

# Support for balancing cancer treatment and work by occupational health nurses: support structures and implementation status

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**Abstract:** This study aimed to quantitatively grasp the structure of support for balancing cancer treatment and work among occupational health nurses (OHNs) with the current implementation status. The anonymous questionnaire was designed based on the findings of our previous qualitative study and distributed to OHNs. The degrees of support implementation for workers with cancer, superiors and colleagues, and human resource managers were assessed for each item. Factor analysis of support items was conducted, and Wilcoxon signed-rank test was carried out to compare the support scores between the factors. Support for workers with cancer comprised six factors in which the factor, concerning the provision of information regarding resources inside and outside the company, showed the lowest score. Support for superiors and colleagues was divided into three factors, and that for human resource managers comprised two factors. By Mann-Whitney's U-test, it was found that OHNs, who worked without full-time occupational health physicians for smaller companies, showed significantly higher implementation for several support factors, such as support to human resource managers. This study revealed the structure as well as implementation status of OHNs' support for balancing cancer treatment and work, which will provide suggestions for developing training programs for OHNs to promote these activities.

**Key words:** Cancer treatment, Continuation of work, Occupational health nurse, Support for balance, Structure of support, Implementation status

## Introduction

Cancer is the primary cause of death in Japan, and one in every two individuals present with cancer during their lifetime<sup>1, 2)</sup>. Approximately 995,000 individuals are annually diagnosed with cancer and about 26% of these indi-

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viduals are of working age (between 20 and 64)<sup>2)</sup>. Because of medical advances, the 5 yr survival rate of individuals diagnosed with cancer has reached 62.1%; specifically, that of individuals with testicular cancer is greater than 97%<sup>1, 2)</sup>. Therefore, the number of individuals who continue to work while receiving treatment is increasing. The perception of cancer has changed from that of a terminal illness to a long-term or chronic illness<sup>3)</sup>. Because various difficulties arise from the side effects and generally poor physical health that accompany cancer treatments, such as chemotherapy and radiation therapy, the situation is becoming a major health concern for workers as well as for their employers<sup>4, 5)</sup>.

The issue of how to support patients with cancer who are working and their families has been a topic of interest worldwide<sup>6-11)</sup>. In Japan, the Second National Fundamental Plan on Implementing Cancer Countermeasures was adopted in 2012. The difficulties faced by patients with cancer who are working are influenced by various factors and are not limited to medical aspects, such as type of cancer, how far the cancer has progressed, and method used for treatment; individual factors, such as age, sex, academic background, income, social status, family structure, personality, social skills, and perception of job and workplace value, were also considered<sup>11)</sup>. In addition, workplace factors, such as type of industry, demand for qualitative and quantitative work, level of discretion, whether the workplace has a supportive atmosphere, whether one's superiors and coworkers are understanding, and the amount of paid vacation or partial work days, are important<sup>9)</sup>. Even if two individuals have the same type and level of progression of cancer, their work environment and the difficulties they face may differ<sup>6, 9)</sup>. In addition, because the nature of the problem depends on the progression of the cancer and the course of treatment, providing assistance that addresses individual workers' situations is necessary<sup>12)</sup>.

According to an online investigation by Takahashi *et al.*<sup>4)</sup>, 25.4% of the 326 respondents who were working retired upon diagnosis, and nearly 50% of the respondents experienced a decrease in their personal and household incomes<sup>4)</sup>. In response to an open-ended question related to the problems faced at work after diagnosis, the respondents reported that they faced various problems, including economic problems, inadequate communication with medical care personnel and coworkers, and poor physical and mental working conditions<sup>4)</sup>.

