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**After Hours Nurse Staffing,
Work Intensity and
Quality of Care –
Missed Care Study: South Australia**

**Final Report to the Australian
Nursing and Midwifery Federation
South Australian Branch**

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Glossary

A & E	Accident and Emergency Department
ANMF	Australian Nursing and Midwifery Federation
DON	Director of Nursing
EN	Enrolled Nurse
ICU	Intensive Care Unit
MET	Medical Emergency Team
MO	Medical Officer
NICU	Neonatal Intensive Care Unit
PCW	Patient Care Worker
RN	Registered Nurse

Acknowledgements

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Background to the Study

During November, 2012, the Flinders University *After Hours Nurse Staffing, Work Intensity and Quality of Care* project team, in collaboration with the Australian Nursing and Midwifery Federation, SA Branch (ANMFSA), administered the MISSCARE survey to a sample of 354 nurse/midwife members of ANMFSA.

The survey contained 13 demographic questions, 28 questions that explored working conditions, 96 questions concerning missed nursing care (defined as care that is omitted, postponed, or incomplete) and 17 questions concerning perceived reasons care is omitted in the settings in which the nurse/midwives practice.

In addition, respondents were asked to add comments of their own concerning nursing care that is missed and why.

Missed care

Beatrice Kalisch has done considerable work on Missed Care in the United States of America (USA) drawing upon scholarship which explores the impact of work environment, patient care demands and staffing issues on nursing outcomes (Kalisch, Landstrom and Hinshaw 2009). She defines missed care as “required patient care that is omitted (either in part or in whole) or delayed” and acknowledges that it is a response to “multiple demands and inadequate resources” (Kalisch et al., 2009, p. 1510). Her first foray into this area was the 2006 qualitative study on missed nursing care which became the foundation for the development of the MISSCARE tool. In this first study, Kalisch (2006) identified a range of core nursing tasks that were routinely omitted. These included discharge planning and patient education, emotional support, hygiene and mouth care, documentation of fluid intake and output, ambulation, feeding and general nursing surveillance of the patient; a key to ensuring patients do not deteriorate. The nurses in her study identified staffing levels, unexpected heavy work increase, too few resources and lack of supplies, inappropriate nursing skill mix rostered to a shift and poor handover, and orientation to the ward and team work, as key factors in explaining missed care.

In later work missed care is associated with three antecedents: (1) the labour resources available to provide patient care; (2) access to the material resources needed to provide patient care and (3) relationship and communication factors which impact on capacity to deliver care (Kalisch et al., 2009; Kalisch and Williams, 2009). This understanding underpins the MISSCARE survey originally developed by Kalisch and Williams (2009) to measure the amount and type of care missed by nurses in acute settings and the reason for omitted care. The MISSCARE survey has three components: demographic and workplace data; missed nursing care which consists of a list of nursing tasks which had been identified from the 2006 study as being omitted (Kalisch, 2006) and the reasons for missed care.

Kalisch’s subsequent work has explored the impact of different work environments on omitted care.

In 2009, Kalisch et. al. examined the impact of nursing teamwork on missed care, arguing that it was not simply the number of nurses rostered, but the skill mix of nursing staff that impacted on perceptions of whether care was missed. This study found that RNs were more likely to report missed care and to associate it with an unexpected rise in patient volume or acuity and rates of admission and discharge as well as access to material resources than nurse assistants, reflecting the different roles undertaken by the staff. The nature of teamwork was also the focus of a study by Kalisch and Lee (2010) that found that the level of teamwork accounted for 11% of missed nursing care. A more recent qualitative study compared differences in work environments between units with high and low levels of missed care. This study found that units with low levels of missed care had adequate and flexible staffing; continuous communication between staff; a strong team focus; shared accountability for monitoring and assessing work; sufficient backup; low RN turnover and a smaller geographic area to monitor. Leadership was also found to be important with the charge nurse having a reduced patient load to allow time for leadership (Kalisch, Gosselin, and Choi, 2012).

Work environment is an important factor in missed care. Papastavrou, Andreou and Efstathiou (2013) provide a more comprehensive positioning of Kalisch’s work on missed care in their systematic literature review of rationing care. They rightly establish that the dominant rationale for this research direction in the early part of the 21st century is that there are insufficient resources necessary for nurses to care for patients and that this phenomena is now global. Nurses are now forced to ration care, whether it be off peak or ordinary shift times. It is this that impacts on negative patient outcomes and is a major challenge to quality assurance, risk management and nurse satisfaction. Papastavrou et. al. (2013) situate Kalisch’s studies among those that directly explore rationing and its impact on patient quality care, and safety. Other approaches view missed care from either an ethical standpoint, or identify rationing as part of an organisational approach to nurse satisfaction and burnout.

Nursing after hours

This study sought to extend Kalisch's work to explore the incidence of missed care on after hours shifts (defined as between 1700 and 0900 and weekends) when other allied health and medical resources are limited or not available. It builds upon literature that demonstrates poorer health outcomes on after hour shifts. In the 1970's for example, MacFarlane (1978) found neonatal mortality to be 21% higher among babies born on the weekend in the United Kingdom. Soon after, Mathers (1983) reported similar negative consequences among weekend births in Australia. More recently, higher mortality rates have been reported for night-time discharges in Canadian hospitals (Priestap and Martin, 2006); for patients admitted on weekends with acute myocardial infarction in Korea (Hong, Kang, and Lee, 2010) and for patients admitted through emergency departments on weekends in Spain (Marco, Barba, Plaza, Losa, Canora, and Zapatero, 2010). In the USA increased mortality has been associated with the care received in hospitals on weekends and nights for more than 25 diagnoses/patient groups. Becker (2007) found acute myocardial infarction more likely to result in death among US Medicare patients admitted on the weekend and Goldfrad and Rowan (2000) reported mortality following night discharge from ICU to a general unit, to be 2.5-fold greater compared to discharge during the day. Peberdy et. al. (2008) found lower survival rates from in-hospital cardiac arrest at night and on the weekend, even after adjusting for potentially confounding factors.

Similar trends are evident in Australia. Pilcher, Duke, George, Bailey and Hart (2007) found that discharge from ICU between the hours of 1800 and 0559 was associated with increased rates of mortality and readmissions to ICU while Tobin and Santamaria (2006) found that discharge from ICU during the night shift resulted in 1.63 increase in mortality rates when compared with discharge during the morning shift.

Likewise, Jones et. al. (2005) identify greater use of medical emergency teams (METs) between 1800 and 0800 hours while Nichols, Copeland, Craib, Hopkins and Bruce (2008) found that medication errors were more likely to occur after hours in a large Australian metropolitan hospital.

Other Australian studies have been less definitive however. These include Adbel-Latif, Bajuk, Oei and Lui's (2006) study of mortality and morbidity among premature infants admitted to a neo-natal ICU (NICU) afterhours which indicated no increase in mortality.

Hamilton, Eschiti, Hernandez and Neill (2007) and Hamilton, Mathur, Gemeinhardt, Eschiti and Campbell (2010) USA studies identify hospital activity as at its peak from 7am to 7pm, Monday through Friday. This is a time when maximum resources are available in nurses' work environments. But peak periods make up only 36% of the time nurses actually work. During the remaining 64% of the time, nurses work in off-peak environments with (1) scaled back ancillary services; (2) often with fewer (often less experienced) staff, (3) minimal supervision, and (4) strained communication with on-call health care providers. This has occurred concurrently with increasing demand for flexibility of service delivery resulting in the extension of the some activities beyond peak hours. O'Loughlin, Smithies and Corcoran (2010) in a retrospective audit of surgery occurring during 2300 and 0800 in one Australian hospital found that both emergency and elective surgery were occurring overnight while Tobin and Santamaria (2006) in a retrospective cohort study found that demand for beds had resulted in later discharge from ICU to wards in 2000-2002 than in a comparable period in 1992-1994 resulting in transfer of patients with higher acuity to the wards at times when other supports are less readily available. Hamilton et. al. (2007) argue that these activities disproportionately affect after hours work environments for nurses as staffing levels are reduced during these times.

