

Effect of occupation-based interventions in patients with haematopoietic malignancies undergoing chemotherapy: A pilot randomised controlled trial

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Abstract

Background/objective: Chemotherapy for cancer negatively affects activities of daily living and quality of life. This study aimed to validate and compare the efficacy of two different interventions in patients with haematopoietic malignancies undergoing chemotherapy: (1) occupation-based interventions, designed using the Aid for Decision-making in Occupation Choice (ADOC) (an iPad application) and (2) impairment-based interventions. ADOC helps promote decision-making during activities and participation in occupation-based goal setting. The impairment-based intervention group served as the comparison group and underwent impairment-based interventions focusing on dysfunction.

Methods: In this single-blinded pilot randomised controlled trial, 19 participants received an occupation-based intervention ($n=9$) or an impairment-based intervention ($n=10$). The treatment period comprised two sessions. Recruitment, compliance and outcome completion rates were calculated for the study. Effect sizes were examined for outcomes regarding physical performance, instrumental activities of daily living and quality of life as evaluated by a blinded assessor.

Results: In this study, 24.8% (28/113) of the eligible patients with haematopoietic malignancies were enrolled, and 67.9% (19/28) of these were retained up to the post-assessment stage. Recruitment (25%) and compliance (68%) rates were satisfactory. The Functional Assessment of Cancer Therapy-General emotional well-being and total scores were significantly higher for the occupation-based intervention group than for the impairment-based intervention group (both $p < 0.05$; $d = 0.54$, $d = 0.51$, respectively). Other outcomes showed no significant differences.

Conclusion: Occupation-based interventions designed using the ADOC application were useful for patients with haematopoietic malignancies.

Keywords

Chemotherapy, haematopoietic malignancy, impairment, occupational therapy, occupation-based intervention

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Introduction

In Japan, recent advancements in cancer therapy, such as surgical treatment, molecularly targeted drugs and chemical treatment, have increased the five-year survival rate of patients to greater than 62% (National Cancer Center, Center for Cancer Control and Information Services, 2016). The Basic Act on Anti-Cancer Measures was established in 2007; this act advocated the importance of the quality of life of cancer patients receiving medical treatment (Ministry

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of Health Labour and Welfare, 2007). Following the reformation of medical services in 2010, occupational therapy has become an important element in cancer rehabilitation training programmes; therefore, there has been an increasing demand to include occupational therapists in cancer rehabilitation (Ministry of Health Labour and Welfare, 2012).

Occupational therapy aims to promote health and well-being through a variety of everyday activities important to the patient (World Federation of Occupational Therapists, 2010). Therefore, occupational therapy evaluation and interventions should be based on an occupation (occupation-based intervention, OBI) and include purposeful and meaningful activities based on the patient's life history. OBI involves real-life activities and tasks, and those who practice OBI can help in engaging patients in motivational activities (Fisher, 2014).

With the aim of achieving good patient health, an occupational therapist evaluates the patient's disorder and incorporates interventions focused on the life activities of the individual. In Japan, occupational therapists often use goal-setting tools such as the Management Tool for Daily Life Performance or the Canadian Occupational Performance Measure to perform OBIs (Dedding, Cardol, Eyssen, Dekker, & Beelen, 2004; Noto, Murai, Takeuchi, Iwase, & Nakamura, 2014). Recently, Japanese occupational therapists have developed an iPad application called the Aid for Decision-making in Occupation Choice (ADOC) to promote decision-making during activities and participation in occupation-based goal-setting (Tomori et al., 2012, 2013). The ADOC uses a systematic process to enable the user to choose from 95 illustrations describing daily activities related to the category "activities and participation".

Previous case studies have shown that occupational therapists could identify meaningful activities among older inpatients using the ADOC, even in those with aphasia and a Mini-Mental State Examination score of higher than 8 points (Saito, Uezu, Kinjo, Tomori, & Higashi, 2012; Tomori et al., 2013). Furthermore, Tomori et al. reported that the OBIs established using the ADOC had a larger effect on improving activities of daily living (ADL) and quality of life and quality-adjusted life years than did occupational therapy focusing on impairments or body structure (impairment-based intervention, IBI) (Nagayama et al., 2016, 2017; Tomori et al., 2015).

