Stress of caring and nurses’ beliefs in the stroke rehabilitation environment: a cross-sectional study

Sara Joice, Martyn Jones, Marie Johnston

**Background:** Part of the multidisciplinary stroke team nurses report their role as complex and demanding. Aims: To explore stress of caring in nursing nurses’ and its relationship with perception of the work environment and beliefs about stroke.

**Methods:** This cross-sectional study recruited a convenience sample of nursing staff from stroke units (n=44), 99% female; mean age 39 years (s.d. 9.6). The Stress of Caring Scale (SCS) and an adapted Illness Perception Questionnaire (IPQ-R: HP) were completed. The responses on the IPQ-R: HP were compared to stroke survivors (n=106) responses to the original IPQ-R completed in an earlier study.

**Results:** Nurses’ stress was positively correlated with perceptions of demand, strain and effort, and reward imbalance (P<.001) and negatively correlated with decisional control and helpfulness of support (P<.05). Nurses believed stroke to incur greater symptoms, consequences, emotional impact, and a longer duration (P<.01) and that the patient’s role and their treatment (P<.05) to be less salient than stroke survivors. Stress of caring was associated with the nurses’ beliefs about stroke (P<.05).

**Conclusions:** Work environment and discrepancies between patients’ and nurses’ beliefs may account for perceived stress and possibly impact on the nurse’s role in rehabilitation.

Key words: stroke ■ stress of caring ■ illness beliefs ■ rehabilitation ■ multidisciplinary environment

Submitted 13 June 2011, sent back for revisions 6 September 2011; accepted for publication following double-blind peer review 28 February 2012

While occupational stress is generally acknowledged within nursing (O’Henly et al, 1997; Jones and Johnston, 2000; McGrath et al, 2003; McVicar, 2003), the specific effect of caring for patients with particular health/illness needs arising from long-term conditions is not well understood. Nursing patients with stroke has been described as complex with demands arising from an interaction of newly acquired impairments, existing co-morbidities, and the intensity of input to promote recovery (McKevitt et al, 2004). Demand can also arise from the multiple roles the nurse must fulfill in stroke care, e.g. carer, facilitator of emotional and physical recovery and care manager (Burton, 2000; McKevitt et al, 2004) and the availability of limited health service resources (Perry et al, 2004). In addition, the nurse’s role within the multi-disciplinary team is reported to be poorly defined and understood (Perry et al, 2004) which may place further demands on nurses caring for those with stroke.

Models of stress
Perceptions of workplace stress are commonly studied using two dominant theoretical models, the demand control model (DC) (Karasek, 1979) and the effort reward imbalance model (ERI) (Siegrist, 1996). Both models have furthered our understanding of how nurses’ general perceptions of the work environment in uence their wellbeing (Fox et al, 1993; Bakker et al, 2000; Shamian et al, 2002; Hasslehorn et al, 2003). Johnston et al (2006), developed a brief Stress of Caring Scale (SCS) incorporating the main constructs from the DC and ERI models, and found that self-reported emotional stress in general nursing settings is more likely when nurses perceive the care setting to be highly demanding or effortful, with little possibility for decisional control or reward (Johnston et al, 2006).

In addition, the support received from colleagues and managers may in uence decisional control whether their work has been appreciated or not, i.e. perceptions of reward (McKee et al, 2010). Research examining stress of caring for patients recovering from a stroke appears to be focused mainly on the informal carers (Molloy et al, 2008), while the impact on nurses caring for stroke survivors is less clear.
Beliefs about stroke
Health professionals’ beliefs about health/illness play an important role in stroke care, but are difficult to measure (Kalra et al., 2001). Hale et al. (2007) promotes the use of the Common Sense Self Regulation Model (CS-SRM) (Leventhal et al., 1984; Leventhal and Cameron, 1987; Leventhal et al., 2005) to explain and possibly identify illness beliefs of individuals within the health care setting, in an attempt to facilitate improved patient care. The CS-SRM postulates that individuals are natural problem-solvers who process health threats via a subjective and a cognitive interrelated pathway. The subjective pathway processes emotional thinking of a health threat such as fear, anxiety, and relief, whereas the cognitive pathway is characterized by beliefs within five domains:

- Identity—the individual’s awareness of illness symptoms;
- Timeline—the notion of onset, duration, and fluctuation of the illness;
- Cause—the considered cause of the illness;
- Consequence—the personal consequences the illness may incur;
- Control—the concept of control one has over their illness.

