Determining differences between novice and expert physiotherapists in undertaking emergency on-call duties

Fiona Dunford *MHSc; PGCert; Grad Dip Phys; MNZSP*
Department of Physiotherapy, Faculty Health and Environmental Sciences, Auckland University of Technology, Private Bag 92006 Auckland 1020, New Zealand. fydunford@xtra.co.nz

Julie Reeve *PhD; MSc; Grad Dip Phys; MNZSP*
Senior Lecturer in Physiotherapy, Department of Physiotherapy, Faculty Health and Environmental Sciences, Auckland University of Technology, Private Bag 92006 Auckland 1020, New Zealand. Julie.reeve@aut.ac.nz

Peter Larmer *DHSc, MPH (Hons); Dip MT, Dip Acup. MNZSP*
Head of Physiotherapy, Department of Physiotherapy, Faculty Health and Environmental Sciences, Auckland University of Technology, Private Bag 92006 Auckland 1020, New Zealand. Peter.larmer@aut.ac.nz

ABSTRACT

This study explored the perceptions of physiotherapists with different levels of context related experience undertaking emergency on-call duties in New Zealand (NZ). A purpose-designed questionnaire was developed to investigate whether differences existed between novice and expert physiotherapists in their perceptions of emergency on-call duties and in their responses to an emergency on-call vignette. A questionnaire was administered to 71 participants with varying levels of on-call experience, in all centres providing emergency on-call services within NZ. Years of active emergency on-call experience were used to classify novices (less than 5 years) and experts (more than 5 years). A response rate of 79% (n = 56) was obtained. Significant differences between novices and experts were seen in self-rated confidence scores, self-rated stress levels and perceived support required whilst undertaking emergency on-call duties (all $p < .001$). There were no statistically significant differences between novices and experts in response to any questions in the vignette. The results of this study provide useful information for service providers regarding the perceptions and concerns of emergency on-call physiotherapists. It is recommended that novice physiotherapists be provided with better opportunities to gain specific context related experience prior to undertaking emergency on-call duties in order to improve confidence levels and reduce stress associated with undertaking on-call duties. In addition, specific continuing professional development (CPD) opportunities and support mechanisms should be provided for all staff undertaking emergency on-call work.

INTRODUCTION

Emergency on-call physiotherapy has been defined as "… the provision of respiratory/cardiorespiratory/cardiothoracic physiotherapy or combinations of respiratory and orthopaedic physiotherapy, out of normal working hours" (Gough and Doherty 2007, p.37). The common criterion for referral for emergency on-call physiotherapy is that the patient is likely to deteriorate without physiotherapy intervention before usual hours services resume. Frequently, physiotherapists employed in hospitals which provide emergency on-call services are contractually bound under their employment agreement to be part of that service; often finding themselves working in an area that is not their chosen specialty or area of expertise (Reeve 2003). The on-call physiotherapist is likely to work in a pressured time frame and under greater stress than in the normal work environment, often in conditions where support is limited. In managing these acutely compromised patients, physiotherapists are required to assess, diagnose, problem solve, plan, implement and evaluate patient care. Accuracy in problem recognition and choice of interventions can be crucial to effective treatment outcomes.

Many newly qualified physiotherapists may face their first on-call duty with minimal or no prior hands-on experience of working with acutely ill patients or of working in a highly skilled area such as intensive care (Bott 2002). Gough and Doherty (2007) established that in the United Kingdom (UK) the majority of newly qualified staff provided emergency on-call services without any direct senior supervision although some form of emergency on-call support, such as telephone support, was available in most units. Additionally, in a study which sought to determine whether newly qualified physiotherapists were affected by job pressures (related to their lack of experience), Mottram & Flin (1988) found that 'being on-call', 'making decisions alone' and 'working with the acutely ill' were amongst the highest ranked of 28 stressful activities. Furthermore, novice physiotherapists have expressed fear when undertaking emergency on-call duties and voiced concerns about 'doing the wrong thing', 'working alone', 'lack of experience to rely on' and 'being unable to justifying physiotherapy rationale to a senior member of medical staff' (Thomson 2000). In Thomson's study (2000) novice physiotherapists described themselves as having a lack of skills and experience for dealing with on-call

duties especially when not undertaking a respiratory rotation at the time of performing emergency on-call duties.

Problems relating to emergency on-call duties have been identified, particularly in relation to the maintenance of confidence and competency levels (Bott 2000, Broad 2005, Dixon and Reeve 2003, Roskell and Cross 2003). Additionally, audits of on-call service provision in the United Kingdom (UK) have identified ongoing problems with emergency on-call provision such as staff training and resource management and attempts to resolve these problems have focused on strategies at both national and local levels (CSP 2004, Dixon and Reeve 2003, Gough and Doherty 2007, Harden et al 2005, Thomas et al 2008). To date, the majority of studies investigating physiotherapy emergency on-call duties have focused on the issues of concern for service provision rather than investigating the specific concerns of those physiotherapists working in the emergency on-call environment. In addition, much of the current research has taken place in the UK and it is unclear whether the findings from these studies can be extrapolated to the NZ context. Furthermore, whilst differences in novice and expert physiotherapists' clinical reasoning strategies have been examined in orthopaedic, neurology and cardiorespiratory fields, to the authors' knowledge no such investigation has been undertaken in the field of emergency on-call physiotherapy. Thus, the purpose of this study was to determine if, in NZ, there were differences between novice and expert physiotherapists working in the emergency on-call environment in their self-perceived confidence and stress levels, self perceived need for support when undertaking these duties and in their responses to standardised questions within a clinical on-call vignette.