A recent meta-analysis emphasised the positive influence of exercise therapy on the physical functioning and quality of life of patients with haematopoietic malignancies who undergo haematopoietic stem cell transplantation (Steinberg et al., 2016). Moreover, previous studies have reported a dramatic effect of exercise

therapy during chemotherapy among inpatients with haematopoietic malignancies (Courneya et al., 2009). The role of physical therapy for patients with haematopoietic malignancies has also been clarified (Steinberg et al., 2016). However, reports regarding the efficacy of occupational therapy for patients with haematopoietic malignancies in terms of symptom management are rare, and none with a higher level of evidence exist (Pergolotti, Williams, Campbell, Munoz, & Muss, 2016).

Previously, we have piloted an OBI among patients with haematopoietic malignancies undergoing chemotherapy during hospitalisation using the ADOC, which consisted of daily diary records of the patient's life during home care. We found that patient satisfaction level increased after they engaged in activities established for them as the goal during home care.

Therefore, the purpose of this study was to examine the efficacy of an OBI established using the ADOC among patients with haematopoietic malignancies undergoing chemotherapy. We also compared the efficacy of an IBI with that of an OBI and explored the feasibility using a randomised controlled trial in inpatients with haematopoietic malignancies undergoing chemotherapy.

Methods

Trial design

The present pilot randomised controlled trial, following Zelen's method, involved a single blind assessor (Zelen, 1979). Written informed consent was obtained from each subject. The study was approved by the appropriate ethics committee of the Nagasaki Genbaku Hospital. This study was registered in the UMIN Clinical Trials Registry (UMIN000029114). The participants were randomly allocated to the OBI or IBI groups by occupational therapists. A concealed envelope was used for random allocation, which was designed by a person not involved in the study.

Participants

The participants were patients with haematopoietic malignancies who had received occupational therapy at our institution from April 2015 to October 2016. Eligibility criteria included patients with haematopoietic tumours who had received occupational therapy. Exclusion criteria included a performance status of grade 3 or higher, a Mini-Mental State Examination score of less than 24 points, age less than 40 years, uncontrollable pain, less than three courses of the same regimen of chemotherapy and lack of consent to participate.

Interventions

For the OBI group, we set goals using the ADOC and conducted an OBI. Using the ADOC, patients were required to choose urgent and important activities. Next, the occupational therapist selected the activity required for the patient on the ADOC. The patient and the occupational therapist then discussed and selected five activities that were consistent among the choices. The goal of the occupational therapy was to achieve agreement regarding the activities.

During their hospital stay, patients actively performed activities using the facilities at the hospital (such as washing or cleaning tasks). During home care, patients in the OBI group were required to use a diary to record their attempts at performing the activity that had been set as their goal. Before discharge, the occupational therapist provided the patient with a diary that contained the occupational therapy plan with an illustration created using the ADOC. We did not set detailed content to write in the diary for patients such as "Today I went shopping with my daughter and visited the grave. I was very tired as I climbed the stairs, but I felt satisfied that I was able to perform these activities". Rather, the purpose of having the patient write their goals in a diary was to encourage them to practice activities that had previously been practiced during inpatient occupational therapy sessions. This could also serve as a reminder for patients in case of re-hospitalisation.

The IBI group served as the comparison group and underwent an IBI focusing on dysfunction. The therapists did not use a goal setting tool such as the Management Tool for Daily Life Performance or the Canadian Occupational Performance Measure and Goal Attainment Scale. The participants performed strength training and aerobic exercise at a relatively high intensity (modified Borg scale score of greater than 4) (Wilson & Jones, 1989). For the IBI group, at admission, the occupational therapist guided the patients to perform systematic stretching and muscle strengthening as well as walking the patient for approximately 20 minutes.

The therapy sessions were conducted five times per week, 1 hour per session.

All occupational therapists who implemented the programme underwent an 8 hour training programme regarding occupation-based practice using the ADOC.

Outcomes

Muscle strength was assessed as handgrip strength, which was measured using a Smedley hand dynamometer. Maximum isometric knee extension force (KEF) values (kgf) were obtained using a hand-held

dynamometer with belt stabilisation, with the patient in the sitting position at 90° hip joint flexion and 90° knee joint flexion. The KEF was divided by the body weight (kg), expressed as %KEF, converted to Newtons and divided by the moment arm (m) to obtain the KEF in N/m (Hirasawa, Hasegawa, Matsusita, & Yamasaki, 2004).

