Effects of liaison between physiotherapists and occupational therapists for home-visit rehabilitation: preliminary study

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Abstract. [Purpose] Home-visit rehabilitation is used to restructure patients’ home lives and involves comprehensive intervention. In Japan, liaison between physiotherapists and occupational therapists occurs, but impact of this cooperation is unclear. The present study aimed to investigate therapeutic efficacy of this liaison. [Participants and Methods] The study used a cross-sectional design. Participants were community-dwelling older adults who required long-term care and were receiving home-visit rehabilitation provided in the Chubu region. They were divided into a single-intervention group with either physiotherapy or occupational therapy alone, and a liaison-intervention group with therapy coordinated between the 2 professions. In addition to basic information, the Barthel Index, Frenchay Activities Index, Health Utility Index Mark 3, and subjective health assessments were evaluated. [Results] Eighteen participants were recruited. No significant differences were observed between groups for the Barthel Index, whereas the total Frenchay Activities Index score and items of the Frenchay Activities Index (outdoor domestic chores and outdoor activities) were significantly higher in the liaison-intervention group. The emotion item in the Health Utility Index Mark 3 and subjective health assessments were also significantly higher in the liaison-intervention group. [Conclusion] These findings suggest that this liaison is effective for improving activities of daily living and increasing quality of life. This is probably due to each therapist performing a specialized intervention and professional cooperation.

Key words: Home-visit rehabilitation, Liaison between physiotherapy and occupational therapy, Older adults

INTRODUCTION

Recently, worldwide societal aging has become an increasing concern. Particularly in Japan, 17.48 million people are over 75 years old, and 27.7% of the total population is over 65(1). These numbers are anticipated to continue to increase and, in response, in Japan, a system may need to be established to transition medical and nursing care from hospitals and other institutions to homes and the community. This approach will result in home-visit rehabilitation playing a critical role.

Home-visit rehabilitation is covered by care insurance in Japan. This care involves physio- and occupational therapy, along with other services, in the home for patients certified as requiring long-term support, long-term care, or both. It addresses physical function and also focuses on basic activities of daily living (BADL), instrumental activities of daily living (IADL), and quality of life (QOL). To this end, rehabilitation also emphasizes promoting activity, encouraging social participation, and enabling independent home living(2). Thus, home-visit rehabilitation requires multifaceted intervention(2) and restructuring of patients’ lives based on multidisciplinary collaboration.

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In Japan, liaison between physiotherapists and occupational therapists occurs, but its efficacy for home-visit rehabilitation has not been demonstrated. In a Danish study, participants were allocated randomly into intervention and non-intervention groups, with and without physiotherapy, and comparison of participants in these groups revealed no significant differences in IADL and other measures of success. However, a multidisciplinary meta-analysis showed improvement in activities of daily living (ADL) in elderly patients. No consistent impact of the home intervention with liaison among therapists has been demonstrated to date.

The present study focused on impacts of liaison between physio- and occupational therapists for rehabilitation for patients requiring multifaceted intervention. Previous research on liaison among specialized professionals has reported positive effects in in-hospital rehabilitation, but no information in this respect is available for rehabilitation for home-dwelling older adults.

The present study was a preliminary investigation of the effects of liaison between physiotherapists and occupational therapists, carried out with home-dwelling older adults receiving home-visit rehabilitation.

**PARTICIPANTS AND METHODS**

The study was cross-sectional, and the participants were home-dwelling older adults who were undergoing home-visit rehabilitation provided by one of two facilities in the Chubu region (i.e. Central Japan). Inclusion criteria were: (i) were currently undergoing home-visit rehabilitation that involved physiotherapy, occupational therapy, or both, and (ii) had provided informed consent for participation after oral and written explanation of the study. Patients were excluded if certified as requiring long-term support or had been diagnosed with dementia.

Study duration was from October to November 2017. After obtaining informed consent for participation, the study performed while participants were receiving home-visit rehabilitation in their homes. A physiotherapist or occupational therapist was responsible for each participant, and these personnel were fully conversant with evaluation techniques.

