

## *Letters to the Editors*

### EVALUATION OF STROKE REHABILITATION

THE CONCLUSIONS drawn by Keith Lind (Vol. 35, p. 133-149, 1982) are invalidated by the fact that his review of studies in stroke rehabilitation, though extensive, is not comprehensive. Furthermore, there are many unknown or unmeasurable factors which affect recovery after stroke. Attempts in using data on obviously different populations as historical controls is, therefore, a pointless exercise. In addition to the studies reviewed in the article, there are three studies [1-3] which have compared progress of stroke patients following intensive therapy with that following community care or no formal treatment. But, as pointed out by the author, most of these studies used different criteria and measures, hence the functional recovery in these groups of patients is not comparable. The only reliable way of controlling for the known and unknown confounders, including spontaneous recovery, is a randomized controlled trial (RCT) approach. However, largely due to their small numbers, the two randomized controlled studies discussed in the review and further two American RCTs [4, 5] were inconclusive.

A notable omission in the review was the two recent British RCTs which clearly demonstrate the effectiveness of intensive rehabilitation. The Scottish trial [6] has shown the effectiveness of in-patient rehabilitation; a higher proportion of patients treated in a special stroke unit achieved functional independence than those treated in general medical wards. The English RCT [7] compared functional recovery following different intensities of out-patient rehabilitation. In this study, improvement was greatest in those receiving intensive treatment, intermediate in those receiving conventional treatment, and least in those receiving no treatment; decreasing intensity of treatment was associated with a significant increase in the proportion of patients who deteriorated and in the extent to which they deteriorated [7].

Other observations made in the two British studies [6, 7] are equally important. The benefits from intensive rehabilitation in special stroke units were not sustained on longer follow-up [8]. In the English study, it was found that only 11% of all stroke patients seen at a district general hospital during a six-year period survived the acute episode and were suitable for intensive out-patient rehabilitation, and only 14% of those who survived the acute episode were severely disabled [9]. These findings suggest that in practice only selected patients could benefit from intensive rehabilitation, and it is in this context that we need to know reliable predictors of mortality and disability or functional recovery in stroke. Interactions between the predictors are well recognized. Yet, most studies have been carried out on small numbers of selected stroke patients, using univariate methods of analyses. Data on 1094 stroke patients, for example, have revealed higher early mortality in women as compared to men [9] and this sex difference in mortality was not fully explained by age difference [10]. Multivariate analyses, however, have shown that other factors associated with high mortality were also responsible for the apparent sex difference. Interestingly enough, female sex is independently associated with higher level of disability following stroke [10].

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*Response*

THE PURPOSE of "A Synthesis of Studies on Stroke Rehabilitation" was to address the problem of conflicting results arising among several studies. My intention was not to advocate a position either for or against rehabilitation of stroke victims, rather I hoped to guide practicing clinicians through the maze of apparently contradictory studies which have appeared in the literature over the past 20 years. A clinician seeking advice on the proper treatment of hemiparetic patients may reasonably conclude that, although many experts advocate the use of intensive, multidisciplinary rehabilitation efforts, this approach is not appropriate for all functionally impaired stroke patients. Unfortunately, the diversity of regimes used in treatment and variation in the method of measuring their effectiveness obscures the applicability of results to specific cases. However, the difference in outcome measures found among the studies reviewed does not invalidate comparison but only makes it more difficult, notwithstanding Dr Sheikh's assertion to the contrary.

Dr Sheikh implies in his letter to the editor that the Synthesis of Studies found no effect from rehabilitation of stroke patients. However, this conclusion misconstrues my findings. I found the effects of therapy elusive. Recovery appeared spontaneous because similar results persisted across studies in spite of differences in rehabilitation techniques and varying intervals of treatment. Six of seven studies reviewed revealed similar patterns of improvement or deterioration during analogous phases of convalescence. In comparing results, I must reemphasize the importance of controlling for functional ability after the stroke and time since onset. The persistence of negligible effects lead me to affirm the conclusion by a researcher who conducted a randomized controlled comparison, "... that the great majority of hemiparetic stroke victims can be rehabilitated adequately on medical and neurological wards without formal rehabilitation services if proper attention is given to ambulation and self care activities." [1].

Imprecise outcome measures may account for the absence of reliable signs of improvement in six of seven studies reviewed. However, one study seemed to record improvement related to the rehabilitation effort [2]. In this study, the use of intensive and extended rehabilitation appeared to overcome the limits of measurement. However, a sweeping conclusion regarding the general effectiveness of rehabilitation was hardly warranted from such findings in one study of seven, especially when this study employed no comparable randomly assigned control group. I inferred that the results of treatment are likely to be substantial when efforts focus on patients for whom marginal improvements