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Title: Understanding nursing practice in stroke units: a Q-methodological study.

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Title: Understanding nursing practice in stroke units: a Q-methodological study.

Abstract:

Purpose: Nurses represent the largest professional group working with stroke-survivors but there is limited evidence regarding nurses' involvement in post-stroke rehabilitation. The purpose of this study was to identify and explore the perspectives of nurses and other multidisciplinary stroke team members on nurses' practice in stroke rehabilitation.

Method: Q-methodological study with 63 multidisciplinary stroke unit team members and semi-structured interviews with 27 stroke unit team members.

Results: Irrespective of their professional backgrounds, participants shared the view that nurses can make an active contribution to stroke rehabilitation and integrate rehabilitation principles in routine practice. Training in stroke rehabilitation skills was viewed as fundamental to effective stroke care but nurses do not routinely receive such training. The view that integrating rehabilitation techniques can only occur when nursing staffing levels were high was rejected. There was also little support for the view that nurses are uniquely placed to co-ordinate care, or that nurses have an independent rehabilitation role.

Conclusions: The contribution that nurses with stroke rehabilitation skills can make to effective stroke care was understood. However, realising the potential of nurses as full partners in stroke rehabilitation is unlikely to occur without introduction of structured competency based multidisciplinary training in rehabilitation skills.

Introduction:

Stroke is the third largest cause of death and largest cause of adult disability in the United Kingdom and United States. The World Health Organization (WHO)^[1] estimates 15 million people worldwide will have a stroke annually; this represents a major health burden^[1-2]. Overall, mortality rates are falling^[2] but WHO^[1] data indicate 5 million deaths from stroke annually and 5 million people living with permanent disability. Post-stroke rehabilitation aims to *'enable an individual who has experienced a stroke to reach the highest possible level of independence and be as productive as possible'*^[3]. Inpatient rehabilitation is provided by multidisciplinary teams (MDTs) which include nurses. Nurses represent the largest professional group working with stroke survivors but there is currently limited evidence regarding nurses' involvement in post-stroke rehabilitation^[4-5]. Nurses' rehabilitation role can be hidden and not fully understood by other MDT members^[6-7]. The perspectives of other MDT members, on nurses' practice and contribution in stroke rehabilitation are largely unreported. This is an anomaly given the evidence that MDT working is a major factor in achieving the improved outcomes associated with stroke units^[8]. Findings from studies exploring patients' and carers' perspectives on nurses' rehabilitation role post-stroke indicate mostly positive descriptions of nurses' caring activities. However, patients and carers were largely unable to identify instances where nurses contributed to rehabilitation^[9-11].

Research conducted by Kirkevold^[12-13], Gibbon^[14], O'Connor^[15] and Burton^[16] drew largely on nurses' perceptions of their work. Synthesis of findings suggested three main nursing roles in stroke care. *Direct care*, focused on prevention of complications, including assessment of swallowing, monitoring blood pressure, positioning, moving and handling, managing personal care and continence, preventing pressure ulcers and maintaining nutrition. *Co-ordination and management of care*, based on ensuring care and treatment happened when it should through liaison with other MDT members. The third role was *rehabilitation related* encompassing what was variously termed carry-over care, continuation care, rehearsal care, or integrative/conserving care. Researchers

reported nurses appreciated the importance of contributing to rehabilitation but cited time and workload pressures as reasons why they did not routinely employ stroke rehabilitation principles in their practice ^[5,17]. Stroke rehabilitation nursing has been described as using knowledge gained from teaching or working with therapists to routinely integrate therapy into activities of daily living and into nurse-patient communication^[18]. Observational studies also identified nurses' limited involvement in post-stroke rehabilitation ^[17-20]. A recent meta-ethnography of 16 qualitative studies, published between 1990-2012, concluded nurses' reported involvement in post-stroke rehabilitation remains limited ^[5]. Integration of rehabilitation principles in routine nursing activity was perceived to be contingent on adequate nurse staffing levels and management of demands on nurses' time. Direct care and monitoring were prioritised, often without appreciation that these activities provided opportunities to integrate rehabilitation principles. The review provided evidence of the need to re-examine nurses' involvement in inpatient post-stroke rehabilitation. This study aimed to explore the perspectives of nurses and other MDT members on nurses' practice in stroke rehabilitation.

The objectives of the study were:

- To establish nurses' and other MDT members' subjective views on statements drawn from a meta-ethnography of nursing practice in stroke rehabilitation.
- To explore how nursing roles and nursing practice in stroke units were described and understood by nurses' and other MDT members.
- To compare and contrast explanations for nurses' practice in stroke rehabilitation from nurses and other MDT members.

Methods:

A Q methodological approach was utilised, Q methodology focuses on the subjective views of the participants. Data is collected using Q sorts whereby participants sort a set of statements about the subject under investigation. The data derived from the Q sorts is then intercorrelated, factor analysed and interpreted with the aim of uncovering the differing accounts constructed by the participants^[21-22].

Q methodology shares some features with qualitative methodology; however, statistical analysis is used to identify themes that emerge from the data. Baker et al^[23] argue that combining features of quantitative and qualitative designs is a strength of Q methodology. The approach has been used previously in disability related research^[24-25] but in only three studies of stroke services, all with patients^[26-28].

