Regulated and Unregulated Nurses in the Acute Hospital Setting: Tasks Performed, Delayed or Not Completed

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ABSTRACT

Aims: Investigate the number and type of tasks performed, delayed or not completed by regulated and unregulated (assistant) nurses.

Background: Assistants in nursing (AINs) change the work environment of the nurses with whom they work. As the number of assistants in nursing working on acute units grows, it is important to understand how their presence influences nursing care.

Design: Descriptive analysis of survey data from 62 acute nursing units across three Australian states between 2008 and 2010.

Methods: All staff providing nursing care to patients were asked to complete a survey that included demographics, the number of tasks delayed/incomplete, and the completion of 6 specific tasks. Non-parametric tests compared assistants in nursing (n=25) to regulated nurses (n=1630), and regulated nurses on units with no assistants in nursing (n=1356) to those on units with up to 5% assistants (n=76) and over 5% assistants (n=198).

Results: More regulated nurses on units with zero, or up to 5% assistants in nursing, completed tasks usually associated with assistants' scope of practice, relative to those on units with over 5% AINs. Statistically significant differences were found between the units in delays responding to the patient bell and in the planning of nursing care.

Conclusion: This study suggests that assistants in nursing have an impact on the nature and timeliness of care provided in acute hospital units, that is relative to the proportion of staffing they comprise, to the effectiveness of integration, and to the clarity of their scope of practice and associated delegation.

Relevance to clinical practice: With increasing employment of assistants in nursing in acute hospital settings comes the requirement to optimise their use. This needs to include a well-articulated scope of practice, clear delegation of tasks, and effective integration with the rest of the care team.

Keywords: Nursing support worker; nurse staffing; skill mix; nursing tasks delayed or not done; assistant in nursing

What does this paper contribute to the wider global clinical community?

- The presence of AINs on acute nursing units is linked to the nature and timeliness of care provided to patients.

- Relative to no AINs or high proportions of AINs, the incorporation of a small proportion of AINs into a nursing team is associated with delays in nursing tasks amongst regulated nurses, highlighting the need for effective integration and delegation.

- Clarity in regard to scope of practice is needed, as one-third of AINs reported completing ECGs, phlebotomy or initialising IVs.

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INTRODUCTION

Although direct patient care has been undertaken by a combination of licensed (regulated) and unlicensed (unregulated) nurses for many years, persistent nursing workforce shortages combined with increased patient acuity and throughput have led to the employment of large numbers of nursing support workers internationally (Bureau of Labor Statistics 2013, Duffield *et al.* 2014, Health Workforce Australia 2012, National Health Service 2013a). For example in Australia, the number of nursing support workers has increased considerably over the past decade, with over 80,000 nursing and personal care assistants employed in the Australian health sector in 2010 (Australian Institute of Health and Welfare (AIHW) 2012). In the US, the proportion of nursing assistants and orderlies is expected to rise by 21% from 2012 to 2022 (Bureau of Labor Statistics 2014). Tasks formerly completed by Registered Nurses (RNs) and Enrolled Nurses (ENs, similar to LPN/LVN in North America) are now being taken on by nursing support workers (Gillen & Graffin 2010, Plawecki & Amrhein 2010), called Assistants in Nursing (AINs) in Australia. These changes raise questions about what tasks AINs are most frequently performing and whether their presence helps or hinders licensed nurses' ability to perform tasks in a timely manner. Limited existing research has investigated these questions. This article explores the tasks performed, delayed, and not completed by these staff in two ways. Firstly it does so by comparing unregulated (AINs) and regulated (RN/ENs) nurses on units with AINs, and then compares RN/ENs on units with or without AINs.

BACKGROUND

Educational Preparation

In Australia as in many other countries including the United States, Canada and United Kingdom, licensed nurses are required to attain a specified qualification (e.g. bachelor's degree for registered nurses, or a diploma in nursing for enrolled nurses), in order to achieve registration (Australian Institute of Health and Welfare (AIHW) 2012, Bureau of Labor Statistics 2013, Canadian Nurses Association 2013, National Health Service 2013b). In contrast to licensed nurses, AINs may or may not have received formal preparation for their role or requirement to practice (Algoso & Peters 2012, Duffield *et al.* 2014, Potter *et al.* 2010, Rimmer & Hand 2010). Formal training for assistants can last from 6 days to 6 weeks. The variation in qualifications can influence the kinds of tasks that the registered nurse and/or enrolled nurse (hereafter called RN/ENs except where only RNs or only ENs are indicated) can safely delegate to the AIN (Alcorn & Topping 2009). In particular, tasks like delivering/retrieving meal trays, housekeeping duties, and transporting patients are

tasks suitable for AINs with little formal training. In the present study, these tasks are referred to collectively as 'delegateable tasks'.

