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A Study on Factors Affecting the Quality of Life Stroke Patients in Nursing Hospitals: Focusing on Occupational Balance

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ABSTRACT

The purpose of this study was to identify the Occupational balance of elderly people with stroke and to examine the effect of these variables on their quality of life. Forty patients aged 65 years or older living in a nursing home were surveyed for 3 months. Occupational balance, depression, Activity daily living, and quality of life were assessed. The collected data were analyzed by Pearson correlation analysis and hierarchical regression analysis using SPSS. Occupational balance($r=.541$, $p<.001$) and Education level($r=.334$, $p<.05$) showed positive correlations with quality of life and depression($r=-.725$, $p<.001$) showed negative correlation. Finally, the variables that have the greatest effect on the quality of life were analyzed as Occupational balance and depression. Occupational balance and depression should be considered as the goal of occupational therapy intervention to improve the quality of life of the elderly hospitalized with stroke.

Keywords
Elderly, Occupational balance, Quality of life, Stroke

1. Introduction

Stroke is one of the most important chronic diseases throughout the world, which medical service organizations must unremittingly tackle in future [1]. Stroke patients have to live the rest of their lives with disability, unable to regain full movements or functions of the upper body, depending on lesions in a particular hemisphere [2]. Health-related quality of life is an important outcome of rehabilitation, particularly rehabilitation from health conditions with a chronic course such as stroke [3].

The environment in which each individual is living can facilitate a context that enables or hinders a meaningful occupational life [4]. Elderly patients with stroke, who reside within a limited space of a long-term care hospital, tend to lose their identity, independence, and sense of control [5]. Those who live sequestered in such care hospitals are given only “experience barely a life” with their lost social, political, and cultural identities [6].

The relationship between occupation and health has been the subject of research and debate for many years [7]. A fundamental concept of occupational therapy is that maintaining occupational balance in our daily lives is related to health and well-being [8]. Occupational balance can then be defined as the way in which people satisfactorily organise the patterns of their daily activities, with emphasis on individual allocation of time for self-care, productivity, and leisure [9]. Use of time is employed to evaluate occupational balance, and the status of the occupational balance being maintained is referred to as instances wherein the amount of time spent in work, relaxation, and leisure is distributed in an appropriate ratio [9-10]. Although time alone is not enough to fully

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enable an understanding of the concept of occupational balance, measuring time can be said to be the beginning of the measurement of occupational balance [11].

Forhan and Backman [12] confirmed that there were statistically significant positive correlations between quality of life and occupational balance in relation to the measurement and use of time. Stamm et al [13] reported that achieving occupational balance not only increased quality of life, but also improved health. Thus, occupational therapists are considering occupational balance to be a way of promoting the clients' meaningful occupational participation and of improving quality of life [11-14]. Imbalance in the domains of life will deteriorate health and quality of life, and therefore, it is recommended in occupational treatment that the amount of time use among subjects should be analysed in the course of goal setting and interventions [15-16]. The sense of satisfaction with occupational outcomes and achievements and use of time will contribute to the experience of occupational balance [12-17].

Thus, this study seeks to analyse occupational balance in terms of time as a way of improving the quality of life of elderly people with stroke and to identify the effects of the former on the latter. In addition, the study is aimed at providing basic material of occupational treatment programmes to improve the quality of life of elderly people with stroke, living in a limited environment.

2. Methods

2.1 Study subjects

The subjects of this study were 40 elderly patients who were living in a care hospital after being diagnosed with stroke. All participating patients understood the purpose of this study and provided written informed consent prior to their participation in the study, in accordance with the ethical standards of the Declaration of Helsinki. Surveys were conducted at three nursing hospitals and facilities catering to patients with chronic diseases. The average age of subjects was 77.6 years, and there were more women than men (Table 1). Subject selection criteria were as follows: 1) Elderly people aged >65 years, with more than two years since the onset of the disease. 2) Subjects with uncompromised cognition, who had scored more than 24 on the Mini-Mental State Examination-Korea. 3) Subjects who could live independently with minimum help. 4) Subjects who understood the study purpose and voluntarily agreed to participate in the study.