Development of the Q-set:

The statements participants sort are referred to as the Q-set which should provide good coverage of issues related to the research question and *'must be broadly representative of opinion, domain, population or concourse at issue'*^{29p58}. We drew on nursing rehabilitation role descriptions identified in a meta-ethnography of nursing practice in stroke rehabilitation^[5]. Initially 134 items related to different aspects of nurses' work with stroke survivors were identified. The size of the Q-set is dependent on the subject matter but between 40 and 60 items are usually selected^[21], although useful interpretations have been derived from Q-sets with lower numbers^[24-28]. In an iterative process these items were reviewed and synthesised independently by 4 researchers and reduced to 38 statements, and then to 32 by *author 1*. These were reviewed for content and clarity by *author 2* and by another stroke researcher for relevance and coverage. A number of theoretical frameworks have been developed to define nursing roles in rehabilitation^[12-13,15-16]. These were reviewed for the degree of fit with the role descriptions identified in the meta-ethnography^[5]. The empirically derived framework developed by Long et al^[30] was adopted (Supplementary file 1) to group items under six thematic headings which appeared to most closely match contemporary nursing activity in stroke rehabilitation settings. The larger number of items in the 'therapy integration and carry on theme' reflects the focus of this study.

Conditions of instruction

provide individual input following referral and are regarded as peripheral MDT members. Each unit was supported by an experienced nurse whose title varied from stroke co-ordinator and stroke specialist nurse to stroke thrombolysis co-ordinator and specialist nurse.

Inclusion criteria:

Staff were eligible to participate in the study provided they were: a RN, HCA, therapist, physician, dietician, social worker, clinical psychologist or orthoptist working on or visiting patients on the stroke unit for more than three days a week. Therapists completing post-registration training rotations were required to have been working on the stroke unit for > two months. The study received a favourable ethical opinion through the National Research Ethics Service (Reference 11/YH/0211) and research governance approval in each hospital; all participants provided written informed consent.

Recruitment and sampling

Purposive sampling was used to invite participation from nurses and therapists in senior and junior roles and those with extensive and limited stroke care experience. The views of such participants provide for meaningful comparisons between disciplines and sites. Recruitment ceased when 63 participants had completed Q-sorts (Table 1). Participants were representative of all core MDT members, with numbers recruited roughly proportional to the professional groups involved in stroke care (Table 1).

Table 1: Sample	Q-study (n=63)	Interviews (n=27)
Registered nurse	25	12
Healthcare assistant	10	3
Occupational Therapist	8	4
Occupational Therapy Assistant	3	-
Speech and Language Therapist	3	2
Physiotherapist	9	5
Physiotherapy Assistant	1	-
Physician	2	1
Carer Support Officer	1	-
Orthoptist	1	-
Age range of participants	24-61 years	

Data collection:

Q-sorts were completed between October and December 2011; either one-to-one or in small group sessions on stroke units, at times participants chose. Researchers were present to explain the Q-sort exercise. Participants took 25-50 minutes to complete Q-sorts; no discussion took place between participants. Participants were encouraged to record comments on the statements or the reasons for placing them in a specific grid position in a booklet provided; approximately half of the participants added comments. The last section of the booklet, completed by all participants, sought biographical details.

Following Q-sort analysis, semi-structured interviews (n=27) took place with MDT members from each unit, all but one of whom had completed the Q-sort. Interviews were completed between February and May 2012; purposive sampling was used. Interviews were used to explore the Q-sort findings in more detail and to establish individual perceptions of RN and HCA rehabilitation roles. This sub-sample included 12 RNs, 2 HCAs, 6 PTs, 4 OTs, 2 SALTs and 1 physician. Interviewees received a written summary of Q-sort findings before interviews which took place on stroke units at

times chosen by participants. Few had read this before interview, so findings were discussed during interviews.

Data analysis

Q-sorts:

Q sort data were entered into PQ Method (version 2.11). The 63 completed Q sorts were analysed using principal components analysis. A correlation matrix for all Q sorts was produced and factor analysis performed to identify Q sorts that appeared to group together. PQ method computes eight factors, all had eigenvalues of >1 (range 32.68 to 1.55), therefore a scree plot was created to decide which factors to keep for rotation. The scree plot indicated 4 to 5 factors to the left of the point where the line flattened out ^[31]. Following Brown ^[32] the percentage of explained variance, the number of participants loading on the factors and the contextual significance of the factor arrays were considered for 3, 4 and 5 factor solutions. The 5 factor solution was disregarded as it did not provide additional understanding. The 3 factor solution was considered too limiting as it masked a fourth understanding. The 4 factor solution, accounting for 66% of the explained variance, was selected for Varimax rotation. There were twelve defining sorts for factor 1, seven for factor 2, eleven for factor 3 and six for factor 4. These defining sorts characterise the factor and while it does not mean that the sorts of all participants who load on one factor are identical, they are nevertheless significantly similar. A structured 'crib sheet' ^[29] was used to ensure all items in the factor arrays, were considered. Qualitative data drawn from the Q-sort statement booklets were used to help interpret the placing of statements.