Patients for whom intervention was based on liaison between physiotherapists and occupational therapists (liaison-intervention group), began intervention with discussion of the study with an occupational therapist. On the basis of the International Classification of Functioning, Disability and Health, this discussion defined and established common control over objectives for activities and social participation. Occupational therapists were primarily concerned with direct intervention for these aspects of rehabilitation.

Subsequently, and considering these objectives for activities and social participation, a physiotherapist evaluated physical function and basic capabilities and made recommendations for appropriate intervention.

For participants in the single-intervention group, intervention involved a physiotherapist or occupational therapist, but not both. Intervention was continued as prescribed prior to the study but was not stipulated in detail.

Age, gender, primary disease, the level of long-term care required (care level) and presence or absence of family members living with the participant were recorded as basic attributes. Intervention duration after initiation, and the intervention frequency (times/week) were also recorded. Results were evaluated with the Barthel index, the Japanese version of the Frenchay activities index (FAI), the Japanese version of Health Utilities Index Mark 3 (HUI3), and patients’ subjective feeling about health.

The Barthel index is an evaluation index for BADL that was developed by Mahoney et al., by which the participant’s degree of autonomy is evaluated for each of 10 parameters. A maximum score of 100 indicates substantial ability for BADL.

The FAI is an evaluation index for IADL and social life that was developed by Holbrook et al.. It covers five categories, with the terms in parentheses being low-order items: (i) indoor activities (food preparation, clean-up after meals, washing clothes, cleaning and tidying, and heavy physical work); (ii) outdoor domestic chores (shopping, gardening, and house and car maintenance); (iii) outdoor activities (going out, walking outside, using transport, and travel); (iv) interests (hobbies, and reading); and (v) work (employment). The frequency of participation in each activity during the previous 3 or 6 months was scored on a scale of 0 to 3, with the maximum score of 45, indicating better IADL and social participation.

The HUI3 is a measure of health-related QOL that was developed by Feeny et al., with the Japanese version prepared by Ikeda et al. It evaluates health-related QOL using a five- or six-point scale, for the following eight items: vision, hearing, speech, ambulation, dexterity, emotion, cognition and pain. Higher scores indicate higher QOL.

Finally, a question sheet was used to evaluate patients’ subjective feelings of health, with the question, “Do you usually feel healthy?” and answers on a four-point scale, as follows: (i) very healthy; (ii) reasonably healthy; (iii) not so healthy; and (iv) unhealthy.

The analysis involved comparing study measurements between liaison-intervention and single-intervention groups. For statistical analysis, normality was determined, and, if the distribution was normal, differences were analysed using the t-test, otherwise differences were tested using the Mann-Whitney test. A hazard ratio below 0.05 was taken to be statistically significant. SPSS software (version 25) was used for analysis.

Before initiation of the study, participants and their legal representatives were given oral explanations, and their freely given, written, informed consent was obtained. This research was approved by the ethical committee of Health Science University, Japan (Ref. No.14) in accordance with the Declaration of Helsinki.
RESULTS

Eighteen participants were recruited, consisting of 8 in the single-intervention group, and 10 in the liaison-intervention group. Of the single intervention group, physiotherapy only intervention was included 65% (n=5). Nine prospective s were excluded. Participants’ attributes are shown in Table 1. Participants included more females than males, 11 and 7, respectively. Mean age was 83.3 ± 9.5 years, and the mean intervention duration was 698.6 ± 616.1 days. No inter-group differences were found in age, proportion with diseases, care level, presence or absence of family members living with the participant, intervention duration, or intervention frequency.

