Evaluation of functional activity components in the occupational therapy program for patients with stroke

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ABSTRACT

Occupational Therapy (OT) with the aim of improving Functional Activities (FAs) for patients. In theory framwork, the FAs should be the main component and take up most of OT intervention. This research's goal is to assess the ratio of the composition of FAs to different therapeutic modalities on stroke's patient by observing 31 OT sessions of 12 therapists with a lisence of 3 years experience or more on 31 stroke patients (14 acute stage, 17 recovery stage) in Japan. The result showed that the duration time for one session was with an average of 45.5 ± 11.3 minutes; of which 30% of session was used for FAs. Activities relating to cooking (8.5%) and functional mobility (7.8%) were the most frequently used activities. Three forth of the treatment time is spent on activities in the sitting and standing positions, and the remaining time is spent on activities in the lying position. At the acute stage, there is a link between the level of patients independence (FIM) and the use of FAs in the tre program (P<0.05). However, at the recovery stage, the level of independence of the patients increased significantly but did not change the composition of the FAs. This study illustrated that the therapists seem to have focused more on activities with the aim of improving body structure and function defects according to the ICF classification.

Keywords: *Cerebrovascular accident, Occupational Therapy, Functional activity*

1. INTRODUCTION

Occupational Therapists (OTs) play an important role in post-stroke rehabilitation. Stroke has been the most common diagnosis seen by the OTs in physical disability settings [1 - 3]. Several systematic studies suggest that Occupational Therapy (OT) after stroke improves the performance of functional activities and reduces impairments [4 - 5]. However, the precise description of activities provided by OTs to stroke patients are not enough [6].

In general, post-stroke rehabilitation teams are directed under the leadership of physicians trained in physical medicine and rehabilitation. Although the physicians decide overall purposes and goals of rehabilitation program, the details of the intervention plan and how to achieve these goals leave up to each therapists' discretion. As the first step of establishing practice-based evidence, there have been some trials to describe the rehabilitation program for stroke patients which tried to establish the OT interventions classifications but only in the United States, Canada and the western countries [7 - 11].

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This study designed to describe the more detailed OT program and figure out the difference of OT interventions for stroke patients between acute and recovery phase. And it may provide fundamental data to clinical researchers investigating effective occupational therapy interventions in the future. Also, the way to describe OT session may be used in the clinical settings to exchange information among OTs as contents for post-stroke and professional education.

2. LITERATURE REVIEW

The primary goal of OT is to enable individuals to live independently and safely [9]. To achieve these goals, however, the OTs use a variety of intervention strategies to design individualized OT program meeting of each patient's needs, which lead to the difference in the types of OT interventions among each patient. From the literature of OT, the OT profession has experienced tremendous change over time through its development [13 - 14].

In the early stage of OT profession, the purposeful activities were used to remedy motor function consistent with the identity of the profession. Occupational therapy interventions were described as crafts, and bilateral activities with purposes concerning daily living, play and leisure, and social participation. This starting point built up the primary documents of the philosophical base of OT and described the features of occupational therapy's practice which aimed to improve daily living. But in the late 1950s and early 1960s, OTs clearly moved away from clients' doing and actual practice which was the primary role in the profession. In this stage, the OTs focused too much on techniques, resistive activities, repetition therapies, and also using assessments developed by other disciplines (educational psychology, psychology, neuropsychology, physical therapy…).

Finally, the core of OT became blurred over that years. After this period, some OT models grounded in OT philosophical roots such as the Canadian model of occupational performance and engagement, the model of human occupation, the person-environment-occupation model (occupational performance). The OT profession returned to the primary philosophical base over the past decades, which the cored emphasis focuses on meaning and purposeful occupations to support the person in daily life living [13].

3. PREVIOUS TRIALS TO DESCRIBE STROKE REHABILITATION PROGRAM

Few observational studies described the contents of OT sessions for inpatient stroke rehabilitation in the United States [7 - 8]. One of these studies tried to describe how OT activities and intervention techniques used in clinical practice during stroke inpatient rehabilitation [7]. This research used a part of the result of the Post-Stroke Rehabilitation Outcomes Project (PRSOP) [15 - 16] to develop the classification forms for data collection. PRSOP was the project with the purpose to disclosing the “black box” which means contents of stroke rehabilitation and develop a classification of stroke rehabilitation interventions including occupational therapy, physical therapy, and speech-language therapy in 1999.