To help patients with cancer who are working, physicians and nurses in medical institutions as well as oc-

cupational health care staff, such as occupational health physicians and nurses, who have detailed knowledge of workplace conditions, must provide collaborative support. The Health and Safety system in Japan and the prominent roles of occupational health physicians were described by Sakurai<sup>13)</sup>. The roles of occupational health nurses (OHNs) in Japan were reported by Ishihara *et al.*<sup>14)</sup> and Inoue<sup>15)</sup>, whereas the role or placement standard of the OHNs is not enacted in the Occupational Safety and Health Act. Japanese OHNs have closer contact with the workers than other occupational health staff, resulting in more information that OHNs can collect to assess their needs and coordinate necessary support<sup>14, 16)</sup>; thus, they can provide a wide range of assistance in the form of either primary prevention, including provision of information and improvement in the work environment; secondary prevention, such as early detection of difficulties, anxiety, and poor working conditions, consultation, treatment recommendations, and workplace coping; tertiary prevention, such as assistance in returning to work. All these types of assistance are characterized by communication skills to quickly understand and respond to the issues or needs of workers and workplace<sup>16)</sup>. These nurses provide assistance to help workers or the workplace to independently handle any challenges that may arise. Another characteristic of their assistance is the coordination of several roles with various individuals involved<sup>17, 18)</sup>. These characteristics are indispensable in providing support that makes workers with cancer compatible with the treatment and work. OHNs are expected to contribute toward increasing the compatibility of cancer treatment with work.

In order to describe the support actually provided by OHNs, we firstly investigated the support to workers with cancer and their workplaces via individual interviews<sup>19)</sup> and a focus group interview<sup>20)</sup>. These previous qualitative studies showed that OHNs supported not only the workers with cancer but also their superiors, colleagues, and human resource (HR) managers to enhance the work-treatment compatibility. However, neither the main content nor the degree to which OHNs actually implement such kind of support has been quantitatively investigated. By quantitatively grasping the structure of the support for the workers with cancer, their superiors or colleagues, and HR managers, even novice OHNs can clearly image the necessary support activities for those stakeholders. In addition, to assess the implementation status of those support activities will help the development of future training programs for OHNs.

This study aimed to quantitatively grasp the structure

regarding OHNs' support activities to workers diagnosed with cancer, their superiors, colleagues, and HR managers as well as to assess the current implementation status and its related factors. Based on the results of this study, training programs for OHNs can be developed to contribute more in balancing cancer treatment and work.

## Methods

### *Participants and data collection*

Self-administered anonymous questionnaires were distributed to 703 registered OHNs certified by the Japan Society of Occupational Health (JSOH) on November, 2011. The sample excluded nurses who worked at education facilities or medical institutions.

### *Structure of the questionnaire*

To make the questionnaire, the items of support for balancing work and cancer treatment provided by OHNs were developed based on the results of our previous qualitative study<sup>20)</sup> via a focus group interview with experienced OHNs. From this previous study five researchers with more than 10 yr of experience as OHNs extracted important concrete support contents provided by OHNs. The sentences were investigated with due consideration and repeatedly revised among the researchers. Finally, 35 items related to supporting individual workers with cancer, 14 items related to supporting superiors and colleagues, and 9 items related to supporting HR managers were determined. In addition, we added basic demographic items, such as years of experience as an OHN, employing institution, and whether a full-time occupational health physician was employed at their workplaces.

Respondents were asked to answer the questionnaire including their level of implementation of the above items concerning support provided to workers with cancer, their superiors and colleagues, and HR managers based on the following choices: not implemented, rarely implemented, somewhat implemented, and always implemented. Regarding this level of support implementation, the response choices were assigned with scores ranging from 1 to 4, with higher scores assigned to greater levels of implementation. These numerical values were referred to as support scores.

### *Analysis*

Demographic characteristics of respondents were calculated. These values were compared between the respondent groups working with and without full-time oc-

cupational health physician by  $\chi^2$  test.

On each item, the total responses of somewhat implemented and always implemented were considered as the proportion of respondents who provided support (named 'support rate').

A factor analysis on the 35 items related to supporting workers was carried out by maximum likelihood method with varimax rotation to compile analogous items. The number of factors was determined considering the interpretability of each factor, eigenvalues >1.0, and scree plot characteristics. We gave a name to each factor according to the items included after repeated discussion among the researchers. Moreover, Cronbach's  $\alpha$  was calculated to confirm internal consistency in each factor. The same procedures were adopted for supporting superiors and colleagues as well as HR managers. Then, the average score for each factor was calculated.