Reduced staffing levels in turn, have been associated with incapacity to perform some care tasks and poorer quality patient care. Current literature suggests as nurses' work intensifies they have less time to care for individual patients. Schubert, Glass, Clarke, Aiken, Schaffert-Witliet, Sloane and DeGeest (2008) reported results of a multi-hospital, international project studying the association between implicit rationing of nursing care and patient outcomes. They found that implicit rationing of nursing care was a significant predictor of the six negative patient outcomes studied. More recently, Kalisch and Williams (2009) found

that aspects of nursing care were most likely to be missed when nursing communication is impaired; material resources such as equipment and medications are unavailable or when patient acuity increases or nurse staffing decreases.

This study applies the tool developed by Kalisch and Williams (2009) to an Australian setting through a survey of 354 South Australian nursing and midwifery staff working across hospital and community settings. The study has potential to build on existing knowledge through provision of information about the experiences of ward and community nurses and midwives who have not previously been studied in Australia, but also in relation to the quality of care offered during both peak hour and after hour shifts as measured by a perceived capacity to perform nursing care.

Methods

Data were collected through the administration of the MISSCARE survey. Permission to administer the survey was successfully sought from Beatrice Kalisch. The team modified the demographic section of the survey to better fit with terminology and work environments in Australia and added separate questions to capture differences in missed care during day, evening, night, and weekend shifts. Ethics review was conducted by the Social and Behavioural Research Ethics Committee (SBREC) at Flinders University with final approval received on October 29, 2012.

The survey was administered using the online survey tool, *Survey Monkey*. Recruitment occurred through the Australian Nursing and Midwifery Federation (SA Branch) (ANMFSA).

The ANMFSA sent electronic invitations on November 1, 2012 to approximately 10% of its members; 1,600 nurses and midwives were randomly selected. This email contained a link to the online survey.

Methods (cont)

Members were told the research would provide information about when nursing care is missed and the circumstances under which this occurs. They were assured no identifying information would be collected and the raw data would not be viewed by anyone outside of the immediate research team.

They were also told demographic data would be used to identify patterns in responses and where the numbers of respondents in any category was small that the responses would be aggregated to prevent the possibility of identification of the respondent. This was later followed up by an advertisement in an electronic newsletter distributed to all ANMFSA members.

The survey was available online for members for two months from November 1st to December 31st and was completed by 354 nurses/midwives with 258 (22% response rate) and 72.9% nurses/midwives completing it in its entirety.

Results

Table 1: Demographic characteristics of respondents

	N	%
GENDER		
Female	261	90
Male	28	10
AGE		
Under 25	6	2
25-34	34	12
35-44	57	20
45-54	108	37
55-64	80	27
65 and above	6	2
YEARS OF EXPERIENCE AS A NURSE		
Less than 2 years	38	13
2-5 years	42	14
5-10 years	45	16
More than 10 years	166	57
LOCATION		
Metropolitan	197	68
Rural	93	32
SETTING		
Public	218	75
Private	54	19
Agency	18	6
NUMBER OF HOURS WORKED		
Less than 30 hours/week	95	33
30 hours or more /week	195	67
LENGTH OF SHIFT		
5-8 hours	199	99
9-12 hours	76	30
Greater than 12 hours	2	1

Demographic profile

Table 1 describes the demographic characteristics of the respondents. The majority of the sample was female (90%) with 66% aged 45 years and above. The respondents were experienced nurses with 73% having 5 or more years nursing experience. They came from a variety of settings. Both rural (32%) and metropolitan (68%) nurses were represented as were nurses working within the public (75%) and private sector (19%) with the remaining 6% employed by agencies. The majority worked 30 or more hours a week (67%) with a similar proportion (69%) working 5-8 hours/shift. When compared to the profile of ANMF members as a whole the gender distributions among ANMF members and our sample are very similar (females represented 89% and 90% respectively) however, our average respondent was older than the average ANMF membership (66% aged 45 years and older compared with 51% of ANMF members). A lower percentage of our sample of nurses/midwives (75%) worked in the public sector than did members of ANMF (80%). We also had slightly higher percentages of respondents in private (19%) and agency settings (6%) than found in the general membership of ANMF (16% and 3% respectively). Despite minor differences the sample of Registered Nurses/Registered Midwives in our study was comparable to the members of ANMF and our findings can be generalised to like members with reasonable caution.