Balance ability was determined using the one-leg standing test. Participants were asked to place their hands on their hips and raise one leg; using a stopwatch, the amount of time until the raised leg touched the floor was measured to the nearest tenth of a second, up to a maximum of 60 s. Participants practiced the task once on each leg. The test was repeated for the contralateral leg and conducted twice. The maximum score of the two tests was adopted for analysis (Michikawa, Nishiwaki, Takebayashi, & Toyama, 2009). Walking speed was assessed using the 10 m walking test. Participants were instructed to walk as fast as they could safely, without running, on a 10 m walkway in a clinical setting (Bohannon, 1997). Cognitive function was evaluated using the Mini-Mental State Examination (Tombaugh & McIntyre, 1992). Performance status was evaluated using the Eastern Cooperative Oncology Group scale, which represents the overall status of patients with cancer (Orr & Aisner, 1986). Instrumental activities of daily living (IADL) were determined using the Frenchay Activities Index (Schuling, de Haan, Limburg, & Groenier, 1993). Quality of life was evaluated using the Functional Assessment of Cancer Therapy-General (FACT-G) system (Weitzner et al., 1995). The FACT-G measures the quality of life of patients with cancer, and comprises of 27 items that assess physical, social/family, psychological and functional aspects; higher scores indicate better functional status.

Data regarding white blood cell count, haemoglobin level, platelet count and neutrophil count were obtained from participants' medical records. Although there was no masking for the patients as well as the therapists who provided the intervention, evaluation was conducted by physiotherapists blinded to the intervention type. All assessments were conducted before the intervention and after two intervention sessions.

Statistical analysis

We compared baseline characteristics and outcomes using the Mann-Whitney U test and the chi-squared test (for categorical data). Primary outcomes were assessed after a two-month period. Intervention effects were tested by examining the changes in scores (after a baseline test) for each outcome variable. We used a two-tailed independent t-test for between-group

comparisons of baseline and post-test outcome changes. We calculated two-tailed 95% confidence intervals and effect sizes (Cohen's *d*), with effect sizes of 0.3, 0.5 and greater than 0.8, designated as small, medium and large, respectively (Mizumoto & Takeuchi, 2008). For all analyses, *p* less than 0.05 was considered statistically significant. Data were assessed according to the intention-to-treat principle using the SPSS for Windows ver. 23 software (IBM Corp, Armonk, NY, USA).

Results

Figure 1 presents the CONSORT flow diagram and details of the screening, enrolment and delivery of the intervention. In this study, 24.8% (28/113) of patients with haematopoietic malignancies who were assessed for eligibility were enrolled, and 67.9% (19/28) of those enrolled were retained up to the post-assessment stage. Of the 28 participants, 11 were included in the OBI group (three were moved to the IBI group and two had changes in their outpatient therapy plan) within the period of the intervention,

and 17 were included in the IBI group (three transferred from the OBI group during the intervention period, two had changes in their outpatient therapy plan, three deteriorated or died, one had uncontrolled pain and one refused participation) before the post-intervention assessment. There were no significant differences between the groups in terms of baseline clinical characteristics (Table 1). There were no significant within-group differences in terms of pre- versus post-intervention outcomes; however, there were significant between-group differences in changes in several scores (Table 2).

The FACT-G emotional well-being and total scores were significantly higher in the OBI group than in the IBI group ($p < 0.05$), with a larger effect size observed for emotional well-being ($p < 0.05$, $d = 0.54$) and total ($p < 0.05$, $d = 0.51$) scores in the OBI group. Statistical power calculations were made assuming 80% power, a two-sided effect, and a type I error rate of 5%. Assuming a loss-to-follow-up of 32% at two months (number of participants recruited, 28; number of participants analysed, 19), the study was powered to detect an effect size of 0.54 and a 3.64-point difference in the

