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Development of competence in the first year of graduate nursing practice: A longitudinal study

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest

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ABSTRACT

Aim. To determine the extent to which competence develops in the first year of nursing practice in a paediatric setting.

Background. Amongst all the literature related to nursing competence, there have been few studies that have used a standardised tool to determine the development of professional nursing competence in the first year of practice.

Design. A quantitative longitudinal design was applied as part of a mixed methods study.

Methods. Forty seven nurses commencing a 12 month graduate nurse program were invited to undertake a self-assessment of their level of competence at four time points; commencement, 3 months, 6 months and 12 months, between January 2013 - February 2014. The assessment was completed using the Nurse Competence Scale; a questionnaire with 73

items across seven domains of competence. Each item is scored along a visual analogue scale (0-100). Response rates varied from 100% at commencement to 68% at 12 months.

Results. At commencement, the self-assessed level of overall competence was 41.4, 61.1 at 3 months, 72.9 at 6 months and 76.7 at 12 months. Similar patterns were seen for each domain. Mixed effects model analysis for longitudinal data revealed gains in competence for each of the domains and overall, were statistically significant from commencement to 3 months and 3 months to 6 months. While gains were made between 6 - 12 months, the results were not statistically significant.

Conclusion. Graduate nurses showed significant gains in competence in the first 6 months of transition from nursing students to registered nurses.

SUMMARY STATEMENT

Why is this research needed?

- Few studies have used a standardised, validated measure to determine the growth in competence of newly registered nurses.
- There is a need for longitudinal studies to determine the trajectory of development of competence.

What are the key findings?

- There is a significant increase in the level of competence of newly registered nurses in their first 6 months of practice, with stabilisation in the subsequent 6 months.
- The rate at which competence develops varies between professional domains of practice

How should the findings be used to influence policy/practice/research/education?

- Attention must be given to ensuring registered nurses continue to develop in the domain of ensuring quality.
- Future research should be directed to the duration and structure of transition programs.

KEY WORDS

Professional competence, staff development, professional development, transitional programs, new graduate nurses, prospective studies, quantitative studies

INTRODUCTION

What it means to be competent, how competence develops and how competence is assessed has been a focus in the nursing literature for many decades, particularly in relation to undergraduate nursing students and newly registered nurses. Several published reviews have summarised the evidence related to development of competence in the transition from nursing student to registered nurse (Park & Jones 2010, Hoffart et al. 2011, Baxter 2010, Rush et al. 2013, Levett-Jones & FitzGerald 2005, Healy & Howe 2012).

Two systematic reviews of the effectiveness of transition programs for graduate nurses have been conducted (Fitzgerald et al. 2001, Edwards et al. 2011). Fitzgerald et al. (2001) included 13 papers in their review. The vast majority of papers excluded were descriptive case studies with no formal evaluation. Ten years after the review by Fitzgerald et al. (2001), Edwards et al. (2011) reviewed the literature related to transition from student to newly qualified nurse from 2000 onwards, focusing on support strategies and interventions. Thirty three papers were included in the review. As with the review by Fitzgerald et al. (2001), the majority of papers excluded by Edwards et al. (2011) were descriptive case studies with no formal evaluation. Both reviews recommended future research using more objective measures to determine the success of transition programs.

Background

In an effort to establish an objective measure of competence in nursing, several instruments have been developed, however there has been little testing of the validity and reliability of these (Chen & Watson 2011, Girot 1993, Meretoja & Leino-Kilpi 2001, Robb et al. 2002, Fitzgerald 2001, EdCan 2008, Watson et al. 2002, Redfern et al. 2002). One instrument which has undergone psychometric testing and been used extensively in the past decade is the Nurse Competence Scale (NCS) (Meretoja & Leino-Kilpi 2003, O'Leary 2012, Salonen et al. 2007, Hamström et al. 2012, Numminen et al. 2013). An extensive description of the development and psychometric testing of the NCS has been published by Meretoja et al. (2004) and Meretoja et al. (2002).

All papers reporting use of the NCS in a language other than Finnish or English include a description of determining the psychometric properties of the NCS (Dellai et al. 2009, Bahreini et al. 2011, Istomina et al. 2011, Wangensteen et al. 2012, Muller 2013). The only paper where the validity of the NCS was questioned was that by Muller (2013) who reported translating and using the NCS in German. A combination of factor analysis and Rasch

modelling did not confirm the 73 item, seven factor structure of the NCS and led to identification of six factors incorporating 54 items (Muller 2013). These findings highlight the importance of ensuring the validity and reliability of a tool for the purposes for which it is being used.