Figure 1: Main area of employment of respondents to survey

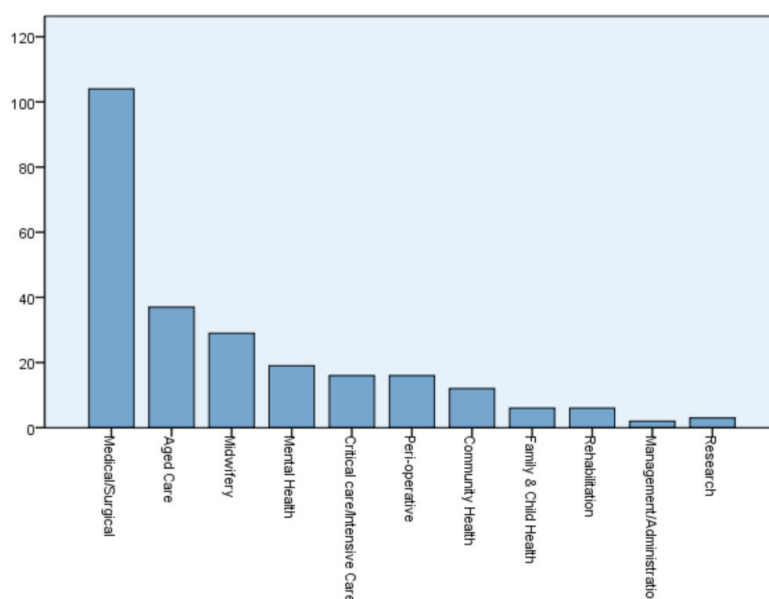


Figure 2: Adequacy of staffing on unit

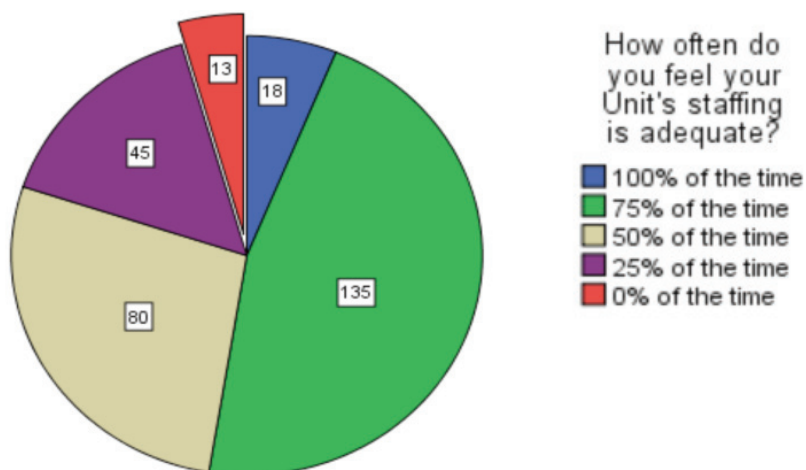


Figure 3: Rates of absenteeism within the last 3 months

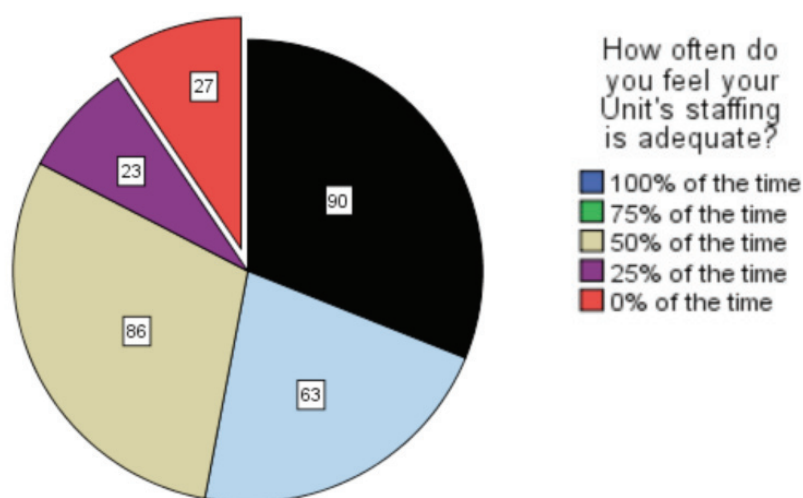
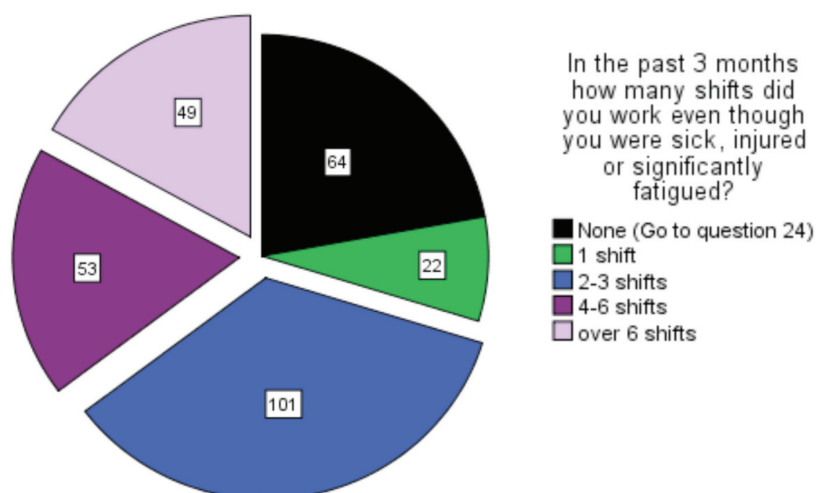


Figure 4: Rates of presenteeism in last three months



Working conditions

In addition to demographic data, information was collected on workforce factors.

Figure 1 outlines the main area of practice of nurses responding to the survey. The largest category of respondents worked on either medical or surgical wards, accounting for 104 responses (42%). This was followed by aged care (N=37, 15%) and midwifery (N=29, 12%). The data collected on working conditions also includes data about: perceived adequacy of staffing; overtime worked; job satisfaction; absenteeism and attending work when unwell.

Figure 2 shows how often respondents viewed staffing on their unit to be adequate. Only 18 respondents (6%) viewed staffing as adequate at all times. The most common response was to view staffing as adequate 75% of the time, with 13 respondents (4%) stating that staffing was never adequate.

Respondents were also asked to indicate how often and the number of hours of overtime they had worked within the last three months.

Results (cont)

While many respondents (N=66, 22.8%) had worked overtime less than five times or between 5 and 10 times (N=83, 28.7%) there is also a group who reported working overtime over 20 times (N=51, 17.6%). Similar findings were evident when respondents were asked how many hours of overtime they had worked. Of these respondents 71 (25%) had not worked overtime, 80 (29%) had worked between 0-10 hours and 48 (17%) had worked 11-15 hours. At the other end of the scale 40 respondents (14%) had worked more than 20 hours overtime in the previous three months. Participants were given the option of commenting on overtime. The majority noted that any overtime worked was either unpaid or alternatively they were given time off in lieu while part-time staff noted that they were often expected to work extra hours that were not considered overtime (N=51, 17.6%). Respondents were asked how many rostered shifts they had missed due to sickness, fatigue or injury within the previous 3 months (absenteeism) as well as the number of shifts they had worked when ill, fatigued or injured (presenteeism).

Figure 3 provides data for rates of absenteeism within the last three months. From this data it is evident that 83% (n=239) of respondents had been absent for 3 or less shifts within the previous 3 months, with 90 (31%) not missing any rostered shift. This does not imply that they had not experienced illness, fatigue or injury, rather respondents report working when unfit to work (see **Figure 4**). Of these respondents 102 (35%) had worked 4 or more shifts and 101 (35%) working 2-3 shifts.

When asked to indicate the reasons why they worked when ill, injured or significantly fatigued, 154 (43.5%) felt an obligation to colleagues; 127 (36%) indicated that they were short staffed; 75 (21%) worked for financial reasons; 65 (18%) felt fit for work; and 29(8%) had no sick leave left. A final set of questions address satisfaction with their current position; with teamwork on their unit and with nursing as a profession along with intention to leave their current position. Levels of satisfaction with nursing as a profession were generally high, with 197 (67%) of respondents indicating that they were satisfied or very satisfied with nursing as a profession.

This is reflected in level of satisfaction with their current position with 152 (52%) indicating that they were satisfied or very satisfied with their current position. This is borne out in levels of satisfaction with teamwork on their unit with 180 (62%) reporting being satisfied or very satisfied and is also reflected in intention to leave their current position with 185 (64%) having no intention to leave.

Missed care

A second component of the survey addressed the type and amount of care which respondents viewed as being omitted. Participants were asked to indicate on a five point scale where 1 is never omitted and 5 is always omitted, the frequency in which different aspects of care were missed.

Figure 5 graphs mean scores for frequency of missed care across all shifts.

Figure 5: Mean frequency for missed care across all shifts

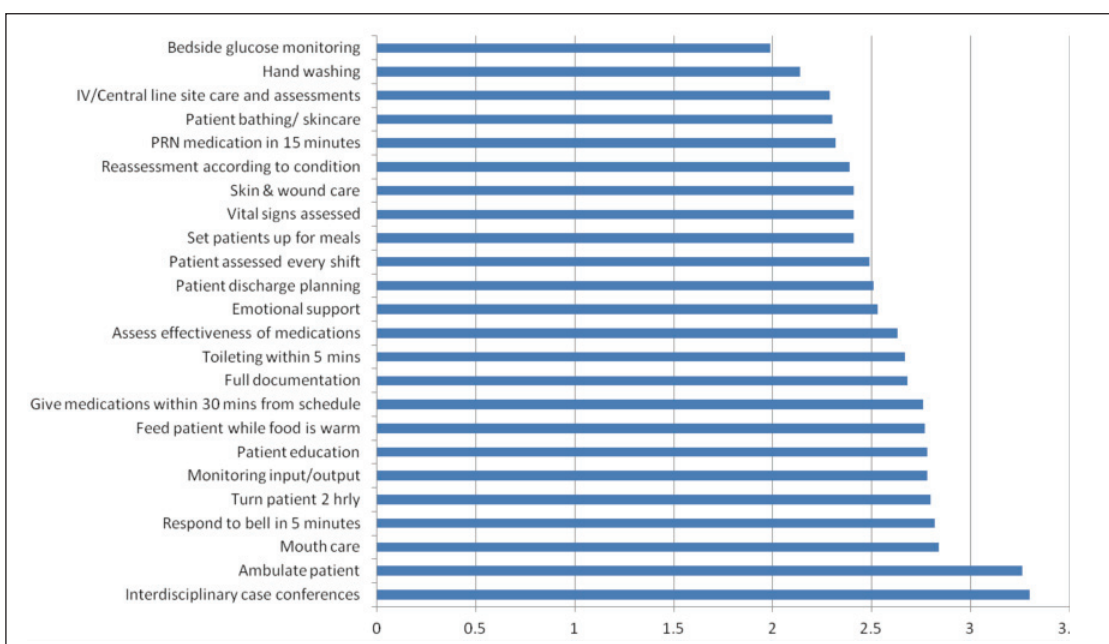


Figure 5 demonstrates that the tasks that are most frequently reported as being omitted are interdisciplinary case conferences (mean=3.30) and ambulation of patients (3.26). At the other end of the scale the tasks reported as least often omitted are blood glucose monitoring (1.99); hand washing (2.14); and IV/central line care (2.29). Bathing patients (2.30) and providing PRN¹ medication within 15 minutes (2.32) are also reported as being missed less frequently suggesting that when nursing time is rationed priority is given to clinical and basic nursing care tasks over other tasks which may be less immediately important for patient well-being.