METHOD

All hospitals in NZ providing emergency on-call physiotherapy (n = 27) were identified from a previous study of physiotherapy on-call providers (Reeve 2003). As a search of the literature did not identify any previous valid or appropriate questionnaires or vignettes that could be used, a purpose-designed two part questionnaire was developed. Part One sought demographic data and information regarding on-call requirements. In addition, participants were asked to indicate their levels of confidence, support required and stress felt when undertaking on-call duties via a six point Likert Scale (with 0 = always stressed/requires maximal support/not confident at all and 6 = never stressed/ no support required/always confident). Part Two investigated differences between novices and experts in responses to a vignette based case scenario. The scenario detailed a physiotherapy based emergency on-call assessment and treatment of a patient presenting in the early acute stages of a rapidly deteriorating Guillain Barré syndrome. The vignette was purpose designed by two of the authors (FD and JR) who both have extensive cardiorespiratory and emergency on-call duty clinical experience in the UK and NZ. The vignette used both open and closed questions and was divided into two stages; Stage 1 – at initial patient presentation and Stage 2 – at assessment following acute deterioration of the patient. The deterioration of the patient was designed to accurately reflect a typical Guillain Barré presentation, affecting multiple systems including the respiratory system, and challenge participants to interpret assessment findings, determine priority problems, make treatment choices and reason their chosen physiotherapy management. To ease interpretation of responses, throughout

the vignette the responses to closed questions were designated to be: correct, partially correct or incorrect by two of the authors (FD and JR). These designated answers were determined in concordance with the best quality available evidence. Where required, predetermined statements were supplied which enabled participants to indicate their levels of concern for the patient regarding assessment findings. The full vignette can be obtained from the principal investigator (FD) (or viewed as an e addendum).

To be included in the study, participants had to be: qualified physiotherapists, actively undertaking (or rostered to undertake) emergency on-call duties in hospitals throughout NZ and be willing to participate in this study. Recruitment consisted of an introductory letter and follow up phone call to the physiotherapy service manager of each centre which ascertained permission to approach their physiotherapy staff to take part in the study. If willing, the physiotherapy manager was asked to nominate a key worker who would assist with administering the questionnaire (both Parts One and Two). Participants were recruited via an information sheet posted on the department notice board explaining the project and asking for volunteers. The study aimed to sample one physiotherapist per provider from each of the following groups: current senior cardiorespiratory physiotherapy specialists, senior physiotherapy staff not specialising in cardiorespiratory care but undertaking emergency on-call duties and rotational physiotherapy staff; all of whom had varied emergency on-call experience. If there were no volunteers, the key worker was asked to make no further attempt at recruitment to prevent coercion. In the event of more than one physiotherapist in each group volunteering to undertake the questionnaire, the volunteers were asked to determine between themselves who would participate. The sample size and composition were pragmatic; due to the expected time taken to complete the vignette, it was felt that physiotherapy managers would be more likely to agree to physiotherapy staff taking part if the sample size were limited. Participants were asked to set aside at least an hour for completion of the questionnaire and were requested to complete it in one sitting, in the order that questions appeared and with no reference to colleagues or texts. In an attempt to ensure that these conditions were controlled, the key worker administered the questionnaire to the participant at the time the participant set aside for completion. No monitoring of compliance with this request was undertaken although participants were asked to record the time taken to complete the questionnaire. A stamped addressed envelope was provided to participants who were requested to return the questionnaire directly to the principal investigator (rather than through the key worker) to maintain the confidentiality and anonymity of the responses. A general reminder letter was sent to all key workers at all hospitals after nine weeks to maximise the return rate. Consent to participate in this study was implied by the return of a completed questionnaire. Ethical permission for the study was granted from the Auckland University of Technology Ethics Committee (AUTEC).

DATA ANALYSIS

All closed response data were of the nominal/ordinal form and were analysed using the Statistical Package for the Social Sciences (version 17, SPSS Inc, Chicago, IL, US) using a variety of descriptive frequency analyses. Open questions were analysed by

content analysis and development of themes. Open data were coded by developing coding frames, drawn up by the principle investigator prior to analysis for all open questions. Content analysis was undertaken by the principle investigator (FD) by summarising responses into a series of themes for each open question. Where any lack of clarity occurred in assigning to a theme, a second opinion (JR) was sought.

For the purposes of this study novice and expert physiotherapy practitioners were determined using time-dependant, context related criteria as suggested by Benner (1984) and Jenson (1990). As emergency on-call physiotherapy duties in NZ may be undertaken on an infrequent basis, often less than one duty per month with a low mean number of call outs (Reeve 2003), this information was used to define those physiotherapists with less than five years emergency on-call experience as novices and those with more than five years emergency on-call experience as experts.

RESULTS[1]

In total, 71 vignettes were administered. The administration across groups was not equal as not all centres had physiotherapists of each grade undertaking on-call duties. Table 1 shows the administration and return rates according to physiotherapy grade. An overall response rate of 79% (n = 56) was achieved with representatives from 26 of the determined 27 on-call service providers. Demographic data from participants can be seen in Table 2.

Table 1: Administration and return rates of the questionnaire in each of the three physiotherapy groups undertaking on-call duties

Group	Administered n =	Returned n = (%)
Cardiorespiratory senior physiotherapist	20	13 (65)
Non cardiorespiratory senior physiotherapist	26	23 (88)
Rotational physiotherapist	25	20 (80)

Part one: General Information and self assessment.

The previous cardiorespiratory experience of participants can be seen in Table 2. As determined by the criteria allocated for novice and expert practitioners, for the purpose of this study 61% (n = 34) participants were novice physiotherapists (< 5 years emergency on-call experience) and 39% (n = 22) of participants were defined as experts (> 5 years emergency on-call experience). Further analysis of these groups demonstrated that 44% (15/34) of the novices had over two but less than five years emergency on-call experience and the majority of the expert group (54%, 12/22) had over five but no more than 10 years of emergency on-call experience. The number of years that participants had been actively involved with on-call duties ranged from those who had less than one year's physiotherapy experience (20%, 11/56) to those who had more than 15 years experience (12%, 7/56).