The OT data collection form in PRSOP categorized into evaluation, and activities to remediate performance skill deficits or body structure or function impairments; Activities of Daily Living (ADLs), and Instrumental Activities of Daily Living (IADLs). Data of the study were arranged in specific interventions including neuromuscular interventions, musculoskeletal interventions, cardiopulmonary interventions, modality interventions, cognitive/perceptual/sensory interventions, adaptive and compensatory interventions, equipment interventions, and education and training interventions [7].

There were up to 5 of these specific

interventions used in one session. The researchers directly observed OT sessions. The duration of each activity or intervention was recorded in a block of 5 minutes. The result of this study revealed that a total of 40.2% of therapy time was spent on functional activities in which most of this time was basic ADL (28.1%). A small proportion of therapy time was spent on leisure and community integration. In contrast, the pre-functional activities made up more than a half (59.8%) of treatment time consisting of upper-extremity control, evaluation, transfer, sitting balance and trunk control, and wheelchair management. Functional activities were defined as activities directly targeted to life activities (ADLs, IADLs). The pre-functional activities in this research were described as activities that were related to or provide preparation for functional activities. Another research aimed to categorize occupational therapy interventions for stroke patients in rehabilitation unit[8].

Measures and data collection built from the Occupational Therapy Practice and Framework: Domain and Process (OTPF) and the data collection form reported in previous studies [6, 7, 17]. OTPF described the summary of constructs in OT practice. The data were collected retrospectively by using the record of the OT interventions during inpatient stroke rehabilitation. Three graduate students analyzed the OT records and then two researchers reviewed the analysis. The results of this research showed that majority time of the sessions was spent in pre-functional activities instead of functional activities. Sixty-six percent of the sessions were not related to function and 51.2% of sessions spent for ADLs, IADLs, leisure participation, and social participation.

The results of these studies in the United States of America indicated that the large portion of OT time addressing activities in the area of physical function through using impairment-focused activities or pre- functional activities instead of functional activities (ADLs, ADLs, play, pleasure and participation) and this result conflicted with the philosophy of OT.

4. PURPOSE AND SIGNIFICANCE

The purpose of this study is to describe occupational therapy for stroke patients and it's time use of different intervention methods. The difference between acute phase and recovery phase was investigated by comparing them.

This study will provide data to reconsider about the occupational therapy philosophy and to facilitate communication among occupational therapists. This classification of intervention methods can be put an idea to provide a reliable guidance tool in communication among occupational therapists working with stroke patients. All information from this study can contribute to further research establishing practice-based evidence for stroke patients.

5. SUBJECTS AND METHODS

Research design was descriptive research which was data collected during OT in stroke rehabilitation sessions. The subjects were all currently practicing Registered Occupational Therapists (OTR) with 3 years or more experience who work with clients after the stroke at two hospitals belonging International University of Health and Welfare (IUHW) in Tochigi Prefecture. This research was approved by the International University of Health and Welfare (IUHW) with the approval number of 17-Io-10 and the IUHW hospital ethical committee with the approval number of 13-B- 245. After receiving ethical approvals, the research plan was introduced and explained to chief OTRs in the 2 hospitals.

Then chief OTR introduced the procedure to the OTR who met the requirements. The data collection was conducted from 22nd August to the 30th October 2017 after receiving the written consent form from OTRs. All information regarding the type and duration of interventions

provided during the session was observed and recorded by one of two professors of OT department at IUHW and researcher during an OT session. The occupational therapy intervention was noted to get the raw data about the patients' position, environmental settings, details and duration of each activity. At this time, activities were classified into pre-functional activities and functional activities based on what OTR's doing on patients.

Secondly, the OTR was interviewed. The interview's purpose was to ask OTR about the main purpose of each activity and then classify activity into pre-functional and functional activity based on the main purpose of OTR's opinion. Besides, the information relating to the OTR (clinical experience year, age) and the patient's characteristic (age, time since onset, diagnosis, FIM score) also were collected in this interview. After the interview, researchers discussed together with the result and compared the detailed information. Finally, all information from that occupational therapy notes was organized and transferred to OTIAF.

