

Original Article

Associations between occupational performance and quality of life, well-being, and instrumental activities of daily living in older adults

Associações entre desempenho ocupacional e qualidade de vida, bem-estar e atividades instrumentais da vida diária em idosos

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Abstract

This study aimed to investigate the associations between occupational performance and quality of life, well-being, and instrumental activities of daily living in older Japanese adults by examining the correlations between the Canadian Occupational Performance Measure and other assessment instruments. We recruited 45 participants (≥ 65 years old, without dementia) from inpatient and outpatient rehabilitation services in Japan. The associations between the Canadian Occupational Performance Measure as a measure of occupational performance and satisfaction and the Medical Outcomes Study Short Form-36 as a measure of the quality of life, Philadelphia Geriatric Center Morale Scale as a measure of well-being, and Tokyo Metropolitan Institute of Gerontology Index of Competence as a measure of instrumental activities of daily living were examined using Spearman's correlation coefficient. The Canadian Occupational Performance Measure performance and satisfaction scores showed fair correlations with the physical and mental component summary scores of the Medical Outcomes Study Short Form-36 ($r = 0.35$ and 0.45 , respectively) but not with the role or social component summary scores. Both performance and satisfaction scores showed fair correlations with the total Philadelphia Geriatric Center Morale Scale score ($r = 0.35$ and 0.41 , respectively), but not with the total Tokyo Metropolitan Institute of Gerontology Index of Competence score. The occupational performance showed fair correlations with quality of life and well-being but not with instrumental activities of daily living in older Japanese adults.

Keywords: Occupational Therapy, Geriatrics, Activities of Daily Living, Quality of Life.

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Resumo

Este estudo teve como objetivo investigar associações entre desempenho ocupacional e qualidade de vida, bem-estar e atividades instrumentais da vida diária em idosos japoneses, examinando as correlações entre a Medida Canadense de Desempenho Ocupacional e outros instrumentos de avaliação. Quarenta e quatro participantes (≥ 65 anos, sem demência) foram recrutados a partir de serviços de reabilitação hospitalar e ambulatorial no Japão. Associações entre a Medida de Desempenho Ocupacional Canadense, como medida de desempenho e satisfação ocupacional, o Estudo de Resultados Médicos Versão Curta-36, como medida de qualidade de vida, a Escala Moral do Centro Geriátrico da Filadélfia, como medida de bem-estar, e o Índice de Competência do Instituto Metropolitano de Gerontologia de Tóquio, como medida das atividades instrumentais da vida diária, foram examinadas usando o coeficiente de correlação de Spearman. Os escores de performance e satisfação da Medida de Desempenho Ocupacional Canadense mostraram correlações altas com os escores de componentes físicos e mentais do Estudo de Resultados Médicos Versão Curta-36 ($r = 0,35$ e $0,45$, respectivamente), mas não com os escores de função ou componente social. Ambos os escores de desempenho e satisfação mostraram correlações altas com o escore total da Escala Moral do Centro Geriátrico da Filadélfia ($r = 0,35$ e $0,41$, respectivamente), mas não com o Índice de Competência do Instituto Metropolitano de Gerontologia de Tóquio. A performance demonstrou correlações altas com qualidade de vida e bem-estar, mas não com atividades instrumentais de vida diária em idosos japoneses.

Palavras-chave: Terapia Ocupacional, Geriatria, Atividades da Vida Diária, Qualidade de Vida.

1 Introduction

Occupational therapy is a client-centred health profession concerned with promoting health and well-being through occupation as shown in almost all definitions of the profession worldwide (World Federation of Occupational Therapists, 2018). The term “occupation” refers not only to work but also to all activities that individuals wish to do, have to do, and are expected to do, including self-care, productivity, and leisure (Law et al., 2014). Law et al. (1998) reviewed research on the association between occupation, health, and well-being, and concluded that occupation substantially affects human health and well-being. Kielhofner (2008) also emphasized the importance of occupation and its influence on health, and suggested that participation in meaningful activities can lead to well-being. In addition, a previous study showed that activity loss was strongly associated with lower physical and psychological quality of life (QOL) among patients with upper extremity nerve damage, whereas greater pain correlated only weakly with QOL (Bailey et al., 2009).