For use in the Australian context, the NCS was tested for convergent validity with the 2000 version of the Australian Nursing and Midwifery Council (ANMC) Standards, using a non-experimental cross-sectional survey design (Cowin et al. 2008). In undertaking correlational analysis, the results demonstrated a statistically significant relationship ($r = 0.075$) between the two measures. In a separate paper related to the same study, Andrew et al. (2008) reported inconsistencies with the psychometric properties of the 2000 version of the ANMC Standards and recommended further investigation before the standards could be used as a measurement tool. Cowin et al. (2008) suggested the NCS could be used to identify nurses' competence on entry into practice and that future studies should consider using a longitudinal design. To date, no studies have used the NCS longitudinally with nurses in their first year of practice.

THE STUDY

Aim

The aim of this study was to determine the extent to which competence develops in the first year of transition from undergraduate nursing student to practising registered nurse, in a tertiary paediatric setting, as determined by self-assessment using a standardised competency scale.

Design

The design for the reported phase of the study was quantitative longitudinal, measuring self-assessment of competence at four time points over a 12 month period. A second, qualitative explanatory phase followed. Those findings are reported in a separate publication by Lima et al (in press).

Setting and Participants

All nurses (n=47) commencing in a graduate nurse program (GNP) in early 2013 in a major metropolitan paediatric hospital in Australia were invited to participate. The GNP consisted of 10 formal classroom days, a period of supernumerary time, allocation of a preceptor,

regular performance reviews and a formal plan for attaining competence over a 12 month period.

Data collection

Data were collected at four separate time points over the 12 month GNP; at commencement, 3 months, 6 months and 12 months. Approximately 6 weeks prior to commencing the GNP, potential participants were mailed a participant information statement and consent form. During their second day of employment, a classroom day, the principal investigator, who had no relationship with the graduate nurses, met with them to describe each phase of the study. All graduate nurses consented to participate in the study and completed the first questionnaire which comprised three parts; contact details, demographic information and the NCS. The provision of contact details was necessary for delivery of subsequent questionnaires. Each participant created a unique personal code consisting of the first three letters of the participant's mother's name and the last four numbers of the participant's cell phone number, or a combination of letters and numbers that were memorable to the participant. The individual personal codes were inserted onto subsequent questionnaires prior to sending to participants. This enabled tracking of responses over time and follow-up of non-responders to maximise response rates. Demographic data that was collected included age related information, the hospital unit where employed and previous nursing experience.

It was determined that the Nurse Competence Scale (NCS), a questionnaire developed by Meretoja et al. (2004), was most suited to this study. The NCS includes 73 items across seven domains related to nurse competence, as first described by Benner (2001). The domains, including a brief description of each and the number of associated items on the questionnaire are presented in Table 1.

Respondents are asked to indicate their level of competence for each item using a visual analogue scale (0-100mm), where 0 is very low and 100 is very high. For descriptive purposes, Meretoja et al. (2004) recommend levels of competence are separated as low (0-25), rather good (>25-50), good (>50-75) and very good (>75-100). Respondents are also asked to nominate the frequency of use of the competency items in clinical practice. For this a 4 point Likert type scale is used where 0 = not applicable in my work, 1 = used very seldom, 2 = used occasionally and 3 = used very often.

At 3 months, 6 months and 12 months, the questionnaire was personally delivered by the principal investigator with a covering letter and a return address envelope. Where the NCS was not returned within a 2 week time frame, a follow up email was sent to the participant requesting completion and return.

Ethical Considerations

The study protocol was approved by the Human Research Ethics Committee at the institution where the study was conducted. Participation was voluntary with the only anticipated burden being the time taken to complete the questionnaire. Performance management related to competence of participants was to be addressed as per standard processes in place at the institution.

Data Analysis

Data were entered into and analysed using SPSS for Windows V21 (Armonk, NY: IBM Corp.). Following cleaning of the data, several figures were generated to help visualise the results to inform subsequent analysis. Data from each time point were analysed using descriptive statistics. To determine the extent to which competence developed over time, analysis was performed using a mixed effects model for longitudinal data. The response variable was set as either the relevant domain or overall competence. Factors were set as fixed and random, with time being the fixed effect and individual personal codes being set as the random effect. The level of significance was accepted if the p value was < 0.05 .