2.2 Depression assessment

The modified Barthel Index (MBI) with a five-step scoring system, developed by Shah, Vanclay& Cooper [18]was found to achieve greater sensitivity and improved reliability, compared to the original version. More specifically, the index consists of seven items on self-management and three on mobility, and yields five-point scores for to each activity. The test-retest reliability is r=.89, with interrater reliability at r=.95 [19].

2.3 Level of depression assessment

In this study, the Korean version of the Geriatric Depression Scale (GDS-K) was used [20]. The scale is composed of a total of 30 questions, each of which was assigned one point. A higher score means a higher degree of depression: scores below 13 points were classified as "normal",

scores from 14 to 18 as "depression", scores from 19~21 as "moderate depression", and scores above 22 as "severe depression". The reliability of the Korean version of the elderly depression scale was represented by a Cronbach's alpha value of .87.

2.4 Time use assessment

Time use study, a time-diary, one of the methodologies used by Statistics Korea, was used. The time-diary entailed the test participants' 48-hour (2d) self-records at 10-min intervals, with consideration of time allocation and activity type [21]. There are various types of life activities in which people, populations, or organizations engage, including ADL (Activities of Daily Living), IADL (Instrumental Activities of Daily Living), rest and sleep, education, work, play, leisure, and social participation [22]. The activities recorded in the time-diary were coded according to eight categories (Activities of Daily Living, Instrumental Activities of Daily Living, Rest and Sleep, Education, Work, Play, Leisure, Social Participation) indicated within the Occupational Therapy Practice Framework: Domain & Process II (OTPF-II).

2.5 Quality of life assessment

The WHOQOL-BREF (World Health Organization Quality of Life-BREF) was self-administered by respondents; an experienced interviewer assisted administration by reading items aloud, where self-completion was not possible, usually due to illiteracy or disability [23]. Standard instructions, socio-demographic details, and an item on current health status were completed before administration of the 26-item WHOQOL-BREF. The scale consists of 26 questions and 5 sub-areas (general, physical, psychological, social, and environmental), all of which are scored on a five-point scale. Scores can range between 26 and 130 points, with higher scores indicating better quality of life.

2.6 Study Model

This study classified types of time use in detail, based on previous studies [24-25]. Time use is often studied in an effort to understand the occupational lives of individuals and populations [8]. When occupational therapy practitioners work with clients, they consider the many types of occupations in which clients might engage [22]. The broad range of activities or occupations are sorted into categories called 'areas of occupation'. In the area of occupational therapy, there are eight categories of human occupations areas. Subject`s use of time was coded into eight occupational domains (Activities of Daily Living, Instrumental Activities of Daily Living, Rest and Sleep, Education, Work, Play, Leisure, Social Participation) presented in the OTPF-II. This study re-classified the eight occupational domains to four types of activities of daily life, work, leisure, and sleep, and determined whether the use of time was large or small, based on the averaged values of each domain. Moreover, a total of four occupational domains were classified(the type of daily life, the type of excessive leisure, the type of excessive work, and occupational balance [24-25)(See Figure 1).

However, most of the elderly inpatients with stroke in the care hospital spend 24 hours a day mainly engaging in daily life activities, and resting and sleeping [26]. In view of this, the researcher of this study redesigned the four occupational domains of the type of daily life, the type of excessive work, the type of excessive leisure, and occupational balance into the types of

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non-activity (type of daily life) and activity (type of excessive work, type of excessive leisure, and occupational balance) [25]. Taking into account the limited setting of the care hospital, this study showed that elderly persons with stroke were more active during activities, compared to during non-activity; time allocated was appropriately distributed, thus corresponding to the occupational balance studied in this paper.