The Occupational Therapy Intervention Activities Form (OTIAF) was revised from the data collection form of the previous studies [9, 10, 17]. The previously data collection forms were alternated for this research for some reasons as follows: duration of activity counted in a block of 5 minutes, specific intervention techniques were vague and were not consciously used in Japan. In the OTIAF of this study, the data collection was conducted by both observation and interview of the OTR. Total time of each session was set from OTR meeting the patient to leaving the patient. The duration of each activity was counted in every minute. The categories in OTIAF included 2 general groups of activities, that were pre- functional activities and functional activities.

For this study, the pre-functional activities mean preparatory activities or activities with the main purposes to improve balance, motor control, cognitive functions related to body structures and functions in ICF. The functional activities mean the direct practice of ADLs, IADLs, play and pleasure, and social participation, which the patients are going to do or need to do in the real-life setting. With functional activities, this study used two different categorizations. One is based on what OTRs' doing and the other based on the main purpose for which activity is provided. For example, when the OTR has a patient wash his/her hands, and the task is provided in order to improve arousal level by providing sensory input as the main purpose, then the activity was categorized as pre-functional activity based on purpose, but functional activities based on what OTR's doing.

Furthermore, the information relating to patient's position during treatment such as supine, other lying, sitting, wheelchair (W/C) sitting, standing was also collected to consider how occupational therapist notice to support patient get out of bed and prevent from the disused syndrome. The environmental settings in OT session were divided into two areas, outside OT's room area consisting of patient's room and ward (not patient's room) and OT's room area consisting of OT's room and space surrounding OT's room. The outside OT's room area can be presented for an environmental setting where the patient and OTR can easily concentrate on the tasks and less disturbance from the other factors, and OT's room area can be seen as enriched environment or opened environment where the patient has more chance to interact with surroundings like people and different sounds.

In this study, the criteria for stroke clients who were older than 18 years old and admission diagnosis as follow Cerebral Infraction (CI), Cerebral Hemorrhage (CH), and Subarachnoid Hemorrhage (SAH). The acute phase of stroke was defined as the time from onset within 28 days (4 weeks) and the recovery phase of stroke as onset over 28 days. Descriptive statistics were used to describe and examine characteristics of

OTRs, patients and contents of OT sessions. The content of treatment sessions was described by determining the duration of each session, the detailed OT intervention time spent for pre-functional activities and functional activities in acute and recovery phase. Furthermore, this study also examined the correlation between FIM characteristics, time since onset of the stroke patient with different interventions by using t-test: two-samples assuming unequal variances with the significant level less than 0.05.

6. RESULTS

6.1. Demographics and clinical characteristics of OTRs and participants

Twelve OTRs joined this research from Hospital A (7 OTR) and Hospital B (5 OTR) consisting of 6 males and 6 females. Their ages ranged from 25 to 37 years old with the mean of 27.4 ± 3.3, and experience time ranged from 40 to 185 months with the mean of 64.3 ± 40.2 months. In this study, each OTR worked with one to four patients of stroke in this study. A total of 31 stroke patients was provided by 12 OTRs, with the mean of 2.6 ± 0.9 patients per OTR. These patients were 14 females and 17 males with 14 patients in the acute stage and 17 patients recovery stage.

The diagnosis were 21 (67.7%) patients with the cerebral infarction (CI), 10 (32.3%) patients with the cerebral hemorrhage (CH), and no subarachnoid hemorrhage (SAH) patient. Affected sides consisted of 11 (35.5%) on the left side of brain hemisphere, 18 (58%) on the right side of brain hemisphere, and 2 (6.5%) on both sides of the hemisphere. The patients' ages ranged from 58 to 91 years with the mean of 74.5 ± 10.1. The time since onset was from 5 to 195 days with the mean of 53.0 ± 51.9 days. The patient's FIM total score ranged from 18 to 124 with the mean of 63.9 ± 36.2. The FIM motor score was from 13 to 91 with the mean of 41.2 ± 29.2 and the FIM cognition score was from 5 to 35 with the mean of 21.8 ± 9.9 at the time of data collection.