Validity and Reliability

As detailed earlier the validity and reliability of the NCS has been demonstrated in several settings and countries including Australia.

RESULTS

Participants

All (100%) of 47 graduate nurses completed the questionnaire at commencement. The response rate was 85% at 3 and 6 months and 68% at 12 months. There were 45 female and two male participants which largely reflects the nursing population. Given the small number of male participants, no analysis based on gender was undertaken. The median age of the participants was 23 (IQR 22-29). Of those participating, 62% (n=29) had completed paediatric placements during their undergraduate programs and 23% (11) had previously

worked as enrolled nurses. Analysis of the data based on age or previous experience did not reveal any significant differences or patterns in the extent to which competence developed.

Level of competence

Table 2 presents the results for self-assessed level of competence for each of the domains and overall at each of the four time points.

At commencement, the mean for self-assessed overall competence was 41.4 (10.3). In the domains, the mean level of competence ranged from 35.0 (14.3) for the 'teaching-coaching' domain to 47.5 (14.6) for the 'ensuring quality' domain. By 3 months, the mean overall competence had increased by almost 20 to 61.1 (13.9). The mean for the domain of 'teaching-coaching' remained the lowest at 3 months, 57.4 (15.8), while the mean for the domain 'helping role' was the highest at 65.5 (15.3). At 6 months, the mean for overall competence had risen to 72.9 (12.1). At this point the domain of 'therapeutic interventions' had the lowest mean with 67.6 (15.2), while the 'helping role' remained the domain with the highest mean at 77.3 (10.9). These remained in their respective positions at 12 months, at the end of the GNP, with mean overall competence stabilising at 76.7 (10.6). Of particular note was the shift of the domain 'ensuring quality', which at commencement was the highest mean competency domain, but at 12 months dropped to being sixth of the seven domains.

In addition to identifying the means, the individual data for level of competence across the domains and overall competence were grouped as low (0-25), rather good (>25-50), good (>50-75) and very good (>75-100). The results of this analysis are presented in Figure 1.

At commencement, most graduate nurses indicated their level of competence as rather good (>25-50) for each of the domains and overall. These ranged from 49% of graduate nurses being located in the rather good range for teaching-coaching, up to 74% in the work role. By 3 months (R2), most graduate nurses were located in the good range (>50-75), with 47% of graduate nurses self-assessing their competence in the work role at this level, up to 65% in diagnostic functions. The results at 6 months saw most nurses self-assessing their level of competence as very good (>75-100) across all except one of the domains and overall. The exception was the domain of therapeutic interventions, where most nurses (47%) were still self-assessing their level of competence in the good range. The other result of note at 6 months was that the domain of ensuring quality was the only domain to still have a graduate nurse self-assessing the level of competence as low.

By 12 months, most graduate nurses were self-assessing their level of competence as very good, in all the domains and overall with the exception of ensuring quality. While 78% of the graduate nurses indicated a very good level of competence for the 'helping role' and 69% for 'diagnostic functions, just under half the graduate nurses (49%) indicated competence as very good for 'ensuring quality.

When mixed effect model analysis was conducted (Table 3), the gain in competence was statistically significant (p value $< .001$) across all domains and overall at all time points, with the exception of the time between 6 months and 12 months. While small gains were made for each of the domains and overall between 6 and 12 months, those gains were not statistically significant.

In addition to enabling a measurement of level of competence, the NCS asked participants to identify the frequency with which they used each competency. For this measurement, a 4 point Likert-type scale was used where 0 = not applicable in my work, 1 = used very seldom, 2 = used occasionally and 3 = used very often. In analysing the data, individual responses were grouped together into frequency of use as either not applicable or used very seldom and used occasionally or very often. This was done for each domain and overall competence. The number of graduate nurses indicating frequency of use as occasionally or very often is presented in Table 4.

Analysis of the data indicated graduate nurses most frequently used competencies in the domains of the helping role and diagnostic functions and this held true for each round. The domain that saw the greatest increase in frequency of use was the work role between commencement (R1) and 3 months (R2). While only minimal, the domain of ensuring quality experienced a slight decrease in frequency of use at each round.