The *Canadian Occupational Performance Measure (COPM)* is an important occupational therapy evaluation tool that has been widely used in research and clinical practice in many countries (Law et al., 2014). It measures clients’ self-perception of their occupational performance, and helps to identify difficulties in everyday activities, ensuring client participation in the goal formulation process. Previous studies have

demonstrated that the COPM can identify a wide range of problems in daily activities (Spadaro et al., 2010; Colquhoun et al., 2010), and that age, gender, and severity of disability do not predict COPM scores (McColl et al., 2000). The tool has shown good test-retest reliability for stroke patients (Cup et al., 2003), ankylosing spondylitis patients (Spadaro et al., 2010), and patients with psychiatric disorders (Pan et al., 2003). Some types of validity have been evaluated for the COPM in various populations (Law et al., 2014). It was suggested that the COPM has adequate content validity, construct validity, and feasibility, and therefore has multidisciplinary use in clinical practice for home-dwelling older adults (Tuntland et al., 2016). As for criterion validity, the COPM has been reported to show fair correlations with the Satisfaction with Performance Scaled Questionnaire in orthopedic and stroke clients ($r = 0.22$ to 0.39) (Chan & Lee, 1997), and schizophrenia clients ($r = 0.17$ to 0.39) (Boyer et al., 2000), and with the Reintegration to Normal Living Index for disabled individuals living in the community ($r = 0.22$ to 0.38) (McColl et al., 2000). Regarding associations with activities of daily living (ADL), it was reported that the COPM performance score, but not the satisfaction score, had significant fair correlations with the elimination sub-dimension of the Klein-Bell ADL Scale and the motor subscale of the Functional Independent Measure in orthopedic and stroke patients ($r = 0.32$ and 0.33 , respectively) (Chan & Lee, 1997). In contrast, as for instrumental activities of daily living (IADL) which is more complex activities and requires a higher level of personal autonomy compared to ADL, the COPM showed no significant correlation with the Frenchay Activities Index in stroke patients (Cup et al., 2003), or with the Health Assessment Questionnaire in ankylosing spondylitis patients (Spadaro et al., 2010). On the other hand, as for QOL, it was reported that the COPM performance score had weak correlations with the Euroqol-5D in stroke patients ($r = 0.143$) (Cup et al., 2003), and with the vitality and mental health subscores ($r = 0.248$ and 0.206 , respectively) of the RAND-36 in chronic pain patients (Nieuwenhuizen et al., 2014). These results suggested that the clients' self-perception of occupational performance might have different associations with ADL, IADL, and QOL. There is a Swedish study which showed that satisfaction with daily occupations was closely related to QOL and other measures of health and well-being in schizophrenia patients (Eklund et al., 2001), but little research has been conducted on the association among them in Japan.

The COPM, measuring self-perception of occupational performance, was translated into Japanese in 1998 and conference reports indicate its excellent test-retest reliability and usability, and fair validity in Japanese samples (Law et al., 2014). In Japan, the percentage of the population aged over 65 reached 25% in 2013, and is expected to exceed 30% in 2025 and reach about 40% in 2060 (Arai et al., 2015). When we take the impact of aging on occupational capacity into account in this situation, it will be valuable to know how occupational performance, QOL, well-being, and functional capacity in the community such as IADL are associated with each other in daily clinical practice. In the present study, we aimed to investigate the associations between occupational performance and QOL, well-being, and IADL by examining correlations between the COPM and several assessment instruments in a sample of older Japanese adults.

2 Method

2.1 Participants

The participants in this study were recruited from two facilities, a hospital and a geriatric healthcare facility, in Hiroshima, Japan between October and December 2014. The Saiseikai Hiroshima Hospital is a medium-sized hospital consisting of 15 departments including Neurology, Orthopedic Surgery, Cardiology, and Physical Medicine and Rehabilitation. The Misasakai Hiunaso is a geriatric healthcare facility providing services under the Japanese long-term care insurance system such as rehabilitation, nursing, and care to help admitted older adults residents to return home and outpatient rehabilitation. Eligible participants were older adults attending inpatient and outpatient departments of the rehabilitation services at these facilities, aged 65 or over at the time of the study. Exclusion criteria were as follows: patients whose general condition was serious and who were unable to endure an approximately 30-min interview to complete each measure as follows: the COPM, Medical Outcomes Study Short Form-36 (SF-36), Philadelphia Geriatric Center Morale Scale (PGCMS), and Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG); patients with a consciousness disorder (such as delirium); patients who had been diagnosed with dementia; patients who had been judged by their attending physician to require psychiatric treatment; and patients who had difficulty in verbal communication. The study was conducted according to the principles of the Helsinki Declaration and approved by the Ethics Committee of the Graduate School of Health Sciences, Hiroshima University (Approval No. 1437). The authors did not belong to both facilities as occupational therapists. Both facilities agreed to support the study in advance, and all participants provided written, informed consent. After obtaining informed consent, participant sociodemographic and medical information was collected from medical records. Next, the COPM, SF-36, PGCMS, and TMIG were administered in rehabilitation rooms of each facility or in participants' own rooms if they wished. It was different among participants when the assessments were administered during their clinical course. All instruments were presented in Japanese. Assessments were administered by the two authors, who were both occupational therapists. We calibrated our use of the COPM by observing each other's performance during several pilot assessments to ensure our techniques were similar.

