Shock and myocardial infarction	1.22	(0.52, 2.88)	0.65	**2.66**	**(1.07, 6.61)**	**0.04**
Length of stay	1.53	(0.63, 3.75)	0.35	1.52	(0.61, 3.80)	0.37

[a]These results were not adjusted for nurses' age to satisfy model fit requirements.
Bold values indicate statistically significant at the 0.05 level.

Table 3: Participants suggestions of additional clinical indicators on which nursing care has an impact

Clinical indicator	Examples	Percentage of respondents making this suggestion (*N* = 32)
Infection	'blood stream infection', 'sepsis', and 'hospital acquired infection'	34
Mental health indicators	'psychosocial stressors', 'patient coping mechanisms', 'psychological wellbeing', and 'delirium'	31
Falls	'falls', and 'falls injury'	25
Physiological outcomes	'clinical deterioration', 'malnutrition', and 'physiological wellness'	19
Patient education	'patient education', and 'better patient knowledge'	16
Readmission to hospital	'readmission', 'rehospitalisation d/t complications', and 'representation for similar'	12
Medication errors	'medication errors'	12
Positive outcomes	'positive effects not adverse effects', 'breastfeeding rates', 'patient satisfaction with care', and 'opportunistic immunisation'	12
Discharge information	'discharge planning', 'patient compliance', and 'discharge information'	9
Pain management	'pain management' and 'symptoms (pain)'	6

research about whether nurses from varied clinical and educational backgrounds recognise this association (Jordan, 2011).

Nurses who worked in roles delivering patient care or who had lower levels of educational attainment were less likely to indicate that nursing care impacted on patient outcomes than their non-clinical, postgraduate educated counterparts. This is concerning given that these are the nurses providing direct patient care and the likelihood of individuals to moderate their behaviour to optimise patient outcomes is reduced if they do not recognise the potential impact of their actions (Wood, Ferlie, & Fitzgerald, 1998). It is not clear why nurses with these characteristics have given lower average responses. It is possible that these nurses have not been afforded the same exposure to the research literature reporting the impact of nursing care on clinical indicators and unlike managers, researchers and educators have not seen the 'big picture' of the impact of nursing care on patient outcomes. The clinical indicators used in this survey were selected because they have been used widely in the international literature, and there is evidence to demonstrate that nursing care influences a patient's likelihood of suffering one of these complications (Kane et al., 2007; Lankshear et al., 2005). The results of this survey suggest a relative lack of appreciation of the application of research evidence to the practice of some nurses. This may indicate that better mechanisms should be implemented for disseminating this research evidence within the profession.

Top three clinical indicators most effected by nursing care

Although there were differences in opinions about the extent of the impact of nursing care on certain clinical indicators, there was agreement that pressure ulcers, surgical wound infection and length of hospital stay are those most affected by nursing care. Respondents agreed on the five indicators least likely to be related to nursing care, these being: death in hospital or within 30 days of discharge, physiologic or metabolic derangement, central nervous system complications, pulmonary failure, and upper gastrointestinal tract bleed. Since pressure area care and wound care lie firmly within the traditional domain of nursing, it is not surprising that these were identified as being most influenced by nursing care. The other indicators represent patient complications that can be associated with a failure in nursing care. However, they are also affected by the interactions of the interdisciplinary health care team and hence the impact of nursing care is more challenging to extricate from other influences within the complex health care environment. It is important that nurses have an understanding of the important role nursing plays within the health care team and can articulate the relevance of their role with respect to patient outcomes.

Additional clinical indicators

Eighty one per cent of the 32 participants who suggested additional indicators were nurses with university degrees whose primary work role was non-clinical although participants with these characteristics made up only 67% of the total sample. Thus, the additional clinical indicators were suggested by nurses who had demonstrated that they believed nursing care had a larger impact on patient outcomes than nurses with lower education levels and those who worked in clinical roles. In most cases their suggestions echoed work that has already begun in the field to find additional appropriate measures of nursing care. Broader definitions of hospital acquired infections, falls, medication errors, positive outcomes and pain management have all been considered by researchers as outcome indicators in this field (Lankshear et al., 2005; Lee, Chang, Pearson, Kahn, & Rubenstein, 1999; McGillis Hall, Doran, & Pink, 2004; Seago, Williamson, & Atwood, 2006). Patient education and discharge information are two possible indicators that have not been widely explored. They reflect core nursing care activities and could also be constructed as positive outcome indicators for measuring when nursing care is optimal, as opposed to indicators which focus on inadequate nursing care. Readmission to hospital, which was suggested by 12% of participants, was originally considered as a clinical indicator by Needleman et al. (2002). However, it was not included in this earlier work as it was deemed too difficult to measure using

the data available at the time. It may be time to revisit the practicalities of operationalising outcomes such as this which have been rejected in the past but may now be feasible given advances in patient data management systems.

Limitations

Participants in this study represent nurses from a variety of age groups, years of experience, education levels, and work roles. However we make no claim that our sample is representative of all nurses. This study used a convenience sampling method and a small sample size. The research reported here was intended as a preliminary exploration of nurses' opinions about NSO and took advantage of a situation where a large number of nurses were in one place for a concentrated period of time. It is likely that nurses who attended the conference and responded to the questionnaire are not representative of all nurses. Although the average age of respondents (44.8 years) is similar to the average age of nurses in general (44.1 years; AIHW, 2010) the educational and work role characteristics of the sample may mean they are more likely to be attuned to evidence based outcomes.

However, this suggests that a more representative sample may produce results that show even less appreciation of the evidence of the impact of nursing care on patient outcomes – which is concerning.

Conclusion

These results suggest that nurses' educational background and work role may affect their ideas about the impact of nursing care on patient outcomes. The aim of measuring the relationship between nursing care and patient outcomes is to identify strategies to optimise patient care and it follows that it is important to ensure that nurses 'at the coalface' appreciate the impact of their actions on patient outcomes. Our results indicate that there is a need to raise awareness among nurses of the influence of their care on patient outcomes. In addition, we need to give further consideration to the validation of the additional clinical indicators suggested by nurses in our survey as being potentially better measures of the impact of nursing care on patient outcomes.

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