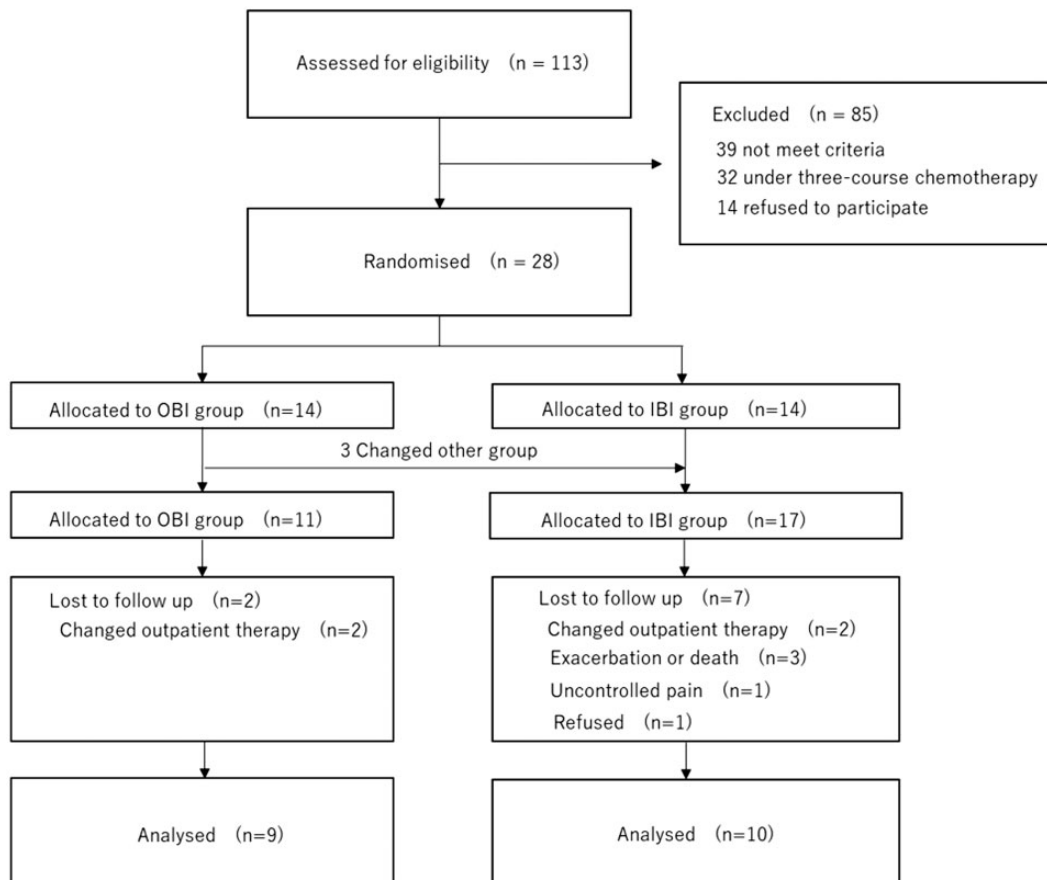


Figure 1. CONSORT diagram for enrolment of patients. OBI group: occupation-based intervention group; IBI group: impairment-based intervention group.

Table 1. Patients' pre-intervention characteristics.

Characteristics	OBI group (n = 9)	IBI group (n = 10)	p
Age (mean ± SD)	73.89 ± 8.12	74.90 ± 7.64	0.905 ^a
Sex (male/female)	2/7	3/7	0.073 ^b
Weight (mean ± SD)	43.98 ± 8.34	51.53 ± 11.17	0.243 ^a
MMSE (mean ± SD)	28.89 ± 0.93	28.20 ± 2.44	0.78 ^a
White cell count (10 ³ /μL) (mean ± SD)	3.50 ± 3.52	5.88 ± 7.66	0.156 ^a
Haemoglobin (g/dL) (mean ± SD)	9.86 ± 1.78	10.56 ± 2.14	0.356 ^a
Platelet count (10 ³ /μL) (mean ± SD)	153.00 ± 119.19	144.40 ± 66.52	0.842 ^a
Neutrophil count (10 ³ /μL) (mean ± SD)	2.44 ± 3.43	2.80 ± 2.16	0.278 ^a
Duration of hospital stay (mean ± SD)	48.22 ± 22.29	45.50 ± 20.50	0.78 ^a
Duration of home stay (mean ± SD)	25.44 ± 13.11	35.60 ± 18.69	0.211 ^a

OBI, occupation-based intervention; IBI, impairment-based intervention; MMSE, Mini-mental State Examination.

^aMann-Whitney U test.

^bχ² test.

FACT-G emotional score, with a minimum sample size of 113 patients. No important adverse or unintended effects were reported.