2.1 Instruments

2.2.1 Canadian Occupational Performance Measure (COPM)

The COPM was developed to identify and prioritize client-specific occupational problems in daily activities (Law et al., 2014). The standardized COPM test procedure comprises a semi-structured interview to capture performance problems (Chan & Lee, 1997; Boyer et al., 2000). The procedure of COPM are as follows: problem definition, rating importance, scoring, and reassessment. First, the therapist interviews to encourage th
at clients identify occupations that they want to do, need to do, or expected to do in daily life, regardless of the areas of self-care, productivity and leisure. Then, clients

prioritize up to five problems that they consider most urgent or important and rate each of them on ordinal 10-point scales of performance (1 = not able to do it at all, 10 = able to do it extremely well) and satisfaction (1 = not satisfied at all, 10 = extremely satisfied). Higher scores indicate more positive ratings of occupational performance. The mean performance and satisfaction scores are obtained by adding the ratings of each prioritized problem and dividing the sums by the number of prioritized problems. The COPM can be used in all populations regardless of diagnosis. A client him/herself rates along the interview and a therapist notes and scores. It usually takes around 20 minutes.

2.2.2 Medical Outcomes Study Short Form-36 (SF-36)

The SF-36 is one of the widely used QOL measures. It is used in research and clinical settings to monitor medical care outcomes and has sufficient validity and reliability (Fukuhara & Suzukamo, 2004). It contains eight subscales: physical functioning, role limitations due to physical health problems (role physical), bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional problems (role emotional), and general mental health. It also comprises three summary components: physical component summary, mental component summary, and role and social component summary. The scoring of the items varies from dichotomous scales (yes/no) to 6-point ordinal scales. The total score is calculated as the mean of the eight subscales and ranges from 0 to 100; higher scores indicate better health. The Japanese version of the SF-36 has shown adequate validity (Fukuhara et al., 1998). A client him/herself rates and notes, and a therapist scores. It usually takes around 15 minutes.

2.2.3 Philadelphia Geriatric Center Morale Scale (PGCMS)

The PGCMS was developed and revised by Lawton to measure psychological states in older adults and has been used worldwide to evaluate well-being in this population (Lawton, 1972). The PGCMS comprises 17 dichotomous items; the total score ranges from 0 to 17, with higher scores indicating greater well-being. The PGCMS contains three stable and replicable factors: agitation (0-6), attitude toward own aging (0-5), and lonely dissatisfaction (0-6). PGCMS scores are highly correlated with life satisfaction and adjustment, and with perceived control of daily activities. After the Japanese version was developed in 1989, Liang et al. (1992) showed a further replication of the structure of PGCMS using Japanese and American data sets. Another Japanese study reported that scores between 8 and 15 should be considered normal for community-living older Japanese adults (Suzuki et al., 2003). A client him/herself rates and notes, and a therapist scores. It usually takes 5 to 10 minutes.

2.2.4 Tokyo Metropolitan Institute of Gerontology Index of Competence (TMIG)

The TMIG is a multidimensional 13-item scale based on Lawton's activity ability model (Lawton, 1975); it is used to evaluate the functional capacity of older adults in the community. The total score (0-13) is calculated from three subscales: instrumental self-maintenance score (0-5), intellectual activity score (0-4), and social role score (0-4). Higher scores indicate higher functional capacity. Instrumental self-maintenance refers

to the activity capacity that is the basis for living in the community and includes abilities such as going out using transportation, shopping for everyday life, cooking, and money management. Intellectual activity refers to activities such as leisure activities, learning and creative activities. Social role refers to the ability to maintain positive relationships with friends, neighbors, and the wider society. The average TMIG total score in a nationally representative sample of Japanese individuals was 10.5 (standard deviation [SD] = 3.0) in those aged 75-79 years, and 8.0 (SD = 4.2) in those aged 80 years or older (Koyano et al., 1993). A previous Japanese study indicated that the TMIG had high reliability coefficients of alpha and test-retest, and high construct, discriminant, and predictive validity with a sample of 6776 older adults community residents (Koyano et al., 1991). A client him/herself rates and notes, and a therapist scores. It usually takes 5 to 10 minutes.