AIN Role

Consistent with variation in AIN educational preparation, there are many potential clinical roles AINs can undertake (Keeney *et al.* 2005). Guidelines often list direct patient care, housekeeping and clerical duties (Keeney *et al.* 2005, McKenna *et al.* 2004, Spilsbury & Meyer 2004). Direct patient care duties usually include hygiene, nutrition, monitoring, mobilization, and escorting, while housekeeping usually includes bed making. However, the scope of AINs' duties can be much broader and may include performing ECGs, routine phlebotomy, or IV initiations or perform services usually associated with other disciplines such as physiotherapy (National Health Service 2013a).

One way that AINs may be incorporated into units is through their participation in hourly 'rounds.' Through 'rounding,' AINs regularly visit patients and ensure that basic patient care needs (e.g., grooming, nourishment. and positioning, etc.) are addressed (Shepard 2013). These regular patient visits could conceivably reduce the number of tasks RN/ENs delay or leave undone, as the rounds ensure that routine tasks are done in a systematic fashion and provide patients the opportunity to make requests or remind staff of missed care. Hourly rounding also provides continuity of patient care (Ford 2010) and limits interruptions to RN/EN workflow, as patients are less inclined to use the call bell when they are visited regularly (Meade *et al.* 2006, Shepard 2013).

AINs and Patient Outcomes

A great deal of research has been conducted that links richer skill mix (higher % of RN staffing) to lower rates of negative patient outcomes (Duffield *et al.* 2011, Jacob *et al.* 2015, Needleman *et al.* 2011, Roche *et al.* 2012, Twigg *et al.* 2011). These outcomes include falls and medication errors (Duffield *et al.* 2011), mortality, and a collection of nursing-sensitive outcomes (Jacob *et al.* 2015, Needleman *et al.* 2011, Twigg *et al.* 2011). Research to date frequently adopts a broad concept of skill mix, measured by the proportion of a unit's direct-care staff that are RNs. These findings do not necessarily inform the question of how AINs affect patient care (Butler *et al.* 2011). A few studies have explicitly measured and compared patient outcomes on units with at least one AIN to outcomes on units without AINs. Two separate studies at single hospitals found little change in adverse events, falls, and medication events on units after introducing AINs to nursing teams (Bostrom & Zimmerman 1993, Tourangeau *et al.* 1999). A multi-site study (8 Toronto hospitals) found RN perception of patient care quality to be significantly lower on units with AINs compared to units without AINs (McGillis Hall *et al.* 2003). The current study explores differences between tasks completed by AINs and RN/ENs that may be linked to patient care outcomes.

AINs and Process Outcomes

With the expansion in numbers of AINs, it is important to understand how these nursing support workers affect the work processes within their units. If AINs and RN/ENs are able to coordinate tasks efficiently, it is plausible that their cooperation could lead to a reduction in negative process outcomes such as tasks delayed or tasks not completed. Some evidence on this topic already exists. Two early studies examined how nurse work environments changed after their units introduced an RN/AIN partnership model of care. One found the intervention increased nurses' perceived workloads and RN turnover (Garfink *et al.* 1991). Another found the intervention increased overtime, on-call hours, and sick time (Powers *et al.* 1990). A third study found introducing AINs to units at a single tertiary care hospital led to RN/ENs performing fewer non-professional patient care activities, tasks turned over to AINs (Bostrom & Zimmerman 1993). Nursing teams with 5-7 AINs to 10 RNs were linked to greater efficiency and productivity than teams with only RNs (Eastaugh 1990). These studies leave little doubt that AINs affect the process outcomes of their units. However, only one study (Bostrom & Zimmerman 1993), again from many years ago, whose report on a single hospital may not be generalizable, indicates how specific tasks change when AINs are present. None comment on whether the presence of AINs influence delayed or incomplete tasks on their units.

Research Questions

This paper explores differences between AINs and RN/ENs in relation to tasks performed and negative process outcomes (tasks delayed or not completed last shift). Specifically, it asks:

- Are delegateable nursing tasks (meal tray delivery/retrieval, housekeeping duties, and transporting patients) completed by a higher proportion of AINs than RN/ENs on units with AIN support?

- Do higher proportions of RN/ENs on non-AIN units perform selected tasks compared to RN/ENs on units with up to 5% or over 5% AINs?

- Do higher proportions of RN/ENs on non-AIN units delay or not complete tasks compared to RN/ENs on units with up to 5% AINs and over 5% AINs?

METHODS

This paper reports an analysis of survey data collected from 62 medical and surgical units in 11 public general acute hospitals across three Australian states between 2008 and 2010. Ethics approval was obtained from participating health services and the university (7 committees in total).

Sample & Data Collection Procedure

Nursing units were selected randomly from all medical, surgical and mixed medical/surgical units in the participating acute-care hospitals. All direct personal care workers (RN, EN & AIN) on the selected units were asked to complete the survey and return via reply–paid mail. Data were collected from each unit in two 3-month 'waves', 12 months apart, with individuals surveyed only once. An overall response of 1655 was achieved (44.4% of 3728 potential consenting respondents). The response rate is consistent with similar survey approaches (Baruch & Holtom 2008) but limits generalisability. AINs comprised 1.5% (*n*=25) of the sample, a lower proportion than that identified in another Australian study that used detailed payroll data in a comparable sample of units (2.6%; Duffield *et al.* 2011). As this study sought to explore differences between AINs and RN/ENs in regard to tasks performed, and between ward types in regard to tasks performed and delayed, using the sample as collected, *post-hoc* sample size calculations were performed to estimate the adequacy of the sample for that purpose.