Table 2 provides mean scores for the frequency for which each activity is performed across early, late, night and weekend shifts. Generally the scores are similar across shifts with staff reporting marginally less tendency to omit nursing tasks on the night shift when compared with other shifts. There are some notable exceptions. Attendance at interdisciplinary case conferences for example, is less likely to be omitted on an early shift compared with other shifts while nurses report that ambulation of patients is more likely to be missed on night shift. These responses are likely to reflect the timing of organisation of work. While respondents were given the option of identifying a task as not being applicable on a given shift this option was not always used.

Table 2: Comparative mean scores for frequency in which care is missed across all shifts

	<i>Early</i>	<i>Late</i>	<i>Night</i>	<i>Weekend</i>	<i>All shifts</i>
Interdisciplinary case conferences	3.03	3.33	3.59	3.48	3.30
Ambulate patient	3.12	3.29	3.65	3.16	3.26
Mouth care	2.79	2.94	2.71	2.90	2.84
Respond to bell in 5 minutes	2.84	2.88	2.67	2.89	2.82
Turn patient 2 hourly	2.88	2.92	2.69	2.86	2.80
Monitoring input/output	2.80	2.85	2.58	2.87	2.78
Patient education	2.71	2.83	2.70	2.78	2.78
Feed patient while food is warm	2.79	2.83	2.48	2.77	2.77
Give medications within 30 mins from schedule	2.74	2.80	2.52	2.81	2.76
Full documentation	2.68	2.80	2.56	2.68	2.68
Toileting within 5 mins	2.65	2.73	2.56	2.73	2.67
Assess effectiveness of medications	2.56	2.67	2.60	2.69	2.63
Emotional support	2.52	2.61	2.43	2.55	2.53
Patient discharge planning	2.37	2.57	2.60	2.55	2.51
Patient assessed every shift	2.42	2.55	2.49	2.50	2.49
Set patients up for meals	2.38	2.44	2.31	2.45	2.41
Vital signs assessed	2.41	2.47	2.30	2.47	2.41
Skin & wound care	2.34	2.43	2.43	2.40	2.40
Reassessment according to condition	2.33	2.41	2.36	2.46	2.39
PRN medication in 15 minutes	2.29	2.37	2.24	2.37	2.32
Patient bathing/ skincare	2.23	2.35	2.33	2.32	2.30
IV/Central line site care and assessments	2.28	2.31	2.28	2.30	2.29
Hand washing	2.09	2.18	2.12	2.19	2.14
Bedside glucose monitoring	2.00	2.03	1.92	2.02	1.99

Reason for missed care

Finally, participants were asked to rate 17 factors for the degree of impact they had on potential to omit care on a scale of 1 to 4 where 1 was not a reason and 4 was a significant reason. **Table 3** provides raw data on the significance given to the impact of each factor on missed care. From this table it is clear that over half of the respondents viewed an 'unexpected rise in patient volume or acuity' as a significant reason for missed care. 'Heavy admission and discharge activity' (44.8%); 'Inadequate numbers of staff' (43.4%) and 'inadequate number of assistive and/or clerical personnel' (40.2%) were also identified as significant factors in missed care.

A similar trend is evident when mean scores are examined. **Figure 6** plots the mean score for each variable. Those factors with higher scores indicate that this factor was considered as having a more significant impact on missed care.

Returning to the three antecedents identified by Kalisch and Williams (2009) of the five top reasons for omitted care are two dealing with staffing issues ('Inadequate number of staff'; 'Inadequate number of assistive and/or clerical personnel'); two address issues of throughput and patient 'churn' (Duffield, Diers, Aisbett, and Roche, 2009) ('Unexpected rise in patient volume and/or acuity'; 'Heavy admission and discharge activity') and one relates solely to the changing acuity of patients ('Urgent patient situations').

Issues of access to resources are also identified particularly in relation to accessing medications and equipment when needed, while issues of communication between health professionals were viewed as less problematic by this cohort.

¹ PRN – from the Latin pro re nata or 'as needed'.

Results (cont)