2.3 Statistical analysis

We calculated the sample size that would be required to obtain results with a statistical power of 80% for a two-sided test, 1% significance level, based on a correlation value of 0.5, and determined that 42 patients would be required.

All participants were included in the main analysis. The sociodemographic and medical data were analyzed using descriptive statistics. COPM performance and satisfaction scores were calculated from the mean scores of the reported activities.

We first examined scatter plots to assess the strength and nature of the relationships between assessment scores. Because no curvilinear relationship was observed in any plot and the scores of all instruments were not normally distributed, Spearman's rank correlation coefficients were used to test the correlations between the COPM (performance scores and satisfaction scores) and the SF-36, PGCMS, and TMIG. Correlation values were interpreted as weak or non-existent (0 to <0.25), fair (0.25 to <0.5), moderate to good (0.5 to <0.75), and good to excellent (0.75 to 1).

The *P* values for all tests were two-sided, and those <0.05 were considered significant. We used IBM SPSS Statistics, Version 21.0 (IBM Corp., Armonk, NY, USA) to perform the statistical analyses.

4 Results

4.1 Characteristics of participants

A total of 44 individuals participated in the study. From them, 25 participants were recruited from the hospital (14 inpatients and 11 outpatients) and 19 from the geriatric healthcare facility (7 inpatients and 12 outpatients). On average, each assessment visit lasted 1 hour. Table 1 shows the participant characteristics. The sample contained 12 males (27%) and 32 females (73%), with a mean age of 79.0 years (SD = 7.8). In total, 21 participants were inpatients (48%) and 23 outpatients (52%). The diagnosis was musculoskeletal disorder in 29 patients, cerebrovascular disorder in 5 patients, cancer in 3 patients, cardiovascular disease in 2 patients, and other diagnoses in 5 patients.

Table 1. Characteristics of participants ($n = 44$).

	<i>n</i>	(%)
Gender	Male (%)	12 (27)
	Female (%)	32 (73)
Type of patient	Inpatients (%)	21 (48)
	Outpatients (%)	23 (52)
Diagnosis	Musculoskeletal disorders (%)	29 (66)
	Cerebrovascular disorders (%)	5 (11)
	Cancer (%)	3 (7)
	Cardiovascular disease (%)	2 (5)
	Others (%)	5 (11)
Means of mobility	Independent gait (%)	16 (36)
	Cane gait (%)	11 (25)
	Walker gait (%)	9 (20)
	Wheelchair (%)	8 (18)
Care level of the Long-Term Care Insurance System	Independence (%)	15 (34)
	Requiring help 1 (%)	5 (11)
	Requiring help 2 (%)	6 (14)
	Long-term care level 1 (%)	8 (18)
	Long-term care level 2 (%)	9 (21)
	Long-term care level 3 (%)	1 (2)

4.2 Results of assessments

Table 2 shows the measurement results of the four instruments: COPM, SF-36, PGCMS, and TMIG. Means and SDs for scores, subscales, and factors are shown.

Table 2. Results of assessments ($n = 44$).

	Mean	(SD)	[Range]
COPM	Performance score	5.1 (2.2)	[1.6 – 9.2]
	Satisfaction score	5.4 (2.2)	[1.8 – 10.0]
SF-36	Physical functioning	41.3 (23.0)	[5.0 – 95.0]
	Role physical	59.0 (28.1)	[0.0 – 100.0]
	Bodily pain	53.8 (26.2)	[12.0 – 100.0]
	General health	57.3 (23.6)	[5.0 – 92.0]
	Vitality	55.3 (22.6)	[12.5 – 100.0]
	Social functioning	78.1 (25.3)	[12.5 – 100.0]
	Role emotional	75.9 (27.1)	[16.7 – 100.0]
	Mental health	66.5 (21.6)	[15.0 – 100.0]
	Physical component summary	21.9 (15.0)	[-20.1 – 51.6]
	Mental component summary	56.8 (10.6)	[32.4 – 81.0]

Table 2. Continued...