Semi-structured interviews:

Interview data were analysed using directed content analysis ^[33]. This approach typically aims to validate or conceptually extend a theoretical framework or theory. We used this data and that derived from the comments in the statement booklets to help interpretation of the factors. Transcripts were read and re-read by *author 1*. References to nurses' involvement or lack of involvement in post-stroke rehabilitation were identified and included in one of four pre-determined

categories based on the four factors derived from the analysis. Some data could not be coded to these categories, two additional categories proved necessary. These categories were participants' perceptions of contextual or professional factors which facilitated or hindered nurses' involvement in post-stroke rehabilitation.

Results:

Consensus statements:

There were seven consensus statements which did not discriminate between factors.

Table 2: Consensus statements					
Number	Statement	Factor 1	Factor 2	Factor 3	Factor 4
5	Nurses are the most appropriate professional to liaise between stroke survivors, families and the stroke unit team.	0	0	-1	-2
12	Helping stroke survivors recover and regain some independence makes nursing in stroke care satisfying and meaningful work.	2	3	2	3
19	It does not help stroke survivors in their rehabilitation and recovery from stroke if nurses stand back and let the stroke survivor do some tasks or activities for themselves.	-3	-3	-2	-3
22	Nurses do not need any additional stroke specific specialist training to meet the needs of stroke survivors.	-4	-4	-4	-3
24	Nurses should help stroke survivors in their rehabilitation and recovery from a stroke by routinely carrying out tasks or activities for them.	-2	-2	-1	-3
25	Nurses working in stroke care have an independent rehabilitation role as well as working as part of the stroke unit team.	-1	0	0	-1
27	Nursing in stroke care must include facilitating and enabling patients to develop the confidence and skills to do things for themselves.	2	3	1	4

Statements 19 and 24 were strongly disagreed or disagreed with demonstrating a shared view among participants (all disciplines) that it is important for nurses to encourage and facilitate independence. There was moderate to strong agreement with statements 12 and 27 which explicitly identify these elements of rehabilitation as being part of RNs and HCAs roles. This is not an entirely surprising finding given the focus of stroke units in general, and therapists in particular, on

rehabilitation. However, RNs and HCS in other studies have identified the conflict felt when they are faced with time pressures and staff shortages, but understand the importance of facilitating independence ^[13,17,19,34]. Such time and workload pressures were present in this study, but this kind of conflict was rarely identified by participants, with both RNs and HCAs in all clinical areas arguing facilitating independence was an essential element of their work.

Even something simple like, if a patient needs a bed-bath just getting them washing their own face, that's part of it, that's where we tend to start [...]. Feeding, we're trying to encourage them to actually feed themselves, we'll sit down beside them and help them if need be and then when they get really tired then we'll take over, simple things like that help [facilitate independence]. (Interview, RN (ward sister) mixed unit C).

Neutral or moderate disagreement with statement 5 challenges researchers' claims that the co-ordination role is core to stroke care nursing ^[16, 34-36]. Participants' indicated the best person to co-ordinate depended on what issue was being considered, e.g. aids and adaptation to the home were best addressed by OTs, whereas continence issues were often addressed by nurses:

[It is] Often but not always [the nurse]. For example, a patient with Wallenberg's Syndrome, the SALT may be most appropriate or the Dr, given severe dysphagia is the most prevalent feature. (Q-sort booklet response: Lead SALT, HASU B).

The whole team need to liaise with families and stroke survivors to ensure an appropriate flow of information (Q-sort booklet response: Lead PT, HASU B).

Consensus on statement 25, where there was neutral or moderate disagreement, challenges claims made previously for an independent rehabilitation role for RNs ^[12,16,34]. However, this may reflect the clearer role understanding held by those who routinely work in stroke units where an MDT approach is well established and underpinned by evidence of its value ^[8]. Statement 22 reflects strong agreement with the view that RNs and HCAs need additional stroke specific specialist training; this was endorsed in interviews:

They will assist the therapists; we've provided training to make sure that there was the same procedure followed all the way through. (Interview, Clinical Specialist OT, HASU B).

We've had the Speech Therapist on a rolling programme, talk to staff, we've also had the PTs and OTs coming in, every Friday we've had educational hours, covering all aspects and the stroke nurse specialist coming in talking about strokes and thrombolysis and the OT and PT looking at positioning techniques.(Interview, RN rehabilitation unit D)

Informal unit based training such as that described above was often highlighted as a strategy being used to develop RNs and HCAs nurses' stroke knowledge; however this was said to be increasingly difficult to deliver:

The problem is getting the nurses [to attend], even something simple as education when everybody is so busy with their own job, it's finding that time [...] or even me giving up the time to teach them, so working alongside nurses on the ward is probably the best way. (Interview Lead PT, HASU, A)

At the moment this is just such a busy ward that, we'd love to have training sessions every other week but it's just not possible, we can't even get staff on basic training. (Interview, RN, Rehabilitation Unit D)

Review of training reported by participants (Supplementary file 2) indicates that, with the exception of online Stroke Training and Awareness Resources (STARS) ^[37] training, and in contrast to most therapists, few RNs had completed post-qualifying stroke specific education and training.

Factors

A four factor solution was found to represent the 'best-fit' in terms of generating interpretable data and understanding participants' perspectives on RNs and HCAs practice in stroke rehabilitation (Figure 2).

Figure 2: Q-study Factors	
Factor 1	Integrate rehabilitation principles into routine nursing practice.
Factor 2	Physical care activity takes priority over rehabilitation principles.
Factor 3	Support the wider stroke team to provide stroke rehabilitation.
Factor 4	Be cautious about nurses' engagement in stroke rehabilitation practice.