The CS-SRM suggests individuals think about their illness via the subjective and cognitive pathways enabling them to shape their coping strategies as they self-regulate their recovery and treatment recommendations (lifestyle change and/or medication adherence) (Horne, 1997; Leventhal et al., 2005). Patients’ beliefs about their illnesses are associated with the actions they take to manage conditions such as rheumatoid arthritis (Hill et al., 2007); multiple sclerosis (Jopson and Moss-Morris, 2003); haemophilia (Llewellyn et al., 2003), motor neurone disease (Earll et al., 1993); and myocardial infarction (French et al., 2006).

Stroke survivors rehabilitated in designated stroke units are more likely to make a better recovery, i.e. being “alive, independent, and living at home one year after the stroke” than those cared for in general medical wards (Stroke Unit Trialists’ Collaboration, 2007; p. 2). While the actual constituents of stroke unit care remain elusive and in need of examination (Stroke Unit Trialists’ Collaboration, 2007), it seems plausible that such units may influence both patients’ and staff beliefs about stroke (Kalra et al., 2001). Nurses working in stroke may presume that they are objective when assessing their patients and their observations will be similar to those of their colleagues and patients (Molzahn and Northcott, 1989). However, health professional beliefs about patients’ age, gender, degree of impairment, and motivation may be incongruent with those of the stroke patients they care for (McKevitt et al., 2004). Furthermore, discrepancies between the types of information health professionals believe patients require following a stroke has been shown to be different to that desired by the patient (Choi-Kwon et al., 2000; Wachters-Kaufman et al., 2005).

Discrepancies between nurses and patients beliefs may not only have consequences for the success of the patient’s rehabilitation but also the perceptions of stress the nurses’ may experience.

The aim of this study is to examine the relationships between nurses’ reported stress in stroke care, their perceptions of the care environment and their beliefs about stroke and recovery.

Research questions
1. Is the stress of caring reported by stroke unit nurses related to their perceptions of the work environment?
2. Is stress of caring related to nurses’ beliefs about stroke and recovery?

METHODS

Design
A cross-sectional design was used where a convenience sample of nursing staff were recruited. Nurses from different stroke units across a single Scottish Health Board completed questionnaires and their responses compared to the responses of stroke survivors obtained in a previous study.

Participants
Given the overlap in roles and functions of trained staff, healthcare assistants and student nurses on placement in stroke rehabilitation (McKenna et al., 2006), ‘nursing’ was operationalized to include all three occupational groups. Participants were nurses (including students and health care assistants), NHS employed, and working on stroke units (both acute and rehabilitation) caring for stroke patients. Non-permanent staff were excluded.

Measures
Stress of Caring Scale (SCS) (Johnston et al., 2006) comprises 10 single items to assess nurses’ perceptions of the work environment on a five-point scale of 0 ‘not at all’ to 5 ‘very much indeed’. Items measure demand/effort (items 1 and 2), decision control (item 3), over commitment, i.e. wanting more control (item 4) reward, i.e. work has been appreciated (item 5). Items 6 and 7 ask respondents to rate stress and anger on a visual analogue scale (VAS) from 1–100.
Respondents were also asked to report a stressful incident (item 8) and from whom they received support (item 9). Item 10 detailed how helpful the support was on a VAS from 1–100.

A measure of strain was calculated (demand divided by control) where a value greater than one indicated high strain, i.e. high demand relative to control. Effort reward imbalance (ERI) was also calculated (effort divided by reward) where greater than one indicated a work environment characterized by perceptions of high effort relative to the amount of reward. This measure is widely used and validated (Johnston et al, 2006; McKee et al, 2010).