Figure 6: Mean score for significance of factors that impact on missed care

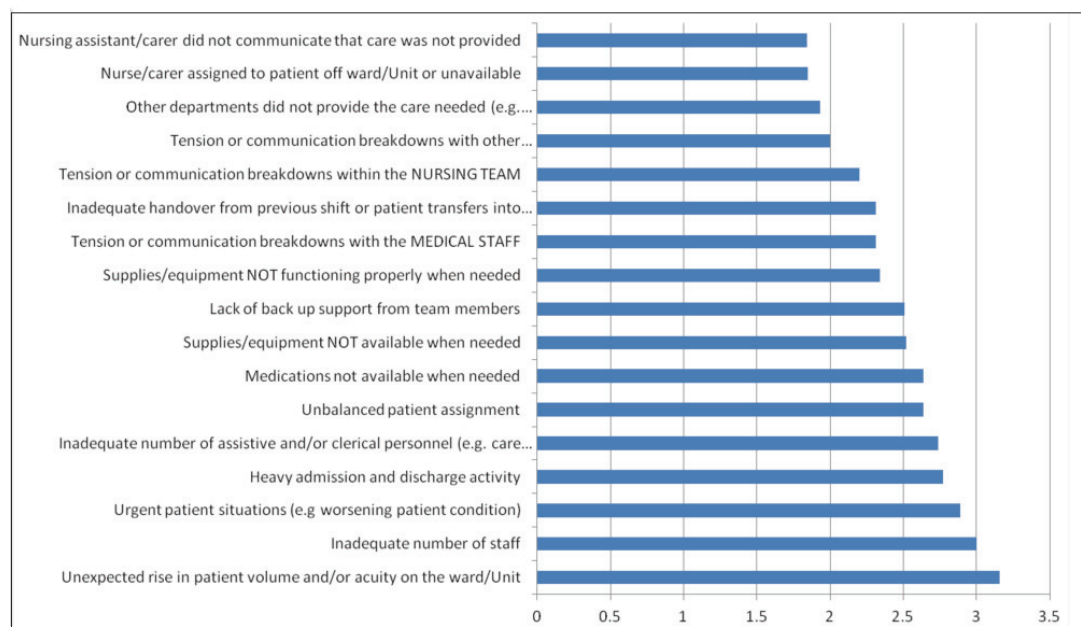


Table 3: Impact of reasons for missed care

	Not a reason	Minor reason	Moderate reason	Significant reason	N/A	Mean	N
Unexpected rise in patient volume and/or acuity on the ward/Unit	3.2% (8)	8.8% (22)	26.3% (66)	54.2% (136)	7.6% (19)	3.16	251
Inadequate number of staff	3.2% (8)	21.9% (55)	26.7% (67)	43.4% (109)	4.8% (12)	3.00	251
Urgent patient situations (e.g. worsening patient condition)	4.4% (11)	17.3% (43)	30.5% (76)	39.8% (99)	8.0% (20)	2.89	249
Heavy admission and discharge activity	6.0% (15)	12.4% (31)	22.4% (56)	44.8% (112)	14.4% (36)	2.77	250
Inadequate number of assistive and/or clerical personnel (e.g. care assistants, ward clerks, porters)	10.4% (26)	18.3% (46)	22.3% (56)	40.2% (101)	8.8% (22)	2.74	251
Unbalanced patient assignment	7.7% (19)	23.4% (58)	25.0% (62)	33.9% (84)	10.1% (25)	2.64	248
Medications not available when needed	8.4% (21)	27.1% (68)	25.5% (64)	31.5% (79)	7.6% (19)	2.64	251
Supplies/equipment NOT available when needed	10.8% (27)	28.5% (71)	27.3% (68)	25.7% (64)	7.6% (19)	2.52	249
Lack of back up support from team members	11.6% (29)	31.2% (78)	27.6% (69)	23.6% (59)	6.0% (15)	2.51	250
Supplies/equipment NOT functioning properly when needed	14.8% (37)	33.6% (84)	20.8% (52)	22.4% (56)	8.4% (21)	2.34	250
Tension or communication breakdowns with the medical staff	14.6% (36)	31.2% (77)	26.7% (66)	18.6% (46)	8.9% (22)	2.31	247
Inadequate handover from previous shift or patient transfers into ward/Unit	12.7% (32)	33.9% (85)	29.5% (74)	15.5% (39)	8.4% (21)	2.31	251
Tension or communication breakdowns within the nursing team	18.4% (46)	33.2% (83)	26.4% (66)	14.0% (35)	8.0% (20)	2.20	250
Tension or communication breakdowns with other ancillary/support departments	19.6% (49)	36.8% (92)	21.2% (53)	10.8% (27)	11.6% (29)	2.00	250
Other departments did not provide the care needed (e.g. physiotherapy did not ambulate)	16.5% (41)	31.3% (78)	21.7% (54)	12.4% (31)	18.1% (45)	1.93	249
Nurse/carer assigned to patient off ward/Unit or unavailable	22.6% (56)	29.8% (74)	16.5% (41)	13.3% (33)	17.7% (44)	1.85	248
Nursing assistant/carer did not communicate that care was not provided	17.3% (43)	29.4% (73)	19.4% (48)	12.5% (31)	21.4% (53)	1.84	248

Reason for missed care (cont)

Figure 7 provides a path analysis of the impact of some of the demographic, workplace and the resourcing variables outlined in Figure 6 on capacity for missed care for general and ICU qualified nurses. This sample was chosen as this group is most likely to perform the range of tasks included within the survey. The Partial Least Squares Path Analysis (PLS-PATH 3.01) program was used to test the model of variables that were thought to influence nurses' estimates of missed nursing care. The main aim of this procedure is to estimate relationships (and their magnitude of influence) between the predictor variables and the final outcome (Noonan 1985), which in this case is the nurses' estimates of reported missed nursing care in the day shift of nursing work.

The variables that are directly attributable to the frequency of reported missed nursing care will be discussed first together with their magnitude of influence and then factors that have indirect effects on why nursing care is reported as being missed, will follow.

Thirty-two per cent of the variance of the frequency of reported missed nursing care scores are predicted by the combination of these direct and indirect variables. Figure 7 identifies that there are six (statistically significant) variables that directly influence the self-reported incidences of missed nursing care as generated by general and ICU nurses participating in the survey. This can be seen by identifying the arrows that arrive to the missed nursing care variable (No.12).

Adequacy of nursing resources and the frequency of reported missed nursing care

A significant influence on reported missed nursing care arises from the variable portraying resource allocation (No.7) with a co-efficient of +0.61. This path demonstrates that lack of either human and/or physical resources for participating qualified nurses has the strongest influence on the increased incidences of reported missed nursing care.

This influence is felt most strongly by nurses employed in the rural sector as shown by a path arising from the Worksite variable (No.1) towards the nursing resource variable (No.9) with a co-efficient of -0.25.

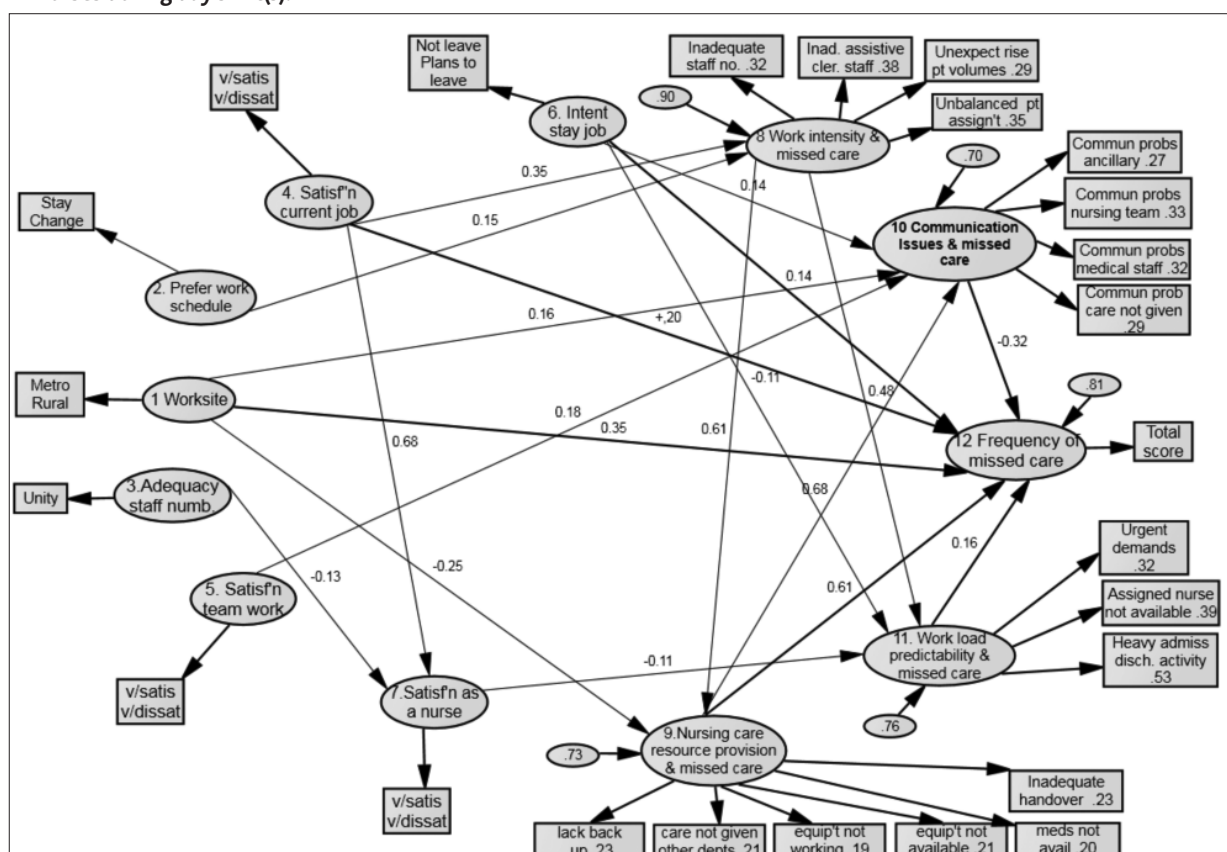
Nurses' worksite and the frequency of reported missed nursing care

Nursing staff employed in metropolitan hospitals (No.1) believe their worksite contributes more toward reported missed nursing care overall, compared to those nursing staff employed in the rural sector. This relationship between worksite and the incidences of reported missed nursing care is significant with a co-efficient of +0.35.

The role of nurse communication and the frequency of reported missed nursing care

An inverse relationship of influence exists between the variables that identify if communication tensions between nurses and other health care providers (No.10) are as a contributing factor for the reported incidences of missed nursing care.

Figure 7: Final path model identifying factors that influence frequency of missed nursing care for general & ICU qualified nurses during day shift(s).