DISCUSSION

A persistent debate in the literature is whether being competent is something one is, or is not, or if there are levels or degrees of competence (Eraut 1998). The stance taken in this study based on the review of the literature and the acceptance of Benner's model of novice to expert (Benner 2001), was that competence continues to develop. This is the first study to be conducted that measures the longitudinal development of competence of graduate nurses, where the development of competence was considered more broadly than the development of knowledge and skills. In this study, a holistic conceptualisation of competence was applied and the extent to which graduate nurses developed competence, as determined by self-

assessment using the NCS, was found to be statistically significant across the first 6 months, with small gains from 6 to 12 months. A discussion of the results at time of commencement has been published previously (Lima et al. 2014).

In the current study, the level of competence for the domain of 'ensuring quality' was higher than any other domain at commencement. By 3 months it was 3rd, by 6 months 4th and by 12 months it was 6th. Turning attention to frequency of use, there was a slight decrease at each time point for the domain of 'ensuring quality'. It is concerning that in all studies to date that have used the NCS, including this one, that the domain of 'ensuring quality' has been either lowest or 2nd lowest, when measured further into one's career. It is this domain that provides an indication of the extent to which nurses use Evidence Based Practice (EBP). Much emphasis is placed in undergraduate studies on the development of critical thinking, use of research and implementation of EBP with a view to informing provision of quality care. However, while there is much expectation in organisations that practice will be based on evidence, there is equally an expectation that new nurses will 'hit the floor running', quickly gaining the clinical knowledge and skills necessary for practice (Wolff et al. 2010).

Several papers, including a systematic review, have been published that highlight the barriers to EBP (Kajermo et al. 2010, Andersson et al. 2007). Various strategies have been proposed to address the barriers to EBP, however to date those papers have been descriptive in nature (Kinney et al. 2012, Linton & Prasun 2013, Fink et al. 2005). Melnyk et al. (2014) developed a set of competency standards for EBP. The findings from this and other studies using the NCS, demonstrate the need for continuing emphasis on development of competence in the domain of 'ensuring quality' for practising nurses.

While the domain of ensuring quality was the highest at commencement in this study, the 'helping role' was 2nd at commencement and was 1st at the other three time points, consistent with other studies that have used the NCS. Similarly the frequency of use for this domain was higher than all other domains at each time point. Benner (2001) describes the 'helping role' as one which encompasses; the creation of a healing relationship between the nurse and patient, providing comfort in the face of adversity, being present, empowering patients, communicating through touch and guiding patients through change. Much of the competence required in the 'helping role' draws on the attributes of the nurse. A key finding in the Francis Report (Francis, 2013) was that the Mid Staffordshire NHS Foundation Trust failed to recognise the importance of creating an environment to foster key attributes to enable safe,

quality outcomes for patients. It is unknown whether the other studies where the NCS has been used to date, fostered development of competence in the 'helping role'. This may be an area for future research.

Development in the domain of 'diagnostic functions' as determined by the NCS results in this study followed a similar pattern to the 'helping role', both in level of competence and frequency of use. The 'diagnostic and monitoring domain' is described by Benner (2001) as incorporating patient assessment, detecting changes in the patient's condition, anticipating problems, understanding illness and recognising the patient's potential for healing. One hundred and fifty years ago Nightingale (1860) claimed:

The most important practical lesson that can be given to nurses is to teach them what to observe – how to observe – what symptoms indicate improvement – what the reverse – which are of importance – which are of none. (p. 150)

In the time since past, a similar emphasis has remained. One of the four domains of the ANMC Standards is 'provision and coordination of care' (Australian Nursing & Midwifery Council 2006). In both undergraduate studies and in practice, the competence of nurses to undertake accurate patient assessments is given great importance. Therefore it is not surprising that results in this study indicate a higher level of competence for this domain than most other domains of nursing practice in the NCS.

At the other end of the spectrum, the domain of 'therapeutic interventions' was either lowest or second lowest in this and other studies using the NCS with graduate nurses (Hengstberger-Sims et al. 2008, Wangenstein et al. 2012). Frequency of use also tended to sit lower than other domains. According to Benner (2001) 'competencies in this domain can be found in almost any procedure book' (p. 121). It is in this domain that much of graduate nurses' competence is judged (Wolff et al. 2010). Given the sheer range of therapeutic treatment options available in the 21st century and the rapidity with which those options continue to evolve, it is nigh on impossible for graduate nurses to commence practice having well developed competence in the domain of 'therapeutic interventions'. It is therefore important that the expectations of graduate nurses in the domain of 'therapeutic interventions' are clear and that there are defined processes in place to facilitate development in this domain without placing nurses or patients in unsafe situations.