The Illness Perception Questionnaire–Revised (for Health Professionals IPQ-R: HP) (Moss-Morris et al, 2002) is a 3 sectioned questionnaire designed to assess the respondent’s illness beliefs as described in the CS-SRM (Leventhal, 1984). The first section (identity) comprises 14 items asking about the symptoms a person may experience as a result of their illness and requires a yes/no response. Section 2 includes 38 items relating to beliefs about timeline (chronic/acute=6 items; cyclic=4 items), consequence (6 items), control (personal=6 items; treatment=5 items); illness coherence i.e. how much the individual understands their illness (5 items) and emotion (6 items). Each statement required a response of ‘strongly disagree’ to ‘strongly agree’ on a 5-point scale; the higher the score in each domain the stronger the belief. Section 3 gives the respondent an opportunity to express what they thought the most important factors were that caused their illness.

The IPQ-R (IPQ-R: HP) was adapted and completed by nurses while thinking about the last stroke patient they were involved with who was discharged home. For example, using a ‘timeline’ item where the IPQ-R states, ‘My illness will last a long time’, the IPQ-R: HP says ‘Their illness will last a long time’. For comparison purposes, nurses IPQ-R: HP data was compared with patient data from stroke survivors (n=106) who had completed the IPQ-R in an earlier study (Joice, 2005). These stroke survivors were recruited as in-patients who had a confirmed medical diagnosis of stroke in 2004 and had been admitted to the same units as the current nurse participants in this study. All consenting stroke survivors were interviewed at home two weeks following their discharge from hospital. The IPQ-R has been widely used and well validated in other illness groups (Moss-Morris et al, 2002; Hill et al, 2007).

**Procedure**

Following ethical approval from East of Scotland Research Ethics Service, permission was sought from the heads of departments to approach unit managers, who in turn advised staff in their multidisciplinary team (MDT) about the proposed study. Information sheets were administered via ward meetings and a contact number for further questions offered. Other members of the MDT were included in this survey but only the responses of the nurses are reported in this paper. The researcher visited the wards between March and November 2006 at prearranged times to administer the questionnaires. Available and volunteer nursing staff were asked to sign a consent form and any questions about the study were answered. Nurses were asked to think about the last stroke patient they were involved with who was discharged home and to describe them in terms of age, gender, affected side of that patient, and length of time in hospital (nurse-described patient). Thinking about this patient, they completed the IPQ-R: HP and SCS questionnaires assessing illness beliefs and stress of caring.

**Table 1. Baseline descriptives of nurses and their described patients and the differences between nurse-described patient and stroke survivors; t-test and chi square analysis results**

<table>
<thead>
<tr>
<th></th>
<th>Nurses (n=44)</th>
<th>Described patient (n=44)</th>
<th>Stroke survivors (n=106)</th>
<th>t-test results</th>
<th>Chi square results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (years)</td>
<td>39.00</td>
<td>68.41</td>
<td>68.44</td>
<td>t(148) = -.02; P=.99</td>
<td></td>
</tr>
<tr>
<td>Mean length of stay (days)</td>
<td>78.34</td>
<td>66.67</td>
<td>34.87</td>
<td>t(148) = -3.95; P=.001**</td>
<td></td>
</tr>
<tr>
<td>Count %</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender: Male</td>
<td>27</td>
<td>61</td>
<td>56</td>
<td>χ² = .92 (df1); P=.34</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>39</td>
<td>53</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Affected Side: Left</td>
<td>18</td>
<td>58</td>
<td>55</td>
<td>χ² = .37 (df1); P=.54</td>
<td></td>
</tr>
<tr>
<td>Right</td>
<td>13</td>
<td>42</td>
<td>51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit: Acute</td>
<td>13</td>
<td>30</td>
<td>49</td>
<td>χ² = 3.19 (df1); P=.08</td>
<td></td>
</tr>
<tr>
<td>Rehab.</td>
<td>31</td>
<td>30</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
survivors beliefs (Table 3). Levene’s test of equality was used to identify when the homogeneity of assumption was violated and t-test results are reported using the appropriately adjusted statistics (Tabachnick and Fidell, 2001).