To compare the scores for supporting individual workers with cancer, for their superiors and colleagues, or for HR managers, the Wilcoxon signed-rank test was conducted after the Friedman test. The Bonferroni correction was performed at Wilcoxon signed-rank test to adjust  $p$ -value for multiple-comparison correction.

Mann-Whitney's U-test was also conducted to compare the scores between groups with and without full-time occupational health physician. A  $p$ -value <0.05 was considered statistically significant.

### *Ethical consideration*

The ethical review board of the School of Health Sciences in Tokai University approved this study (No. 11-16). Along with the questionnaire, OHNs were sent to provide written explanations of the study objectives and ethical considerations, such as voluntary cooperation with no penalty for not responding to a questionnaire, anonymous response, and guaranteed privacy. The respondents were assumed to agree if they returned the questionnaire.

## Results

A total of 225 nurses responded (response rate: 32.0%). Among 159 (70.7%) valid responses, 121 were from full-time nurses who had experience in assisting workers diagnosed with cancer, and these responses were analyzed. In this group, nearly 80% of respondents were aged over 40 and belonged to companies (Table 1). Most of the participants had experiences of 10 yr or more as OHNs and two-thirds had clinical experiences. OHNs working without full-time occupational health physicians had significantly

**Table 1. Demographic characteristics of respondents**

Variables	Total (n=121)	With full-time OH physician (n=53)	Without full-time OH physician (n=68)	p-value
Age group	<39	27 (22.3)	15 (28.3)	0.043
	40–49	47 (38.8)	24 (45.3)	
	50–	47 (38.8)	14 (26.4)	
Years of experience as an OHN	<10	24 (19.8)	15 (28.3)	0.039
	≥10	97 (80.2)	38 (71.7)	
Experience as the hospital nurse	Yes	82 (67.8)	34 (64.2)	n.s.
	No	39 (32.2)	19 (35.8)	
Qualification (multiple answer)	Registered nurse	100 (82.6)	42 (79.2)	n.s.
	Public health nurse	79 (65.3)	40 (75.5)	0.038
Affiliated institution	Company	99 (81.8)	48 (90.6)	0.028
	Others <sup>#</sup>	22 (18.2)	5 (9.4)	
Main workplace in charge	3,000–	19 (15.7)	16 (30.2)	3 ( 4.4)
Number of employees	1,000–2,999	27 (22.3)	19 (35.8)	8 (11.8)
	500–999	25 (20.7)	10 (18.9)	15 (22.1)
	50–499	48 (39.7)	7 (13.2)	41 (60.3)
	–49	2 ( 1.7)	1 ( 1.9)	1 ( 1.5)
Frequency of working as OHNs at the workplace	4–5 times/wk	95 (78.5)	42 (79.2)	53 (77.9)
	1–3 times/wk	5 ( 4.2)	1 ( 1.9)	4 ( 5.9)
	less than 3 times/month	21 (17.4)	10 (18.9)	11 (16.2)

Values are n (%). p-values were calculated by  $\chi^2$  test.

OH: occupational health; OHN: occupational health nurse.

<sup>#</sup>health insurance society, occupational health service agent, etc.

**Table 2. Comparison between the scores of support provided to different subjects**

Items	Mean ± SD	p-value <sup>a)</sup>
Support to individual workers with cancer	3.2 ± 0.7	* n.s. **
Support to superiors and colleagues	3.0 ± 0.8	
Support to human resource managers	2.9 ± 0.9	

n=121.

<sup>a)</sup>Wilcoxon signed-rank test with Bonferroni correction \* $p < 0.017$  (=0.05/3), \*\* $p < 0.003$  (=0.01/3).

n.s.: not significant, SD: standard deviation.

longer experiences as OHNs ( $p < 0.05$ ) and supported for workplaces with smaller number of employees ( $p < 0.001$ ). On the other hand, OHNs who worked with full-time occupational health physicians were relatively younger and had more qualification of public health nurse than those without full-time physicians.