Turning attention to overall competence, when the results from this study are compared with the single time point results of Wangensteen et al. (2012) and Hengstberger-Sims et al. (2008), the nurses in this study indicated markedly lower overall competence at the time of commencement. Given the development expected to occur in the first year of practice, this difference is perhaps not surprising, given the graduate nurses in the other studies had been practising for between 4 - 12 months. What is noteworthy in this study, is that the mean overall competence at 6 months was 72.9, approximately 10 points higher than that reported by Wangensteen et al. (2012) and Hengstberger-Sims et al. (2008), even though the majority of nurses in those studies had been practising as registered nurses for a longer period of time than the graduate nurses in this study.

The graduate nurses in Hengstberger-Sims et al. (2008) study had completed 3 year undergraduate nursing programs and were participating in 12 month transition programs in large metropolitan public hospitals in Australia; the same as the graduate nurses in this study. The graduate nurses in Wangensteen et al. (2012) study had also completed 3 year undergraduate nursing programs, however were working in a variety of settings in Norway and it is unknown whether any or all of them were participating in formal transition programs. All three studies used self-assessment as the means for determining levels of competence. Despite widespread recommendations for 12 month graduate nurse transition programs, there is little in the way of rigorous evaluation that provides a rationale. Given the significant development in competence during the first 6 months of practice in this study, with little gain in the following 6 months, an area for future research might be to undertake a comparative analysis of 6 month and 12 month duration programs across a variety of settings.

LIMITATIONS

The key limitations to this study are the sample size, a single paediatric hospital location with no comparison group and use of self-assessment. Given the small sample size, the statistical power of the results is low. The sample size did consist of the entire graduate nurse population at the study site and the results of the quantitative phase were used in the subsequent qualitative phase (Lima et al, in press). Conducting the study at a single site, with no comparison group, where all participants were engaged in the same transition program, may limit the findings to a particular type of program or to the paediatric setting. There would be benefit to conduct similar research across a range of settings. There is a risk that self-assessment can lead to a more subjective measure of competency. However the NCS has undergone validity and reliability testing and been shown to produce consistency in results

across different population groups. It therefore provides a level of objectivity despite the self-assessment nature of the tool.

CONCLUSION

Given the ever increasing complexity of healthcare, ongoing financial constraints and persistently reported nursing shortage, the expectations placed on nurses making the transition from undergraduate nursing students to registered nurses will expand. It is important to recognise the degree of competence of newly registered nurses and beyond. There must be support and professional development opportunities in place to facilitate ongoing development of competence, ensuring the safety of both the newly registered nurses and the patients for whom they care during this period of transition. Ongoing work must be carried out to determine the most effective strategies for enabling the development of competence, shifting from a piecemeal approach, or an emphasis solely on development of knowledge and skills, to a comprehensive, holistic framework for developing competence across the trajectory from undergraduate nursing student to advanced practice nurse.

Author Contributions:

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

- 1) substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
- 2) drafting the article or revising it critically for important intellectual content.

* <http://www.icmje.org/recommendations/>

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Table 1

Table 1: Brief description of the domains of professional nursing competence and number of items in the Nurse Competence Scale related to each domain

Domain	Brief description	Number of items
Helping role	Encompasses the creation of a healing relationship. Providing comfort, being present, empowering, communicating through touch and guiding through change	7
Teaching - coaching	Recognising readiness to learn, assisting integration of illness and recovery into life, eliciting understanding, interpreting, and coaching	16
Diagnostic functions	Incorporates assessment, detecting changes in conditions, anticipating problems, understanding illness and recognising potential for healing	7
Managing situations	Recognising and responding to deterioration	8
Therapeutic interventions	“Competencies in this domain can be found in almost any procedure book” (Benner, 2001, p. 121)	10
Ensuring quality	Encompasses risk prevention, quality and safety, critical thinking and reflection, evidence based practice and research	6
Work role	Coordinating needs, setting priorities, working effectively as part of a team	19