RESULTS

A response rate of 45% was achieved, with 44 nurses (out of a possible 98) from five different units across the health board area, volunteering to participate. Slightly more nurses responded from the rehabilitation units (49%) when compared to the acute unit (37%).

The nurses were predominantly female with a mean age of 39 years (standard deviation 9.6 years) (Table 1) and described themselves as either qualified nurses (n=26, 60%; grade range C-D); healthcare assistants (n=9, 20%; grade range A-B); or student nurses (n=9, 20%). All qualified nurses and health care assistants had worked on the stroke units for over 15 months.

Missing data was minimal. Omissions for the nurse–described patient included affected side (n=13, 30%); and time the nurses had spent working with this patient group (n=5, 11%), this data was not replaced. There were no missing responses on the IPQ-R: HP, SCS and the IPQ-R. All data appeared to be normally distributed with no z-score exceeding 3.6 (Tabachnick and Fidell, 2001) apart from the treatment control item and the ERI item. Attempts to transform the responses did not reduce the z-scores to within acceptable limits therefore these items were interpreted with caution. The ERI scores were further examined and shown to have three outliers. These outliers were removed and the distribution achieved a z-score below 3.6. All the measures achieved alphas between 0.60–0.86 (Table 3).

Research question 1. Is the stress of caring reported by stroke unit nurses related to their perceptions of the work environment?

Responses to the SCS indicated that generally nurses did not report high levels of demand/control or ERI (Table 2) when thinking about nursing the stroke patient they had described. When asked to rate their level of stress on a VAS the median score was 23.5 out of 100.

Stress ratings were positively related to demand, strain (demand/control) and ERI while being negatively correlated with control and perceived helpfulness of support. Stress was not related to ‘over commitment’ and ‘anger’ did not relate to perceptions of the work environment.

Approximately half of the nurses (n=23, 52%) described a stressful event which were categorized below in terms of high demand and low decisional

Figure 1. Nurses and stroke survivors perceived symptoms; percentage responses (*P<.05; **P<.01)

Figure 2. Nurses and stroke survivors’ perceived cause (percentage responses) (*P<.05; **P<.01)

Statistical analysis

Data were screened for missing items and all variables examined for their distribution using skewness and kurtosis statistics, z scores (z > 3.6 indicating a non-normal distribution) (Tabachnick and Fidell, 2001). Appropriate transformations were performed where necessary. The internal reliability of the measures was assessed using Cronbach’s Alphas with a lower limit of .60 indicating acceptability (Hair et al, 2010). Descriptive data, frequencies, and means were conducted and are presented in Table 1. Pearson’s correlations for the continuous data and point bi-serial correlations for dichotomous data (gender) were used to relate perceived stress to nurse’s beliefs about stroke. T-tests and chi square analyses were performed to examine the differences between nurses and
control over the environment:

- High demand arising from
  
  Physical effects of stroke (n=3) included patients inability to walk, decline in condition and communication difficulties;
  
  Patients emotional response to their stroke and recovery (n=13) where comments focused on patients’ frustrations and mood;
  
  Relatives needs (n=4); such as continual reassurance and explanation.

- Low decisional control arising from
  
  Frustration (n=1) where the nurse felt her advice was not being followed;
  
  Lack of resources and patient safety in the care environment (n=2).

  Many nurses (n=38, 86%) reported receiving their main support from colleagues when describing their stressful event. One nurse received support from their manager, one did not receive any support and four required no support. Helpfulness of support was positively associated with control and negatively with emotional distress.