The average scores and standard deviations of the items for supporting individual workers with cancer, their superiors and colleagues, and HR managers were shown in Table 2. The Friedman test revealed that there were significant differences among the three support scores ( $p < 0.01$ ). And the Wilcoxon signed-rank test showed that the support score for individual workers was significantly higher than that for others after Bonferroni correction: the

statistical threshold was adjusted to 0.017 (=0.05/3) or 0.003 (=0.01/3) (Table 2).

Results of the factor analysis showed that items on support for individual workers were grouped into six factors, i.e., ‘identifying the worker’s intention and conditions’ (14 items), ‘psychological support’ (8 items), ‘provision of information regarding resources inside and outside the company’ (4 items), ‘support after returning to work’ (4 items), ‘support before and after the diagnosis’ (3 items), and ‘support towards return to work’ (2 items) (Table 3). The Cronbach’s  $\alpha$  value was 0.96–0.71 for each factor. The higher support score among the factors for supporting individual workers was observed in ‘support before and after the diagnosis’, ‘support after returning to work’,

**Table 3. Support provided by occupational health nurses to individual workers with cancer**

Factors	Factor loadings						Support	Support	Wilcoxon
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	rate	score	signed-rank test <sup>#</sup>
Items							(%)	(Mean ± SD)	
<b>Identifying the worker's intention and conditions (<math>\alpha=0.958</math>)</b>							-	3.3 ± 0.8	a
Identifying the worker's intention to continue working, transfer, and change of post and rank	0.752	0.189	0.194	0.178	0.129	0.222	83.5	3.4 ± 1.0	
Identifying the worker's intention to which range one want inform to superiors and colleagues	0.740	0.274	0.200	0.129	0.200	0.285	78.5	3.2 ± 1.0	
Identifying measures that can be provided when physical condition worsens, and thinking together when needed	0.718	0.389	0.212	0.145	0.136	0.079	80.2	3.3 ± 0.9	
Identifying necessity for improving work environment or for coordinating work schedule	0.707	0.351	0.202	0.238	0.131	0.077	77.7	3.2 ± 0.9	
Confirmation of having a talk with the physician in charge about continuation of work	0.702	0.239	0.057	0.168	0.163	0.182	84.3	3.4 ± 1.0	
Advices so that the worker can inform one's needed support to workplace	0.700	0.383	0.150	0.183	0.137	0.255	80.2	3.3 ± 1.0	
Obtaining a physician's opinion about continuation of work	0.684	0.190	0.117	0.246	0.285	0.143	85.1	3.4 ± 0.9	
Confirmation whether the worker can visit a hospital for necessary treatment	0.630	0.280	0.165	0.205	0.280	0.210	82.6	3.4 ± 0.9	
Confirmation of symptoms influencing work and side effects of medications	0.622	0.319	0.103	0.134	0.295	0.086	79.3	3.3 ± 0.9	
Providing information about the roles of occupational health staff and support that can be offered	0.577	0.380	0.236	0.033	0.180	-0.004	83.5	3.4 ± 0.9	
Providing information about sick leave system and flexible work pattern that the worker can use	0.522	0.219	0.296	0.179	0.142	0.198	68.6	3.0 ± 1.0	
Identifying a family's opinion about continuation of work	0.478	0.210	0.368	0.017	0.055	0.236	52.1	2.6 ± 1.1	
Advices about important points at returning to work	0.475	0.319	0.111	0.454	0.317	0.288	84.3	3.4 ± 0.8	
Coordinating the meeting for assessing return to work and attending it	0.400	0.165	0.077	0.371	0.257	0.315	86.0	3.5 ± 0.8	
<b>Psychological support (<math>\alpha=0.940</math>)</b>							-	3.2 ± 0.8	a
Providing support for accepting worker's hesitation and feeling sorry to people of the workplace and for preventing overwork	0.320	0.836	0.137	0.129	0.222	0.140	81.0	3.3 ± 0.9	
Providing support for positively accepting decreased work performance	0.250	0.744	0.155	0.101	0.219	0.243	71.9	3.1 ± 1.0	
Accepting worker's feeling of uneasiness during the reception of illness and balancing cancer treatment and work	0.360	0.737	0.048	0.181	0.314	0.190	80.2	3.3 ± 0.9	
Providing psychological support according to symptoms and treatment stage	0.292	0.720	0.119	0.042	0.301	0.284	76.9	3.2 ± 0.9	
Providing support in achieving self-efficacy to continue working with cancer	0.270	0.599	0.381	0.200	-0.053	0.221	67.8	3.1 ± 1.0	
Confirmation of the presence of family, friends and keypersons at workplace	0.283	0.597	0.309	0.244	-0.027	0.225	74.4	3.2 ± 1.0	
Confirmation whether the worker asked for support from superiors and colleagues when needed	0.445	0.583	0.145	0.476	0.105	0.055	81.8	3.3 ± 0.9	
Providing advices for contents and timing of support request from occupational health staffs	0.254	0.547	0.280	0.152	0.038	0.047	72.7	3.1 ± 1.0	
<b>Provision of information regarding resources inside and outside the company (<math>\alpha=0.754</math>)</b>							-	2.5 ± 0.8	c
Provision of information regarding resources at medical institutions	0.194	0.154	0.794	0.032	0.271	0.071	44.6	2.5 ± 1.0	
Provision of information regarding resources outside the medical institutions	0.073	0.153	0.794	0.074	0.160	0.084	24.0	2.0 ± 1.0	
Provision of information regarding good practices of balancing cancer treatment and work	0.343	0.188	0.409	0.058	0.063	0.195	41.3	2.5 ± 1.1	
Provision of information regarding financial support system of medical insurance association or workers' union	0.216	0.104	0.379	0.065	0.098	0.330	62.0	2.8 ± 1.1	