		Mean	(SD)	[Range]
	Role and social component summary	45.7	(12.4)	[14.2 – 70.0]
PGCMS	Agitation	4.2	(1.9)	[0 – 6]
	Attitude toward own aging	2.1	(1.3)	[0 – 5]
	Lonely dissatisfaction	4.0	(1.6)	[0 – 6]
	Total	10.3	(4.0)	[0 – 17]
	Instrumental self-maintenance	3.2	(1.8)	[0 – 5]
TMIG	Intellectual activity	3.0	(1.0)	[0 – 4]
	Social role	2.0	(1.4)	[0 – 4]
	Total	8.3	(3.5)	[1 – 13]

Notes: SD = standard deviation; COPM = Canadian Occupational Performance Measure. SF-36 = the Medical Outcomes Study Short Form-36. PGCMS = the Philadelphia Geriatric Center Morale Scale. TMIG = the Tokyo Metropolitan Institute of Gerontology Index of Competence.

Table 3. Correlations between assessments (*n* = 44).

		COPM		SF-36							PGCMS				TMIG							
		Performance	Satisfaction	Physical functioning	Role physical	Bodily pain	General health	Vitality	Social functioning	Role emotional	Mental health	Physical component	Mental component summary	Role and Social component	Agitation	Attitude toward own aging	Lonely Dissatisfaction	Total	Instrumental Self-Maintenance	Intellectual Activity	Social Role	
COPM	Performance																					
	Satisfaction	.85**																				
SF-36	Physical functioning	.38*	.23																			
	Role physical	.32*	.25	.34*																		
	Bodily pain	.21	.25	.28	.55**																	
	General health	.39**	.39**	.32*	.48**	.42**																
	Vitality	.47**	.49**	.45**	.58**	.47**	.73**															
	Social functioning	.24	.27	.07	.50**	.30*	.35*	.37*														
	Role emotional	.22	.42**	.26	.40**	.35*	.52**	.65**	.37*													
	Mental health	.27	.47**	.26	.41**	.35*	.65**	.71**	.43**	.79**												
	Physical component summary	.35*	.14	.88**	.44**	.48**	.43**	.49**	-.06	.17	.14											
	Mental component summary	.29	.45**	.06	.26	.41**	.82**	.75**	.41**	.59**	.80**	.09										
	Role and Social component summary	.16	.27	-.05	.58**	.15	.19	.36*	.77**	.64**	.54**	-.22	.30									

Table 3. Continued...

		COPM		SF-36										PGCMS				TMIG			
		Performance	Satisfaction	Physical functioning	Role physical	Bodily pain	General health	Vitality	Social functioning	Role emotional	Mental health	Physical component	Mental component summary	Role and Social component	Agitation	Attitude toward own aging	Lonely Dissatisfaction	Total	Instrumental Self-Maintenance	Intellectual Activity	Social Role
PGCMS	Agitation	.18	.29	.20	.18	.08	.41**	.40**	.23	.62**	.56**	.08	.43**	.39**							
	Attitude Toward Own Aging	.38*	.41**	.41**	.41**	.29	.54**	.68**	.35*	.53**	.63**	.31*	.60**	.37*	.49**						
	Lonely Dissatisfaction	.28	.24	.31*	.31*	.14	.40**	.51**	.33*	.53**	.45**	.23	.40**	.41**	.41**	.59**					
	Total	.35*	.41**	.35*	.37*	.23	.54**	.65**	.38*	.70**	.68**	.24	.58**	.49**	.79**	.84**	.79**				
TMIG	Instrumental Self-Maintenance	.22	.10	.53**	.06	-.17	.010	.10	.10	-.10	-.06	.33*	-.20	-.09	.07	-.04	.09	.04			
	Intellectual Activity	-.04	-.08	.34*	-.06	-.15	.11	.06	.09	-.03	.11	.17	.00	-.04	.25	.10	.05	.11	.58**		
	Social Role	.23	.05	.42**	-.12	-.22	.25	.14	.01	-.19	.11	.26	.14	-.26	.08	.29	.15	.17	.56**	.53**	
	Total	.19	.04	.53**	-.03	-.21	.13	.12	.07	-.14	.03	.33*	-.06	-.17	.13	.14	.13	.12	.88**	.77**	.84**

Notes: Spearman's correlation coefficient, ** $P < 0.01$. * $P < 0.05$. COPM = Canadian Occupational Performance Measure. SF-36 = the Medical Outcomes Study Short Form-36. PGCMS = the Philadelphia Geriatric Center Morale Scale. TMIG = the Tokyo Metropolitan Institute of Gerontology Index of Competence.