As there were no studies located that compared groups on the tasks measured here, an estimated meaningful difference between groups was determined based on the clinical and management experience of the research team: that a change or delay of one in every five tasks would indicate divergent practice. That is, a difference of 20% in the percentage of respondents completing or delaying a given task was considered an appropriate distinction. For comparisons of activities conducted by AINs and RN/ENs, using this effect size figure along with power of 0.8 and alpha of 0.05, for two groups with a ratio of 10:1 in size, for Fisher's exact test, a sample of 23 in one group and 230 in the other was adequate. For comparisons between RN/ENs on the three ward types determined by AIN percentage (described below), an estimate was obtained for non-parametric analysis (Chi-squared test) using the same parameters with two degrees of freedom, which indicated that an overall sample of 273 was required to explore differences between the groups (G*Power 3.1). On the basis of these calculations our sample appears to have sufficient power to detect differences between the groups at both stages of analysis.

Nurse Survey

The survey items were derived from previous research in Australia (Duffield *et al.* 2011, Duffield *et al.* 2010) and elsewhere (O'Brien-Pallas *et al.* 2004). Respondents were asked for their years of direct-care (nursing) experience, whether their employment was permanent or temporary, and whether they worked on a full-time, part-time, or casual (agency/labour hire) basis. They also reported their own position as AIN, RN, or EN. Registered and Enrolled nurses were grouped together as they are both licensed (regulated) nurse grades. Nursing units were divided into three categories using the mean proportion of AIN respondents on the unit (4.8%). Units with up to 5% of respondents identified as AINs were classified as 'up to 5% AIN' units and those with over 5% AIN respondents as 'over 5% AIN' units. Units without AINs were categorised as 'non-AIN units.'

Tasks Performed, Delayed, and Not Completed

Survey respondents were asked to indicate whether, during their last shift, they had completed, delayed, or not completed a range of common nursing tasks. Participants replied to six questions intended to provide an estimate of the types of activities undertaken by nurses and AINs. Respondents indicated whether they had delivered or retrieved meal trays, undertaken housekeeping duties, conducted patient transport (escort), arranged discharge (including referrals and transportation), performed ECGs/routine phlebotomy/IV initiation, or performed other disciplinary services such as physiotherapy. As noted previously, the first three of these tasks were within the defined scope of practice for AINs in the hospitals in the study and therefore considered likely to be delegated to AINs by licensed nurses ('delegateable tasks'). Respondents were also asked whether any of the following tasks were necessary but delayed on their last shift: routine vital signs, medications or dressings, pain medications, responding to patient bell, routine mobilisation, back rubs and skin care, oral hygiene, discharge planning, discharge preparation, routine patient teaching, comforting patients, documenting nursing care, and nursing care planning. Participants were re-queried on the same list of tasks and asked whether any were necessary but not completed.

Analysis

This study reports data on the measures of nursing tasks performed, delayed, and not completed during the last shift on sampled medical, surgical, and joint medical/surgical units. Missing data were less than 5% for most items and appeared to be random. Data were analysed using SPSS version 22. The first analysis was performed on the subset of respondents who worked on a unit with at least one AIN. It compares the proportions of AINs (n=25) versus RN/ENs (n=274) on each of the tasks completed measures. The low number of AIN respondents required use of Fisher's exact tests to determine statistically significant differences across these comparisons. The second analysis compares the responses of RN/ENs on units with no AINs (n=1356), units with up to 5% AINs (n=76), and units with over 5% AINS (n=198) in regard to tasks performed, tasks delayed, and tasks not completed. These comparisons are made with a Kruskal-Wallis test for each group of tasks (performed, delayed or not completed). *Post-hoc* comparisons were undertaken, for tasks showing statistically significant differences across the 3 ward categories, using the Dunn-Bonferroni ranking approach (Dunn 1964) which adjusts for the increased chance of detecting significant relationships where none exist due to multiple comparisons made on the same data set. The same procedure was applied to the total number of tasks delayed.

RESULTS

As seen in Table 1, the majority of respondents were female (RN/ENs: 90.8%; AINs: 84.0%) and, on average, were in their late 30s (RN/EN: 39 years; AIN: 37 years). Both RN/ENs and AINs were younger than the

national average, which was 44 years in 2012 (Australian Institute of Health and Welfare (AIHW) 2012). RN/ENs had more years of nursing experience than AINs (12 years versus 6 years). Compared to AINs, RN/ENs were more likely to be on a permanent contract (RN/ENs: 91.0% versus AINs: 80.0%) and to work full time. In regard to units, most (82.3%, n=51) had no AINs, 4.8% (n=3) of units had up to 5% AINs, and 12.9% (n=8) of units had over 5% AINs.