  A post hoc analysis was performed to identify differences in strain, ERI, and rated stress between the nurses from the stroke units in this study compared with those from general medical and surgical wards participating in the study by Johnston et al, (2006). Stroke unit nurses reported significantly higher levels of strain (mean=.82; s.d .06) than those working in general surgical and medical wards (mean .55; s.d .10) (t(78)=14.93; P=.001). However, there were no significant differences on ERI or stress (t(78) =.08; P=.45; t(78)=21; P=.83 respectively).

  Research question 2: Is stress of caring related to nurses’ beliefs about stroke and recovery?

  Nurses’ stress ratings correlated positively with identity (r=.32; P=.04), consequences (r=.39; P=.01) and emotion (r=.36; P=.02). If the nurses believe their patient’s stroke to be associated with many symptoms, have greater impact and be more emotionally laden then they themselves perceived greater stress of caring.

  Nurse’s beliefs about stroke compared with survivor’s beliefs revealed that nurses believed stroke to be significantly more serious on all scales of the IPQ-R except cyclic timeline and coherence (Table 3). Comparisons between the nurse-described patients and survivors show that the nurses believed their patients were more likely to have significantly greater levels of pain (c2=50.12; (df1): P=.00); sleep difficulties (c2=14.78; (df1): P=.00); headaches (c2=19.48; (df1): P=.00); dizziness (c2= 10.10; (df1): P=.002); stiff joints (c2=21.83; (df1): P=.00); and upset stomach (c2=4.12; (df1): P=.00) (Figure 1).

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  Similarly there were significant differences
when examining beliefs about cause (Figure 2), significantly more nurses (32%) than stroke survivors (14%) believed that the primary cause of stroke was smoking ($c^2 = 6.22$ (df1), $P = 0.01$).

Stroke survivors (21%) claimed to have no idea what caused their stroke compared to nurses (0%) ($c^2 = 18.25$ (df1), $P = 0.00$). More stroke survivors (21%) than nurses (11%) reported stress as being a primary cause of stroke; however, this was not statistically different ($c^2 = 5.4$ (df1), $P = 0.46$).

The described patients identified by nurses in order to complete the IPQ-R:HP did not differ statistically from the stroke survivors from the previous study apart from time in hospital, with stroke survivors spending less time in hospital. Nurses associated patients having a longer hospital stay with greater identity ($r = 0.37; P = 0.01$) and a lack of coherence ($r = -0.35; P = 0.02$) whereas stroke survivors associated longer stay with a more chronic condition ($r = 0.21; P = 0.03$); greater consequence ($r = 0.27; P = 0.01$), and less treatment control ($r = 0.20; P = 0.04$).

Since nurses described patients with longer lengths of stay than those of the comparison group of stroke survivors, a post-hoc analysis was conducted to examine if the length of hospital stay affected the nurses beliefs. The median number of days of hospital stay was 28.5 days therefore all nurse-described patients ($n = 35$) and stroke survivors ($n = 40$) who had been in hospital for greater than 28.5 days were selected and were now equivalent on background measures of age, gender, affected side, or length of stay. The same differences in beliefs existed between nurses and survivors (Table 3). To account for number of t-tests Bonferroni’s correction was applied (.05/15) resulting in a $P$ value =.003; differences between nurses’ and survivors’ beliefs about personal consequence were significant (Table 3).

### DISCUSSION

While the stress of nursing in general has been
well documented (Jones and Johnston, 2000; McGrath et al, 2003), this study is one of the first to quantitatively explore the stress of caring for patients with stroke, examining the contribution of perceptions of the work environment and nurses’ beliefs about stroke. Stroke unit nurses reported significantly higher levels of strain (P=0.001) but similar ERI and stress ratings (P>0.05) to those reported by general nursing (both surgical and medical wards) (Johnston et al, 2006). These reported higher levels of strain may possibly reflect the ongoing input from the nurses to recovery and rehabilitation in this setting (O’Henley et al, 1997; Burton, 2000; McKeivitt et al, 2004).

Enabling stroke survivors to be successful in their recovery from stroke can be very rewarding, just as promoting patient recovery in other settings has its rewards, which may explain the similarity of ERI in general and stroke nursing. This study confirmed the findings of a previous study (Johnston et al, 2006), that ERI and strain were positively correlated with perceived stress ratings.