---

1 NB. It is recommended that the results in this section are read in conjunction with the full vignette which can be found as an e addendum at the Physiotherapy New Zealand website

Table 2: Demographic data for all participants

| Demographic Data	Respondents (n = 56)
Respondent qualification n = (%)	
Bachelor degree	47 (84)
Graduate Diploma of Physiotherapy	8 (14)
Missing data	1 (2)
Country of qualification n = (%)	
New Zealand	49 (88)
United Kingdom	5 (9)
Australia	1 (2)
Missing data	1 (2)
Frequency of on-call duties performed n = (%)	
1 shift per week	9 (16)
> 1 shift per week but < 1 shift per month,	19 (34)
Approximately 1 shift per month	12 (21)
Less than 1 shift per month	12 (21)
Less than 3 shifts per year	4 (7)
Length of time qualified Years, mean (SD, range)	8.5 (9.2, 0.5 - 38)
Clinical experience n = (%)	
Senior CR physiotherapist	13 (23)
Senior physiotherapist with 2 CR placements	11 (20)
Senior physiotherapist with 1 CR placements	8 (14)
Senior physiotherapist with 0 CR placements	4 (7)
Junior physiotherapist with 2 CR placements	12 (21)
Junior physiotherapist with 1 CR placements	5 (9)
Junior physiotherapist with 0 CR placements	1 (2)
Missing data	2 (4)

Note: CR – cardiorespiratory, SD – standard deviation

The frequency of emergency on-call duty requirements can be seen in Table 2. Participants were asked to report the date of their most recent emergency on-call duty; 50% (n = 28) had been called out within the last 6 months, but only one respondent (2%) had been called out within the last month. Seven percent of participants (n=4) had been rostered to undertake on-call duties but had never been called in to the hospital to perform emergency physiotherapy treatments. Fifty two percent (n = 29) of respondents reported being responsible for six or more different clinical areas when covering emergency on-call duty.

Likert scales were used to assess self assessed confidence scores, support required and stress felt whilst undertaking emergency on-call duties. Figure 1 demonstrates the self-assessed confidence scores for novices and experts when undertaking emergency on-call duties. When compared to the

Figure 1: Self assessed confidence scores for novice and expert physiotherapists when undertaking emergency on-call duties

Confidence level
(1 – not confident at all, 6 – always confident)
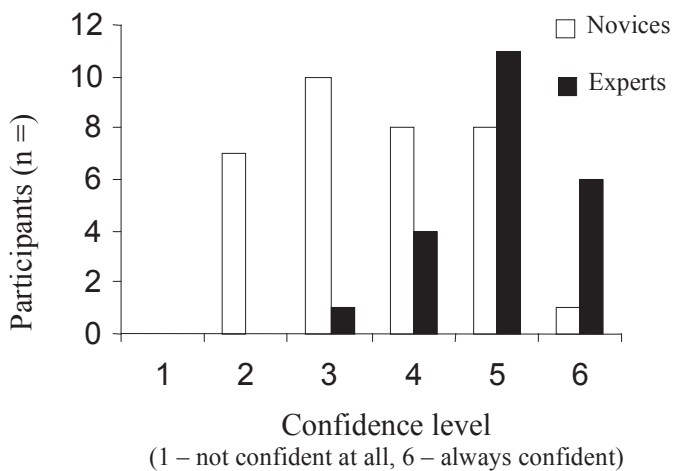
experts, novices had significantly lower scores for self assessed confidence levels (Z = -4.19, U = 132.0, $p < .0001$) indicating less confidence when undertaking emergency on-call duties. Novice and expert self-assessed scores for support required during emergency on- call duties are shown in Figure 2. Novice physiotherapists reported requiring significantly more support during emergency on-call duties when compared with experts (Z = -3.38, U = 183, p = .001). Figure 3 shows the stress levels reported by participants whilst undertaking on-call duties. Significantly higher stress levels were reported by novices compared with expert physiotherapists whilst undertaking

Figure 2: Self assessed levels of support required for novice and expert physiotherapists when undertaking emergency on-call duties

Support required
1 – no support required, 6 – maximal support required
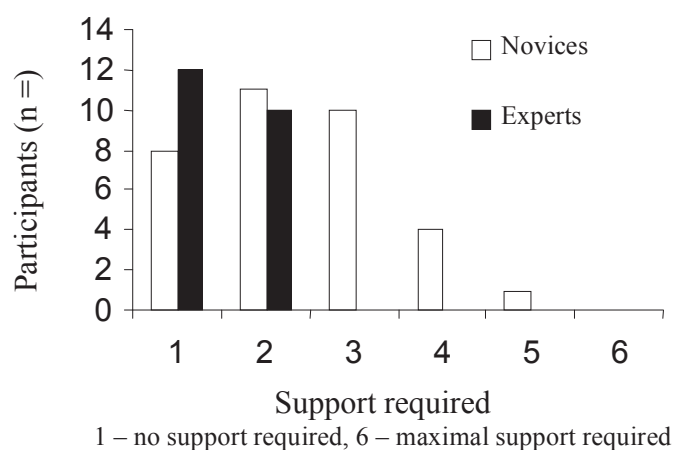
emergency on-call duties (Z = -3.26, U = 186.5, p = .001).

