Group physiotherapy improves time use by patients with stroke in rehabilitation

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Does feedback about the time use of patients with stroke influence the organisation of services in rehabilitation?

An observation was made of the time use by 22 patients with stroke in a specialised rehabilitation unit, feedback was given to the staff, and another observation on 16 patients was made one year later. As a result of the first observation, the physiotherapy staff were urged to organise group sessions for patients with similar levels of disability, allowing practice with a higher patient to staff ratio. During the second observation, patients spent significantly more time on therapy (8%) and with their peers (25%). These results indicate that feedback about patients’ time use can substantially influence management and consequently patients’ behaviour in rehabilitation. [De Weerdt W, Nuyens G, Feys H, Vangronsveld P, Van de Winckel A, Nieuwboer A, Osaer J and Kiekens C (2001): Group physiotherapy improves time use by patients with stroke in rehabilitation. Australian Journal of Physiotherapy 47: 53-61]

Key words: Cerebrovascular Disorders; Hemiplegia; Rehabilitation

Introduction

At the present time, the cost of hospitalisation is enormous (Dobkin 1995, Dombovy et al 1986, Wentworth and Atkinson 1996). Therefore, it is imperative to keep the hospital stay short without jeopardising the patient’s chances for an optimal recovery. One way to achieve this goal is to make the time use of patients in the hospital as efficient as possible. The present study investigates the time use of stroke patients in a specialised rehabilitation unit.

Observations of hospitalised patients with stroke have revealed that rehabilitation programs are not as intensive as expected. Even in specialised stroke units, much of the time is spent in non-therapeutic activities. Keith and Cowell (1987) observed patients with stroke in three hospitals and found that only one third of the time of the working day, between 8.30 am and 4.30 pm, was effectively spent on therapeutic activity. Patients spent a total of 93 minutes per day on physiotherapy and occupational therapy. For an additional 55 minutes per day, they were involved in other types of treatment. Patients spent 52.5% of the time alone and 33.2% of the time with therapists. Tinson (1989) performed a similar study in a neurological rehabilitation unit, observing 15 patients with stroke between 9am and 5pm. These patients spent only 12.9% of their day in therapeutic activity, of which 11% was physiotherapy and occupational therapy. Almost half of the day (44%) was spent on non-therapeutic activities, mainly on the ward. Two-thirds of this time was spent watching others or gazing around the ward. Similar results were found in a study of Esmonde et al (1997). In a study by Lincoln et al (1989), patients with stroke were observed over three days between 8.30am and 4.30pm. Patients spent 45% of the time in solitary behaviour. The staff was informed about the results of the study and strategies for change were discussed. Observations were repeated eight months later, to assess the effect of the feedback. In the second observation period, the proportion of solitary behaviour had increased to 65% of the time, mainly because of an increase in inactive individual tasks.

Despite these observations, studies have demonstrated the importance of intensity of therapy for functional outcome. On the basis of a research synthesis of seven randomised controlled trials involving 597 patients with stroke, Langhorne et al (1996) concluded that a higher intensity of physiotherapy results in significant improvement of functional outcome and neuromuscular variables such as muscle strength and synergism. The finding that
more treatment leads to better functional outcome has been confirmed by a more recent study of Feys et al (1998).

Mackey et al (1996) examined whether the physical design and organisational structure of rehabilitation units was related to the amount of patients’ motor activity. Patients with stroke in two rehabilitation units with a different physical design and organisational structure were observed between 7am and 7pm both during weekdays and weekends. In one unit, the therapy area was separated from the living area and therapy was structured around appointment times. In the other unit, the therapy area was immediately adjacent to the living area and therapy was delivered on an ad hoc basis. The results of behavioural mapping showed that, in both units, patients spent more than 70% of the day on activities unrelated to physical outcome, and less than 20% of the time on tasks that could potentially contribute to their recovery. These findings again raise the question as to whether rehabilitation units offer an optimal time use for their patients. The authors stated that a fundamental change in the approach to rehabilitation is necessary. Instead of focusing on individual features of the environment, attention should be given to a renewal of theoretical frameworks.