Table 1. Demographic and employment characteristics for RN/ENs and AINs

| | Non-AIN Units (n=51) | AIN Units (n=11) | | |
	RNs/ENs (n=1356)	RNs/ENs (n=274)	AINs (n=25)	Overall (n=1655)
		Mean (SD)		
Age	38.9(11.7)	40.5(12.5)	36.7(14.5)	39.2(11.9)
Years Nursing	11.5(11)	13.2(12.3)	5.8(8.3)	11.7(11.2)
Gender		N (%)		
Female	1227(90.8%)	246(90.8%)	21(84%)	1494(90.7%)
Male	125(9.2%)	25(9.2%)	4(16%)	154(9.3%)
Employment status				
Full time	827(61.1%)	145(53.1%)	13(52%)	985(59.6%)
Part time	456(33.7%)	121(44.3%)	6(24%)	583(35.3%)
Casual	71(5.2%)	7(2.6%)	6(24%)	84(5.1%)
Contract type				
Permanent	1224(90.9%)	249(91.9%)	20(80%)	1493(90.9%)
Temporary	123(9.1%)	22(8.1%)	5(20%)	150(9.1%)

Note: Number of missing responses varies per item

Among respondents who worked on a unit with at least one AIN, Table 2 displays the proportions of AINs versus RN/ENs who reported performing each task on that shift. It reveals that a substantially higher proportion of AINs performed 'delegateable tasks' (delivered/retrieved meal trays, performed housekeeping duties, and transported patients), although these differences were not statistically significant. Conversely, significantly higher proportions of RN/ENs than AINs arranged discharge referrals and transportation (51.6% vs. 16%) or performed ECGs/phlebotomy/IV initiations (79.2% vs. 28%) and other disciplinary services (47.4% vs. 28%) (Table 2).

Table 2. Tasks performed by RNs/ENs and AINs on AIN Units

	AINs (n=25) N(%)	RNs/ENs (n=274) N(%)	*p**	Overall N(%)
Delivered/retrieved meal trays	10(40%)	75(27.4%)	0.25	85(28.4%)
Housekeeping duties	14(56%)	113(41.2%)	0.20	127(42.5%)
Transported patients	7(28%)	46(16.8%)	0.13	53(17.7%)
Discharge referrals & transportation	4(16%)	141(51.6%)	<0.01	145(48.7%)
ECGs, routine phlebotomy or IV initiation	7(28%)	217(79.2%)	<0.01	224(74.9%)
Other disciplinary services (e.g. physiotherapy)	7(28%)	130(47.4%)	0.05	137(45.8%)

* Fisher's exact test (two-sided) for all comparisons

Table 3 reports proportions of RN/ENs who completed and delayed specific tasks across the 3 unit categories and overall. The task completed by the highest proportion of RN/ENs was performing ECGs/phlebotomy/IV initiation (78.3%), and the task performed by the lowest proportion of RN/ENs was transporting patients (15.2%). Examining the proportion of RN/ENs performing specific tasks, stratified by unit AIN proportion, shows a story in two parts. First, on both non-AIN units and units with up to 5% AINs, higher proportions of RN/ENs undertook delegateable tasks relative to those on units with more than 5% AINs. Statistically significant differences between the three groups were found for delivering or retrieving meal trays, housekeeping duties, ECG/phlebotomy/IV initiations, and other disciplinary services. Second, post-hoc analyses (Table 4) found that a significantly higher proportion of RN/ENs performed these tasks on 'non-AIN' than on 'more than 5% AIN' units. In addition, higher proportions of regulated nurses completed ECG/phlebotomy/IV initiations on 'non-AIN' relative to 'up to 5% AIN' units. Similarly, RN/ENs performed more housekeeping and other disciplinary services on 'up to 5% AIN' compared to those on 'more than 5% AIN' units.

Table 3. Tasks performed and tasks delayed by RNs/ENs on units with no AINs, up to 5% AINs, and over 5% AINs