In Tables 3-6 which follow, only most agree/most disagree statements for each factor are displayed. However, interpretation focused on the whole factor array, where differences between factors were more evident. Watts and Stenner^[29] recommend giving each factor a name with the aim of capturing

the essential features of the participant's viewpoint. The factor titles emerged during the interpretive phase of data analysis and represent holistic conceptual descriptors of the factor.

Factor 1: Integrate rehabilitation principles into routine nursing practice

Factor 1 explained 23% of the variance. Twelve participants from three units loaded on this factor, they included an OT, PT and RN from a HASU, two RNs, a PT, OT and HCA from a mixed unit, and two RNs, a PT and a physician from a rehabilitation unit. All were experienced and senior staff. Two RNs were Sister grade and two were Stroke Specialist Nurses. Therapists were all senior grade and the physician had worked in stroke for ten years. With the exception of one Sister, all had undertaken stroke specific post-graduate education. Six statements (8,32,21,10,16,28) characterised this factor, these suggest that more experienced MDT members, irrespective of their professional backgrounds share the view that nurses have an active contribution to make in stroke rehabilitation and can integrate rehabilitation principles into routine nursing practice.

Table 3: Factor 1 [most strongly agree/disagree only]		
Number	Statement	Rank
2	The stroke unit team, not individual nurses, should assess and plan for stroke survivors' care and rehabilitation.	+4
8	Nursing stroke survivors and carers is a specialised type of neurological nursing which requires stroke specific knowledge and skills.	+4
1	Being competent in assessment is the most important part of the nursing role in stroke care [include neurological assessment, swallowing assessment, moving and handling assessment].	+3
20	Nurses working in stroke care must incorporate stroke specific rehabilitation techniques in their care [for example: when helping stroke survivors with positioning, sitting and standing, walking, washing, eating and drinking].	+3
32	Stroke rehabilitation nursing is a distinct and specialist role that needs further development.	+3
28	It is important when working with stroke survivors that nurses prevent stroke survivors taking risks in activities of daily living.	-3
19	It does not help stroke survivors in their rehabilitation and recovery from stroke if nurses stand back and let	-3

	the stroke survivor do some tasks or activities for themselves.	
18	Nurses working in stroke care should concentrate on the physical and emotional care of the stroke survivor and leave rehabilitation to the therapists.	-3
9	Nurses working in acute stroke care must focus on physiological monitoring and supporting medical interventions, and so they cannot also incorporate rehabilitation techniques in caring for stroke survivors.	-4
22	Nurses do not need any additional stroke specific specialist training to meet the needs of stroke survivors.	-4

Participants agreed stroke care was a specialist type of nursing (+4) requiring stroke specific training; with strong agreement that the role required further development (+3). There was agreement that RNs and HCAs need to use stroke specific assessment skills and must incorporate rehabilitation techniques in their work, e.g. when helping patients with positioning, washing and dressing, eating and drinking and walking as part of routine activities of daily living (ADLs). Support for facilitation, enabling and integrating rehabilitation in all activities was evident (+2). Joint working between therapists RNs and HCAs to develop skills and share knowledge was viewed positively (+2). In contrast, RNs and HCAs prioritising physiological monitoring, medical interventions and concentrating on physical and emotional care were quite strongly disagreed with (-3 and -2). This factor was the most positive in terms of RNs and HCAs supporting patients to take some risks in ADLs, where appropriate. Participants were neutral about RNs actively encouraging patients' families to come into units to help with ADLs and held negative views about RNs and HCAs inviting in and teaching families skills to provide personal care (-2). Analysis suggested these are regarded as part of rehabilitation provision normally managed by therapists and there was caution about RNs and HCAs undertaking these activities.

It is not the responsibility of nursing staff to 'teach' or supervise PADL activities. Therapists have been trained in approaches such as 'graded activity' 'backward chaining' and 'mindfulness' in order to 'teach and practise skills with stroke survivors and families/carers. (Q-sort booklet response: Senior OT, HASU A).

This can be done by OT/therapy team. (Q-sort booklet response: PT, rehabilitation unit D).

Interview data confirmed that therapists regarded teaching caregivers skills such as washing and dressing or transfers as a pre-discharge activity in which therapists had specialist knowledge and skills. RNs and HCAs largely did not contest this view, indicating they would support other MDT members in these areas but not take a lead role.

Participants did not agree that integrating rehabilitation techniques could only occur when staffing levels are high (-1). Experienced MDT members from different units acknowledged integration of rehabilitation principles in RNs and HCAs routine care practices was difficult when staffing levels were low. However, they argued integration could still be achieved provided RNs and HCAs understood the purpose and contribution of rehabilitation principles as these responses indicate:

You're doing it all the time, just sitting a patient in the chair and putting an arm on a pillow, that's part of rehabilitation [...]. Asking them to speak slowly if they've got aphasia, because they tend to talk like we're talking, they just go off on a tangent and it doesn't come out, so they get annoyed with themselves, so you've got to ask them to take their time. (Interview, HCA, HASU A)

[Statement 23] Is partially true, staffing levels affect care however, even when short staffed care provided should be rehab based. (Q-sort booklet response: Junior RN, mixed unit C).