The relationship between confidence, support required and stress levels was investigated using Spearman's rho correlations. There was a moderate negative correlation between confidence and stress scores (r = -.58, $p < .001$) and a strong negative correlation between confidence and support scores (r = -.65, $p < .001$) indicating that when confidence levels were high, stress levels were lower and less support was required. A positive correlation was seen between support required and on-call stress scores (r = .47, $p < .001$) indicating that when stress

Figure 3: Self assessed stress scores for novice and expert physiotherapists when undertaking emergency on-call duties

Stress felt
(1 – never stressful, 6 – stressful at all times)
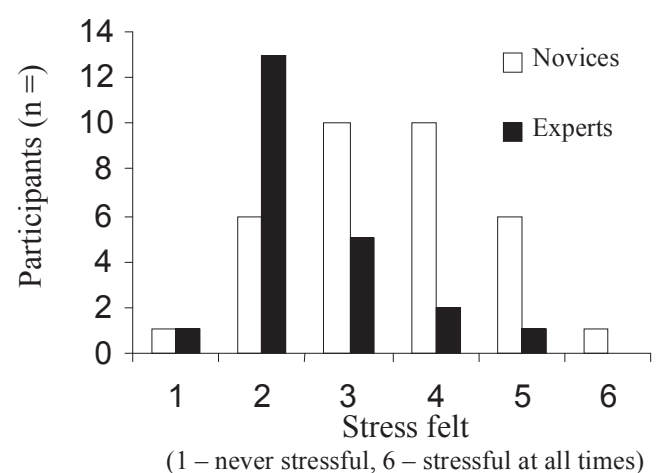
scores were low less support was required.

Participants were asked to indicate what factors most influenced their stress levels. Novices reported significantly higher influences to stress levels when working in isolation (Z = -3.70, U = 148.5, $p < .0001$); when working with a higher complexity of emergency on-call cases (Z = -3.50, U = 147.0, $p < .0001$); when working outside of a familiar specialty (Z = -2.55, U = 211.5, p = .011); and when being called to work in a critical area such as the intensive care unit (Z = -2.95, U = 171.0, p = .003). Other stressors included "dealing with difficult/unhelpful family or non-physiotherapist staffs' attitudes to physiotherapy intervention"; "physiotherapy being considered a 'last resort' by medical staff when earlier intervention would have been more appropriate" and "reduced access to information/ resources when working out of normal hours".

Part two: The Vignette; Stage one

The full vignette can be seen in an e addendum. At stage one of the vignette, participants were given a set of initial assessment findings and asked to analyse these; the results can be seen in Table 3. There was a significant difference between groups in the ability to interpret arterial blood gases but no significant difference between groups in their interpretation of any other assessment findings at this initial stage. From their analysis participants were asked to determine up to four main physiotherapy problems and *prioritise* these. Forty one percent (n = 14) of novices and 36% (n = 8) of experts determined that poor gas exchange/hypoxia was the priority problem, and poor cough effectiveness with resultant retained secretions was considered the priority problem by 24% (n = 8) of novices and 32% (n = 7) of experts. Both of these problems were considered as acceptable priority problem choices by the authors (FD and JR). Additionally respiratory muscle weakness/fatigue was considered the main problem by 15% (n = 5) of novices and 5% (n = 1) of experts. There was no significant difference between novices and experts (U = 339.5, p = .55) in their choice of the primary priority problem.

Participants were offered a choice of treatment strategies to address their priority problem identified in stage one. The authors (FD and JR) considered optimal treatment at this stage would include; positioning to assist ventilation and to reduce the

Table 3: Interpretation of assessment findings during stage one of the vignette

Observations	Novices n (%)	Experts n (%	Test statistic	p value
Respiratory rate			$U = 361.0$	0.79
Raised	12 (35)	7 (32)		
✓Normal	22 (65)	15 (68)		
Lowered	0 (0)	0 (0)		
Heart rate			$U = 374.0$	1.0
✓Raised	34 (100)	22 (100)		
Normal	0 (0)	0 (0)		
Lowered	0 (0)	0 (0)		
Blood pressure			$U = 363.0$	0.42
Raised	1 (3)	0 (0)		
✓Normal	33 (97)	22 (100)		
Lowered	0 (0)	0 (0)		
Temperature			$U = 357.0$	1.0
✓Raised	34 (100)	21 (96)*		
Normal	0 (0)	0 (0)		
Lowered	0 (0)	0 (0)		
Oxygen saturation			$U = 357.5$	0.48
✓Lowered	32 (94)	21 (95)		
Normal	1 (3)	0 (0)		
Raised	1 (3)	1 (5)		
Cough			$U = 357.0$	0.84
Effective	3 (9)*	1 (4)		
✓Semi-effective	29 (85)	21 (96)		
Poor	1 (3)	0 (0)		
ABGs			$U = 218.0$	0.04
Correctly interpreted	1 (3) *	4 (18)*		
Partially correctly interpreted	13 (38)	10 (45)		
Incorrectly interpreted	16 (47)	5 (23)		
Unable to answer	2 (6)	1 (5)		
PEFR			$U = 301.0$	0.16
Extremely concerned	8 (24)	1 (5)		
Concerned but expected result	19 (56)	15 (68)		
Mildly concerned, expected result	5 (16)	5 (23)		
Not concerned, expected result	2 (6)	1 (5)		
Auscultation			Fishers exact test	0.56
Correct	21 (62)	16 (73)		
Incorrect	13 (38)	6 (27)		
CXR			$U = 354.5$	0.72
Correctly interpreted	13 (38)	9 (41)		
Partially correctly interpreted	5 (15)	4 (18)		
Incorrectly interpreted	16 (47)	9 (41)		

Note: * missing data, ABGs – arterial blood gases, PEFR – peak expiratory flow rate, CXR – chest Xray.
✓Indicates correct answer

work of breathing (avoiding head down tilt) and chest clearance techniques with an emphasis on low energy cost strategies such as huffing and active cycle of breathing techniques. Treatment strategies selected can be seen in Figure 4. Of note, 74% (n = 25) of novices and 55% (n = 12) of experts indicated they would mobilise the patient at this stage; this was considered by the authors to be inappropriate at this stage as the patient was demonstrating increasing fatigue and the disease nadir had not yet been reached. There was no significant difference in the number of treatment strategies selected by participants to address the priority problem (Z = -.51, p = .61). The majority of

novices (85.2%, n = 29) and experts (63.6%, n = 14) reported that they would use oxygen saturation as the most important clinical indicator evaluating change following physiotherapy treatment, with a minority of participants indicating they would use auscultation, fatigue, respiratory rate or lung function testing.