Results (cont)

Reason for missed care (cont)

As the co-efficient between these two variables is -0.32 , any major communication problems that may exist between nurses and others involved in patient treatment, is not a significant factor or a major reason contributing to an increased frequency of reported missed nursing care.

Nurses' current level of job satisfaction and the frequency of reported missed nursing care

The current level of job satisfaction of participating qualified nurses (No.4) does have a direct influence on the frequency of reported missed nursing care (No.12) with a co-efficient of $+0.20$. Participant nurses who have increasing dissatisfaction with their current work position believe that nursing care is reported as being missed more frequently compared to other nurses who are more satisfied in their current roles.

The predictability of nurses' work and the frequency of reported missed nursing care

The predictability of the nurses' work (No.11) influences the incidences of reported missed nursing care (No.12) with a path co-efficient of $+0.16$. This relationship confirms that nurses' urgent work demands, together with heavy admission and discharge activity along with a lack of assigned staff were significant reasons for increased incidences of reported missed nursing care.

Nursing staff retention and the frequency of reported missed nursing care

Nurses who are intending to remain in their current job (No.6) are witnessing and reporting increased incidences of missed nursing care (No.12), compared to nurses who indicated they are intending to leave their jobs. A path co-efficient of $+0.14$ exists between these two variables.

There are additional variables exerting influences on the frequency of reported missed nursing care and do so indirectly by modifying the influence variable have on frequencies of reported missed nursing care, as discussed above. As these variables do impact on the overall predictability and explanation of the incidence of reported missed nursing care model, it is worthy of exploring their impact briefly.

The influence of the nurses' work intensity (No.8) on the allocation of nursing resources (No.9) and the frequency of reported missed nursing care (No.12)

It has already been established that the provision of nursing care resources has a strong direct influence on the frequency of reported missed nursing care however, the work intensity variable is also having an effect on the allocation of nursing resources with a co-efficient of $+0.61$. This path identifies that the nurses' degree of work intensity is in turn strongly influencing their view of the availability of nursing resource allocation for nursing care, and both variables are combining as mechanisms of influence on the frequency of reported missed nursing care.

The influence of the nurses' work intensity (No.8) on the predictability of nurses' work (No.11) and the frequency of reported missed nursing care (No.12)

Similarly, workload predictability has been shown to have a direct influence on the frequency of reported missed nursing care however, the work intensity variable is in turn influencing the workload predictability variable with a path co-efficient of $+0.48$. This path strongly demonstrates, that work intensity in combination with the influence of workload predictability are having a conjoint impact on the frequency of reported missed nursing care.

The influence of nursing resource provision (No.9) on communication role of the nurse (No.10) and the frequency of reported missed nursing care (No.12)

Another indirect influence on why nurses believe reported nursing care is increasingly being missed can be identified by examining the relationships between the variables portraying resource provision for nursing care and the health professional communication variable. A path co-efficient of $+0.48$ exists here and this strongly indicates that nurses who see inadequate resource allocation for nursing care, believe it to be related to, or an influence on communication tension between health care staff which in turn, influences the frequency of reported missed nursing care.

Nursing staff retention (No.6) and its effects on the predictability of nurses' work (No.11) and the frequency of reported missed nursing care (No.12)

Participant nurses who intend to stay in their current job was previously shown to have a direct influence on the frequency of reported nursing care being missed. However, staff retention simultaneously influences workload predictability with a path co-efficient of +0.20. This demonstrates that nurses who are planning to remain in their current work roles, believe that the unpredictability of their nursing work is having a significant impact on the increased frequency of reported missed nursing care.

Satisfaction with role of a nurse (No.7) and its effects on the predictability of nurses' work (No.11) and the frequency of reported missed nursing care (No.12)

A negative co-efficient (-0.11) extends from the variable that identifies if participating nurses are satisfied (or not) with their role as a nurse that in turn influences the predictability of their work. This inverse relationship confirms the view that nurses dissatisfied with their role as a nurse, believe their work to be more unpredictable, which in turn contributes to the increased frequency of reported missed nursing care.

Summary of attribution variables and their influences on reported missed nursing care, according to shift of work type

Table 4 illustrates how the reasons for reported missed nursing care vary according to shift type being undertaken by participant nurses.

Table 4: Variables which have a direct and indirect influence on missed care by shift type

Type of shift where frequency of missed nursing care has been reported	Variable type and magnitude of direct influence on the reasons for the frequency of reported missed nursing care	Variable type and magnitude of indirect influence on the reasons for the frequency of reported missed nursing care
NIGHT SHIFT	Adequacy of resources for care (+.37) Current is preferred roster (+.24) Worksite (+.22) Work status (-.17)	Workload intensity (+.64) Worksite (-.32) Satisfaction with current job (+.18)
EVENING SHIFT	Workload intensity (+.43) Current is preferred roster (+.17) Nurses' Age (-.13)	Workload intensity (+.64) Satisfaction with current job (-.39) Worksite (-.35) Satisfaction with level of teamwork (+.19) Work status (+.12)
WEEKEND SHIFTS	Satisfaction with current job (+.40) Intention to stay in current job (+.26) Workload intensity (-.23)	Worksite (-.35) Nurses' Age (+.28)

Open-ended Questions

Additional information was collected from open questions that asked respondents to comment further on missed care in their work area.

Overwhelmingly, the responses dealt with staffing issues, with aged care and rural hospitals self-identifying as areas with unique issues in relation to staffing.

Staffing shortfalls are related by these participants to three main factors:

- 1 ineffective methods for determining staffing levels,
- 2 competing demands that reduce time for patient care, and
- 3 skill mix.

The critique of methods for determining staffing levels centre on the limitations of Excelcare² but also of fixed nurse/patient ratios.

One respondent notes that:

The Excelcare hours don't seem to cover the actual care that the patients really need, these are people that we deal with and their care can't be put down on paper as evaluating to the minute. Every person is different but they get their care categorised just the same as every other patient on the ward...

For another respondent Excelcare is limited in its capacity to recognise the workload associated with new admissions:

Excelcare allows minimal time for admissions that are not already on the ward so multiple expected surgical patients (who may require full admission, ECG, blood work, etc) do not change our Excelcare requirements enough to allow for adequate staff.

A third respondent notes the limitations of Excelcare when a patient's condition deteriorates:

There has always been a lack of quantity of nursing staff based on the unit of care needed on Excelcare. We may receive a patient on my medical ward that may not be so ill at time of admission, but then their health can decline and you need to spend more time with that patient and the your other three patient's care suffers...

Respondents also express concerns with fixed staff/patient ratios due to "unfair allocation of patients" arising from patient acuity. One respondent considers:

...Staff based on patient numbers [as] a joke... ..that is fine if there is consistency, according to the calculations, sadly that is not reality. Six heavy, high need patients for an allocation on a late shift is putting too much demand on a nurse....

A second theme relates to the impact of time taken to perform non-clinical tasks on adequate staffing. This theme is particularly evident among community and rural nurses or after hours in metropolitan hospitals.

One metropolitan nurse notes that:

...no administration, constant calls, family discussions, patient care, 24 hour A&E, psychiatric patients not detained because the doctor was not willing to do the necessary forms and full paperwork for admissions, discharges and transfers.

All these factors impact upon workload on late shifts while another respondent commented upon the lack of clerical support on night shift and how this impacts on nurses' control over patient admissions. For community nurses workload is compounded by factors such as the amount of paperwork, or:

distances to travel to clients homes, wrong information passed onto the nurse eg: wrong address or phone number usually due to the client moving house, safety issues in the house (guns/ drugs/dog), domestic violence in the house, home visits not done due to staff illness and no casual staff employed, large population growth in the area without extra resources to meet the needs of that growth.

For rural nurses having to cover Accident and Emergency (A & E) as well as wards and transfers of patients from metropolitan hospitals at short notice add to workload.