A comparison of the two groups in each variable is shown in Table 2. The median Barthel index was 70 (interquartile range

| Characteristic | Total | Single intervention (n=8) | Liaison intervention (n=10) |
|---------------|-------|---------------------------|-----------------------------|
| Gender (male/female) | 7/11 | 4/4 | 3/7 |
| Age (years\(^a\)) | 83.3 ± 9.5 | 84 ± 10.12 | 82.7 ± 8.32 |
| Diseases (stroke/musculoskeletal disorders/neurodegenerative disease) | 4/9/5 | 2/4/2 | 2/5/3 |
| Family members living (living together/alone) | 18/0 | 8/0 | 10/0 |
| Care (lv1/lv2/lv3/lv4/lv5\(^b\)) | 6/6/4/2/0 | 3/3/1/0/0 | 3/3/3/1/0 |
| Intervention duration (days\(^a\)) | 698.6 ± 616.1 | 905.7 ± 718.8 | 533 ± 456.3 |
| Intervention frequency (minutes per week/times per week\(^a\)) | 80 ± 28.3/1.8 ± 0.5 | 77.5 ± 33.8/1.8 ± 0.7 | 82 ± 22.8/1.8 ± 0.4 |

\(^a\)Data are presented as mean ± SD.
\(^b\)lv: level.
Differences were tested using the Mann-Whitney test. There was no significant difference between the two groups in each item.

Table 2. Comparison of the two groups in each variable (n=18)

| Variables | Single intervention (n=8) | Liaison intervention (n=10) | p value |
|-----------|---------------------------|-----------------------------|---------|
| BI | | | |
| BI total | 77.25 (42.5–92.5) | 70 (55–76.25) | 0.45 |
| FAI | | | |
| Indoor activities | 1 (0–6.5) | 4 (2.25–8.25) | 0.18 |
| Outdoor domestic chores | 0.5 (0–1) | 2.5 (1–3.25) | 0.01 |
| Outdoor activities | 5 (2.5–5.75) | 9 (6.75–11.5) | <0.01 |
| Interests | 1.5 (0–3) | 4 (2.75–5.25) | 0.06 |
| Work | 0 (0–0) | 0 (0–0) | 0.37 |
| FAI total | 11.5 (6.75–18.75) | 19 (15.25–24.75) | 0.01 |
| HUI3 | | | |
| Vision | 0.95 (0.73–0.95) | 1 (0.95–1) | 0.02 |
| Hearing | 0.86 (0.75–1) | 1 (0.82–1) | 0.24 |
| Speech | 1 (0.87–1) | 1 (0.82–1) | 0.73 |
| Ambulation | 0.36 (0.36–0.36) | 0.36 (0.31–0.67) | 0.96 |
| Dexterity | 0.94 (0.56–1) | 0.88 (0.66–1) | 0.81 |
| Emotion | 0.73 (0.43–0.87) | 0.91 (0.87–1) | 0.03 |
| Cognition | 0.89 (0.86–0.98) | 0.89 (0.86–0.94) | 0.81 |
| Pain | 0.77 (0.77–0.92) | 0.92 (0.77–0.92) | 0.16 |
| HUI3 total | 0.18 (0.15–0.35) | 0.32 (0.26–0.48) | 0.08 |
| Subjective health assessment\(^a\) | 3 (2.25–3.75) | 2 (2–2) | <0.01 |

BI: Barthel Index; FAI: Frenchay activities index; HUI3: Health Utility Index Mark 3. Data are presented as median (IQR).
\(^a\)Results are better for those with lower numbers.
[IQR]: 55 to 76.25) in the liaison-intervention group, and 77.25 (IQR: 42.5 to 92.5) in the single-intervention group, this difference is not significant (p=0.45). Median FAI was 19 (IQR: 15.25 to 24.75) in the liaison-intervention group, which was significantly higher than 11.5 (IQR: 6.75 to 18.75) in the single-intervention group (p=0.01). Among low-order FAI items, median score for outdoor domestic chores was 2.5 (IQR: 1 to 3.25) in the liaison-intervention group, which was significantly higher than 0.5 (IQR: 0 to 1). Among the low-order FAI items, the median score for outdoor domestic chores was 2.5 (IQR: 1 to 3.25) in the liaison-intervention group, which was significantly higher than the 0.5 (IQR: 0 to 1) in the single-intervention group (p=0.01). In contrast in the single-intervention group (p=0.01), similarly, the median score for outdoor activities was significantly higher (p<0.01) in the liaison-intervention group (9; IQR: 6.75 to 11.5), than in the single-intervention group (5; IQR: 2.5 to 5.7). Finally, HUI3 items vision (p=0.02) and emotion (p=0.03) were significantly higher in the liaison-intervention group and subjective health assessment was significantly higher in the liaison-intervention group (p<0.01).