Part two: The Vignette; Stage two

At stage two of the vignette, following a further 'call out', participants were asked to reassess the patient's findings. Differences between novices and experts in their response to the

Figure 4: Treatment options utilised by novice and expert physiotherapists during stage one of the vignette
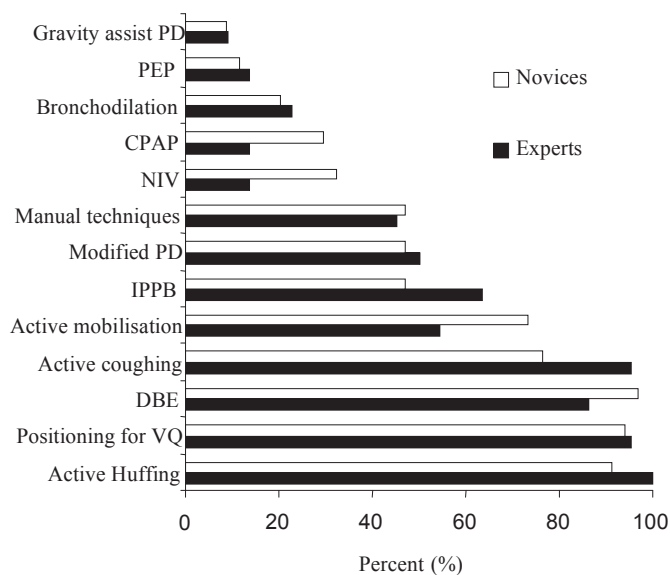
Note: CPAP – Continuous positive airway pressure, DBE – deep breathing exercises, IPPB – intermittant positive pressure breathing, NIV – non invasive ventilation, PEP – positive expiratory pressure, PD – postural drainage, VQ – ventilation perfusion

interpretation of clinical data in stage two of the vignette can be seen in Table 4. Participants were asked to interpret these data and subsequently comment upon the four most likely factors impairing the patient's ability to clear sputum. Novices suggested pain (35%, n = 12), fatigue (24%, n = 8), positioning (15%, n = 5) and respiratory muscle weakness (15%, n = 5), whilst experts suggested pain (36%, n = 8), reduced lung volumes (23%, n = 5) and fatigue (23%, n = 5) to be the most influential factors in impairing sputum clearance in this patient. When asked the most likely cause of the patient's pain, pleuritic pain was determined to be the most likely cause by both novices (59%, n = 20) and experts (82%, n = 18). When asked to analyse the meaning of a set of spirometry test results, the majority of participants in both groups (novices 82%, n = 28, experts 82%, n = 18) correctly recognised the presence of respiratory muscle weakness which was impacting upon lung function. Given the acute deterioration in the patient's condition, participants were asked to determine the most important physiotherapy problem; of note, 9% (n = 3) of novices failed to answer this question. The majority of all participants correctly expressed concerns about respiratory muscle fatigue or weakness with impending respiratory failure or retained secretions (see Table 5).

Participants were asked to choose *up to three* treatment interventions they would utilise to address the primary problem they had identified at stage two. Figure 5 illustrates those interventions and demonstrates that both groups chose similar treatment interventions. Of note, ten percent of novices (n=3) chose over three treatment strategies, adopting more of a "splatter" approach to treatment, and three percent of novices (n=1) did not answer the question. There was a statistically significant difference in the number of experts (23%, n = 5) and novices (3%, n = 1) who indicated they would not undertake any further interventions and would immediately refer to an intensivist for further assessment for intubation and ventilation (Fishers exact test, *p* = 0.03).

Participants were asked to support their choices of interventions, recalling evidence from the literature where they felt it appropriate to incorporate this. The majority of participants reported being aware of literature but did not specifically name these. In total, 18% (n = 6) of novices and 27% (n = 6) of experts cited references by author name only, 9% (n = 2) of experts provided full details of supporting evidence for their treatment with an associated rationale for the use of such evidence.

Open comments and time for completion

Following completion of the questionnaire, participants were asked to comment freely on the value of completing the vignette. Overall the vignette received highly positive comments on its usefulness as a learning and assessment tool. Suggestions such as: "keen to see gold standard answers" and "keen to more regularly use such a case to discuss care and rationalise choice of interventions" were made. Furthermore, feedback from participants included a number of competency concerns regarding working in the emergency on-call environment. These included: "limited experience of working with critically ill patients", "the vignette placed them outside of their comfort zone" and "reduced confidence working with emergency patients because of infrequent training".

Participants were asked to document the time it took to complete the questionnaire. There was no statistically significant difference ($U = 329$, $p = .40$) between novices and experts in time taken to complete the questionnaire with the majority of participants taking between 30 – 60 minutes to complete.

DISCUSSION

This study is the first to attempt to determine whether differences exist between novice and expert physiotherapists in response to a case based emergency on-call vignette. The purpose of this study was to explore the perceptions of physiotherapists with different levels of context related experience undertaking emergency on-call duties in NZ, and to determine if differences exist between physiotherapists with different levels of context-related experience. The current study showed there to be few differences in the responses of physiotherapists to a case based vignette of a patient with acutely deteriorating respiratory function. However, our study also determined that novices reported requiring greater levels of support than experts when undertaking emergency on-call duties, and that self perceived stress and confidence levels were significantly different in novices when compared with experts.