One respondent states:

Country SA is cutting our staffing levels, running acute beds with nursing home, hostel and A & E services with only 1 RN and minimal staff. A & E is not counted in our numbers and sometimes we can have up to 6 A & E presentations in one shift. We have 60 beds to look after on night duty with one RN, one EN and one carer (with A & E as well).

While these comments do not directly point to increases in mortality and morbidity in rural hospitals they do resonate with Ben-Tovim et al. (2009) findings in their report to the Australian Institute of Health and Welfare (AIHW) that rural and remote hospitals have higher morbidity rates.

A third theme relates to skill mix and scope of practice and is identified by nurses in a number of settings. One nurse from a metropolitan hospital identifies "lack of teamwork due to understaffing and inadequate skill mix [as] a major ongoing issue" while another associates missed care with "not enough registered nurses, backfilling RN positions with enrolled nurses and many tasks not within their scope of practice."

Another respondent also identifies nurses' scope of practice as an issue and states:

our enrolled nurses are not allowed to do medications regardless of whether they are diploma trained or not. This puts pressure on the 1 or 2 RN's rostered per shift.

Issues of skill mix are exacerbated in rural hospitals by difficulties in recruiting RNs and unwillingness to make greater use of ENs.

² Excelcare – patient classification system.

Where skill mix issues are most evident however, is in aged care. Aged care is viewed as “being in crisis and getting worse. Staff numbers are totally inadequate to meet the needs of residents.” A number of respondents commented upon the ratio of RNs to patients.

One states that “poor funding in aged care means 1 RN for 110 residents in our facility equals impossible workload” while another reports that the:

On call RN/DON who does not work in the same building is often out of town or does not communicate that she is unavailable so carers call me as I am in charge throughout the weekdays and understand the issues raised as I know my residents however, I never get paid to be on call.

As a result some respondents argue that:

It's not physically possible to deliver all care required within the given hours of work and current resident to nursing/care staff ratio. This is becoming common across Aged Care facilities as both qualified clinical staff and PCWs are having hours cut, while at the same time high care needs and resident/relative expectations (mostly warranted) increase.

For this respondent the answer lies in a fixed ratio of RNs to residents and registration of Patient Care Workers to ensure minimum practice standards.

While given much less emphasis than staffing issues, respondents also identified access to resources as contributing to missed care. This is particularly evident in relation to having to chase medication and equipment.

One respondent notes that:

There seems to be a lot of time these days looking for things or chasing things up ie: medication running out, trying to find equipment that is available and working. Things are not being ordered in advance...

In aged care this is exacerbated after hours by reliance on commercial pharmacies for drug provision. A respondent in aged care identifies a need for “better systems to manage supply of medications after hours post attendance from MO.”

A final series of responses address communication issues primarily, although not exclusively, with medical staff. Poor communication results in difficulties in addressing patient needs “in a timely manner”; time spent on night shift “chasing the doctors and ensuring appropriate medical orders”; time spent “searching for casenotes, medication orders written but not communicated to the nurse delivering care” and time spent chasing locums in aged care.

Conclusion

The study on the vexed issues of missed or rationed and after hours care is timely in this second decade of the 21st century in South Australia. The profession is about to enter into a new Enterprise Bargaining round with the South Australian State Government or with the range of private providers in private hospitals, nursing homes and community settings. The State Government recently commissioned the consultancy firms of Deloitte Touche Tohmatsu and KPMG to do a budget performance review for the two major urban regions. The findings of these reviews suggest that hospitals in South Australia have more than adequate nursing and midwifery staff (Deloitte Touche Tohmatsu, 2012; KPMG, 2012). This survey challenges these reports by pointing to nursing reported missed or rationed care.

The strength of the results of this survey is firstly in the sample. It closely mirrors the ANMF membership profile. More importantly, those surveyed were for the most part, not disaffected staff, but nurses and midwives who reported that they were satisfied with and enjoyed their work. A significant number intended to stay in the profession and the numbers of days missed due to illness was low. This is despite reporting that the majority had worked overtime at some point in the last three months with 14% reporting working more than 20 hours overtime in the last three months. Questions that asked respondents to report on working when they were sick, showed commitment to the team even when not well.

When we asked nurses and midwives to rate the tasks most often rationalised or missed they identified interdisciplinary case conferences and ambulation of patients. This finding is significant given the current moves to strengthen interdisciplinary care being pushed particularly by health professional educators (Gum, Prideaux, Sweet, and Greenhill, 2012). If nurses and midwives identify this work as one that can be rationed innovations in this area are unlikely to succeed.

The tasks reported as least often omitted are blood glucose monitoring, hand washing and IV/central line care. Once again these tasks need to be situated historically. The Australian Commission for Quality and Safety in Hospitals (2013) current project is hand washing. This is one of the items reported on the My Hospital web site (Commonwealth of Australia, 2013). It is a task currently being strongly promoted across the health sector in Australia. The bathing patients and providing PRN medication within 15 minutes are also reported as being missed less frequently suggesting that when nursing time is rationed priority is given to clinical and basic nursing care tasks, over other tasks which may be less immediately important for patient well-being and comfort.

Examination of how these tasks rate across the three shifts and over the weekend show a similar pattern, although staff on night duty report fewer missed tasks contrary to some of the hypothesis suggested in the review of literature on morbidity rates after hours. Exceptions across the shifts include items such as attendance at interdisciplinary case conferences. This is more likely to be missed on late shifts, and ambulation of patients is more likely to be missed at night. Of course these findings are not surprising. They reflect the timing and organisation of work, although as we noted above when respondents were given the option of identifying a task as not being applicable on a given shift they did not always do so.

Participants were also asked to identify why care was missed or rationed. The most significant factors were the 'unexpected rise in patient volume or acuity'. Other factors include 'heavy admission and discharge activity', 'inadequate numbers of staff', and 'inadequate number of assistive and/or clerical personnel'. One of the most interesting findings here is the issue of communication.

Nurses and midwives did not identify lack or failure to communicate as a major explanatory factor in missed care. We think this finding is consistent with their reports of being satisfied and enjoying their work, and the high number of nurses who said they turned up at work when sick because of a commitment to colleagues. While these factors are not directly correlated, there is a suggestion that communication, a key to effective team work, is not as problematic as might have been thought.

A path analysis was done for two cohorts of nurses; general and ICU qualified nurses because of the breadth of the skills they perform. The purpose of this analysis was to provide data on the relationships between these predictors and the final outcome, which in this case is nurses' estimates of reported missed nursing care during day shifts. Factors with a strong prediction included adequacy of nursing resources; the nursing worksite, levels of job satisfaction, the predictability of the work, and intention to stay in the profession. As we have already noted failure to communicate is not seen as significant in explaining missed or rationed care, but a low level of job satisfaction is significant in reporting missed care.

We also examined indirect pathways to missed care by tracing the relationships between the various factors. As noted there is a relationship between work intensity, nursing resources and missed care. Work intensity is related to the predictability of work which in turn impacts on missed care, as does the provision of resources on communication and the frequency of missed care. Staff retention is another factor that impacts on predictability which in turn influences the reporting of missed care. Predictability in the work in turn is related to nurse's satisfaction with their work and missed care. Those nurses who are satisfied with their work are more likely to see their work place as predictable, while those who are not satisfied identify the unpredictable nature of their work as problematic.

Presumably one of the areas that causes dissatisfaction is missed care or the necessity to ration care. The number of nurses who identified lack of resources is an unusual predictor of missed care in a health system in a developed country. This factor requires further analysis. Is it a feature of the state's large urban tertiary hospitals or peculiar to rural, remote and community settings? Previous research by Willis, Henderson, Walters and Toffoli (2008) suggests that lack of resources is an issue for community based nursing and some of the qualitative comments point to aged and rural sites as particularly problematic.