6.2. Duration and details of Occupational Therapy intervention activities

The OTRs spent 45.5 ± 11.3 minutes per session with the duration ranging from 22 minutes to 67 minutes. In one session, there were over 25% (12.3 ± 6.0 minutes) of therapy time used for patients' transfer and basic evaluation, nearly 25% (11.3 ± 14.4 minutes) of therapy time used for the functional activities, and nearly 50% (22.0 ±10.4 minutes) of therapy time used for the pre-functional activities which were classified on the main purpose of interventions. However, based on what OTRs' doing, there were 33% (15.0 ± 15.6 minutes) of therapy time used for functional activities and 40% (18.2 ± 10.7 minutes) of therapy time used for pre-functional activities. Training in standing position was the most common with 31.4% of therapy time (14.3 ± 17.2 minutes). Training in supine and other lying position were least popular with 13.6% of therapy time (6.2 ± 8.2 minutes) and 5.5% of therapy time (2.5 ± 6.0 minutes) in respectively. Sitting and W/C made up with 49.5 % of treatment time. Time spent for activities in OT's room and outside OT's room was nearly equal with 49.9% of therapy time (22.7 ± 21.4 minutes) and 50.1% of therapy time (22.8 ± 14.1 minutes).

In functional activities based on the main purpose, functional mobility training with 27% of functional activity time and cooking task training with 29.4% of the functional activity time were presented as the most common activities in ADLs and IADLs training in the occupational therapy session. Pleasure and social participation training made up less than 1% of treatment time. In pre-functional activities, stretching muscles, strengthening muscles, and repetitive ROM exercises with 74% of the time were the most common activities chosen by the OTR. Sensory stimulation, therapeutic modalities and combined exercises made up with 24% of the pre-functional activities time. Cane, wheelchair, and walker adjustment and management was only 4% of the pre-functional activities time (Figure 1).