In clinical practice in NZ, both senior cardiorespiratory physiotherapists, senior physiotherapy staff not specialising in cardiorespiratory care and rotational physiotherapists perform emergency on-call duties (Reeve 2003) and the current study corroborates this. These duties are performed in specialist, tertiary and general centres with varying degrees of emergency on-call service demand. When working in the on-call environment the grade of 'senior/specialist' or 'junior/rotational' physiotherapist may not represent the physiotherapist's level of emergency on-call experience. Differences have been described between novice and expert physiotherapists in other physiotherapy specialist areas (Doody and McAteer 2002, Jensen et al 1990), however, to date there is no standardised definition of what constitutes a novice or an

Table 4 : Interpretation of assessment findings during stage two of the vignette

| Observations	Novices n (%)	Experts n (%)	Test statistic	p value
ABGs				
Correct	13 (38)	6 (27)	U = 369	0.93
Partially correct	14 (41)	14 (64)		
Incorrect	6 (18)	2 (9)		
Unable to answer	1 (3)	0 (0)		
Level of concern regarding ABGs				
✓Extremely concerned as signs of ARF	8 (24)	3 (14)	U = 324	0.41
✓Extremely concerned but expect this in GBS	26 (77)	18 (82)		
Mildly concerned, I would expect this in GBS	0 (0)	0 (0)		
Not concerned at all, I would expect this in GBS	0 (0)	0 (0)		
Missing data	0 (0)	1 (5)		
Oxygen therapy				
Well managed	0 (0)	0(0)	U = 346.5	0.55
Adequately managed, device appropriate, flow rate needs changing	1 (3)	0 (0)		
Adequately managed, flow rate appropriate, device needs changing	9 (27)	5 (23)		
✓Poorly managed, device and flow rate require changing	24 (71)	17 (77)		
What does the patients' Sp02 indicate				
Correct	2 (6)	2 (9)	U = 374	1.0
Partially correct	6 (18)	3 (14)		
Incorrect	26 (77)	17 (77)		
What does the patients' respiratory pattern indicate				
Correct answer	17 (50)	9 (41)	Fishers exact test	0.59
Incorrect answer	17 (50)	13 (59)		
Auscultation				
Correct answer	20 (59)	12 (55)	Fishers exact test	0.79
Incorrect answer	14 (41)	10 (45)		
CXR				
Correct answer	11 (32)	10 (45)	U = 329	.413
Partially correct	18 (53)	9 (41)		
Incorrect answer	5 (15)	3 (14)		

Note: ABGs – arterial blood gases, PEFR – peak expiratory flow rate, CXR – chest Xray
✓ Indicates correct answer

expert in the emergency on-call environment. For the purposes of this study appropriate models described in the literature were considered and combined (Benner1984, Chipchase and Prentice 2006, Jensen et al 1990, Thomas 1999), based on time spent in a context-related (domain specific) environment. The theoretical framework on which these groups were based is a major limitation of this study; and it is recognised that the novice group may have included some 'nearly experts' and vice versa. Indeed, it may have been preferable to target polar ends of the continuum of increasing expertise to overcome this limitation. However, given the small number of practising senior cardiorespiratory physiotherapists in NZ and the limited number of on-call duties undertaken/call outs required in NZ (Reeve et al 2003), it was determined that occupying a senior cardiorespiratory physiotherapy position alone may not reflect the appropriate level of context-related/on-call experience. Thus physiotherapists with five years or less emergency on-call experience were defined as novices and those with more than five years emergency on-call experience were considered experts.

Interestingly but not surprisingly, novices in this study reported higher stress levels and significantly less confidence than experts when undertaking on-call duties. Novice and expert approaches to managing stress are thought to differ (Benner 1984) and novices are said to require repeated exposures to stressful situations in order to learn how to make sense of such situations and prioritise relevant details (Batalden et al 2002). The results of this study also indicated that novice physiotherapists considered themselves to require a greater level of support than the experts when undertaking on-call duties. Reassuringly, a previous study in NZ has determined that 91% of emergency on-call physiotherapy providers ensure that support is available for physiotherapists during on-call duties (Reeve et al 2003). Despite the differences reported in self perceived levels of stress and confidence, few differences in the interpretation of assessment findings and choice of treatment interventions existed between groups. These findings may reflect that despite their anxieties, novices are actually better prepared than they may believe and that no true differences exist; or, it may reflect that the definition of novices and experts in this study was not sufficiently refined to accurately determine

Figure 5: Treatment options utilised by novice and expert physiotherapists during stage two of the vignette
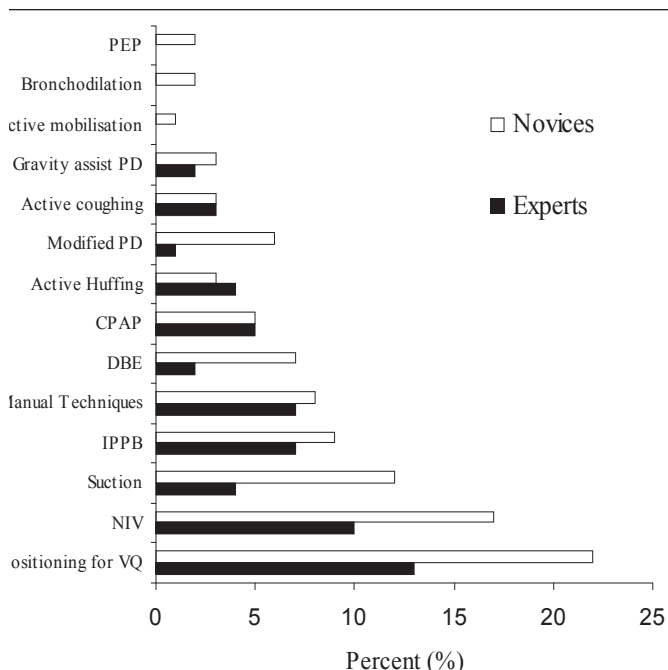
Table 5: Definition of the primary physiotherapy problem at Stage Two of the vignette by novice and expert physiotherapists