A further analysis of the conditions potentially contributing to the performance of physical activity indicated that it is the therapist who drives the practice rather than the therapy area (Ada et al 1999). The authors of the study suggested that a modification of working patterns, such as replacing some of the individual treatment sessions with group sessions for patients with similar levels of disability could increase the amount of time spent with the therapist.

The aim of the present study was to verify whether informing senior staff members of a specialised stroke rehabilitation unit about the time use of their clients resulted in changes in the organisation of services and subsequent changes in the behaviour of the patients with stroke on the unit.

Method

Design Time use by patients with stroke was observed during two consecutive days between 8.30am and 5.10pm This was the time of the day therapists were present at the unit. The results of the observations were discussed in detail with the senior staff members of the unit. After one year, observations of patients with stroke were repeated during one day.

Setting The study was performed in a stroke rehabilitation unit of the University Hospital of Leuven in Belgium. The staff of the unit comprised nurses (0.64 full time equivalents per patient (FTE-PP)), physiotherapists (0.25 FTE-PP), occupational therapists (0.06 FTE-PP), speech therapists (0.04 FTE-PP), medical doctors (0.08 FTE-PP), a clinical psychologist (0.03 FTE-PP), a social worker (0.03 FTE-PP) and a person responsible for sports related activities (0.03 FTE-PP). Between the two observation periods, no staff changes occurred in terms of number or positions of therapists in the different disciplines.

Subjects All available persons with stroke in the rehabilitation unit at the time of the study participated in the study. Stroke was defined as “rapidly developing clinical signs of focal or global loss of brain function, lasting more than 24 hours, with no cause apparent other than cerebral infarction or intracerebral haemorrhage” (WHO 1988).

During the first period, 22 patients (10 men and 12 women) were observed. The average age of this group of people was 52.4 years (SD = 13.5). The mean period of time between stroke onset and observation was 4.1 months (SD = 1.9) and the mean length of stay at the unit at the time of observation was 2.5 months (SD = 1.4).

The group of subjects observed during the second observation comprised 16 patients, seven men and nine women, with an average age of 53.2 years (SD = 13.8). The mean disease duration was 2.9 months (SD = 2.2) and mean length of hospitalisation at the time of observation was 1.4 months (SD = 1.7).

Feedback and education on group physiotherapy

After the first observation period, a meeting was organised to inform the staff of the unit about the time use of their patients during the day. As a result of the feedback, the physiotherapists discussed with the researchers several options for changing their working patterns to increase the amount of time spent with their patients. Subsequently, it was decided to introduce group sessions into the working programs. The idea of organising group sessions as part of the
rehabilitation program was based on the positive results of such an approach in a study by Gauthier et al (1987) of patients with Parkinson's disease. Gauthier et al (1987) found that a group approach in therapy had achieved more behavioural changes than an individual, more dependent, client-therapist relationship. They also concluded that a group approach provides a supportive environment and facilitates interactions among peers and therefore it might be suitable for patients with chronic degenerative diseases who may be easily drawn into depression and social isolation. Recently, Ada et al (1999) recommended group sessions for patients with stroke because they allow efficient time use, more specifically practice with a higher patient to staff ratio, and offer additional therapeutic opportunities related to group dynamics, such as feedback and social reinforcement, for example increased cooperation and motivation by the use of competition.

The introduction of group sessions into the working programs in the stroke unit of Leuven was practically realised by allocation of patients to three groups according to their physical capability, determined by the Rivermead Motor Assessment Scale (Wade 1992). One group comprised three to 10 people who were able to walk independently and exercise with supervision only (score 9 to 13 on the Rivermead test). Therapy was focused mainly on improving the quality of movement patterns during functional activities and included mat exercises, ball games and cardiorespiratory fitness training (Vanhees 1999). The second group comprised three to 10 people who needed the help of a therapist to perform functional activities (score 4 to 8 on the Rivermead test). The main goals of treatment in this group were facilitation of movement and encouraging independent performance of functional activities on the basis of mat exercises, walking and stair climbing. The third group comprised two to four patients who needed major assistance for most functional activities (score 0 to 3 on the Rivermead test). Therapy was focused on prevention or treatment of complications due to lack of mobility such as hypertonia, decreased range of joint motion, pain and oedema, and consisted of positioning, mobilisations and facilitation and coaching of active movements such as transfers. The content of the exercises applied in the different groups was based on different therapeutic concepts such as neurodevelopmental treatment (Davies 2000, Johnstone 1995) and motor learning (Carr and Shepherd 1998, Shumway-Cook and Woollacott 1995). No specific education on running groups was given to the therapists. However, the head of the physiotherapy department had acquired practical experience with running groups in a previous workplace.

