Positioning of Stroke Patients
Evaluation of a Teaching Intervention With Nurses
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Background and Purpose—There is agreement, although little evidence, that consistently positioning stroke patients in allegedly reflex-inhibiting positions is therapeutic and will enhance functional recovery. The nursing staff, therefore, needs to know and implement these postures and understand their potential underlying value. We examined nurses’ knowledge of and practice in positioning stroke patients before and after a formal teaching intervention.

Methods—In a quasi-experimental study, 38 stroke patients and 59 nursing staff members (44 trained nurses and 15 healthcare assistants) from 6 wards were studied. The wards were randomly allocated to experimental or control status. Patients were assessed on entry into the study by use of a range of measures to establish group equivalence. Nineteen aspects of their position were documented at intervals throughout their stay with a previously developed observational tool. One thousand sets of observations of patient position were made. Using 2 questionnaires, the nurses’ knowledge of the terminology used to denote posture and of issues relating to the moving and positioning of stroke patients was assessed before, immediately after, and 3 months after a package of formal teaching was implemented on the experimental wards. Nurse knowledge and patient position were used as the main outcome measures.

Results—Immediately after teaching, nurses in the experimental group scored significantly higher than those in the control group on the terminology questionnaire ($P<0.05$) and the moving and positioning questionnaire ($P<0.001$). Three months later, the experimental group scored higher on the latter questionnaire only ($P<0.005$). The positioning of patients in the experimental group was improved overall after the teaching ($P<0.0005$), and improvements to specific parts of the body were noted.

Conclusions—It was possible to effect a degree of change in the nurses’ knowledge of and practice in the positioning of stroke patients. However, the quality of patient positioning remained variable. More effective ways of improving positioning need to be developed. Only then can the effects of recommended positioning be evaluated. (Stroke. 1998;29:1612-1617.)

Key Words: nurses ■ positioning ■ rehabilitation ■ stroke
Patients following a stroke? Are patients who receive care from nurses who have undertaken the teaching package positioned in recommended ways more often than those cared for by nurses who have not?

Subjects and Methods

Subjects

Data were collected on 6 wards in 2 London teaching hospitals. Two wards specialized in stroke rehabilitation and 4 were general medical wards. All nurses from these wards, comprising registered general nurses (RGN) and healthcare assistants (HCA), were recruited into the study. All patients admitted after a stroke and with a hemiplegia were invited to participate in the study during the first week of their admission to the ward. Written informed consent was sought from all patients or their caregivers, and the study had the approval of the ethics committees.

Nurse Data

Baseline descriptive data were collected from each nurse. These comprised age, gender, grade, number of years qualified, length of time in current post, experience in the field of stroke care, level of education, and completion of relevant postregistration study. In addition, their perceived quality of the ward as a learning environment and their level of job satisfaction were assessed with use of visual analogue scales. Nurses' knowledge of issues relating to stroke patient positioning was assessed using 2 questionnaires developed for the study. One focused on moving and positioning stroke patients and the other on the terminology used to denote posture. Each had a potential score of 20.

Patient Data

Patients were assessed on entry into the study with use of a range of measures to determine group equivalence. These included demographic details as well as measures of stroke sequelae likely to have an effect on the patients' ability to adopt and maintain recommended positions. The following measures were used: Motricity Index, Rivermead Mobility Index, Barthel Index, confrontation test, star cancellation test, paragraph recall test, thumb-finding test, Sheffield Screening Test for Acquired Language Disorders, Hospital Anxiety and Depression Scale, Short Orientation-Memory-Concentration Test, and Taylor Complex Figure Test. Data on the patients' positions were collected repeatedly by a single observer using an observational schedule developed and tested in an earlier study. The schedule requires observation of 19 aspects of posture thought to be important in influencing the return of normal movement after a stroke and records in 1 of 4 positions: sitting, lying supine, or lying on affected or unaffected side. Patients were observed at intervals throughout their stay according to their availability, pilot work having indicated that rigid scheduling of observations was not feasible in these clinical settings. Where multiple sets of observational data were collected on individual patients in any 1 day, these were made at intervals of at least 30 minutes.