<table>
<tr><td colspan="4" rowspan="3"></td><td colspan="4">Leisure</td></tr>
<tr><td colspan="2">Less</td><td colspan="2">Plenty</td></tr>
<tr><td colspan="2">Activities of Daily Living</td><td colspan="2">Activities of Daily Living</td></tr>
<tr><td colspan="4"></td><td>Less</td><td>Plenty</td><td>Less</td><td>Plenty</td></tr>
<tr><td rowspan="4">Work</td><td rowspan="2">Less</td><td rowspan="2">Sleep</td><td>Less</td><td colspan="2" rowspan="2">type of daily life</td><td colspan="2" rowspan="2">type of excessive leisure</td></tr>
<tr><td>Plenty</td></tr>
<tr><td rowspan="2">Plenty</td><td rowspan="2">Sleep</td><td>Less</td><td colspan="2" rowspan="2">type of excessive work</td><td colspan="2" rowspan="2">type of excessive occupational balance</td></tr>
<tr><td>Plenty</td></tr>
</table>

Figure 1. Classification of groups according to types of time use [24]

2.7Procedure and Data Analysis

The research was carried out in three care hospitals for three months, from May of 2011 to July of the same year by the occupational therapists. The purpose and contents of this study were explained to the subjects prior to the evaluation, for their ethical protection, and they were informed that they could decline answering any of the questions, and that the content of the evaluation would not be used for any other purposes than research. We provided food to subjects who responded to the questionnaire. The averaged time spent on each session of the evaluations was about 30~40 minutes, and each of the evaluations was carried out two times per subject. Occupational balance, daily life, depression, and quality of life were evaluated and analyzed for the final 40 stroke patients. This study used SPSS WIN 18.0 to analyse the data. Demographic characteristics in the study subjects were analysed through descriptive statistics, and Pearson's correlation analysis was performed to identify the correlation between the dependent variable (i.e., quality of life) and independent variables. Hierarchical multiple regression analysis was performed to finally determine the factors affecting the quality of life.

3. Results

3.1 General characteristics of study subjects

Descriptive statistics were used to identify subjects' general characteristics. There were more female than male subjects, and more participants aged 70 to 79 years. The most common educational level was middle school, and the duration of illness was more than 4 years.

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Table 1. Demographics and Stroke Characteristics of Participants(N=40)

Characteristics		Number of object(%)
Gender	Male	14(35.0)
	Female	26(65.0)
Age	60-69 y above	9(22.5)
	70-79 y above	22(55.0)
	80-89y above	9(22.5)
Education level	lack of schooling	11(27.5)
	elementary school	3(7.5)
	middle school	16(40.0)
	high school	9(22.5)
	college above	1(2.5)
One set period	2-3y above	3(7.5)
	3-4y above	8(20.0)
	4y above	29(72.5)

3.2 Correlations of the Variables Affecting Quality of Life

In terms of variables showing statistically significant correlations, a positive correlation was found between occupational balance (r=.541, p<.001) and educational levels(r =.334, p<.05). On the other hand, depression (r=-.725, p<.001) showed a negative correlation (Table 2).

Table 2.Correlations of the variables affecting the quality of life

	QOL	OB	MBI	GDS-K	Age	Sex
OB[a]	.541***					
MBI[b]	.248	-.038				
GDS-K[c]	-.725***	-.505**	-.143			
Age	.147	-.052	.108	-.004		
Sex	.105	.032	-.121	-.177	-.332*	
Education level	.334*	.233	-.048	-.286	.087	.401*

Note. a Total score of Occupational Balance (OB), b Total score of Modified Barth Index (MBI), c Total score of Geriatric Depression Scale–Korea version (GDS-K), *p < .05, **p < .01, ***p < .001.

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3.3 Factors Affecting Quality of Life

Hierarchical multiple regression analysis with a total of four models was carried out to determine the factors affecting the quality of life of elderly people with stroke. In Model 1, analysis of variance was performed to examine the goodness of fit of the model, with occupational balance as an independent variable. It was found that the value of F was 15.75; this indicated statistical significance on a 95% confidence level. In addition, the degree of occupational balance's effects on quality of life was found to be significant (β: 13.54, $p < .001$), and the modified coefficient of determination value, which represented the explanatory power of the power model, was 0.27, indicating that these factors had an explanatory power of 27%.