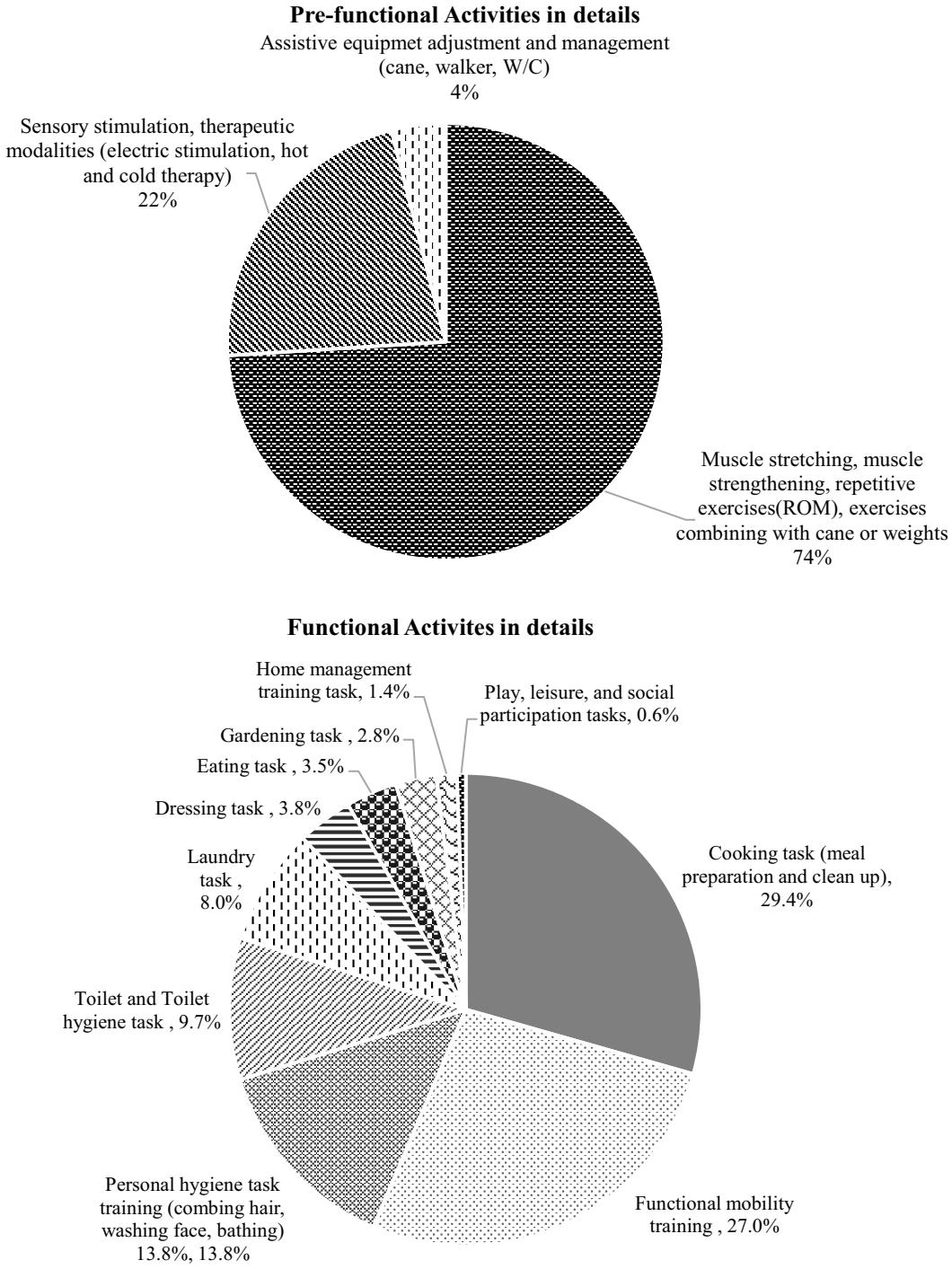

Figure 1. The detailed occupational therapy sessions based on the main purpose of intervention

7. THE OCCUPATIONAL THERAPY INTERVENTION ACTIVITIES IN ACUTE PHASE AND RECOVERY PHASE OF STROKE IN DETAILS

There were 14 stroke patients (50% of males) in acute phase and 17 stroke patients (58.8% of males) in the recovery phase. Among stroke patients in the acute phase and recovery phase, there had a large difference in time since onset which was 11.2 ± 5.1 days and 86.6 ± 48.6 days, the FIM total score which was 51.9 ± 32.0 and 73.9 ± 37.3. In acute phase of stroke, OTR spent 39.6 ± 9.9 minutes for one session in which had 27.6 ± 13.7 minutes for activities at outside OT's room and 12.1 ± 19.0 minutes for activities at OT's room in average. Training in W/C sitting's position with 12.6 ±

11.7 minutes was the most common position used by OTR. In contrast, in the recovery phase of stroke, the OTR spent 50.4 ± 10.3 in total for one session in which had 31.4 ± 19.5 minutes at OT's room and 18.9 ±13.6 minutes at outside OT's room. Training in standing's position with 20.5 ± 20.0 minutes was used the most in this phase.

The t-test revealed that, between acute and recovery phase, there was significant difference in time since onset, duration of session; FIM motor score; time spent for evaluation and basic transfer; time spent for activities at OT's room, at outside OT's room; time spent for activities in standing position. There was no difference between time spent in pre-functional and functional activities.

From the summarized data, some scatter charts were built to investigate the relationship between patients' characteristics and time spent in pre-functional and functional activities. In the acute phase of stroke, there was a mild relation between FIM total score and time spent for functional activities, pre-functional activities based on what OTR's doing; FIM total score and time spent for functional activities based on ther main purpose of the intervention. In the recovery phase of stroke, there was a weak relationship or even no relationship between FIM total score and time spent for functional and pre-functional activities in the recovery phase of stroke.

8. DISCUSSION

8.1. Analysis of detailed occupational therapy program

This descriptive study's results reveal that duration of pre-functional activities (40.0% of therapy time in occupational therapy session based on what OTRs' doing and 48.3% based on main the purpose of OT interventions) were used most frequently and lengthy for stroke rehabilitation. Pre-functional activities were described as interventions which targeted on impairments of body functions and structures in ICF. The OTR spent more than one quarter (27%) of therapy time for basic evaluation and patient's transfer. The reasons can come from some of patients with severe impairments needed a long break among each OT intervention and the reality of OTRs having to be responsible for patients' transfer from the patient's room to OT's room in hospital environment.