DISCUSSION

This study was a cross-sectional investigation of the effects of liaison between physiotherapists and occupational therapists on home-visit rehabilitation in Japan. Participants receiving both interventions were compared with patients that received only a single intervention. Although intervention frequency and BADL showed no significant inter-group differences, IADL and QOL were significantly higher in the liaison-intervention group.

Heieh et al.12) reported that status and rehabilitation efficacy of and for home-dwelling patients cannot be ascertained sufficiently on the basis of BADL alone, and it was therefore necessary to also use IADL to cover a wider range of domestic and non-domestic parameters, including preparation of food, kitchen clean-up, cleaning, washing clothes, shopping, going out, and hobbies.

In addition, Kamioka et al.13) report that, in Japan, most of the time given to home-visit rehabilitation is taken up by therapeutic exercises and basic-action exercises, which have little direct connection to ADL and social participation. The latter include categories such as “ADL and housework activities” and “lifestyle activation and social interaction”.

The finding in the present study of no inter-group differences in BADL, whereas IADL was higher in the liaison-intervention group, suggests that therapeutic and basic-action exercises may have been excessive in the single-intervention group. In the liaison-intervention group, combined use of physiotherapy for physical function and basic actions, and occupational therapy for direct IADL exercises may offer an explanation for positive effects on IADL. In addition, Andersen et al.3) found that with home-visit rehabilitation no significant differences in IADL were obvious between groups of participants receiving physiotherapy and participants without intervention, a finding consistent with the present findings.

In comparison with the single-intervention group, the emotion item in HUI3, and the subjective feeling of health were significantly higher in the liaison-intervention group. One factor in this difference may have been increased IADL and the frequency of participation in outdoor activities. Honda et al.14) reported that participation in social activities in community-dwelling people aged over 65 reduces the risk of depression one year later. Similarly, for subjective feelings of health, Kishi et al.15) showed the importance of “social participation” as a health-related factor, using, the International Classification of Functioning, Disability and Health, and Nakamura et al.16) showed that social participation improves or maintains subjective feelings of health. It is possible that the liaison intervention had similar effects in the present study.

One limitation of the present study was that it was cross-sectional, so causal relationships are uncertain. In addition, it was a preliminary study, the sample size was small, and the study was not blinded at the time of evaluation. Second, the single intervention group was defined as either physiotherapy only or occupational therapy only. However, we should investigate in three groups, physical therapy only group, occupational therapy only group, and liaison-intervention group. By clarifying the difference in the effect of each intervention, the liaison effect can be made clearer. To clarify whether liaison intervention is effective in improving IADL and QOL, it will be necessary to carry out a large-scale, prospective study, with adjustment for bias. The present authors are currently planning such a study.

Furthermore, in the present study, allocation of participants to the liaison- and single-intervention groups may have been biased concerning basic attributes, or severity of disease and disability, which could have had major impacts on study results. Nevertheless, this study is the first Japanese study on the effects of liaison between physiotherapists and occupational therapists in the context of home-visit rehabilitation. Findings will be helpful for establishing home-visit rehabilitation intervention programs in future. In the context of home-visit rehabilitation, QOL would be improved by liaison between physiotherapists and occupational therapists, rather than use of physiotherapy or occupational therapy alone, and also by increasing frequency of participation in IADL, rather than focusing solely on BADL.

In home-visit rehabilitation, liaison between physiotherapists and occupational therapists has the potential to lead to better results in terms of IADL and health-related QOL than single intervention. In addition, in the case of patients who live at home but require long-term care, it is considered that an approach involving IADL as well as BADL will be beneficial for health-related QOL.

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The authors declare that they have no competing interests.
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