The group sessions took place in the morning. In the afternoon, patients were treated on an individual basis for half an hour.

**Data collection and analysis** - The study was approved by the local ethical committee and by the head of the rehabilitation unit. Patients and staff were fully informed and gave their consent to participation.

A direct method of behavioural mapping, a time sampling technique, was used to collect the data. Based on the results of previous studies on time use in rehabilitation units (Keith and Cowell 1987, Kennedy et al 1988, Lincoln et al 1989, Mackey et al 1996, Tinson 1989), a behavioural mapping form was developed with classifications covering the range of potential activities, locations and social interactions that could be observed. The three categories were each divided into mutually exclusive sub-groups. Activities were subdivided into therapeutic and non-therapeutic activities. The eight therapeutic activities were physiotherapy, occupational therapy, speech therapy, medical care, autonomous exercise, nursing care, psychological counselling and sports activities. The non-therapeutic activities were divided into nine categories: sitting, eating, transport, resting or sleeping, talking, dressing and hygiene, active relaxation, watching TV or listening to music, and other non-specified activities. The areas where the patients were located were divided into seven categories: therapy room, patient's room, day room, dining room, cafeteria, toilet or bathroom, corridor and other not previously mentioned places. Social interactions were divided into six categories: solitary behaviour and interactions with a therapist, with a visitor, with a nurse, with other patients and finally with any other, non-specified person.

To avoid conflict of interest, none of the staff members of the unit was chosen to perform the observations. To minimise the possible interference caused by ongoing observations, the observers had been working on the ward during the month prior to each data collection period.

Inter-observer agreement on the observations was
established by two observers recording the same behaviour for a group of patients at the stroke unit for a total of 918 observations. The agreement between the two observers was corrected for chance agreement by means of the Cohen's Kappa statistic (Kramer and Feinstein 1981). Kappa coefficients were calculated separately for the three different categories in the time sampling forms. For activity observations, a Kappa value of 0.99 was found. For locations and interactions of patients, Kappa coefficients were 0.98 and 0.99, respectively.

Results of observations were expressed in relative numbers as a function of time, 100% referring to a behaviour lasting a full day starting at 8.30am and ending at 5.10pm and 1% representing approximately five minutes a day. The absolute duration of a particular behaviour was deduced from the frequencies. One observation corresponded to 10 minutes, as observations had been made with time intervals of 10 minutes, thereby assuming that behaviour between two observations remained unchanged. Statistical significance of differences in calculated frequencies of observations was determined on the basis of a Chi-square statistic.