In Model 2, occupational balance and the ability to perform daily life activities were selected as independent variables. The goodness of fit of the model was found to be statistically significant, at 10.64, and the degree of the effects of the independent variables on the dependent variable showed a significant influence on both occupational balance ($\beta = 13.80$, $p = .001$) and the MBI ($\beta = 0.48$, $p = .05$). In addition, the modified coefficient of determination value was found to be 0.33, indicating that the explanatory power of the model was 33%.
In Model 3, the model's goodness of fit was statistically significant, at 17.77, when occupational balance and the ability to perform daily life activities, and depression were chosen as independence variables. In addition, as for the degree of the effects on the dependent variable (i.e., quality of life), all of the factors, except for the ability to perform daily life activities (i.e. occupational balance: $\beta = 6.53$, $p = .042$ and depression: $\beta = -1.23$, $p = .000$) were statistically significant, and the explanatory power of this model with the modified coefficient of determination value of 0.56 was found to be 56%.

Lastly, in Model 4, an analysis was conducted using occupational balance, the ability to perform daily life activities, depression, and socio-demographic control variables. The model's goodness of fit model was found to be 9.34. With regard to the degree of effects of independent variables on the dependent variable, a significant influence was found in occupational balance ($\beta = 6.52$, $p = .047$) and depression ($\beta = -1.15$, $p = .000$). The explanatory power of this model with the modified coefficient of determination value of 0.56 showed that the explanatory power of factors affecting quality of life was at 56% (see Table 3).

Table 3. Factors affecting the quality of life

	Model 1	Model 2	Model 3	Model 4
	B	B	B	B
OB[a]	13.54***	13.80***	6.53*	6.52*
MBI[b]		0.48*	0.31	0.31
GDS-K[c]			-1.23***	-1.15***
Age				0.29
Sex				0.72

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Education level				0.28
(Constant)	73.28	30.39	65.28	40.23
F	15.75^{***}	10.64^{***}	17.77^{***}	9.34^{***}
Adjust R^2	0.27	0.33	0.56	0.56

Note. a Total score of Occupational Balance (OB), b Total score of Modified Barth Index (MBI), c Total score of Geriatric Depression Scale–Korea version (GDS-K), *p < .05, ***p < .001.

4. Discussion

Most people afflicted with an illness and facing circumstantial limitations experience a lowered quality of life, due to their inability to engage in normal occupation patterns [27]. This is especially true in the case of elderly stroke patients, who spend most of their time sleeping and napping; this implies that they have no specific occupation and little physical activity, passing much of their free time sleeping. Thus, this study sought to identify types of use of time among elderly patients with stroke who are living in care hospitals, set up the model of occupational balance, and determine predictors of quality of life.

A positive correlation was confirmed between occupational balance and quality of life, and the explanatory power of the occupational balance affecting quality of life was found to be 27%. This can be explained by the notion that occupational balance is one of the major factors determining quality of life among elderly persons with stroke. Likewise, Forhan and Backman Study [12] confirmed the significant correlation in the balance of the time spent on quality of life and occupation. These authors also analysed factors affecting the occupational balance of adults with rheumatoid arthritis, using multiple regression analysis. As a result of this, it was reported that the general state of health and self-efficiency were as important as is the ratio of time spent on pleasant occupation [12]. Since fun as being related to meaningful occupations has long been recognized, and previous studies have also recognized fun as an important factor that contributes towards occupational balance, this fact can be said to be a matter of course [28-29]. Therefore, singling out meaningful occupations and then assigning them to the lives of elderly, hospitalized persons with stroke would enable them to attain occupational balance, thereby becoming an important way of delivering an occupational therapy intervention.

A recent increase in the number of elderly persons with stroke using long-term care facilities has provided an opportunity to carefully deal with the debates on their quality of life [30]. This study can be said to be clinically meaningful in that it determined the occupational balance of elderly persons with stroke and identified the latter's causal relationship with quality of life. Post-stroke depression is one of the emotional problems that often befall stroke patients, and is also related to severe physical, mental, and cognitive disorders, and death rates [31-32]. This study analysed the relations between depression and quality of life and found a negative correlation between them. It was also found that depression had a 29% effect on the quality of life of elderly persons with stroke. This result can be understood in the same vein as that in previous studies, which reported depression as a factor affecting the quality of life of elderly persons with stroke [33]. This result implies that depression is an important factor that should not be overlooked in the course of occupational therapy intervention. As such, considering depression as a powerfully influential

factor affecting quality of life, it is presumed that diagnosis and treatment of depression at an earlier time enhances the effects of occupational therapy and is essential for improving quality of life.