Intervention

The research team felt that teaching nurses about positioning stroke patients in isolation from the wider aspects of rehabilitation care would be unsatisfactory and contrary to the ideal of holism. The content of the teaching package was developed accordingly.

The teaching intervention was carried out by a lecturer in nursing with specialist experience in stroke rehabilitation. It consisted of two 2-hour lectures, with an accompanying workbook for each nurse to complete and keep for personal reference. Care was taken to ensure that the content of the teaching program reflected issues covered in the 2 questionnaires assessing nurses' knowledge. The first lecture focused on the definition and etiology of stroke, factors influencing recovery, the multidisciplinary team’s role in rehabilitation, and the influence of ergonomics on movement and positioning. Participation and questioning was encouraged throughout. The second lecture began with a short revision of the first lecture, but it was primarily a practical session during which nurses were taught and helped to develop skills in moving and appropriately positioning patients with stroke. They were also helped to appraise each other’s techniques.

The content of the workbook reflected material covered during the lectures. A copy was given to each nurse at the beginning of the first lecture, with an explanation of its function and how to complete it. The workbook used an open-learning approach with a bias toward reflection, but nurses were also expected to do some self-directed work requiring discussion with other professionals and among themselves and to complete some short question-and-answer exercises. The workbook was used during the lectures; once completed, it also provided a revision aid and resource tool.

A total of 25 separate teaching sessions were given over a period of 13 weeks in order to include all nurses working on the experimental wards.

Procedure

The specialist units and the general wards were assigned to control or experimental status through block randomization so that both groups comprised 1 of the units and 2 of the wards. Baseline data were then collected from all nurses, and 20 patients were recruited, assessed, and observed repeatedly throughout their stay. Nurses in the experimental group then received the teaching intervention, following which both questionnaires were readministered to all nurses. A further sample of 20 patients was recruited from all wards, assessed, and observed. Finally, nurses were asked to complete the questionnaires at 3 months after intervention. The following 4 patient groups were produced: group E Pre, baseline experimental; group C Pre, baseline control; group E Post, postteaching experimental; and group C Post, postteaching control.

Statistical Analysis

Nurse and patient data were analyzed separately. The Mann-Whitney U test was used to detect differences in age, relevant postregistration study, perceived quality of the ward as a learning environment, level of job satisfaction, and in levels of knowledge between the experimental and control groups as a whole, and when subdivided into RGN and HCA, at baseline and following the intervention. The χ² test was used to detect differences in other personal characteristics between the experimental and control groups of nurses. The Kruskal-Wallis test was used to detect significant differences between groups in patients’ characteristics.

The correctness of each patient’s observed position was determined by comparison with the positions recommended by the physiotherapist as suitable for that individual. Each physiotherapist was asked to complete a revised set of recommended positions whenever these changed.

Changes in the frequency with which patients were positioned correctly were sought in 2 ways. First, for each set of observations, the percentage of aspects of posture that were correct (ie, positioned as recommended by the physiotherapist) was calculated. Comparisons between groups were made using the Mann-Whitney U test. Second, to determine whether any improvements in positioning were specific to certain parts of the body, the 19 aspects of posture within each set of observations were considered individually and the percentage of correct positions calculated for each. Group comparisons were made using the χ² test. Differences were labeled as statistically significant at the conventional value of P≤0.05.

Results

Nurses

One hundred sixteen nurses were initially included in the study. There was a reduction in sample size over time as nurses left the hospital (n=26), moved to a different ward (n=4), declined to complete questionnaires (n=6), or were absent due to illness (n=1). One ward was excluded from the study after nonattendance at the teaching sessions, and this
meant the loss of follow-up data from an additional 20 nurses. Ultimately, 59 nurses (44 RGN and 15 HCA) completed questionnaires at all 3 data collection points. There were 30 nurses in the experimental group and 29 in the control group. A statistically significant difference ($P_{(0.01)}$) was found between the groups in nurses’ perceived quality of their ward as a learning environment, with the experimental group rating this more positively. The groups were similar in all of the other personal characteristics considered.