Table 2

Table 2: Summary of mean scores for domains and overall competence

Domain	Competence (out of 100)			
	R1 (n=47)	R2 (n=40)	R3 (n=38)	R4 (n=32)
	M (SD)	M (SD)	M (SD)	M (SD)
Helping role	45.5 (13.1)	65.5 (15.3)	77.3 (10.9)	84.4 (6.9)
Teaching - coaching	35.0 (14.3)	57.4 (15.8)	71.5 (13.0)*	76.2 (10.6)
Diagnostic functions	44.0 (13.6)	62.9 (14.6)	74.5 (12.8)	79.2 (12.2)
Managing situations	41.1 (12.8)	60.0 (14.6)	72.4 (12.8)	76.4 (12.1)
Therapeutic interventions	35.9 (13.5)	57.8 (18.0)	67.6 (15.2)	73.4 [#] (13.8)
Ensuring quality	47.5 (14.6)	62.0 (17.3)	72.9 (16.6)	73.7 [#] (13.9)
Work role	39.9 (11.4)	62.0 (15.6)	74.1 (14.6)	76.6 (13.7)
Overall competence	41.4 (10.3)	61.1 (13.9)	72.9 (12.1)	76.7 (10.6)

* n = 37. [#] n = 31.

R1 = Round 1 at commencement, R2 = Round 2 at 3 months, R3 = Round 3 at 6 months, R4 = Round 4 at 12 months

Table 3: Mixed Effects Model Analysis for Domains and Overall Competence Across Four Time Points

	Time point	Estimated marginal mean	Mean difference	95% confidence interval for difference		p value for difference	
				Lower	Upper		
Helping role	R1	45.5	R2-R1	19.7	15.2	24.3	<.001
	R2	65.2	R3-R1	31.6	26.9	36.3	<.001
	R3	77.1	R4-R1	36.5	31.6	41.4	<.001
	R4	R3-R2	11.9	7.0	16.7	<.001	
		R4-R2	16.7	11.7	21.8	<.001	
		R4-R3	4.9	-0.2	10.0	.061	
Teaching coaching	R1	35.0	R2-R1	22.2	17.3	27.0	<.001
	R2	57.2	R3-R1	36.3	31.4	41.3	<.001
	R3	71.4	R4-R1	41.2	35.9	46.4	<.001
	R4	R3-R2	14.2	9.0	19.3	<.001	
		R4-R2	19.0	13.7	24.4	<.001	
		R4-R3	4.8	-0.6	10.3	.081	
Diagnostic functions	R1	44.0	R2-R1	18.6	14.0	23.2	<.001
	R2	62.6	R3-R1	30.7	26.0	35.4	<.001
	R3	74.7	R4-R1	35.5	30.6	40.5	<.001
	R4	R3-R2	12.1	7.3	16.9	<.001	
		R4-R2	16.9	11.8	21.9	<.001	
		R4-R3	4.8	-0.3	9.9	.067	
Managing situations	R1	41.1	R2-R1	18.4	13.9	22.9	<.001
	R2	59.6	R3-R1	31.0	26.4	35.6	<.001
	R3	72.1	R4-R1	35.4	30.5	40.2	<.001
	R4	R3-R2	12.6	7.8	17.3	<.001	
		R4-R2	16.9	12.0	21.9	<.001	
		R4-R3	4.3	-0.7	9.3	.088	
Therapeutic interventions	R1	35.9	R2-R1	21.4	16.1	26.7	<.001
	R2	57.3	R3-R1	31.7	26.3	37.1	<.001
	R3	67.6	R4-R1	37.5	31.7	43.2	<.001
	R4	R3-R2	10.3	4.8	15.9	<.001	
		R4-R2	16.1	10.2	22.0	<.001	
		R4-R3	5.7	-0.2	11.7	.059	
Ensuring quality	R1	47.5	R2-R1	14.5	9.3	19.7	<.001
	R2	61.9	R3-R1	25.2	19.9	30.4	<.001

	R3	72.6	R4-R1	26.8	21.1	32.4	<.001
	R4	74.2	R3-R2	10.7	5.3	16.1	<.001
			R4-R2	12.3	6.5	18.0	<.001
			R4-R3	1.6	-4.2	7.4	.589
Work role	R1	39.9	R2-R1	21.9	17.2	26.4	<.001
	R2	61.7	R3-R1	34.2	29.5	38.8	<.001
	R3	74.1	R4-R1	37.0	32.0	41.9	<.001
	R4	76.9	R3-R2	12.4	7.6	17.2	<.001
			R4-R2	15.1	10.1	20.2	<.001
			R4-R3	2.8	-2.3	7.9	.284
Overall competence	R1	41.3	R2-R1	19.5	15.5	23.4	<.001
	R2	60.8	R3-R1	31.5	27.5	35.5	<.001
	R3	72.8	R4-R1	35.7	31.4	39.9	<.001
	R4	76.9	R3-R2	12.0	7.9	16.1	<.001
			R4-R2	16.2	11.8	20.5	<.001
			R4-R3	4.2	-0.2	8.6	.062