Discussion

Owing to progress in cancer therapy, the number of cancer survivors has increased worldwide, indicating the importance of rehabilitation. However, treatment such as chemotherapy in these patients often negatively affects muscular strength, physical activity, stamina, ADL and quality of life (American Occupational Therapy Association, 2016; Courneya et al., 2009; Ferriolli et al., 2012; Steinberg et al., 2016). Studies have shown that occupational therapy consisting of exercise therapy, such as yoga and *qigong*, can alleviate the adverse effects of cancer treatment, including malaise. However, few studies have been conducted by occupational therapists (Barsevick et al., 2004; Chan et al., 2012; Mustian et al., 2013; Shneerson, Taskila, Gale, Greenfield, & Chen, 2013). According to a recent meta-analysis concerning cancer rehabilitation, most interventions for symptom management were not conducted by occupational therapy practitioners, but mostly by nurses, social workers or psychologists. Thus, additional research to support OBIs geared toward positive activity and participation outcomes for this large and continually growing population is necessary (Hunter, Gibson, Arbesman, & D'Amico, 2017).

This study was the first attempt to test the effect of an OBI on hematologic cancer survivors during rehabilitation. The experimental group that underwent an OBI showed a greater improvement in quality of life than the control group that underwent an IBI.

Our study was based on research conducted by Tomori et al., who studied the effect of OBIs using the ADOC (Nagayama et al., 2017; Shneerson et al.,

2013; Stewart & Wild, 2014). Their study involved patients undergoing rehabilitation following subacute cerebral infarction and reported improved quality of life using the SF36 questionnaire and a superior quality-adjusted life expectancy using the OBI than that achieved with the IBI (Nagayama et al., 2017; Shneerson et al., 2013). Moreover, a different study reported that in a group of elderly persons, ADL outcomes achieved using the OBI were superior to those achieved using the IBI (Stewart & Wild, 2014). In the present study, participants in the OBI group were required to engage in meaningful occupation-based tasks of their choice based on their goals identified using the ADOC during hospitalisation. The interventions included IADL, leisure activities, social participation and mobility. During home care, we strongly recommended that participants engage in meaningful occupation-based tasks and maintain a record of this activity in their diaries. At readmission, we provided feedback based on these records. Therefore, we anticipated that the OBI based on the ADOC would educate the patients and help them engage in meaningful occupation-based tasks at home. We speculate that the improvement observed in the OBI group was due to (1) the effects of education regarding the significance of engaging in meaningful occupation-based tasks via the OBI and (2) to the phenomenon that patients are actually engaging in meaningful occupation-based tasks at home.

According to the definition established by the World Federation of Occupational Therapists and American Occupational Therapy Association, occupational therapy is the art and science of helping people to perform daily activities that are important and meaningful to their health and well-being through engagement in valued occupations (American Occupational Therapy Association, 2014; World Federation of Occupational Therapists, 2010). Everyday occupational activities can

Table 2. Comparative analysis of pre- vs. post-intervention outcomes in the occupation-based intervention and the impairment-based intervention groups.