	0% AINs (n=1356)	≤5% AINs (n=76)	>5% AINs (n=198)		Overall (n=1630)
	N(%)	N(%)	N(%)	*p**	N(%)
Tasks Performed					
Delivered/retrieved trays	476(35.1%)	25(32.9%)	50(25.3%)	0.02	551(33.8%)
Housekeeping duties	685(50.6%)	42(55.3%)	71(35.9%)	<0.01	798(49%)
Transported patients	215(15.9%)	16(21.1%)	30(15.2%)	0.46	261(16%)
Discharge referrals & transportation	705(52.1%)	45(59.2%)	96(48.7%)	0.30	846(52%)
ECGs, routine phlebotomy or IV initiation	1206(88.9%)	62(81.6%)	155(78.3%)	<0.01	1423(87.3%)
Other disciplinary services (e.g. physio.)	745(54.9%)	45(59.2%)	85(42.9%)	<0.01	875(53.7%)
Tasks Delayed					
Routine vital signs	519(38.3%)	22(28.9%)	64(32.3%)	0.09	605(37.1%)
Medications or dressings	456(33.6%)	28(36.8%)	60(30.3%)	0.53	544(33.4%)
PRN pain medications	326(24.1%)	23(30.3%)	43(21.7%)	0.33	392(24.1%)
Routine mobilisation	461(34%)	22(29.3%)	60(30.5%)	0.46	543(33.4%)
Back rubs and skin care	335(24.7%)	24(31.6%)	45(22.7%)	0.31	404(24.8%)
Responding to patient bell	710(52.4%)	49(64.5%)	85(42.9%)	<0.01	844(51.8%)
Discharge planning	272(20.1%)	20(26.3%)	42(21.2%)	0.41	334(20.5%)
Preparing patient for discharge	272(20.1%)	18(23.7%)	34(17.2%)	0.44	324(19.9%)
Routine teaching patient	271(20%)	15(19.7%)	40(20.2%)	0.99	326(20%)
Comforting patients	463(34.1%)	31(40.8%)	66(33.3%)	0.47	560(34.4%)
Documenting nursing care	400(29.5%)	28(36.8%)	55(27.9%)	0.34	483(29.7%)
Oral hygiene	381(28.1%)	19(25%)	44(22.2%)	0.20	444(27.3%)
Nursing care planning	433(32%)	31(41.3%)	45(22.7%)	<0.01	509(31.3%)
	Median(IQR)	Median(IQR)	Median(IQR)	*p**	Median(IQR)
Number of Tasks Delayed	3(5)	4(4)	3(4)	<0.01	3(5)
Number of Tasks Not Done	0(2)	0(1)	0(2)	0.09	0(2)

* Kruskal-Wallis test for all comparisons

Responding to the patient bell (52.4%) was the most frequently reported delayed task, with routine patient teaching (20%) the least (Table 3). For most tasks, higher proportions of nurses on 'non-AIN' units reported delays than those on 'more than 5% AIN' units, but across the unit types this was statistically significant only for 'responding to patient bell' and 'nursing care planning'. Although not statistically significant, and below the threshold of 20% described above, some other delayed tasks displayed differences that approached 10% and may be important from a practical perspective. For example, delayed routine vital signs ranged from 28.9% to 38.3%, PRN pain medication from 21.7% to 30.3%, skin care from 22.7% to 31.6% and documentation from 27.9% to 36.8%. *Post-hoc* tests (Table 4) identified significant differences between RN/ENs on all ward categories for responding to the patient bell and delaying nursing care planning, with fewer regulated nurses on 'more than 5% AIN' units reporting delaying these tasks relative to those on 'non-AIN' and 'up to 5% AIN' units.

Table 4. Post-hoc comparisons between unit types, for tasks performed and delayed by RNs/ENs

	0% to ≤5% AINs p^*	0% to >5% AINs p^*	≤5% to >5% AINs p^*
Tasks Performed			
Delivered/retrieved trays	0.69	0.02	0.30
Housekeeping duties	0.50	<0.01	0.01
ECGs, routine phlebotomy or IV initiation	<0.01	<0.01	0.40
Other disciplinary services (e.g. physio.)	0.57	<0.01	<0.01
Tasks Delayed			
Responding to patient bell	0.02	0.01	<0.01
Nursing care planning	0.10	<0.01	<0.01
Number of Tasks Delayed	0.14	<0.01	<0.01

* Dunn-Bonferroni ranking test

Overall, RN/ENs reported a median of 3 tasks delayed (mean 3.9), which was statistically significant across the three unit categories. *Post-hoc* tests revealed significant differences between units with no AINs and over 5% AINs, and between those with up to 5% and over 5% AINs (Table 4). The pattern of differences is described graphically in Figure 1 for the individual tasks with the largest differences across the three unit types.