**Nurses’ Knowledge**

The median scores at each time point on the 2 questionnaires are shown in Table 1. At baseline there were no significant differences between the experimental and control groups in nurses’ scores on either questionnaire.

For the questionnaire exploring nurses’ knowledge of the terminology used to denote posture, the median scores at baseline were identical. Immediately after the teaching, the median score for the experimental group increased whereas that for the control group remained the same, representing a significant difference ($P_{(0.05)}$). Three months after the teaching, however, the median score for the control group increased, so that the difference between the groups was no longer significant.

The data from the experimental and control groups were divided into subgroups to give a more detailed picture of the effect of the teaching intervention on both RGNs and HCAs.

For the questionnaire dealing with knowledge of moving and positioning stroke patients, the median scores in both groups increased over time, but, overall, the nurses in the experimental group scored significantly higher than those in the control group both immediately after the teaching ($P_{(0.001)}$) and 3 months afterward ($P_{(0.005)}$).

The difference in the baseline scores of the HCAs in the experimental and control groups was not significant. Although the median score of the HCAs in the experimental group improved by 3 points immediately after the teaching, there was no significant difference at any time point compared with the HCA control group.

**TABLE 1**. Median Score, Median % Correct, and Range From Nurses’ Questionnaires

<table>
<thead>
<tr>
<th>Group</th>
<th>Time*</th>
<th>Terminology of Posture</th>
<th>Moving and Positioning</th>
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<tbody>
<tr>
<td></td>
<td>Score</td>
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<td></td>
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<tr>
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<td>11</td>
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<td></td>
<td>3</td>
<td>12</td>
<td>60</td>
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<tr>
<td>Control</td>
<td>1</td>
<td>9</td>
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*1 indicates baseline; 2, immediately after teaching; and 3, 3 months after teaching.

![Figure 1. Line graph showing median scores of RGNs and HCAs on the “terminology used to denote posture” questionnaire before and after the teaching intervention. There was a significant difference between RGN experimental (●) and control (■) groups immediately after teaching ($P_{(0.01)}$) but not after 3 months. Although HCA experimental (○) group scores improved after teaching, there was no significant difference at any time point compared with the HCA control (□) group.](http://stroke.ahajournals.org/Downloaded from http://stroke.ahajournals.org/)

RGNs in the control group increased, so that the difference between the groups was no longer significant.

The HCA’s in the 2 groups also scored similarly to each other at baseline on this questionnaire ($P_{(NS)}$) but with median scores slightly lower than those of the RGNs. Immediately after the teaching, the median score for the HCA’s in the experimental group increased by 4 points, deteriorating slightly after 3 months but still remaining higher than the median score at baseline. The median score of the HCA’s in the control group showed little improvement during the study. However, the differences between the groups were not significant at either of these assessment points.

Scores of the RGNs on the “moving and positioning” questionnaire (Figure 2) showed a significant difference between the groups at baseline ($P_{(0.005)}$), with the experimental group producing the higher median score. Both groups improved their median scores at the postteaching assessment point, but the experimental group continued to score higher ($P_{(0.0001)}$). In both groups these improved scores were maintained 3 months later.

The difference in the baseline scores of the HCAs in the experimental and control groups was not significant. Although the median score of the HCA’s in the experimental group improved by 3 points immediately after the teaching, there was no significant difference at any time point compared with the HCA control group.
One thousand sets of observations of patients position were obtained. These were related to the 4 groups as follows: E Pre, n=174; E Post, n=202; and C Post, n=152. Of these sets, 208 (20.8%) were of patients lying supine or laterally and 759 (75.9%) were of patients sitting either in a chair or wheelchair. The remaining 33 (3.3%) sets were made while patients were sitting in bed. It was not possible to collect data on all 19 aspects of posture for every set of observations made. This resulted from parts of the body being obscured by bedding or clothing, the patients moving parts of their body independently, or to no specific recommendations being made by the physiotherapist. In total, 17 854 individual aspects of posture were observed.