	OBI group (n = 9) mean (SD)			IBI group (n = 10) mean (SD)			Change in score			Baseline			OBI vs. IBI groups change in score			OBI group pre- vs. post-intervention			IBI group pre- vs. post-intervention				
	Pre-intervention	Post-intervention	Change in score	Pre-intervention	Post-intervention	Change in score	Pre-intervention	Post-intervention	Change in score	p	d	p	d	p	d	p	d	p	d	p	d		
GP	15.50 (4.39)	15.28 (4.02)	-0.22 (2.14)	19.05 (8.57)	18.50 (7.98)	-0.55 (2.27)	0.604	0.604	0.78	-0.08	0.594	0.00	0.39	0.842	-0.06	0.594	0.00	0.39	0.842	-0.06	0.594	0.00	0.39
KEF	0.38 (0.12)	0.36 (0.10)	-0.02 (0.08)	19.13 (9.42)	0.31 (0.17)	-0.12 (3.03)	0.605	0.605	0.095	-0.39	0.31	-0.12	0.95	0.095	-0.39	0.31	-0.12	0.95	0.095	-0.39	0.31	-0.12	0.95
OLS	24.07 (22.12)	21.98 (22.67)	-2.10 (10.59)	19.82 (17.79)	22.96 (20.85)	-0.59 (2.07)	0.720	0.720	0.095	-0.39	0.31	-0.24	0.17	0.095	-0.39	0.31	-0.24	0.17	0.095	-0.39	0.31	-0.24	0.17
10MWT	7.19 (2.00)	7.24 (2.53)	0.05 (0.86)	7.43 (3.74)	6.84 (1.69)	-0.59 (2.07)	0.604	0.604	0.095	-0.39	0.31	-0.03	0.88	0.095	-0.39	0.31	-0.03	0.88	0.095	-0.39	0.31	-0.03	0.88
FAI	24.78 (4.79)	25.78 (5.19)	1.00 (6.36)	23.40 (10.36)	22.00 (8.99)	-1.40 (5.17)	0.905	0.905	0.278	-0.25	0.575	-0.13	0.63	0.278	-0.25	0.575	-0.13	0.63	0.278	-0.25	0.575	-0.13	0.63
FACT-G physical	18.44 (6.09)	20.00 (4.58)	1.56 (6.71)	18.90 (5.13)	18.20 (5.81)	-0.70 (4.45)	0.780	0.780	0.497	-0.16	0.623	-0.11	0.65	0.497	-0.16	0.623	-0.11	0.65	0.497	-0.16	0.623	-0.11	0.65
FACT-G social/family	21.11 (4.09)	19.98 (4.19)	-1.13 (4.53)	18.39 (3.92)	17.59 (4.19)	-0.80 (3.50)	0.182	0.182	0.905	-0.04	0.441	-0.18	0.54	0.905	-0.04	0.441	-0.18	0.54	0.905	-0.04	0.441	-0.18	0.54
FACT-G emotional	14.67 (4.18)	17.11 (3.95)	2.44 (3.40)	16.90 (5.97)	15.70 (5.36)	-1.20 (2.90)	0.243	0.243	0.017	-0.54	0.074	-0.41	0.15	0.017	-0.54	0.074	-0.41	0.15	0.017	-0.54	0.074	-0.41	0.15
FACT-G functional	18.06 (5.55)	20.33 (5.98)	2.28 (5.88)	16.10 (3.57)	15.30 (5.12)	-0.80 (2.74)	0.447	0.447	0.133	-0.36	0.191	-0.30	0.32	0.133	-0.36	0.191	-0.30	0.32	0.133	-0.36	0.191	-0.30	0.32
FACT-G total	72.28 (12.41)	77.42 (11.80)	5.14 (9.76)	70.29 (10.24)	66.79 (8.92)	-3.50 (7.74)	0.497	0.497	0.028	-0.51	0.139	-0.34	0.11	0.028	-0.51	0.139	-0.34	0.11	0.028	-0.51	0.139	-0.34	0.11
ECOG PS	0.67 (0.50)	0.78 (0.44)	0.11 (0.33)	0.80 (0.42)	0.80 (0.42)	0 (0)	0.661	0.661	0.72	-0.24	0.32	-0.23	1.00	0.72	-0.24	0.32	-0.23	1.00	0.72	-0.24	0.32	-0.23	1.00
White cell count	3.50 (3.52)	3.86 (2.63)	0.36 (2.32)	5.68 (7.66)	7.00 (12.01)	1.32 (4.37)	0.156	0.156	1	0	0.81	-0.05	0.64	1	0	0.81	-0.05	0.64	1	0	0.81	-0.05	0.64
Haemoglobin	9.86 (1.78)	10.17 (1.22)	0.31 (1.52)	10.56 (2.14)	10.84 (1.28)	0.28 (1.24)	0.356	0.356	0.968	-0.01	0.593	-0.12	0.635	0.968	-0.01	0.593	-0.12	0.635	0.968	-0.01	0.593	-0.12	0.635
Platelet count	153.00 (109.19)	157.67 (59.09)	4.67 (97.67)	144.40 (66.52)	156.60 (60.71)	12.20 (32.74)	0.842	0.842	0.447	-0.19	0.515	-0.15	0.386	0.447	-0.19	0.515	-0.15	0.386	0.447	-0.19	0.515	-0.15	0.386
Neutrophil count	2.44 (3.43)	2.73 (2.55)	0.29 (2.20)	2.80 (2.16)	4.23 (8.16)	1.43 (6.14)	0.278	0.278	0.549	-0.06	0.674	-0.1	0.185	0.549	-0.06	0.674	-0.1	0.185	0.549	-0.06	0.674	-0.1	0.185