A lot of it can be done around personal care [...] It can be part of, washing and dressing and their initial personal care and part of a patient's daily routine [Interview, PT HASU and rehabilitation unit A and D].

This factor did not support the view that RNs are uniquely placed to co-ordinate care, or that RNs have an independent rehabilitation role. Instead, the role of the team in assessment and planning care is strongly supported (+4). RNs and HCAs were viewed as part of stroke teams as opposed to a unique group within stroke MDTs.

I don't feel it should have to be nurses because [.....] sometimes as an OT if we've got that knowledge of the community and what happens for that person at home then it might be a therapist that's the best person for that coordinator role. (Interview, Clinical Specialist OT mixed unit C)

They do in some ways because they're on the ward 24/7, they're often seeing the families in the evening, so they do feel responsible for the care, [.....] but they're just one member of that team. (Interview, Senior OT HASU A).

What participants meant by care-coordination did appear to differ, for therapists it largely meant goal setting and discharge planning; for RNs it meant ensuring that all elements of care related

activity were monitored or facilitated, e.g. ensuring scans, X-rays, medications, community care reports, were occurring as intended.

Factor 2: Physical care activity takes priority over rehabilitation principles

This factor, which explained 11% of the variance, differed in a number of ways from the other three. Seven participants loaded on this factor, all were all RNs (x3) or HCAs (x4). The HCAs were from HASUs; two RNs were from a mixed unit (x2) and one a HASU. The RNs were basic grade, and whilst they had more than one year of stroke care experience they were less experienced than many of their colleagues. RNs at this grade and most HCAs spend most of their working day providing direct care, supporting completion of ADLs, monitoring vital signs and in medication administration. There were 14 distinguishing statements for this factor (10,12,7,3,9,26,21,29,2,18,11,17,6,31).

Table 4: Factor 2 [most strongly agree/disagree only]		
Number	Statement	Rank
1	Being competent in assessment is the most important part of the nursing role in stroke care [include neurological assessment, swallowing assessment, moving and handling assessment].	+4
10	Physical care [including managing incontinence, bathing and preventing pressure ulcers] should be the main focus of nurses' work in stroke units.	+4
27	Nursing in stroke care must include facilitating and enabling patients to develop the confidence and skills to do things for themselves.	+3
20	Nurses working in stroke care must incorporate stroke specific rehabilitation techniques in their care [for example: when helping stroke survivors with positioning, sitting and standing, walking, washing, eating and drinking].	+3
12	Helping stroke survivors recover and regain some independence makes nursing in stroke care satisfying and meaningful work.	+3
6	Providing information about the cause of a patient's stroke, residual disability and long term impairment is not a nursing responsibility.	-3
19	It does not help stroke survivors in their rehabilitation and recovery from stroke if nurses stand back and let the stroke survivor do some tasks or activities for themselves.	-3
30	The role of the nurse in rehabilitation of stroke survivors is not understood by all members of the stroke unit team.	-3
31	Specialist stroke nurses should focus on management of care including chairing MDT meetings and patient follow up after discharge.	-4

22	Nurses do not need any additional stroke specific specialist training to meet the needs of stroke survivors.	-4
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This factor revealed the strongest agreement with more traditional views on what RNs and HCAs in stroke care need to prioritise and where their work should largely be focused. In direct contrast to factor 1, factor 2 emphasises the importance of physical care, placing statement 10 at +4. Nursing stroke patients is viewed as demanding physical work (+2), whereas it was placed at neutral in factors 1 and 3 and at +1, in factor 4. The shared views evident in this factor were more consistent with findings from the meta-ethnography^[5] and overall literature, that RNs and HCAs prioritise direct care and physiological monitoring ^[12,19,34].

I've got hyper-acute patients that need lots of care, you've got to deal with their care and then you've got the rehab patients and they always seem to lose out.[Interview, RN (Ward Sister) mixed unit C]

I think basing things on people's needs; the physical aspects need to be sorted out first before you can move on to the rehab. [Interview, Senior RN, HASU A]

Negative views in respect of RNs encouraging families to come into units to help patients with ADLs (-2) were evident, similarly and RNs and HCAs teaching and assessing families e.g. re personal care skills was ranked 0. More distinct nursing roles were supported, e.g. social and emotional support roles, the need for close relationships with patients and carers. Participants agreed RNs and HCAs need stroke specific training as in factors 1,3 and 4, but agreement with statement 32, that this is a specialist type of neurological nursing which needs further role development was less strong (+2). This is the lowest scoring factor on team as opposed to nursing assessment and planning of care and rehabilitation (-1).

There are some seemingly contradictory views within this factor. The statement indicating that as RNs and HCAs have to focus on physiological monitoring and supporting medical interventions they cannot incorporate rehabilitation techniques in their care had moderate agreement (+1). However, 3 other statements indicating RNs and HCAs can incorporate such techniques and should facilitate and enable patients to be more independent (15,20,27) were positively ranked (+1, +3, +3

respectively). Statement 23, which indicates support for the view that integrating rehabilitation techniques is not staffing dependent was ranked negatively (-2); there is a similar rejection of standing back (19) and 'doing for' (24). One interpretation of this seeming contradiction is that these RNs and HCAs understand the philosophy of stroke rehabilitation, and acknowledge that they have a role in promoting independence, even if they do not currently do this.