During the preintervention phase there was no significant difference between the experimental and control wards in the proportions of correct positions within each set of observations. Patients in group E Pre were positioned correctly for a median of 55.6% (range, 17.6% to 100%) of the aspects of posture within each set (n=472) and those in group C Pre for a median of 57.9% (range, 16.7% to 89.5%; n=174). After the teaching, a small but highly significant improvement (P<0.0005) in the proportions of correct positions within each set of observations was found on the experimental wards (group E Post), with the median percentage increasing to 61.1% (range, 15.8% to 94.7%; n=202). In contrast, positioning in the control group in the postteaching phase (group C Post) showed a significant deterioration (P<0.05), with the median percentage of correct positions falling to 48.7% (range, 20.0% to 84.2%; n=152).

The percentages of individual aspects of posture observed as correct are shown in Table 2. Again, groups E Pre and C Pre were comparable. Group E Pre scored significantly higher than group C Pre for 4 aspects of posture (trunk: rotation [P<0.001], shoulder: protraction [P<0.001], shoulder: abduction [P<0.01], and forearm: pronation [P<0.05]), and Group C Pre scored higher for 5 aspects (head: lateral flexion [P<0.05], head: rotation [P<0.01], trunk: lateral flexion [P<0.05], shoulder: flexion [P<0.01], and wrist: flexion [P<0.05]).

Comparison of groups C Pre and C Post revealed no improvement on the control wards in the postteaching phase, with group C Post scoring significantly higher than Group C Pre for only 1 aspect of posture (thumb: abduction [P<0.05]). In contrast, when compared with group E Pre, the experimental wards (group E Post) scored significantly higher after the teaching intervention on 8 aspects of posture (head: lateral flexion [P<0.05], head: rotation [P<0.0005], trunk: lateral flexion [P<0.0005], elbow: flexion [P<0.0005], forearm: pronation [P<0.0005], wrist: flexion [P<0.0005], hip: rotation [P<0.0005], and hip: abduction [P<0.0005]). Group E Post also scored significantly higher than group C Post for 6 aspects of posture (thumb: rotation [P<0.0005], shoulder: protraction [P<0.0005], forearm: pronation [P<0.0005], wrist: flexion [P<0.0005], hip: rotation [P<0.025], and hip: abduction [P<0.0005]).

Overall, an improvement in patients’ posture after the nurses had received the teaching was demonstrated. However, even after the teaching the percentage of correct positioning remained variable on the experimental wards, ranging from 23.7% (for thumb: abduction) to 86.9% (for forearm: pronation).

**Discussion**

This study sought to evaluate a teaching package designed to improve nurses’ knowledge of and practice in positioning stroke patients. The quasi-experimental design used the nurses and patients on 6 wards, those within the experimental group being well matched with those in the control group in all personal characteristics. The one exception was that the nurses in the experimental group rated the learning environment of their wards higher than those in the control group. This might have been expected to enhance the standard of clinical practice on these wards.4 Nevertheless, at baseline there were no significant differences between the groups as a whole in their level of knowledge about issues relating to positioning or the positions in which patients were nursed. It is possible, however, that working in a learning environment...
perceived as positive contributed to the success of the teaching.