<table>
<thead>
<tr>
<th>Activity</th>
<th>1st observation (N = 22)</th>
<th>2nd observation (N = 16)</th>
<th>Difference</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapeutic activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physiotherapy</td>
<td>12.1</td>
<td>20.2</td>
<td>+ 8.1</td>
<td>0.001</td>
</tr>
<tr>
<td>Occupational therapy</td>
<td>2.2</td>
<td>1.0</td>
<td>- 1.2</td>
<td>0.03</td>
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<td>Speech therapy</td>
<td>1.9</td>
<td>0.2</td>
<td>- 1.7</td>
<td>0.001</td>
</tr>
<tr>
<td>Medical care</td>
<td>1.4</td>
<td>0.0</td>
<td>- 1.4</td>
<td>0.001</td>
</tr>
<tr>
<td>Autonomous exercising</td>
<td>1.0</td>
<td>3.3*</td>
<td>+ 2.3</td>
<td>0.001</td>
</tr>
<tr>
<td>Nursing care</td>
<td>0.4</td>
<td>1.0</td>
<td>+ 0.6</td>
<td>0.09</td>
</tr>
<tr>
<td>Psychological counselling</td>
<td>0.1</td>
<td>1.6</td>
<td>+ 1.5</td>
<td>0.001</td>
</tr>
<tr>
<td>Sports activities</td>
<td>0.1</td>
<td>0.0</td>
<td>- 0.1</td>
<td>0.58</td>
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<tr>
<td>Non-therapeutic activities</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sitting</td>
<td>16.0</td>
<td>18.9</td>
<td>+ 2.9</td>
<td>0.08</td>
</tr>
<tr>
<td>Eating</td>
<td>13.8</td>
<td>10.9</td>
<td>- 2.9</td>
<td>0.04</td>
</tr>
<tr>
<td>Transport</td>
<td>13.0</td>
<td>8.2</td>
<td>- 4.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Resting or sleeping</td>
<td>12.8</td>
<td>10.2</td>
<td>- 2.6</td>
<td>0.07</td>
</tr>
<tr>
<td>Talking</td>
<td>11.6</td>
<td>11.3</td>
<td>- 0.3</td>
<td>0.84</td>
</tr>
<tr>
<td>Dressing and hygiene</td>
<td>6.1</td>
<td>4.2</td>
<td>- 1.9</td>
<td>0.05</td>
</tr>
<tr>
<td>Active relaxation</td>
<td>3.4</td>
<td>3.5</td>
<td>+ 0.1</td>
<td>0.92</td>
</tr>
<tr>
<td>Watching TV or listening to music</td>
<td>1.0</td>
<td>0.0</td>
<td>- 1.0</td>
<td>0.002</td>
</tr>
<tr>
<td>Other</td>
<td>3.1</td>
<td>5.5</td>
<td>+ 2.4</td>
<td>0.006</td>
</tr>
</tbody>
</table>

* Autonomous exercising: 2.5% speech therapy, 0.8% other types of therapy.
Results

Activity Table 1 illustrates the activities in which the patients were involved. During the first observation, patients spent 19.2% of the day on therapeutic activities, with physiotherapy accounting for most of the time, 12.1% of the day. On each of the other therapeutic activities, patients spent 2.2% of their time or less. Patients were observed during 80.8% of the day time involved in non-therapeutic activities. Sitting, eating, transport, resting or sleeping and talking each accounted for 11.6-16% of the day time. Dressing and hygiene took 6.1% of the time in the day. Finally, 7.5% of the time was used for other activities, including active relaxation, watching TV or listening to music and non-specified activities.

During the second observation, the time spent on non-therapeutic activities had decreased to 72.7% of the day in favour of the time used for therapeutic activities, which had increased to 27.3%. Both changes were statistically significant ($p = 0.001$). The biggest difference in therapeutic activities was noted for physiotherapy, where an increase of 8.1% had been found. In absolute terms, this change represented 42 minutes per day. At the second observation, patients were observed 20.2% of the time (105 minutes per day per patient) involved in physiotherapy. There was also a slight increase of 2.3% of the time (12 minutes a day) for autonomous exercises. Other changes in therapeutic activities were considered minimal from a clinical point of view, although some of these items presented statistically significant changes, such as time spent in psychological counselling, occupational therapy, speech therapy and medical care ($p < 0.05$).

In non-therapeutic activities, a considerable change was noted for transport time (-4.8% or -25 minutes a day).

Location Table 2 presents different areas where patients spent time during the two observation periods.

During the first observation, patients spent nearly one third of the day (29.2%) in their own rooms. The second most used area was the corridor. The dining room, therapy room and day room were used for approximately the same amount of time during, respectively, 15.2%, 14.7% and 13.0% of the day. Finally, patients were located for 10.5% of the day in other locations, including the toilet or bathroom, the cafeteria and other non-specified areas.

During the second observation, the patient’s room was
still the most attended area in the unit although the
time spent there had decreased slightly, by 2.7%. The
main change was noted for the time spent in the
therapy room where an increase of 9% was found
\((p = 0.001)\). As a result, the therapy room became
the second most attended area. A significant decrease
was found for the time spent in the dining room, in the
day room and in the cafeteria \((p < 0.05)\).

**Social interaction** During the first observation,
patients were involved in solitary behaviour about
half of the day \((51.4\%\); Table 3). Contacts with other
people were most frequent with therapists \((20.7\%)\)
and visitors \((12.3\%)\). Interactions between patients
and their peers or with nurses took up only 7.4% of
the day. The researchers observed very few contacts
between patients and other non-specified persons.