The mean COPM performance score was 5.1 (SD = 2.2), and the mean COPM satisfaction score 5.4 (SD = 2.2). In the COPM interview, total of 219 activities were reported as important occupational problems. Out of them, 63 activities were related to community, social, and civic life (travel with family or friends, shopping with family or friends, etc.) followed by 44 activities related to domestic life (cooking, shopping for groceries, laundry, etc.), 30 activities related to mobility, and 27 activities related to self-care, and so on.

Regarding QOL, two out of eight subscales of the SF-36 showed ceiling effects, that is, the values of mean + SD were higher than their maximum score (max) for social functioning and role emotional (103.4 and 103.0 > max = 100.0, respectively). Three summary components showed neither a ceiling nor a floor effect.

Regarding well-being, one out of three factors of the PGCMS showed a ceiling effect (agitation, mean + SD = 6.1 > max = 6.0). Additionally, the mean + SD for lonely dissatisfaction was close to max (5.6 and 6.0, respectively).

Regarding IADL, two out of three subscales of the TMIG showed ceiling effects (instrumental self-maintenance, mean + SD = 5.03 > max = 5.00; intellectual activity, mean + SD = 4.02 > max = 4.00). The two scores of the COPM, three summary components of the SF-36, and the total score of the PGCMS and that of the TMIG showed neither a ceiling nor a floor effect.

4.3 Correlations between assessments

Table 3 shows the correlations between assessments. Although the COPM performance and satisfaction scores showed a good-to-excellent correlation ($r = 0.85$; Figure 1A) as expected, their observed correlations with other assessments were somewhat different from each other.

As for subscales of the SF-36, both COPM performance and satisfaction scores showed similar fair correlations with general health and vitality, whereas only COPM performance showed fair correlations with physical functioning and role physical, and only COPM satisfaction showed fair correlations with role emotional and mental health. Neither of them showed significant correlations with bodily pain or social functioning, which showed a ceiling effect. As for the three summary components of the SF-36, COPM performance and satisfaction scores showed fair correlations with physical component summary and mental component summary (Figures 1B and 1C), respectively, but not with role and social component summary. Physical component summary showed a good-to-excellent correlation with physical functioning ($r = 0.88$); mental component summary showed good-to-excellent correlations with general health, vitality, and mental health ($r = 0.82, 0.75,$ and 0.80 , respectively); and role and social component summary showed a good-to-excellent correlation with social health ($r = 0.77$). There was no correlation between these three summary components.

As for the PGCMS, both COPM performance and satisfaction showed fair correlations with attitude toward own aging and total PGCMS score (Figures 1D and 1E). Agitation and lonely dissatisfaction, which had slight to marginal ceiling effects, showed no correlation with COPM. The three factors of the PGCMS were fairly to moderately correlated with one another. On the other hand, the total PGCMS score showed moderate-to-good correlations with four subscales of the SF-36. Two of them

were general health and vitality, which were correlated with both COPM performance and satisfaction, and the other two were role emotion and mental health, which were correlated with COPM satisfaction. The total PGCMS score showed a moderate-to-good correlation with mental component summary ($r = 0.58$), which was correlated with COPM satisfaction, but not with physical component summary ($r = 0.24$), which was correlated with COPM performance. Interestingly, the total PGCMS score showed a fair correlation with RSC ($r = 0.49$), which was not correlated with COPM satisfaction nor performance ($r = 0.27$ and 0.16 , respectively).