The OTRs in this study used nearly 25% therapy time for functional activities (based on the main purpose of the interventions), whereas mostly emphasized on functional mobility training (7.8% of total time), personal hygiene task training (4% of total time) in group of ADLs and cooking task training (8.5% of total time) in group of IADLs. Leisure task and social participation were rarely chosen in the occupational therapy session with less than 1% of total time. OTRs focused on instrumental activities at home and basic ADLs more than social participation. This result showed a gap between the OT domain in philosophy and OT domain in clinical practice. The OTRs should focus on ADLs and IADLs which support for patients improving self-care activities and integration with society.

Regarding patient's positions, the OTRs seemed to be emphasized in activities in sitting and standing position with more than 80% of therapy time (standing position (31.4% of therapy time), sitting position (25.75% of therapy time), W/C sitting position (23.95% of therapy time)) more than supine position (13.6% of therapy time) and other lying position (5.5% of therapy time) which mostly

intervened in patient's room. The OTR showed the strong idea to support patient getting out of bed and prevent from disuse syndrome.

8.2. Comparison the results of this study to previous researches in duration for pre-functional activities and functional activities

Based on what OTR's doing, the results of this study and previous study of author Latham[9] were consistent of duration in this study of pre-functional activities, functional activities, and basic evaluation and patients' transfer. The occupational therapists spent a large amount of occupational therapy time for addressing physical functions through impairment-focused activities and less time spent for ADLs, IADLs, leisure and social participation tasks. Basic evaluation and patients' transfer used least time within one session.

8.3. Comparing the differences in occupational therapy interventions between acute and recovery phase of stroke

Some significant difference was found when comparing acute and recovery phase of stroke rehabilitation such as duration of OT session, proportion of time for basic evaluation and patient's transfer, FIM motor score, proportion of time spent for activities in OT's room and outside OT's room, and proportion of time for activities in standing position.

In acute phase, The total therapy was 39.6 ± 9.9 minutes in average compared to 50.4 ± 10.3 in recovery phase. It could show the reality that the OTRs spent more time in acute stage for patients with low FIM motor score and less time in recovery stage for patients with higher FIM motor score.

Patients in acute stage of stroke with the low FIM motor score (30.0 ± 23.5) seemed to be engaged in activities in sitting position (0.22) and W/C sitting (0.32) more than activities in standing position (0.15). Supine position (0.21) and other lying positions (0.09) was less noticed. In constrast, patients in recovery phase of stroke with higher FIM motor score were emphasized in training with standing position made up with 0.38 of total time proportion. Other positions were sitting (0.25), W/C sitting (0.21), supine (0.13), and other lying (0.04). There was less than 20% of therapy time used for supine and other lying position than sitting and standing position in OT session which means the OTRs seemed to concentrate on support patient get out of their bed and prevent patient from disuse syndrome in both acute and recovery phase of stroke.

The OTR spent about 34.5% of therapy time in acute phase of stroke rehabilitation and 23.5% of therapy time in recovery phase of stroke rehabilitation to evaluate and transfer the patients from their room to OT department. It showed patient evaluation in acute stage seemed to be focused and used more time than recovery phase.

In acute phase of stroke, OTR spent around 75% of therapy time for activities or tasks in patient's room and ward but around 25% of therapy time spent for activities in OT's room. In contrast, the reversed result in recovery phase with nearly 60% of therapy time in patient's room and around 40% in OT's room used by OTR. For the patients in acute phase of stroke, the OTR emphasized on personal hygiene activities or self-care tasks in patients' room which simulated like environment at home. But stroke patients in recovery stage had better condition and higher FIM motor score who can join in activities or IADLs in more opened environment like OT's room.

Within acute phase of stroke group, there was different time used for functional and pre-functional activities based on the main purpose of intervention. But the OTR paid exceed attention on pre-functional activities instead of functional activities.

8.4. The correlation between the FIM score of patient and different interventions

From the overview of this results' study, there were mild correlation between time spent for pre- functional activities and FIM total score, and time spent for functional activities and FIM total score of patients in only acute phase of stroke (figure 4). Based on what OTR's doing, the amount of time functional activities seemed to be proportional with FIM total score, it means patients with higher FIM total score will receive longer time of functional activities. In contrast, the amount of time for pre-functional activities and FIM total score seemed to be inverse proportion, it means patients with higher FIM total score will receive less time for functional activities. This result seemed to show the independent level of patient having increasing proportion with time of independent self-care activities used by the OTR.