During the second observation, the most frequently
seen social interaction was between patients and their
peers \((32.2\%\) of the time). These contacts had
increased with 24.8% \((p = 0.001)\) between the two
observation periods. The second most frequent
contact was with therapists, accounting for 27.6% of
the day, which was an increase of 6.9% \((p = 0.001)\)
compared with the first observation. A dramatic
change was also observed in the amount of time spent
in solitary behaviour, taking 24.2% of the day during
the second observation, which was a reduction of
27.2% \((p = 0.001)\) compared with the first. In
absolute terms, this implied that time spent alone was
reduced from 4.5 hours to 2 hours. Time spent with
visitors, nurses and other non-specified persons was
also slightly reduced in the second observation period
compared with the first.

**Discussion**

**Activities** A comprehensive increase was found in the
time patients spent on therapeutic activities. At the
second observation, the patients with stroke were
involved during 27% of the working day, in therapy.
These results were similar to those found in other
studies \((Keith 1980, Miller and Keith 1973)\).

The detailed results of the present study indicated that
the biggest increase in all activities was in the amount
of physiotherapy. The introduction of group sessions
into the working programs brought about a substantial
increase in the time spent in physiotherapy \((8.1\% or
42 minutes per day)\). In speech therapy, a shift was
observed from activities guided by a speech therapist
towards autonomous training, explaining some of the
decrease noted in speech therapy in favour of
autonomous exercising. These results indicate that it
could be useful to encourage autonomous exercising
into the working programs. The introduction of self-
directed, independent exercises is a potential way to
improve time use of patients between therapy
sessions, without necessitating the presence of a
therapist. The feasibility of increasing the time on
autonomous exercising in patients with stroke has
been questioned. On the basis of observational

<table>
<thead>
<tr>
<th>Social interactions</th>
<th>1st observation ((N = 22))</th>
<th>2nd observation ((N = 16))</th>
<th>Difference</th>
<th>(p)-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solitary behaviour</td>
<td>51.4</td>
<td>24.2</td>
<td>-27.2</td>
<td>0.001</td>
</tr>
<tr>
<td>With a therapist</td>
<td>20.7</td>
<td>27.6</td>
<td>+6.9</td>
<td>0.001</td>
</tr>
<tr>
<td>With a visitor</td>
<td>12.3</td>
<td>10.6</td>
<td>-1.7</td>
<td>0.21</td>
</tr>
<tr>
<td>With a nurse</td>
<td>7.4</td>
<td>4.8</td>
<td>-2.6</td>
<td>0.02</td>
</tr>
<tr>
<td>With other patients</td>
<td>7.4</td>
<td>32.2</td>
<td>+24.8</td>
<td>0.001</td>
</tr>
<tr>
<td>With other persons</td>
<td>0.8</td>
<td>0.6</td>
<td>-0.2</td>
<td>0.71</td>
</tr>
</tbody>
</table>
studies, Newall et al (1997) and Ada et al (1999) concluded that spending much time on self exercise may be hindered in patients with stroke by their incapacity to carry out or even remember therapists’ recommendations. However, a comparative study in a Belgian and a Swiss rehabilitation setting has demonstrated that an increase of autonomous training in patients with stroke is feasible and may possibly improve time use in the rehabilitation unit (De Weerdt et al 1999). Patients in the Swiss setting spent nearly four hours of the day on therapeutic activities compared with 2.5 hours in the Belgian unit. Autonomous practice accounted for nearly half an hour of the difference between the two settings.

Within the other therapeutic disciplines where no specific strategies for changing the treatment programs were undertaken after the first observation period, changes could be considered minimal from a clinical point of view.

The total time spent on non-therapeutic activities decreased by 8.1%. Main decreases were observed in the time spent on transport, eating, resting and sleeping, dressing and hygiene. Apparently, a more economic use of time had been introduced within these activities.

In the second observation period, none of the patients were found to be involved in medical care activities. Patients were not deprived of medical care during their stay on the rehabilitation unit. The results from the second observation period in this study are based on one day of records per patient. As a consequence, they may have been subject to fluctuations of daily routines on the ward.