Figure 1 Proportion of nurses reporting delayed tasks, by ward category
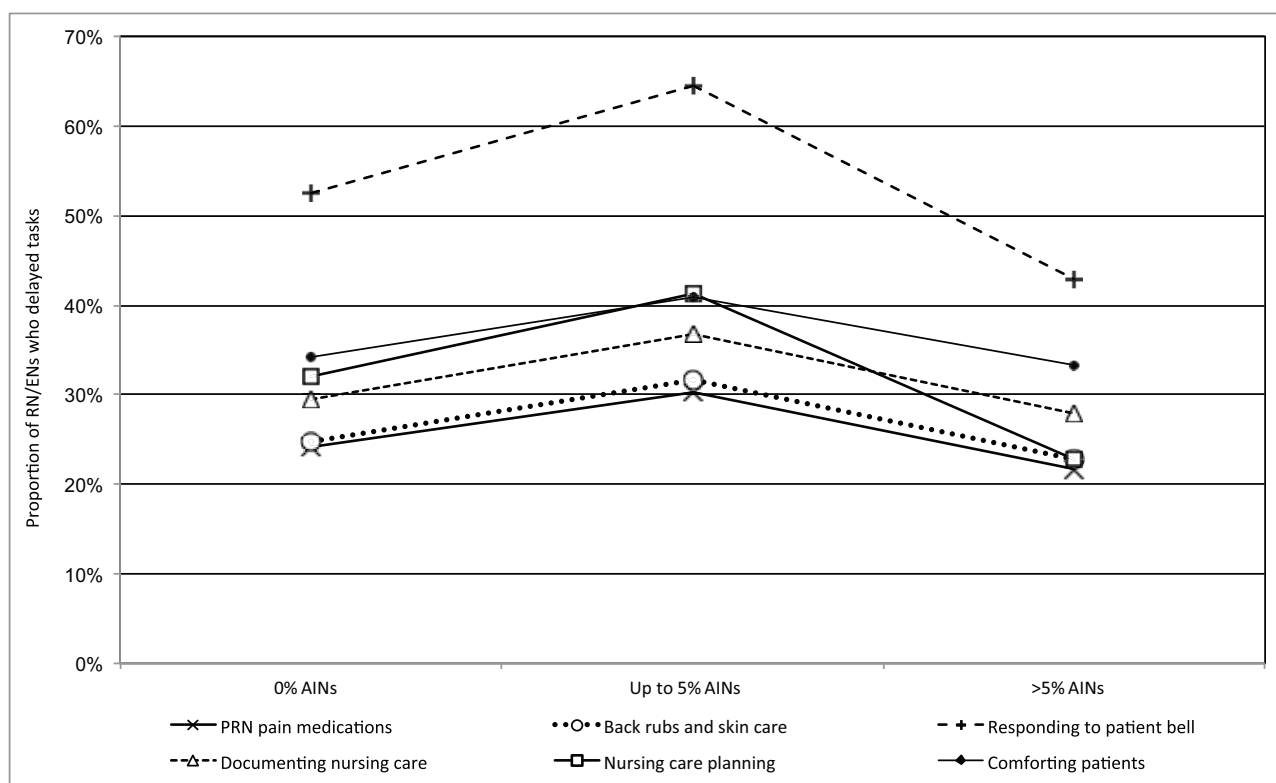
Note: Largest (top 6) proportional differences across the ward categories; see Table 3 for statistically significant differences

Very low proportions of RN/ENs reported not completing tasks and differences between unit categories for individual tasks, or for the total number of tasks not completed, were not found. Overall, the highest

proportions of RN/ENs report not comforting patients (17.1%), not performing oral hygiene (16.6%) and not completing backrubs and skin care (16.1%; full data not shown). The median number of tasks not completed per shift was 0 (mean 1.1).

DISCUSSION

This paper compares the tasks performed by AINs and RN/ENs, and tasks performed, delayed or not done on nursing units with or without AINs. Relative to licensed/regulated nurses, higher proportions of AINs performed tasks considered to be within their scope of practice ('delegateable tasks'). Across the 11 Australian hospitals studied, RN/ENs on units with over 5% AIN support are the least likely to delay care compared to those on wards with 0% or less than 5% AINs. Further, the absence of a significant difference in the number of delayed tasks reported by nurses on wards with 0% and less than 5% AINs highlights the need for the correct level and integration of AIN support, such that the addition of too few AINs does not give rise to any beneficial effect. Indeed, with regards to responding to the patient bell, RN/ENs on units with up to 5% AIN support are *more* likely to delay this task than nurses in the other two groups. Taken together, these findings suggest that the right level and integration of AIN support has the potential to improve staff skill and task alignment, as well as reduce delayed nursing care on medical and surgical units.

The RN/EN role mixes skilled tasks requiring formal training with tasks that can be learned on the job. The promise of AINs is that they can take on nursing tasks not requiring formal training, freeing up RN/ENs to perform more highly skilled tasks in a timely and safe manner. On units using AINs, unskilled tasks are more likely to be performed by AINs than RN/ENs, while skilled tasks are more likely to be performed by RN/ENs than AINs. Still, it is interesting to note that nearly one third of AINs perform ECGs/routine phlebotomy/IV initiation. This may reflect the different levels of training for AINs. On the other hand, the high proportion of AINs conducting these tasks may be indicative of out-of-scope, inappropriate practice or task delegation.

This paper's findings regarding the kinds of tasks delegated to AINs support findings from a pre-post study at a single Canadian hospital, where it was found that RN/ENs spent less time assisting patients with activities of daily living (Tourangeau *et al.* 1999). While the present study does not make conclusions about temporal changes in RN/EN task performance, Tourangeau and colleagues' findings correspond to the current findings, as many tasks involved in assisting with activities of daily living do not require formal training and can be delegated to support staff. A cross-sectional study in three northern California acute-care hospitals found a high proportion of RN survey respondents reported role changes associated with staffing AINs on their units (Barter *et al.* 1997), a finding also consistent with the divide in role assignment by skill level detected by this study.