When these predictors are examined across the three shifts outside the standard working week some differences emerge. For night shifts, resources, preferred roster allocations, worksites and work status are significant, with work intensity and work satisfaction having indirect impacts. The evening shift highlights the direct impact of work intensity, roster preferences and the nurse's age, with indirect influences being work satisfaction, the worksite, work status and satisfaction with team work. For weekend shifts, satisfaction, intention to stay in the current job and work intensity rated highly, and for indirect factors, worksite and age were predictors.

The reasons for reported missed nursing care by night duty staff closely resembles those factors described earlier for the morning shift, particularly the relationship between resource provision and the type of worksite on the frequency of reported missed nursing care. The major difference to the path model highlighting missed nursing care during the day shift and that of night duty, is that night staff link the preferred time to work (roster preference) and their frequency of attending work (full or part time status) to the frequencies of reported missed care. Staff who do not wish to change their current roster and staff who work on a part-time basis identify more frequent episodes of missed nursing care.

Evening shift nurses believe that the strongest influence leading to increased reporting of missed nursing care is the intensity of their work. This factor is unique to this shift as a direct influence on reported missed nursing care. Those nurses indicating a preference to work this shift (evening shift) reported more missed nursing care compared to nurses not working their preferred roster. Younger nurses working on evening shifts reported higher rates of missed nursing care compared to older nursing staff working late shifts. For staff working weekend shifts the frequency of reported missed nursing care had an inverse relationship to their workload intensity. Missed nursing care is reported less frequently as workload becomes less intensive during the weekend shifts. Additionally, reported missed nursing care is directly linked to nursing staffs' satisfaction with their job and their intention to stay in their current roles.

In the qualitative comments a number of nurses highlighted the inadequacy of Excelcare, the nursing rostering and staffing tool used in the public hospital system, to predict the number of nurses needed for a particular shift. Their major objection was that Excelcare is a nursing care plan first and foremost, not a staffing tool and is out of date. While we would agree with these comments there is anecdotal evidence that Excelcare predicts the need for higher numbers of nurses per patient per shift than other models or methods used in other states in Australia. The Deloitte Touche Tohmatsu (2012) and KPMG (2012) reports would appear to support this anecdotal evidence.

The Deloitte Touche Tohmatsu (2012) report notes that the two public hospitals in the Adelaide central region have higher numbers of nurses per patient load than their peer hospitals in other Australian states and then goes on to define both as overstaffed. Other nurse comments point to skill mix, and of course resources, although the accounts of nurses from rural and the aged care sector suggest nursing numbers are also the key explanatory factor in missed care.

Kalisch herself has noted that missed or rationed care may not be as simple as nursing numbers or keeping pace with patient acuity (Kalisch, 2006). This study certainly points to a more complex environment than at first sight, where resourcing and the management of patient load may provide first level solutions, rather than increased numbers of nurses rostered per shift. Of course people do not get sick or have accidents in a predictable manner. The very concepts of emergency and accident point to the uncertainties of illness and disease and by default the unpredictable nature of nursing and medical work. Given the increasing high cost of health care, the desire of the Australian population to maintain a Medicare funded public hospital system, but the politically unpopular strategy of increased taxation, it is clear some compromises need to be made. Solutions to the rationing of care may lie in devolving it to other care workers, including the family.

The question then for nurses will be on how to define nursing work in all its richness and integrity.

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Appendix A: Invitation and Missed Care Survey information sent to ANFMSA members

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CRICOS Provider No. 00114A

After hours nurse staffing, work intensity and quality of care

Dear Member

Researchers from the Flinders University Faculty of Health Sciences are conducting research on after hours nursing care. In particular, we are interested in situations where you missed care and the circumstances in which this occurred.

We would be grateful if you would volunteer to assist in this research by consenting to complete the attached survey. We anticipate that completion of the survey will take approximately 20 minutes. Attached is an information sheet. Should you wish to take part in this study, you can access the online survey simply by clicking on the link at the bottom of this email.

Please be assured that this raw data will not be viewed by anyone outside of the Flinders University team. Any information provided will be treated in the strictest confidence and no individuals or organisations will be identified in the resulting report or other publications. Results from this study will be published in peer reviewed publications and in a report to be given to the ANMF at the completion of the study. You are free to discontinue participation at any time or to decline to answer particular questions.

Any enquiries you may have concerning the evaluation can be directed to the Flinders University team through Associate Professor Eileen Willis on 8201 3110, or by email Eileen.Willis@flinders.edu.au.

Thank you for your attention and assistance. The survey can be accessed by clicking on the following link:

<https://www.surveymonkey.com/s/MISSCARE>

If the link does not work when you click on it, you may have to copy and paste this link into your address bar (NOT the Google search bar). This is your personal unique link to the survey. You can use this link to return to the survey at any time. It will take back to the last page you completed and submitted by hitting the next button.

If you have any questions regarding the survey, please contact the project officer, Luisa Toffoli, luisa.toffoli@flinders.edu.au, telephone 8201 2791

We would very much appreciate your support for this initiative. The survey will remain open until 23 November 2012.

Yours sincerely
Eileen Willis

Appendix B: Ethics approval

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INFORMATION SHEET

After hours nurse staffing, work intensity and quality of care

Research Team
Associate Professor Eileen Willis, Professor Patti Hamilton, Dr Julie Henderson, Dr Clare Harvey, Ms Claire Verrall, Ms Liz Abery, Dr Luisa Toffoli.

Purpose of the Research
The survey is one aspect of a larger study exploring the impact of after hours staffing on the delivery of nursing care. The survey explores aspects of care which are not performed and reasons for this. The data from this study will be compared with similar studies undertaken in the US to determine how differences in work and health policy environments impact nurses' capacity to deliver nursing care.

What will you be asked to do?
We will ask you to complete an online survey related to aspects of nursing care missed and the circumstances under which this occurs. The questionnaire will have 3 main sections:

- 1) demographic questions,
- 2) questions about capacity to perform nursing care,
- 3) questions about why care was missed.

The survey should take about 20 minutes. Participation is entirely voluntary and you are free to not answer questions or to withdraw from the questionnaire at any stage.

Benefits of the Research
This research will provide information about when nursing care is missed and the circumstances under which this occurs. The majority of studies on missed care have been done in the Northern Hemisphere, and in intensive care units. Little has been done on wards or in the community context. This study will provide a more complete picture. As the report will be given to the ANMF it also has the potential to inform health and nursing services and ANMF policy in regards to after hours staffing in South Australia.

How will confidentiality be maintained?
No identifying information will be collected and the raw data will not be viewed by anyone outside of the immediate university research team. Demographic data will be used to identify patterns in responses and where the numbers of respondents in any category is small the responses will be aggregated to prevent the possibility of identification of the respondent.

How will this data be used?
The data will be used to determine the factors which impact on nurse capacity to deliver care across different settings and the results compared with similar research undertaken in the US. Upon the completion of the study a report will be provided to the ANMF outlining the key findings and brief description of findings provided for dissemination to ANMF members via the ANMF website.

How are you protected?
This project has been approved by the Flinders University Social and Behavioural Ethics Committee. Any concerns that you may have about the conduct of this project can be addressed to Andrea Fiegert, Executive Officer of this committee, Flinders University Social and Behavioural Ethics Committee: telephone 8201 3116 or email human_researchethics@flinders.edu.au

Funding and Dissemination
The research is funded by a Flinders University Faculty of Health Science seeding grant and Midwestern State University (Texas), Wood Research Professorship grant. The research will lead to a report and publications in peer reviewed journals. Results of the study will be made available to participants at the end of the project via the ANMF website.

How can I find out more information?
Further information about this project can be obtained from Associate Professor Eileen Willis: telephone on 8201 3110 or email (Eileen.Willis@flinders.edu.au).



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