The results also indicated a relatively small amount of time spent on nursing care. This was no surprise, since the observations were performed between 8.30am and 5.10pm. A considerable amount of nursing care would undoubtedly take place before and after this period.

Although the observers tried to remain as unobtrusive as possible, it cannot be excluded that staff aware of the observations changed their work pattern and their interactions with clients. However, there was no reason to believe that this change in behaviour would have been different during the second observation.

Location During the second observation, the patients spent 9% more time in the therapy rooms compared with the first observation. This corresponds with the increase noted in physiotherapy activities. The patients were also seen more often in places other than those specified on the time sampling form. Also during the second observation, patients spent some time of the day outside the hospital building, enjoying good weather. This was not the case during the first observation, which had taken place during winter time. At the second observation, the time spent in the dining room and in the patient's own room was reduced, confirming the conclusion that less time was spent on daily activities such as eating, resting and sleeping, dressing and hygiene.

The patients spent approximately 17% of their time in the corridor during both observations. This was surprising, because there was a decrease of 25 minutes of time spent on transport. The corridor was used as a meeting place and also as a surrogate waiting room.

Social interaction The comparison of the two observations revealed striking differences in the social interactions of patients at the rehabilitation unit. The time patients were alone decreased by 27.2% of the day, which really meant 2.5 hours. This was mainly compensated by the time patients were observed interacting with other patients or with a therapist. This shift may have been due to the introduction of the group sessions. Patients were seen during a longer time of the day involved in therapy and had more contacts with therapists. Because of the collective activities, patients also met one another on a regular basis and had the opportunity to socialise. The time patients spent in solitary behaviour during the second observation was comparable with the results of the study of Kennedy et al (1988), but was 20-30% less compared with the results of other studies (Keith 1980, Keith and Cowell 1987, Lincoln et al 1989, Lincoln et al 1996, Miller and Keith 1973). This considerable difference in the amount of time spent alone may also be partially explained by the operational definition used for the term “social interactions”. Is the presence of another person in the neighbourhood sufficient to be considered as a social interaction? Is verbal contact necessary to label the contact as a non-solitary behaviour? What about patients watching each other or gazing around when other persons are present in the same room? It is clear that if observers consider the presence of another
person in the room sufficient to label the social interaction as “non-solitary behaviour” the number of these contacts may be much higher than if only verbal interactions would be considered being social interactions. In the present study, “solitary behaviour” was noted exclusively when the observers saw no other person in the neighbourhood of the patient. Social interactions were interpreted as “being physically in the neighbourhood” of other persons. In reports of studies on time use within rehabilitation settings, operational definitions of equivocal terms such as “social interactions” should be explicit to allow comparison of results.

In the present study, all patients who were available in the stroke unit at the time of observation were included. No distinction was made with regard to the severity of stroke or the stage of recovery while there are strict admission criteria to enter the specialised stroke rehabilitation unit, the needs of the individual patients may still have been different on the two occasions. Therefore, in future research, it would be interesting to investigate needs of patients with stroke with different clinical conditions. Other important issues are the quality of the group activity in terms of content and outcome and the impact of the group on other routines.

Besides the practical feasibility of increasing therapy in the rehabilitation program, the question remains of how much the intensity of treatment should be increased to obtain an optimal effect (De Weerdt et al 2000). In future studies, it would be interesting to investigate the time use of subjects in other rehabilitation settings and to examine the effect of intensity and type of treatment regime on the rate of recovery.

Conclusions

Investigating the time use of patients in a rehabilitation setting is a challenging experience for both the staff members and the managers of the unit. It is useful to identify gaps or weak points in the services offered to the patients and to indicate where the treatment programs could be improved. Giving feedback to the staff members about the time use of patients with stroke has changed the working patterns applied in the physiotherapy department. This indicates that objective information can be used as a positive incentive for those involved in a rehabilitation set-up. On the other hand, the results of the second observation period indicated that there is still a potential improvement of time use to be made, for example by replacing passive behaviour or treatment necessitating the presence of a therapist with self-directed exercises. Patients should be encouraged to be actively involved in the management of their clinical condition, particularly in between treatment sessions. More research is needed to assess the effect of group interventions on functional recovery in patients with stroke.

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