Contrary to expectations, this paper found little evidence that RN/ENs on non-AIN units are more likely than those on AIN units to perform delegateable tasks such as delivering/retrieving meal trays, housekeeping duties, and transporting patients. In fact, only one of these tasks, housekeeping duties,

exhibited significant differences between the units. The other two tasks with significant differences across the three unit types, performed ECG/routine phlebotomy/IV and performed other disciplinary services, are tasks more often associated with RN/ENs. Still, the significantly higher proportions of RN/ENs performing these tasks on units with no AINs compared to those on units with over 5% AINs may be explained by increasing numbers of AINs performing these tasks. This may reflect either a more advanced AIN practice in the surveyed units or inappropriate delegation of these tasks to AINs.

Only two delayed tasks, responding to patient bell and documenting nurse care planning, were found to be significantly different across the three unit types. Interestingly, while not statistically significant, the proportion of RN/ENs delaying many of the other tasks did not decrease linearly with the proportion of AINs on a unit. That is, a higher proportion of RN/ENs on units with up to 5% AINs reported delaying tasks such as medication, dressings, pain medication and skin care. Although not significant, the scale of the percentage differences between the unit types for some of these tasks provides a suggestion that there may be an issue when a small proportion of AINs is incorporated on a unit. This may be an echo of early studies that concluded adding AINs to a nursing team without effective integration could increase RN/ENs' workload (Garfink *et al.* 1991, Powers *et al.* 1990). Notably, in relation to almost all tasks, the proportion of RN/ENs who delayed care was lowest for RN/ENs in units with over 5% AINs. Taking these suggestions from the data and previous studies, it may be that units with a higher proportion of AINs integrate AINs into their team more effectively, with a well-defined scope of practice and clear delegation. These units may be able to reap the benefits of more boots on the ground without tripping over the extra feet.

A few notes of caution should be heeded when interpreting these results. First, the measure of units' AIN status (no AINs, up to 5% AIN, and over 5% AIN) is highly dependent on survey responses. If AINs on units with a higher proportion of AINs did not respond to the survey, the unit AIN status will be highly biased. Without an administrative measure of the proportion of AINs on the unit, the measure used is the best available data. Second, the lack of administrative data also prevents controlling for the number of beds on a unit and patient severity mix, factors often associated with delays in nursing care (Duffield *et al.* 2011). Third, the study does not have a reliable way to determine whether AINs are integrated into the team by assigning tasks on an 'as needed' basis or by giving AINs responsibility of a patient throughout the day (patient assignment). Additionally, it is not clear whether AINs are used as substitutes for RN/ENs or if they are added in addition to current RN/EN staffing levels. The variety of ways by which AINs can be incorporated into care teams is likely a main source of variation within AIN units, potentially erasing existing differences between non-AIN units and AIN units.

CONCLUSION

This study examines the interlocking roles of AINs and RN/ENs on medical and surgical units using survey data from 11 acute care hospitals in three Australian states. AINs are significantly less likely than RNs and

ENs to perform skilled tasks such as starting IVs or arranging discharge referrals, although notable proportions of AINs still perform these tasks. More RNs and ENs on units with low proportions of AINs, relative to those on units with no, or high, proportions of AINs, report delayed tasks. Although this difference is only statistically significant in regard to two tasks, it provides a basis on which to tentatively suggest that the integration of AINs into an effective model of care is a key factor.

CLINICAL RELEVANCE

With increasing employment of Assistants in Nursing in acute hospital settings comes the requirement to optimise their use. This needs to include a well-articulated scope of practice, clear delegation of tasks, and effective integration with the rest of the care team.

REFERENCES

Alcorn J & Topping AE (2009): Registered nurses' attitudes towards the role of the healthcare assistant. *Nursing Standard* **23**, 39-45.

Algoso M & Peters K (2012): The experiences of undergraduate Assistants in Nursing (AIN). *Nurse Education Today* **32**, 197-202.

Australian Institute of Health and Welfare (AIHW) (2012) Nursing and Midwifery Workforce 2011. In *National health workforce series no. 2. Cat. no. HWL 48.* AIHW, Canberra.

Barter M, McLaughlin FE & Thomas SA (1997): Registered nurse role changes and satisfaction with unlicensed assistive personnel. *Journal of Nursing Administration* **27**, 29-38.

Baruch Y & Holtom BC (2008): Survey response rate levels and trends in organizational research. *Human Relations* **61**, 1139-1160.

Bostrom J & Zimmerman J (1993): Restructuring nursing for a competitive health care environment. *Nursing Economics* **11**, 35-41, 54.

Bureau of Labor Statistics (2013) Occupational Outlook Handbook. U.S. Department of Labor, Washington DC.

Bureau of Labor Statistics (2014) Occupational Outlook Handbook, 2014-15 Edition, Nursing Assistants and Orderlies. U.S. Department of Labor, Washington D.C.

Butler M, Collins R, Drennan J, Halligan P, O'Mathuna DP, Schultz TJ, Sheridan A & Vilis E (2011): Hospital nurse staffing models and patient and staff-related outcomes. *Cochrane Database of Systematic Reviews*, Cd007019.

Canadian Nurses Association (2013) RN & Bacclaureate Education. Available at: http://www.cna-aiic.ca/en/becoming-an-rn/education/rn-baccalaureate-education-table (accessed 20 March 2015).