When considering the groups as a whole, the use of the formal teaching intervention produced small but significant improvements in the nurses’ knowledge of moving and positioning stroke patients and of the terminology used to denote posture in stroke care. Nurses in the experimental group scored significantly higher than those in the control group on both questionnaires immediately after they had received the teaching and on one questionnaire 3 months later. The increased median scores achieved by both RGNs and HCAs in the experimental group following the teaching were sustained 3 months later for both questionnaires. However, some of the median scores of the nurses in the control group also improved over time. This could have resulted from the nurses’ participation in the study, and the presence of the researcher may have initiated an increased awareness and interest in stroke care. In addition, their completion of questionnaires at baseline may have motivated them to look up answers to questions they were unsure of, thus independently increasing their level of knowledge. It is important to note, however, that although the knowledge of the nurses in the control group may have improved during the course of the study, their practice did not.

HCAs tended to score lower than the RGNs. This has implications for the design of future teaching programs. Furthermore, despite fairly large improvements in the median scores of the HCAs in the experimental group immediately after the teaching compared with little or no improvement in the median scores of the HCAs in the control group, the differences between the groups were not significant. This may have been due to the small size of these subgroups.

Our study has identified the presence of poor positioning on both stroke rehabilitation units and general wards. The results also indicate that nurses’ practice in the positioning of stroke patients can be improved through a formal teaching intervention. However, the educational package tested in this study did not effect improvement in all of the aspects of positioning thought to be important, and some of the improvements obtained were fairly small. Overall, therefore, there is scope for further enhancement of nurses’ practice in this potentially important aspect of care.

Lincoln et al also found evidence of poor positioning of stroke patients. However, these researchers made an overall rating of patients’ posture using the categories “good,” “poor,” and “not possible to say.” In contrast, our study used a more focused observational technique that considered the specific positioning of individual aspects of the body. This approach has 3 advantages. First, comparing observed positions with those which physiotherapists specifically recommend for each patient means the individuality of patients can be taken into account. Second, it highlights which areas of the body are being positioned in recommended ways and which are not. Third, the data gained in this way can provide a baseline from which realistic goals for the improvement of positioning can be made, and they can be used to guide the content of educational programs for clinical staff.

There were some limitations to the study. The patient sample was small, although the number of observations carried out was large. The sample of nurses was compromised because of the withdrawal of nurses from one of the experi-

<table>
<thead>
<tr>
<th>TABLE 2. Number of Aspects of Posture Observed and Percentage Positioned Correctly by Group</th>
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<td>Aspects of Posture</td>
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<tr>
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<tr>
<td>Head: lateral flexion</td>
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<td>Head: rotation</td>
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<tr>
<td>Neck: flexion</td>
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<tr>
<td>Trunk: lateral flexion</td>
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<td>Trunk: rotation</td>
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<tr>
<td>Shoulder: protraction</td>
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<td>Shoulder: abduction</td>
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<tr>
<td>Shoulder: flexion</td>
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<tr>
<td>Elbow: flexion</td>
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<tr>
<td>Forearm: pronation</td>
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<tr>
<td>Wrist: flexion</td>
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<tr>
<td>Fingers: flexion</td>
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<tr>
<td>Thumb: abduction</td>
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<tr>
<td>Hip: flexion</td>
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<td>Hip: rotation</td>
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<tr>
<td>Hip: abduction</td>
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<tr>
<td>Knee: flexion</td>
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<tr>
<td>Ankle: dorsiflexion</td>
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<td>Foot: inversion</td>
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mental wards who experienced difficulty attending the teaching sessions. It was not possible for the observer to remain blind to the control or experimental status of the wards. In retrospect, possible bias could have been minimized by use of a second researcher to collect the physiotherapists’ recommendations for patients’ positions and withhold this information from the observer. This strategy should be considered for use in any future studies.

Overall, the results of our study indicate that it is possible to effect a degree of change in both nurses’ knowledge of and their practice in the positioning of stroke patients through the use of a formal teaching intervention. However, there remains much room for improvement. It is imperative that such improvement is achieved; without access to a group of patients who are consistently positioned well, research evaluating the effect of positioning on outcome after stroke cannot be undertaken. The findings of this study highlight the need for further consideration of how nursing practice may be influenced.

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References

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