In this study, there was no correlation between activities daily living performance and quality of life. Although activities daily living also affects quality of life, its explanatory power is not high. One of the reasons for this might be the fact that there was no major difference in the level of quality of life according to the ability to perform daily life activities, since the subjects were those who could, at the time of their selection, perform daily life activities after undergoing an acute phase of the disease.

Though this study is valuable in that it has identified the importance of occupational balance and depression, it has some limitations that need to be addressed in future studies. In particular, the WHOQOL-BREF, which measured the dependent variable, failed to reflect the particularities of stroke. It should ideally reflect the specificity of stroke patients with physical and mental disabilities. In future studies, the Stroke Specific Quality of Life Scale (SS-QOL) should be considered, as it is an appropriate tool for stroke patients and is designed to assess the quality of life of stroke patients only. For example, language use, mobility, self-help activities, social roles, thinking skills, upper limb function, and vision items are included in the SS-QOL [34]. In addition, few subjects met the selection criteria for participation in the study, thereby limiting the generalizability of the findings. To address this, more standardized and systematized selection and evaluation of the subjects is needed.

5. Conclusions

This study sought to identify major factors affecting the quality of life of elderly persons with stroke, living in care hospitals. Quality of life was found to have a negative correlation with depression, and positively correlated with occupational balance. The major factor finally determining quality of life was found to be occupational balance and the degree of depression. The clinical implication of the results is that occupational balance and depression should be considered in the therapeutic interventions provided to stroke patients living n care hospitals.

References

[1] Patel, M. D., McKevitt, C., Lawrence, E., Rudd, A. G. & Wolfe, C. D. A. (2007). Clinical determinants of long-term quality of life after stroke. Age and Aging, 36(3), 316-322.

[2] Woodson, A. M. (2007). Stroke. In M. V. Randomski& C. A. Trombly(Eds.), Occupational therapy for physical dysfunction(6th ed., pp. 1001-1041). Philadelphia, PA: Lippincott Williams & Wilkins.

[3] Fayers, P. & Machin, D. (2007). Quality of life: The assessment, analysis and interpretation of patient-reported outcomes (2nd ed.). Chichester, UK: John Wiley & Sons.

[4] Christiansen, C., Backman, C., Little, B. & Nguyen, A. (1999). Occupational and well-being: A study of personal projects. American Journal of Occupational Therapy, 53(1), 91-100.

[5] Song, A. R. (2001). The effects of leisure activity program intervention on activities of daily living, depression and quality of life in institutionalized older population(Doctoral dissertation). Chungnam National University, Daejon.

[6] Agamben, G. (1998). Homo Sacer: Sovereign Power and Bar Life. Trans, Daniel Heller-Roazen, Stanford: Standford UP.

[7] Edgelow, M. M. & Krupa, T. (2011). Randomized controlled pilot study of an occupational time-use intervention for people with serious mental illness. American Journal of Occupational Therapy, 65(3), 267-276.

[8] Edgelow. M. M. (2008). Efficacy of an occupational time use intervention for people with serious mental illness(Master's thesis). Queen's University, Kingston, Ontario, Canada.

[9] Christiansen, C. H. (1996). Three perspectives on balance in occupation. In R. Zemke & F. Clark(Eds.), Occupational science: The evolving discipline(pp431-451). Philadelphia: F. A. Davis.

[10] Farnworth, L. (2004). Time use and disability. In: M. Molineux (Ed.), Occupation for occupational therapists, 46-65. Oxford: Blackwell Publishing.

[11] Backman, C. (2004). Occupational balance: Exploring the relationships among daily occupations and their influence on wellbeing. Canadian Journal of Occupational Therapy, 71(4), 202-209.

[12] Forhan, M. & Backman, C. (2010). Exploring Occupational Balance in Adults with Rheumatoid Arthritis. Occupation, Participation and Health, 30(2), 133-141.

[13] Stamm, T., Lovelock, L., Stew, G., Nell. V., Smolen, J., Machold, K., Johnson, H. &Sadlo G. (2009). I have a disease but I am not ill: A narrative study of occupational balance in people with rheumatoid arthritis. Occupation, Participation and Health, 29(1), 32–39.