Responses (open)	Novices n = (%)	Experts n = (%)
1. Respiratory muscle weakness or fatigue, impending respiratory failure	9 (26)	7 (32)
2. Poor oxygenation / Poor ventilation perfusion matching	2 (6)	0 (0)
3. Retained secretions causing increased work of breathing	9 (26)	5 (23)
Combination of 1+2	2 (6)	0 (0)
Combination 2+3	2 (6)	0 (0)
Combination 1+3	7 (21)	10 (45)
Missing	3 (9)	0(0)

any differences. Conversely, it may be that responses to a paper based case scenario differ from that which would be seen in clinical practice. Being paper based, the vignette did not allow assessment of the effectiveness of the clinical skills chosen by the respondent and nor did it provide any indication of response to changes in status with interventions. Additionally, no visual representation of the patient (such as video analysis) was provided and some participants indicated they had no previous experience of patients presenting with Guillain Barré. The focus on the clinical decision making in a 'hypothetical/theoretical' sense during this vignette cannot be assumed to represent skills or competence in the clinical situation. Nonetheless, vignettes are considered useful tools to ascertain information about behaviour in situations that may be difficult to observe in daily life, such as during emergency interventions (Polit 2001). Typically vignettes are used to standardise the context of the scenario and minimise the variability of responses (de Vaus

1995), but as suggestions have been made that self reported behaviours differ from actual behaviours (Hughes 1998), this influences the ability to extrapolate the results of our vignette to responses in the clinical situation. Further research investigating the behaviours and clinical decision making processes of physiotherapists whilst undertaking on-call duties would be useful.

Authors have supported the need for specific on-call learning opportunities and, in some instances, specific programmes have been designed in order to better prepare staff for emergency on-call working (Carr et al 1995, Case et al 2000, CSP 2004, Harden et al 2005, Thomas et al 2008). In the UK, recommended guidelines for standardising emergency on-call training and duties exist and audits thus far have found the implementation of these to be successful (Broad 2005, Byrne 2002, Gough and Doherty, 2007). To date, in NZ, no such guidelines or standards exist for on-call purposes and the lack of specific education and training for on-call duties has been previously highlighted as a problem area (Reeve et al 2003). Legislation requirements within the NZ Health Practitioners Competence Assurance Act 2003 (HPCA) set standards to ensure a competent health workforce and under this Act, physiotherapists are required to demonstrate their competence to work in any area they are required (Physiotherapy Board of New Zealand 2005). For a number of physiotherapists that would include the emergency on-call environment. In addition, acute-care cardiorespiratory student placements are in short supply (Kirk et al 2007, Reeve 2003) and cardiorespiratory placement supervision by suitably experienced staff has been identified as a problem area (Baxter 2007). Newly qualified physiotherapists entering the profession may start their career with little or no emergency on-call related cardiorespiratory experience. Physiotherapists with emergency on-call experience have acknowledged the need to provide more support for new on-call physiotherapists in order to reduce their stress levels (Dixon and Reeve 2003) and to increase experience for working in the emergency on-call environment (Roskell and Cross 2001).

During this study, the usefulness of the vignette as a learning tool was widely commented upon by all grades of participants with several suggesting they would like to see a 'gold standard' interpretation of the case. Many commented that undertaking similar case based scenarios on a routine basis with active discussion, debriefs and expert feedback would be useful for continuing professional development. Simulation, video and role playing scenarios may also prove useful in this regard and such programmes are being delivered successfully in other countries (Thomas et al 2010) and could be delivered in NZ at local, regional or national level. Additionally, websites such as the Goodfellow club (http://www.goodfellow.org), which provide easily accessible certified online continuing professional education packages for health professionals, could be utilised to provide on-line case based scenarios and quizzes to enhance clinicians' confidence in their decision making processes.

Previous studies within the field of cardiorespiratory physiotherapy have identified differences between novice and experts in their knowledge organisation and decision making (Case et al 2000, Smith et al 2007). These include the ability of the expert practitioner to be more flexible, adaptive and rapid during practice, demonstrating smooth integrated performance and an ability to make frequent rapid procedural changes in

response to changes in patient status. The current study was not able to determine the urgency or speed of responses to the vignette in anything other than a rudimentary way (i.e. self timing to vignette completion) and it is recognised that this is unlikely to reflect the speed of clinical reasoning and responses in the clinical environment. However, of interest; the current study findings suggest that significantly more experts would seek further medical intervention at much earlier stage than the novices and this is reflective of suggestions that experts have a more holistic perspective of the patient than novices (King et al 2007), have more context related experience, and thus are able to more readily predict patient outcomes linked to previous experience (Jensen 2000).

Interestingly in the current study, the frequency of callouts of physiotherapists when undertaking on-call duties was small. Only one respondent had been 'called out' within the last month. The frequency of these call outs should only be related to the NZ context and may be related to the increasing use of other medical personnel or treatment strategies such as non invasive ventilation (which is frequently implemented in NZ by personnel other than physiotherapists). However, given the low number of reported attendances and the high levels of reported stress and anxiety associated with treating patients requiring emergency duty physiotherapy, a reconsideration of service provision may be justified.

CONCLUSION

Despite no statistically significant differences in the interpretation and reported management of a paper based emergency on-call vignette, novice physiotherapists reported significantly lower levels of confidence, significantly greater stress levels and a significantly greater need for support whilst undertaking on-call duties. It is recommended that, when expected to undertake on-call duties, novice physiotherapists are given greater opportunities to gain specific context related experience prior to undertaking such duties in order to improve their levels of confidence and reduce stress levels. Furthermore, where necessary and feasible, employers and participants should seek mutually achievable strategies to address the concerns of the emergency on-call workforce in order to enhance safe and effective service provision. These strategies may include provision of specific CPD opportunities in emergency on-call physiotherapy and provision of support mechanisms for staff whilst undertaking on-call duties.

KEY POINTS

- Novices are less confident, require more support and are more stressed than experts when working in the emergency on-call environment.
- Factors exist which have influence on stress levels of all emergency on-call physiotherapists and novices appear to be more influenced by these.
- Whilst national standards for emergency on-call physiotherapy are used in other countries, no national standard for emergency on-call physiotherapy exists in NZ.