It's a priority, I mean if people are not washed, dressed, fed, tablets and everything else, so a large part of our role and the physical side is. [...]. What I'm trying to say is, we do more for the patients than we should be doing, I see that a lot, we try not to but that does happen [Interview, RN (Ward Sister), rehabilitation unit D].

The views expressed in Factor 2 assert the importance of nursing but more narrowly define priorities, these differ from the wider team emphasis noted in factors 1 and 3. In interviews, most participants thought this factor would have been defined by RNs and HCAs working in HASUs. In reality participants loading on this factor were from a mixed unit and a HASU. Interview data suggest some of these RNs and HCAs may underestimate their use of rehabilitation techniques in routine care.

They're [HCAs] more hands-on, [...]. They do observations as well, they do a lot of feeding, they do the vast bulk of the care work. One of our HCAs is the moving and handling expert and we can go to her and say such and such about this, and they do incorporate a lot of the continuing rehab side of things. [Interview, Senior RN, HASU B]

Factor 3: Support the wider stroke team to provide stroke rehabilitation

Factor 3 explained 20% of the variance and 11 participants loaded on this factor. These were: 2 HCAs from a mixed unit, 5 RNs including a Sister, and Stroke Specialist Nurse from a rehabilitation unit and one HASU RN; these were mostly experienced staff. A PT, PT assistant and OT were from the mixed unit and there was a junior doctor from a rehabilitation unit; therapists were all experienced and in senior grades. There were 11 distinguishing statements (15,14,29,4,20,2,11,1,9,10,23).

Table 5: [most strongly agree/disagree only]		
Number	Statement	Rank
14	A close relationship with stroke survivors and carers is necessary if nurses are to help stroke survivors regain some independence and cope with their stroke.	+4
15	Nurses must work in partnership with stroke survivors so that they can take an active part in own their care and rehabilitation.	+4
29	Stroke unit nurses should help stroke survivors by continuing with the rehabilitation programmes prescribed by therapists throughout the day, evening and night.	+3
21	Nurses and therapists ought to routinely work jointly with stroke survivors to develop their respective rehabilitation skills and stroke specific knowledge.	+3
13	It is important for nurses to help stroke survivors and their carers make sense of and cope with the emotional and psychological effects of stroke.	+3
23	Nurses working in stroke care can only incorporate stroke specific rehabilitation techniques in helping stroke survivors when nursing staffing levels are high.	-3
10	Physical care [including managing incontinence, bathing and preventing pressure ulcers] should be the main focus of nurses' work in stroke units.	-3
9	Nurses working in acute stroke care must focus on physiological monitoring and supporting medical interventions, and so they cannot also incorporate rehabilitation techniques in caring for stroke survivors.	-3
22	Nurses do not need any additional stroke specific specialist training to meet the needs of stroke survivors.	-4
18	Nurses working in stroke care should concentrate on the physical and emotional care of the stroke survivor and leave rehabilitation to the therapists.	-4

The views expressed in Factor 3 are broadly consistent with those seen in Factor 1 but there is stronger disagreement with statements relating to physical care prioritisation (18,22,9,10). Participants strongly disagreed with statement 23, that rehabilitation can only occur when staffing levels are high (-3). There is apparent contradiction in that the statement that nurses are best placed to make sure team interventions address issues identified was not supported (-1), but statement 4, that nurses are in a unique position to co-ordinate care was agreed with at +2. Whilst this may suggest more support for team assessment and planning, this factor was surprisingly neutral on statement 2. The fact that statement 4 was positively ranked, may account for some of this variation.

Participants loading on this factor were neutral about nursing stroke survivors being a specialist type of neurological nursing and there being an independent rehabilitation role for RNs . However, in common with Factor 1&2 there was strong support for the need for stroke specialist education for RNs and HCAs , and (as Factor 1), for joint working between therapists and RNs and HCAs , and for specialist nurses to work alongside inexperienced RNs and HCAs . Factor 3 exhibits the most positive view in respect of RNs working with families and teaching e.g. personal care skills, statements 16 and 17 at +1. Statements 14 and 15, partnership with patients to take an active role in their own care and rehabilitation, and the need to develop close relationships as being necessary to help stroke survivors regain some independence are both rated +4 in this factor. One RN expressed this view:

I do invite family in. I think it's important, especially if the patient is going home, it's the family that's going to be there and if they come and do it here in hospital they're in that safe environment. If the patient has got swallowing problems we can show them how to feed them. So they can practice here, so I think it's really important that they do. I think nurses are one of the best people to do the training.[Interview, RN (Ward Sister), mixed unit C].

This is consistent with the positive emphasis on incorporation of rehabilitation techniques in routine care (+2) and RNs and HCAs continuing rehabilitation prescribed by therapists across the day and night as appropriate (+3). The views evident in this factor suggest acknowledgement that RNs and HCAs, in addition to their expertise in physical care, co-ordination and psycho-social care, can also develop and integrate specialist stroke skills traditionally associated with therapists.

The nurses have taken on that role so that you've got a continuity 24/7 because the therapists are here [only] five days a week. It's important that they carry on and they feel confident to carry on, we've worked as a very close team on that. [Interview, Clinical Specialist OT, HASU B].

Often the people who have most contact with the patients are HCAs; [...] in fact more often than not it's the HCAs who've said 'I've done some of that work with so and so', [Interview Lead SALT, rehabilitation unit D].