[14] Anaby, D. R., Backman, C. L., &Jarus, T. (2010). Measuring occupational balance: A theoretical exploration of two approaches. Canadian Journal of Occupational Therapy, 77(5), 280-288.

[15] Baltes, M. M., Wahl, H. W. &Schmid-Furstoss, U. (1990). The daily life of elderly Germans: Activity patterns, personal control, and functional health. Journal of Gerontology, 45(4), 173-179.

[16] Clark, F. (1993). Occupational embedded in a real life: Interweaving occupational science and occupational therapy, 1993 Eleanor Clarke Slagle lecture. American Journal of Occupational Therapy, 47(12), 1067-1078.

[17] Matuska, K. M. & Christiansen, C. H. (2008). A Proposed Model of Lifestyle Balance. Journal of Occupational Science, 15(1), 9-19.

[18] Shah, S., Vanclay, F. & Cooper, B. (1989). Improving the sensitivity of the Barthel Index for stroke rehabilitation. Journal of Clinical Epidemiology, 42(8), 703–709.

[19] Granger, C. V., Albrecht, G. L. & Hamilton, B. B. (1979). Outcome of comprehensive medical rehabilitation: Measurement by PULSES profile and the Barthel Index. Archives of Physical Medicine Rehabilitation, 60(4), 145-154.

[20] Kee, B. S. (1996). A preliminary study for the standardization of the Geriatric Depression scale short form Korea Version. Journal of Korean Neuropsychiatric Association, 3(2), 298-307.

[21] Statistical Office. (2009). Statistics on elderly people in 2009. Seoul: National Statistical Office.

[22] American Occupational Therapy Association. (2008). Occupational therapy practice framework: Domain and process 2nd edition. American Journal of Occupational Therapy, 62(6), 625–683. doi:10.5014/ajot.62.6.625

[23] WHOQOL Group. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychological Medicine, 28(3), 551–558.

[24] Jeon, B. J. (2010). A Study on factors influencing elderly`s life time use and occupational balance(Doctoral dissertation). Sungkyunkwan University, Seoul.

[25] Leufstadius, C., Erlandsson, L. K. &Eklund, M. (2006). Time use and daily activities in people with persistent mental illness. Occupational Therapy International, 13(3), 123-141.

[26] Park. H. (2010). Local Community and Nursing-home of the elderly in the comparative study of the Time Use(Master`s thesis). Konyang University, Daejeon Korea.

[27] Hakansson, C. &Matuska, K. M. (2010). How life balance is perceived by swedish women recovering from a stress-related disorder: A validation of the life balance model. Journal of Occupational Science, 17(2), 112-119.

[28] Matuska, K. M. & Erickson, B. (2008). Lifestyle balance: How it is described and experienced by women with multiple sclerosis. Journal of Occupational Science, 15(1), 20-26.

[29] Sandqvist, G. &Eklund, M. (2008). Daily occupations–performance, satisfaction and time use, and relations with well-being in women with limited systemic sclerosis. Disability and Rehabilitation, 30(1), 27-35.

[30] Yang, J. B. (2010). A Study on the Major Factors Affecting Health-Ralated Quality of Life of Elderly Stroke Survivors. Journal of the Korean Gerontological Society, 30(4), 1239-1261.

[31] Whyte, E., &Mulsant, B. (2002). Post stroke depression: epidemiology, pathophysiology, and biological treatment. Biological Psychiatry, 52(3), 253-264.

[32] Williams, L. S. (2005). Depression and stroke: Cause or consequence? Seminars in Neurology, 25(4), 396-409.

[33] Haacke, C., Althaus, A., Spottke, A., Siebert, U., Back, T. &Dodel, R. (2006). Long-term outcome after stroke: Evaluating health related quality of life using utility measurements. Stroke, 37(1), 193-198. doi: 10.1161/01.STR.0000196990.69412.fb

[34] Linda, S. W., Morris, W., Lisa, E. H., Daniel, O. C., & Jose, B. (1999). Development of a stroke-specific quality of life scale. Stroke, 30(7), 1362–1369.