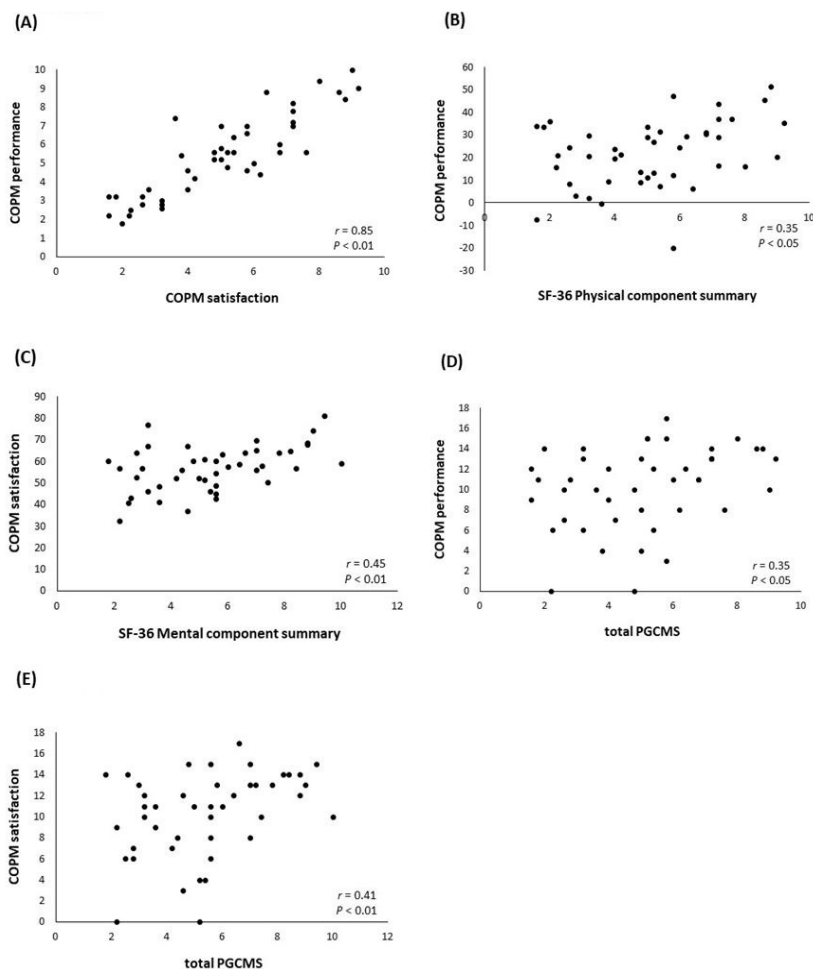


Figure 1. Correlations between COPM performance and satisfaction (A), COPM performance and SF-36 physical component summary (B), COPM satisfaction and SF-36 mental component summary (C), COPM performance and total PGCMS (D), COPM satisfaction and total PGCMS (E).

Finally, as for the TMIG, we found no significant correlation of the total score with COPM performance or satisfaction. Regardless of having a ceiling effect, all three subscales did not show any significant correlations with COPM performance or satisfaction. In contrast, the total score and three subscales were correlated with physical functioning of the SF-36. Three

subscales of the TMIG showed moderate-to-good correlations with one another. There was no correlation between the TMIG and PGCMS at all.

Each dot represents a participant ($n = 44$). Statistical analysis using Spearman's correlation coefficient.

5 Discussion

The primary aim of this study was to investigate the correlations between the COPM and other assessment instruments, namely, the SF-36, PGCMS, and TMIG as measures of QOL, well-being, and IADL, respectively. This study showed that COPM performance and satisfaction scores were correlated with physical component summary and mental component summary of the SF-36, respectively, and that both performance and satisfaction were correlated with total PGCMS scores but not with total TMIG scores in older Japanese adults.

As we expected, COPM performance scores were positively correlated with SF-36 physical factors, such as physical functioning, role physical, and physical component summary. In contrast, COPM satisfaction scores were positively correlated with SF-36 emotional and mental factors, such as role emotional, mental health, and mental component summary. Both COPM performance and satisfaction scores were positively correlated with SF-36 general factors, such as general health and vitality. Although the COPM performance and satisfaction scores showed good-to-excellent correlations, their observed correlations with the SF-36 subscales and summary components were somewhat different from each other, suggesting their independent importance in assessing client-specific occupational problems.

In relation with the PGCMS, which was developed to measure psychological states and has been used to evaluate well-being, COPM performance as well as satisfaction showed only fair but significant correlations with total PGCMS score ($r = 0.35$ and 0.41) and attitude toward own aging ($r = 0.38$ and 0.41). The other two factors of PGCMS showed no significant correlation with COPM, and their correlation coefficients ranged from 0.18 to 0.29 . Their marginal ceiling effects might somewhat affect the results.