ACKNOWLEDGEMENTS

The authors would like to thank all of the participants who took time to answer the questionnaire and their respective managers for allowing staff the time to undertake this study.

REFERENCE

Batalden P, Leach D, Swing S, Dreyfus H, and Dreyfus S (2002): General Competencies and accreditation in graduate medical education. *Health Affairs* 21: 103-111.

Baxter D (October, 2007): Otago: Physiotherapy: Education-The Developing Context. *The New Zealand Society of Physiotherapists Incorporated Newsletter,* 14.

Benner P (1984): Excellence and power in clinical nursing practice. California: Addison-Wesley Publishing.

Bott J (July 2002): Is respiratory care being sidelined? *Physiotherapy Frontline,* p.27.

Broad M (2005): The effect on self-perceived competence when using emergency respiratory on call working: Guidance for physiotherapists-A pilot study. Master of Health Science thesis, University Hospital of Wales, Cardiff, Wales.

Byrne P (April 2002): Setting the standards for emergency physiotherapy. *Physiotherapy Frontline,* p.9.

Carr J, Jones M, and Higgs J (1995): Teaching towards clinical reasoning expertise in physiotherapy practice. In J Higgs and M. Jones (Eds.), Clinical reasoning in the health professions. Oxford: Butterworth-Heinemann, pp. 232-245.

Case K, Harrison K and Roskell C (2000): Differences in the clinical reasoning process of expert and novice cardiorespiratory physiotherapists. *Physiotherapy* 86: 14-21.

Chartered Society of Physiotherapy (2004): Emergency Respiratory on-call working: Guidance for managers. Information paper no. PA 57. http://www.csp.org.uk/director/libraryandpublications/publications.cfm

[Accessed: 4 December 2005]

Chipchase L and Prentice C (2006): Expert physiotherapists' clinical decision-making in acute care. Part one. *International Journal of Therapy and Rehabilitation* 13: 343-350.

de Vaus D (1995): Surveys in social research (4th ed.). New South Wales: Allen and Unwin.

Dixon T and Reeve J (2003): Emergency on-call duties: Audit of support, education and training provision in one NHSE region. *Physiotherapy* 89: 104-113.

Doody C and McAteer M (2002): Clinical reasoning of expert and novice physiotherapists in an outpatient orthopaedic setting. *Physiotherapy* 88: 258-268.

Gough S and Doherty J (2007): Emergency on-call duty preparation and education for newly qualified physiotherapists: A national survey. *Physiotherapy* 93: 37-44.

Harden B, Cross J, and Thomas S (2005): An exploration of emergency respiratory on-call service provision within the United Kingdom. *Journal of the Association of Chartered Physiotherapists in Respiratory Care* 37: 17-24.

Hughes R (1998): Considering the vignette technique and its application to a study of drug injecting and HIV risk and safer behaviour. *Sociology of Health and Illness* 20: 381-400.

Jensen G, Shepard F and Hack L (1990): The novice versus the experienced clinician: Insights into the work of the physical therapist. *Physical Therapy,* 70: 314-323.

Jensen G, Gwyer J, Shepard K, Hack L (2000): Expert practice in physical therapy. *Physical Therapy* 80: 28-43

King G, Currie M, Bartlett DJ, Gilpin M, Willoughby C, Tucker MA, Strachan D, Baxter, D (2007): The development of expertise in pediatric rehabilitation therapists: Changes in approach, self-knowledge, and use of enabling and customizing strategies. *Developmental Neurorehabilitation,* 10*:* 223-240.

Kirk A, Ferdinand S and Conroy J (August, 2007): Tomorrow's physiotherapists: Whose responsibility? *The New Zealand Society of Physiotherapists Incorporated Newsletter,* 16.

Mottram E and Flin R (1988): Stress in newly qualified physiotherapists. *Physiotherapy* 74: 607-612.

Physiotherapy Board of New Zealand (2005): Recertification guidelines; Guidelines for continuing professional development for Physiotherapists. Wellington, New Zealand.

Polit D, Beck C and Hungler B (2001): Essentials of Nursing Research: Methods, appraisal and utilisation (5th ed.). Philadelphia: Lippincott.

Reeve J (2003): A survey of physiotherapy on-call and emergency duty services in New Zealand. *New Zealand Journal of Physiotherapy* 31: 75-83.

Roskell C and Cross V (2001): Defining expertise in cardiorespiratory physiotherapy. *British Journal of Therapy and Rehabilitation* 8: 294-299.

Smith M, Higgs J and Ellis E (2007): Physiotherapy decision making in acute cardiorespiratory care is influenced by factors related to the physiotherapist and the nature and context of the decision: a qualitative study. *Australian Journal of Physiotherapy* 53: 261-267.

Thomas S (1999): Competence in Respiratory Care. *Journal of the Association of Chartered Physiotherapists in Respiratory Care,* 32: 19-24.

Thomas PJ, Lamont A, Baxter B, Neads P, Sturgess J, Watson M and Rego P (2010): Experience and outcomes from state-wide, simulation based, post-graduate education programs for intensive care, cardiorespiratory and orthopaedic physiotherapy. Paper presented at the Congress of the Australian Physiotherapy Association, Surfers paradise, Australia. http://physiotherapy.asn.au/congress10/images/Abstracts/2010/thomas%20peter%20100.pdf [Accessed: 15 February 2011]

Thomas S, Gough S, Broad M, Cross J, Harden B, Ritson, and Quint M (2008): On-call competence: developing a tool for self- assessment. *Physiotherapy* 94: 204-211

Thomson A (2000): Is there a difference in how novice physiotherapists perceive how well they are prepared for, and deal with carrying out emergency respiratory work? *Journal of the Association of Chartered Physiotherapists in Respiratory Care* 35: 21-28.