In this factor, RNs, HCAs and therapists viewed integration of rehabilitation principles as a positive contribution to increasing patient practice in stroke units. Factor 3 suggests rehabilitation is the

primary goal for stroke teams but that this is a collaborative enterprise requiring a whole team approach.

Factor 4: Be cautious about nurses' engagement in stroke rehabilitation practice

This factor explained 12% of the variance, six participants loaded on this factor, 2 RNs and two OTs working in HASUs and an OT and carer support officer (CSO) from a mixed unit. With the exception of the CSO, all these MDT members were basic grade and inexperienced staff. There were five distinguishing statements (10,28,20,31,1).

Table 6: [most strongly agree/disagree only]		
Number	Statement	Rank
27	Nursing in stroke care must include facilitating and enabling patients to develop the confidence and skills to do things for themselves.	+4
2	The stroke unit team, not individual nurses, should assess and plan for stroke survivors' care and rehabilitation.	+4
26	Specialist stroke nurses ought to work alongside less experienced nurses to teach them stroke specific skills as part of providing care for stroke survivors.	+3
21	Nurses and therapists ought to routinely work jointly with stroke survivors to develop their respective rehabilitation skills and stroke specific knowledge.	+3
12	Helping stroke survivors recover and regain some independence makes nursing in stroke care satisfying and meaningful work.	+3
24	Nurses should help stroke survivors in their rehabilitation and recovery from a stroke by routinely carrying out tasks or activities for the patient.	-3
22	Nurses do not need any additional stroke specific specialist training to meet the needs of stroke survivors.	-3
19	It does not help stroke survivors in their rehabilitation and recovery from stroke if nurses stand back and let the stroke survivor do some tasks or activities for themselves.	-3
9	Nurses working in acute stroke care must focus on physiological monitoring and supporting medical interventions, and so they cannot also incorporate rehabilitation techniques in caring for stroke survivors.	-4
1	Being competent in assessment is the most important part of the nursing role in stroke care [include neurological assessment, swallowing assessment, moving and handling assessment].	-4

Participants loading on factor 4, strongly disagreed with statement 9 that RNs and HCAs cannot incorporate rehabilitation due to the requirement to focus on physiological monitoring and supporting medical intervention (-4). At the same time, physical care as the main focus is placed at +2, as is the need to provide nursing care for patients for whom rehabilitation is not suitable. Given this broad support for the physical care role, it was surprising that statement 1, that competence in assessment as the most important part of the nursing role was strongly disagreed with (-4).

Factor 4 indicates strongly positive views in respect of RNs and HCAs facilitating and enabling but in common with factor 1 is also clear that assessing and planning care and rehabilitation are viewed as team rather than individual RN responsibilities (both +4). There was strong agreement that therapists ought to routinely work jointly with patients (+3) and for Stroke Specialists Nurses to work alongside less experienced staff (+3). Interviews highlighted concern for some MDT members that joint working, which had been common as stroke units were being established previously, was now very difficult to achieve because of the increasingly acute focus of units and the necessity for experienced therapists and RNs to be undertaking prescribed assessments to ensure nationally audited targets were being met.

The opportunity for work shadowing is just non-existent but I personally feel that's the best way of learning [...] certainly when I'm educating and working alongside band 5s and my assistant, they would work alongside me to pick up techniques. [Interview, Clinical Specialist OT mixed unit C].

[Its] Very different, we are much more involved in the very early days in meeting targets in the sentinel audit [Interview, Lead PT HASU B].

As in other factors, the view that RNs and HCAs need additional stroke specific training was supported. However, statements regarding this being a specialist type of neurological nursing and regarding the nursing role in rehabilitation of stroke survivors not being understood were both placed at neutral. A neutral view was also evident in respect of whether stroke rehabilitation nursing is a distinct and specialist role which needs development. Participants loading on factor 4

disagreed that nurses were best placed to make sure the team addresses patients' rehabilitation needs, or the most appropriate professional to liaise between patients' families and the team, statements 3 and 5 were ranked -2. The statement that nurses have an independent rehabilitation role was also viewed negatively (-1). Participants expressed positive views about nurses' role in helping patients regain some independence (+3), working in partnership with stroke survivors (+2) and carryover and integration of rehabilitation programmes across the day/evening (+1). However, factor 4 was the only one to agree (+2) with statement 28, that nurses should prevent stroke survivors taking risks in ADLs, factors 1-3 disagreed (-1 to -3).

They're not as aware of risk assessing. I think they play it on the safe side, which is good, because you don't want them doing lots of things that, potentially, could be dangerous, perhaps, that's where we could do a little bit more education into how to get them to risk assess, what to look out for. [Interview, rotational junior PT HASU B]

Factor 4 also had the lowest level of agreement with statement 20 (+1), that nurses must incorporate specific rehabilitation techniques in their care; in other factors this was ranked at +2 or +3. Similarly, statement 16 (-1) and statement 17 (0) indicate little agreement with the view that nurses should teach or work with families on developing ADL support skills.

With eating and things, often it's not as simple as just helping to feed, it's looking for signs, if the patient is aspirating and things like that, but if a patient is going to be going home, families do need to be involved, but perhaps it would be better coming from the speech and language therapist who can give a little bit more specific advice, than the nursing staff. [...] I think it should come from the whole team, not just the nurses. [Interview, Lead PT HASU B].