R1 = Round 1 at commencement, R2 = Round 2 at 3 months, R3 = Round 3 at 6 months, R4 = Round 4 at 12 months

Table 4

Table 4: Summary of participants indicating frequency of use as occasionally or very often for domains and overall competence

Domain	Frequency of use (occasionally or very often)			
	R1 (n=47) n (%)	R2 (n=38) n (%)	R3 (n=40) n (%)	R4 (n=32) n (%)
Helping role	35 (74)	32 (84)	35 (87)	29 (91)
Teaching - coaching	20 (43)	21 (55)*	21 (54)**	16 (50)
Diagnostic functions	31 (66)	30 (81)	30 (75)	28 (87)
Managing situations	27 (57)	18 (47)	23 (57)	24 (75)
Therapeutic interventions	21 (45)	20 (54)*	20 (50)	18 (58)***
Ensuring quality	27 (57)	20 (54)*	20 (50)	15 (48)***
Work role	16 (34)	25 (68)*	25 (62)	17 (53)
Overall competence	18 (38)	23 (60)	27 (67)	18 (56)

* n = 37 ** n = 39 ***n=31

R1 = Round 1 at commencement, R2 = Round 2 at 3 months, R3 = Round 3 at 6 months, R4 = Round 4 at 12 months

Figure 1

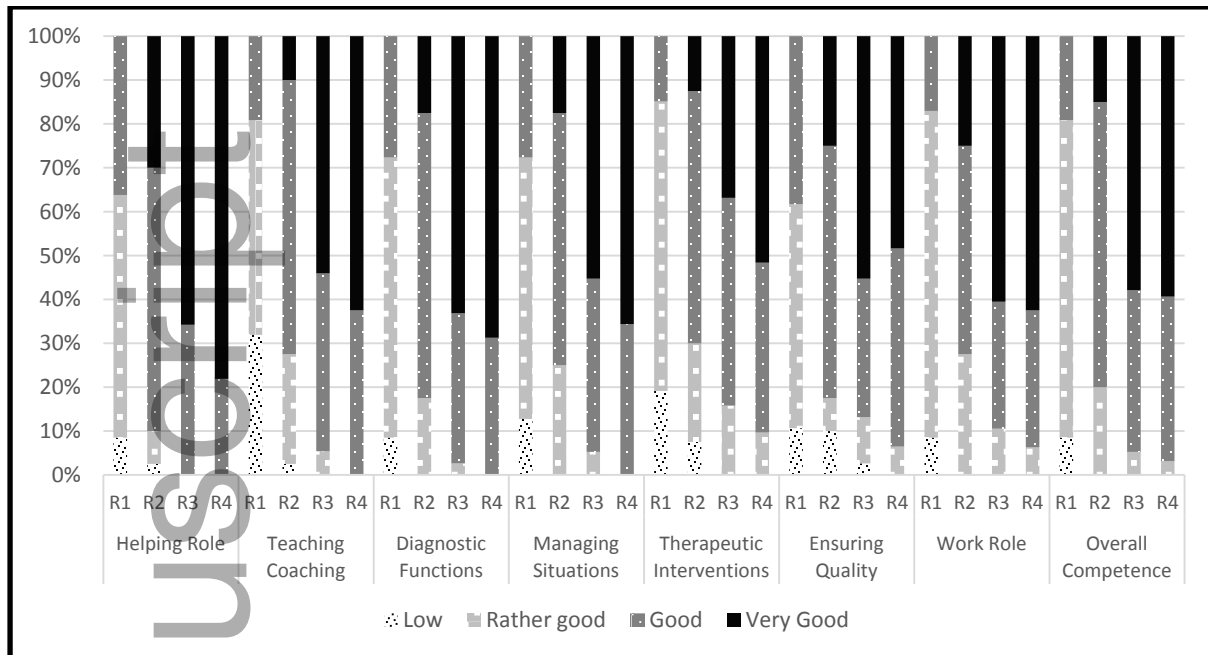


Figure 1: Number of graduate nurses at each level of competence for each domain and overall across 4 time points

R1 = Round 1 at commencement, R2 = Round 2 at 3 months, R3 = Round 3 at 6 months, R4 = Round 4 at 12 months