FAI: Frenchay Activities Index; FACT-G: Functional Assessment of Cancer Therapy-General; ECOG PS: Eastern Cooperative Oncology Group Performance Score; GP: grasping power (kg); KEF: knee extension force; OBI: occupation-based intervention; IBI: impairment-based intervention; OLS: one-leg standing test; 10MWT: 10 m walking test.

be so ordinary and embedded in daily life that their complexity is often not appreciated (Hasselkus, 2006). Under the influence of interventions that focus on meaningful occupation-based tasks, participants are known to develop satisfaction concerning their experience of participating in meaningful tasks of their choice and in engaging in normal life routine again. In previous studies, participants in OBIs have often discussed meaningful occupational activities in their records and admitted that penning down their experiences has even helped them cope with depression (Chippendale & Bear-Lehman, 2012). This provides evidence that meaningful occupation-based tasks contribute to health and well-being (Clark, 1997; Law, Steinwender, & Leclair, 1998).

Because the OBI was focused on meaningful occupational tasks, daily recording of tasks performed was considered essential. If the patients were not able to engage in meaningful occupational tasks, the occupational therapist identified the cause and examined the solution with the patient. We speculate that the improved quality of life observed in the OBI group may have been due to the individualised aid provided by the therapist.

In contrast to our prediction, both groups showed a non-significant improvement in motor function and IADL. Therefore, we presume that an OBI can only help in maintaining the motor function of patients with haematopoietic malignancies. In contrast, OBIs for stroke patients have resulted in improved body function (Tomori et al., 2015).

One of the comments observed in the diary of a participant who underwent the OBI was as follows: 'I did not go outdoors for fear of an infection'. Thus, it is possible in some cases that the participant or a family member may have been concerned about the adverse effects of chemotherapy, which may have limited the performance of IADL. This may also be because medical staff may request that patients limit unnecessary outdoor activity to prevent infections, bleeding and fatigue. Patients undergoing chemotherapy are generally instructed to rest to minimise the risk for adverse events during the home care period. Thus, patients find themselves unable to perform domestic roles, which could result in occupation deprivation. However, even in participants without any improvement in IADL performance, the achievement of mental stability by engaging in meaningful occupation may have still led to an improvement in quality of life.

Advice regarding spending time at home after chemotherapy is valuable. An occupational therapist working with cancer rehabilitation often encounters trade-offs such as risk of infection in terms of participation in IADL. Nonetheless, it is crucial that the occupational therapist discusses the benefits of participating

in a meaningful occupation with patients with haematopoietic malignancies.

The implementation of OBIs at a medical facility is considered difficult, particularly that of OBIs involving patients with subacute stroke, because occupational therapy for stroke is aimed at maximising the recovery of motor and cognitive function. However, we found that an OBI could be easily implemented for patients with haematopoietic malignancies. These patients do not have the motor paralysis observed in stroke patients; thus, the need for a functional approach is relatively low. Moreover, the need for a functional approach changes with the progression of symptoms. For example, patients in the terminal phase of the disease who need to engage in meaningful occupation receive an OBI designed to address this aspect.

The landscape of cancer rehabilitation is changing worldwide (Hunter et al., 2017). We suggest that it is important for an occupational therapist to be included in the cancer rehabilitation team with the aim of improving the patient's quality of life. We recommend that well-being should be used as an index to determine the effectiveness of OBIs and that future studies should be conducted in this regard.

Limitations of the present study include the small sample size and the potential bias inherent in a single trial conducted at a single centre; however, stringent inclusion criteria were used. Moreover, this study involved a randomised controlled trial design according to Zelen's method. Although there was no difference in baseline data, there is a possibility that the research design may have influenced the results.

In summary, this pilot study conducted at a single institution reported the findings of an occupational therapist-led OBI programme using the ADOC for patients with haematopoietic malignancies undergoing chemotherapy. The results indicated that patients were able to maintain their IADL performance after discharge at home and their quality of life was improved. This study shows that engaging in meaningful occupations can enhance the quality of life, and ADOC can help in evaluating the effects of OBIs in patients with cancer. We plan to perform large-scale clinical studies in multiple institutions in the future.

Authors' note

Instruments used: Smedley hand dynamometer TTM-YO II (Tsutsumi Co., Ltd, Tokyo, Japan); hand-held dynamometer with belt stabilisation (μ -tas F-1, Anima Inc., Tokyo, Japan).

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