The unexpected result that neither COPM performance nor satisfaction were correlated with the TMIG, which is a measure of IADL. This might be partially due to marginal ceiling effects found in two subscales of the TMIG. However, correlation coefficients for COPM were quite low regardless of ceiling effects, especially for COPM satisfaction (-0.08 to 0.10). This could suggest that the problems prioritized by participants themselves and their urgency or importance on the COPM were not correlated to the 13 problems presented on the TMIG, such as going out, using transportation, shopping for everyday life, cooking and money management, leisure activities, learning and creative activities, and maintaining positive relationships with friends, neighbors, and the wider society. Even if participants could not solve the problems presented on the TMIG, they could still achieve good satisfaction as well as performance according to their own priorities, and vice versa. For example, one of participants showed a low score of 4 in TMIG (she could not prepare food herself or visit her friends), but she achieved a high score of 10 in COPM satisfaction because she prioritized handcraft, wood grain, and traditional Japanese hand embroidery. Another participants also showed a low score of 4 in TMIG (she could not go shopping for

groceries), but she achieved a relatively high score of 7.4 in COPM satisfaction because she prioritized knitting and housework like laundry. In addition, the TMIG was not correlated with PGCMS and SF-36 scores except for physical functioning and physical component summary, suggesting that IADL were not correlated with well-being or QOL except for physical state. The TMIG is a simple assessment instrument that consists of 13 questions (yes/no answers) and is very easy to use for evaluating IADL in the clinical setting; at the same time, it has a narrow score range (0 to 13) and sometimes shows a ceiling effect (Koyano et al., 1993). Hence, there remains a possibility that we could observe different correlations of IADL with well-being, QOL, and COPM if we use other instruments that have wider score ranges without any ceiling or floor effects. On the other hand, both COPM performance and satisfaction were not correlated with role and social component summary of the SF-36 or social role of the TMIG. As for the social status of older adults, it seems necessary to take account of the possible discrepancy between COPM and other assessment instruments. Furthermore, all observed significant correlations of the COPM with the SF-36 and PGCMS were only fair in the study. Several previous studies have reported fair or weaker correlations between the COPM and other assessment instruments: Euroqol-5D, Stroke-Adapted Sickness Impact Profile (Cup et al., 2003), and RAND-36 (Nieuwenhuizen et al., 2014) for QOL; Klein-Bell ADL Scale, Functional Independent Measure (Chan & Lee, 1997), Barthel Index, Rankin Scale (Cup et al., 2003), and Health Assessment Questionnaire (Spadaro et al., 2010) for ADL; Frenchay Activities Index (Cup et al., 2003) for IADL. Taken together, these findings might imply the importance of each tool as independent assessment instruments that evaluate different phenomena, with each one having its own characteristics. By using more than one instrument, we will be able to perform a more comprehensive evaluation for effective clinical practice of occupational therapy.

One of the limitations of the present study was the small sample size. The study population included only 44 participants from two facilities, which might affect the results. Another limitation is the inclusion and exclusion criteria of the study. We included both inpatients and outpatients and the nature of their functional status, diagnosis, and type of rehabilitation varied widely between the study participants. However, we did not investigate differences arising from these background factors. Further research with a larger number of well-characterized participants is needed to validate and extend the findings of this study.

This was a cross-sectional study; therefore, we could not evaluate changes across time in the scores of each assessment instrument. Because the COPM has been also used as an outcome measure of occupational therapy interventions, we would like to investigate the correlations of score changes between COPM and instruments of QOL, well-being, and IADL in future. A recent systematic review suggested that an increasing role for occupational therapy service delivery in community-based health promotion and prevention efforts to meet the everyday activity and health needs of the growing older adult population (Stav et al., 2012). In Japan's aged society, occupational therapy for improving health and well-being of older adults is required. We believe that better occupational engagement of older adults could be achieved through more appropriate evaluation using the COPM and other assessment instruments for QOL and well-being.

In summary, this study demonstrated that the COPM had significant fair correlations with the SF-36 as a measure QOL and with the PGCMS reflecting well-being in older

Japanese adults, but not with the TMIG as a measure IADL. While these findings are only preliminary at this time, we hope that they will contribute to deepening the knowledge about the nature of associations between occupational performance, QOL, well-being, and IADL, and to improving clients' QOL and well-being as well as IADL through occupational therapy interventions in Japan's aged society.

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Author's Contributions

Emi Miki designed the study, collected and analyzed data, and wrote the paper. Risa Kawabata was involved in collecting data, and analyzed data. All authors approved the final version of the text.

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