Duffield C, Diers D, O'Brien-Pallas LL, Aisbett C, Roche MA, King M & Aisbett K (2011): Nursing staffing, nursing workload, the work environment and patient outcomes. *Applied Nursing Research* **24**, 244-255.

Duffield C, Roche MA, Diers D, Catling-Paull C & Blay N (2010): Staffing, skill mix and the model of care. *Journal of Clinical Nursing* **19**, 2242-2251.

Duffield C, Roche MA & Twigg D (2014): The use of unregulated staff: time for regulation? *Policy, Politics, and Nursing Practice* **15**, 42-48.

Dunn OJ (1964): Multiple comparisons using rank sums. *Technometrics* **6**, 241-252.

Eastaugh S (1990): Hospital nursing technical efficiency: Nursing extenders and enhanced productivity. *Hospital and Health Services Administration* **35**, 561-573.

Ford BM (2010): Hourly rounding: A strategy to improve patient satisfaction scores. *Medsurg Nursing* **19**, 188-191.

Garfink CM, Kirby KK, Bachman SS & Starck P (1991): The university hospital nurse extender model. Part III, Program evaluation. *Journal of Nursing Administration* **21**, 21-27.

Gillen P & Graffin S (2010): Nursing Delegation in the United Kingdom. *The Online Journal of Issues in Nursing* **15**.

Health Workforce Australia (2012) Health Workforce 2025 - Doctors, Nurses and Midwives Volume 1. Health Workforce Australia, Adelaide.

Jacob ER, McKenna L & D'Amore A (2015): The changing skill mix in nursing: considerations for and against different levels of nurse. *Journal of Nursing Management* **23**, 421-426.

Keeney S, Hasson F, McKenna HP & Gillen P (2005): Nurses', midwives' and patients' perceptions of trained health care assistants. *Journal of Advanced Nursing* **50**, 345-355.

McGillis Hall L, Doran D, Baker GR, Pink GH, Sidani S, O'Brien-Pallas L & Donner GJ (2003): Nurse staffing models as predictors of patient outcomes. *Medical Care* **41**, 1096-1109.

McKenna HP, Hasson F & Keeney S (2004): Patient safety and quality of care: the role of the health care assistant. *Journal of Nursing Management* **12**, 452-459.

Meade CM, Bursell AL & Ketelsen L (2006): Effects of nursing rounds: on patients' call light use, satisfaction, and safety. *American Journal of Nursing* **106**, 58-70.

National Health Service (2013a) Health Care Assistant. Available at: http://www.nhscareers.nhs.uk/explore-by-career/wider-healthcare-team/careers-in-the-wider-healthcare-team/clinical-support-staff/healthcare-assistant/ (accessed 20 March 2015).

National Health Service (2013b) NHS Careers: Nursing. Available at: http://www.nhscareers.nhs.uk/explore-by-career/nursing (accessed 20 March 2015).

Needleman J, Beurhause P, Pankratz V, Leibson C, Stevens S & Harris M (2011): Nurse staffing and inpatient hospital mortality. *New England Journal of Medicine* **364**, 1037-1045.

O'Brien-Pallas LL, Thomson D, McGillis-Hall L, Pink GH, Kerr M, Wang S, Li X & Meyer R (2004) Evidence-based Standards for Measuring Nurse Staffing and Performance. Canadian Health Services Research Foundation, Toronto, Canada.

Plawecki L & Amrhein D (2010): A Question of Delegation: Unlicensed Assistive Personnel and the Professional Nurse. *Journal of Gerontological Nursing* **36**, 18-21.

Potter P, Deshields T & Kuhrik M (2010): Delegation practices between registered nurses and nursing assistive personnel. *Journal of Nursing Management* **18**, 157-165.

Powers PH, Dickey CA & Ford A (1990): Evaluating an RN/co-worker model. *Journal of Nursing Administration* **20**, 11-15.

Rimmer D & Hand T (2010): Ask the Board: HCA or AP: what's the difference?... healthcare assistant...assistant practitioner. *British Journal of Healthcare Assistants* **4**, 97-97.

Roche MA, Duffield C, Aisbett C, Diers D & Stasa H (2012): Nursing work directions in Australia: Does evidence drive the policy? *Collegian* **19**, 231-238.

Shepard LH (2013): Stop going in circles! Break the barriers to hourly rounding. *Nursing Management* **44**, 13-15.

Spilsbury K & Meyer J (2004): Use, misuse and non-use of health care assistants: understanding the work of health care assistants in a hospital setting. *Journal of Nursing Management* **12**, 411-418.

Tourangeau AE, White P, Scott J, McAllister M & Giles L (1999): Evaluation of a partnership model of care delivery involving registered nurses and unlicensed assistive personnel. *Canadian Journal of Nursing Leadership* **12**, 4-20.

Twigg D, Duffield C, Bremner A, Rapley P & Finn J (2011): The impact of the nursing hours per patient day (NHPPD) staffing method on patient outcomes: a retrospective analysis of patient and staffing data. *International Journal of Nursing Studies* **48**, 540-548.