Stress ratings were also related to nurses’ beliefs about stroke. If the nurses perceive their patients’ stroke to be associated with many symptoms, have greater impact, and be more emotionally laden, then they themselves perceived greater stress of caring. However, the stroke survivors believed their stroke to be less problematic than nurses, even allowing for them having longer hospital stays, supporting previous observations (Molzahn and Northcott, 1989) suggesting that the nurses may be worrying unnecessarily. Nurses differing beliefs about stroke may account for patient information needs. Choi-Kwon et al, (2005) demonstrated that the information needs of stroke survivors are significantly different to the perceptions of the information health professionals think they should be offering. Supporting nurses to explore their own beliefs about stroke as well as those of their patients and carers’ may enable nurses to understand information requirements. In addition, by being aware of the beliefs they and their patients hold, nurses may also enable their patients to understand their own stroke, possibly facilitating patient beliefs about personal control over their recovery.

Both the work environment and beliefs about stroke were related to perceptions of the stress of caring in stroke rehabilitation. The rehabilitation environment is characterized not only by equipment and manpower but also the individual remits of the MDT members. As Molzahn and Northcott, (1989) suggest, health professionals from different disciplines may have different beliefs about stroke shaped by their role in the patients’ treatment, which in turn may influence their perceptions of the work environment (Kalra et al, 2001).

This study has gone some way to demonstrating the utility of three models, reward-effort imbalance, demand control, and CS-SRM within stroke nursing. Noting the contribution of each to nurses’ perceptions of stress of caring, the CS-SRM clarifies specific illness beliefs (Hale et al, 2007) associated with stress, many of which are discrepant with patient views. It remains to be investigated whether the MDT beyond nursing holds similar conflicting views.

LIMITATIONS

There were a number of limitations in this study. The internal reliability of the IPQ-R measures were good apart from control where the alphas were lower and the distribution of treatment control was non-normal. Beliefs about treatment control may have been different as patients may associate treatment with ‘medication’ rather than ‘therapy’ or activities to promote recovery. Many patients when answering the IPQ-R reported difficulty in responding to the treatment control items because they reported that they were not having any treatment and not taking any tablets or medication (Joice, 2005). Furthermore, the study was open to recruitment bias in that a volunteer sample was examined. The nurses who responded may have been those who were motivated and less stressed than those who did not want to take part.

Not withstanding these limitations this study highlights that stress of caring can be shaped by the beliefs nurses hold about stroke. Advising nurses about the discrepancies between their own beliefs and that of patients may enable nurses to understand the stroke patient better and further define their role in stroke rehabilitation and the MDT.

CONCLUSION

Not fully understanding the patient’s perspective of stroke has implications for nurse wellbeing and patient recovery (Becker and Kaufman, 1995; McKeivitt et al, 2004). The combination of three theoretical models used in this study offers a plausible framework within which to explore beliefs of both nurses and patients and to guide nurse education. The results not only indicate future avenues to explore the constituents of a designated stroke unit, but also contribute to help define key aspects of the nurses’ role within stroke rehabilitation, which has been a subject of debate in recent times (Burton, 2000). All three models contribute towards explaining the stress nurses report in caring for stroke survivors.
This study forms the basis for the design of a complex intervention to rehabilitation. Addressing illness beliefs of both nurses and patients can have the potential underestimate the patient's role in their recovery, and have differing beliefs about the causes of stroke.

This study forms the basis for the design of a complex intervention to promote nursing care that targets the work environment and the nurse's often discrepant beliefs about stroke.

Acknowledgments: This study was possible due to funding by a Nursing Midwifery and Allied Health Professionals (NMAHP) Fellowship Scheme, funded by NHS Education for Scotland (NES), Scottish Executive Health Department and the Health Foundation. Our thanks go to the nurses and patients who participated in the survey.

Conflict of Interest: None