This factor suggests less experienced staff endorse the rehabilitation philosophy expressed in stroke units, but these inexperienced nurses and therapists may lack of confidence in RNs' and HCAs' skills to independently support ADL practice. In interviews some staff noted that early in therapists' careers, role confidence is still developing and that some activities may be regarded as specialist therapy skills, thus inexperienced therapists express caution about RNs and HCAs developing and using these skills.

It's about professional identity and as you develop and you increase your level of professional identity, so as your confidence grows you're less defensive, [than inexperienced staff] who probably think 'well this is my role and I should be doing that role'. [Interview, Clinical Specialist OT mixed unit].

Factor 4 contrasts with Factor 1 and to a lesser extent Factor 3, where those loading on the factors were very experienced in stroke care and reported (in interview) being secure in their own professional roles.

Discussion

The four factors generated identified participants' subjective responses to statements about nurses' practice in stroke units. These provide insight into similarities and differences in viewpoints amongst MDT members working in stroke units which are set up similarly to those currently operating in many developed countries. Participant numbers were high for a Q study and included all disciplines regularly working on stroke units. However, purposive sampling is not intended to be statistically representative; different viewpoints may have been elicited had the study been conducted in additional stroke units. Follow up interviews (as opposed to interview immediately after Q-sorting) were used as staff have difficulty taking time from clinical work. At interview participants sometimes struggled to recall how they had sorted statements. A copy of the statements and a results summary facilitated discussion, but conducting brief interviews immediately after Q-sorting may have enabled more detailed understanding of why participants held particular views on specific statements.

In contrast to previous reports on nursing in stroke care ^[15-16,34-36,38], participants did not support the view that RNs had an independent rehabilitation or specialist co-ordination role. Rather, the Q study demonstrated participants viewed RNs and HCAs as supporting the wider MDT in encouraging and facilitating independence. This is consistent with National Clinical Guidelines which suggest such a role for RNs and HCAs ^[39-41]. Disciplinary demarcation between areas of rehabilitation activity was also evident in the shared viewpoint that teaching family members skills to support patients was not something RNs and HCAs should routinely undertake.

The Q study found strong agreement with the view that RNs and HCAs, in addition to their acknowledged roles in physical care and monitoring, can develop and integrate stroke rehabilitation skills, traditionally associated with therapists, into routine care. Encouraging and facilitating independence is central to stroke rehabilitation; all disciplines considered this to be something RNs and HCAs should integrate in routine care. Q-sort booklet responses and interviews provided examples of these skills in regular use across stroke unit settings. These are important findings for two reasons; firstly RNs and HCAs have previously reported they do not have time to incorporate rehabilitation principles. Secondly, stroke units now treat more acutely ill people, length of stay has reduced significantly and pressure to provide high quality evidence based stroke care is intense ^[39]. Despite these very real time and workload pressures, most stroke unit staff indicated that RNs and HCAs understood and routinely integrated rehabilitation principles in care. There was some evidence to indicate this was influenced by the presence of a stable workforce with knowledge, skills and experience gained from previous work in rehabilitation stroke units, as reported in other studies ^[42-44].

The Q study also identified issues which potentially will damage any recent gains made in RNs and HCAs rehabilitation knowledge and skills. There was strong agreement that RNs and HCAs need additional stroke specific training to integrate rehabilitation principles in care. Reliance on informal unit based training is a high risk strategy; participants in this study stated time and opportunity for such training is no longer available. Joint working between therapists and RNs and HCAs with patients was viewed positively by all disciplines and reportedly used previously as an important vehicle for learning, but was considered very difficult to achieve currently due to increased workload demands on all disciplines. Failure to prioritise and provide rehabilitation training for RNs and HCAs may result in a growing separation between skilled and knowledgeable experienced RNs , who have less direct patient contact, and inexperienced RNs and HCAs , new to stroke care, but who have most patient contact and most need of rehabilitation knowledge and skills. Factors 3 and 4 provide some evidence that inexperienced RNs and HCAs perceive physical care to be something separate from

rehabilitation. These factors also suggest that inexperienced staff in all disciplines may lack confidence in RNs and HCAs ability to encourage and facilitate patients' independence. Training is considered important in National Clinical Guidelines ^[39-41] but in England there is no mandatory requirement for development of specific competencies in rehabilitation. In contrast, for example, routine training to assess patients using the National Institutes of Health Stroke Scale^[3], to manage post-thrombolysis care or to complete swallowing assessments was evident in all units. Few participants were aware of the (UK's) nationally endorsed Stroke Specific Education Framework^[45] and there was no evidence of structured competency based training such as that seen in Scotland ^{46]}. Teasell et al^[47] argue there is a need to refocus stroke care away from preoccupation with acute management to ensure rehabilitation services are also effective. RNs and HCAs may benefit from this kind of refocusing provided that challenges in developing their rehabilitation skills are recognised and addressed.

Conclusion

There was cross disciplinary agreement that RNs and HCAs can and should develop and integrate stroke specific rehabilitation knowledge and skills in their practice, regardless of the type of stroke unit in which they work. However, realising the potential of RNs and HCAs as full partners in stroke rehabilitation is unlikely to occur without introduction of structured competency based multidisciplinary training in rehabilitation skills.

Declarations of interest:

The authors report no conflicts of interest.

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