In the recovery phase, there was no relation between FIM total score and other elements which can result from the OTR using home therapeutic exercises like implement for patients with high FIM total score to improve occupational performance.

9. LIMITATIONS AND FUTURE DIRECTIONS

There may have several limitations in this study that influenced on the outcomes of the research. Firstly, the data collected from only two hospitals with small number of patients (31) and OTRs (12) who worked under the same healthcare management system. Future research should conduct in multiple rehabilitation centers or hospitals which include inpatient and out-patient; and spread out other health professionals. Second, some activities had more than two purposes at the same time, so we analyzed and chose the main purpose to record in data collection sheet. The OTR always spent time to communicate with patient for different purposes but it was difficult to isolate and quantify as implement in occupational therapy classification. Lastly, this study did not collect all the occupational therapy sessions from the beginning to the discharging of patient, and this were unable to link the choice of specific intervention activities and patient's difficulties. Future longitudinal studies are needed to identify the specific interventions and outcomes of occupational therapy for stroke rehabilitation.

10. CONCLUSION

Occupational therapy for stroke rehabilitation provided the variety of interventions for patient. The largest emphasis focused on activities that improved body functions and structures relied on occupational therapy purpose. It showed a gap between OT philosophy in theory and OT in clinical practice. An average time of the occupational therapy session was 45.5 minutes, but there was difference in duration of acute phase of stroke (39.6 minutes) and recovery phase (50.4 minutes). Within a session, pre-functional activities were used the most popular, next to functional activities, and then evaluation. A very small therapy time spent for leisure and community participation task training which need for discharging. Between acute and recovery of occupational therapy, there was some significant difference in FIM motor score,

duration of session, duration of evaluation, time spent for activities in OT's room and outside OT's room, and time for activities in standing position. There was mild relation between FIM total score and time for functional activities meaning that OTR provided longer time in ADLs, IADLs for patient with higher self-care abilities. The OTIAF can be used as an implement for communication in clinical practice among OTR for stroke's patients in the future.

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Đánh giá cấu phần hoạt động chức năng trong chương trình hoạt động trị liệu trên người bệnh đột quỵ

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TÓM TẮT

Hoạt động trị liệu (HĐTL) can thiệp với mục đích cải thiện các hoạt động chức năng (HĐCN) trong các hoạt động sống sinh hoạt hằng ngày cho người bệnh (NB). Về lý thuyết, HĐCN phải là cấu phần chính và chiếm phần lớn thời gian của HĐTL. Mục tiêu nghiên cứu này nhằm đánh giá tỷ lệ cấu phần HĐCN ứng với các phương thức trị liệu (PTTL) khác nhau trên NB tai biến mạch máu não (TBMMN) thông qua quan sát 31 buổi tập của 12 KTV HĐTL có chứng chỉ hành nghề 3 năm trở lên trên 31 NB TBMMN (14 giai đoạn cấp, 17 giai đoạn hồi phục) tại Nhật Bản. Số liệu được ghi nhận qua công cụ Occupational Therapy Intervention Activities Form. Kết quả cho thấy thời gian cho 1 buổi tập trung bình là 45.5 ± 11.3 phút; trong đó 30% thời gian dùng cho các HĐCN. Hoạt động huấn luyện nấu ăn (8.5%) và hoạt động di chuyển chức năng (7.8%) là những hoạt động thường xuyên sử dụng nhất. ¾ thời gian điều trị dành cho hoạt động trong tư thế ngồi và đứng, và ¼ thời gian dành cho các hoạt động trong tư thế nằm. Ở giai đoạn cấp, có mối liên hệ giữa mức độ độc lập của NB (FIM) và việc sử dụng các HĐCN trong chương trình điều trị (P < 0.05). Tuy nhiên ở giai đoạn hồi phục, mức độ độc lập của NB tăng lên đáng kể

nhưng không làm thay đổi cấu phần PTTL trong HĐCN. Với nghiên cứu này cho thấy KTV HĐTL dường như đã tập trung nhiều hơn vào các hoạt động với mục đích cải thiện khiếm khuyết về cấu trúc và chức năng của cơ thể theo phân loại ICF.

Từ khóa: *Tai biến mạch máu não, Hoạt động trị liệu, Hoạt động chức năng*

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