Continued Table 3.

Factors Items	Factor loadings						Support rate	Support score	Wilcoxon signed-rank test <sup>#</sup>
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	(%)	(Mean ± SD)	
<b>Support after returning to work (<math>\alpha=0.898</math>)</b>							-	3.4 ± 0.8	a
Confirmation of physical conditions and advices after returning to work	0.362	0.495	0.090	0.614	0.173	0.171	90.1	3.5 ± 0.7	
Confirmation of implementation status for self-care after returning to work	0.400	0.415	0.044	0.523	0.345	0.205	83.5	3.4 ± 0.8	
Confirmation of difficulty in the gap between estimated and present physical condition	0.399	0.606	0.129	0.520	0.119	0.077	79.3	3.3 ± 0.9	
Confirmation of the result of periodic examinations during complete remission period	0.401	0.441	0.184	0.335	0.130	0.150	76.0	3.2 ± 1.0	
<b>Support before and after the diagnosis (<math>\alpha=0.708</math>)</b>							-	3.4 ± 0.7	a
Confirmation about the result of diagnosis and treatment plan	0.349	0.245	0.248	0.119	0.622	0.060	80.2	3.4 ± 0.9	
Encouragement for a detailed examination and confirmation of the diagnosis	0.175	0.063	0.130	0.134	0.584	0.105	94.2	3.8 ± 0.6	
Provision of information about appropriate medical institution	0.216	0.232	0.336	0.025	0.486	0.070	74.4	3.2 ± 1.0	
<b>Support towards return to work (<math>\alpha=0.808</math>)</b>							-	2.9 ± 0.9	b
Confirmation of physical and mental conditions during sick leave	0.292	0.342	0.168	0.142	0.135	0.723	66.1	2.9 ± 1.0	
Provision of advices about physical recovery and self-care before return to work	0.280	0.281	0.261	0.147	0.116	0.581	59.5	2.9 ± 1.0	
Average score of support to individual workers							-	3.2 ± 0.7	

n=121. SD: standard deviation.

<sup>#</sup>Significantly different between the different letters by the Wilcoxon signed-rank test with Bonferroni correction ( $a>b>c$ ,  $p<0.003$  ( $=0.05/15$ )).

‘identifying the worker’s intention and conditions’ or ‘psychological support’. The support rates of these four factors were approximately 70–90% (Table 3). The lower support score was for ‘provision of information regarding resources inside and outside the company’ or ‘support towards return to work’; approximately only 20–60% of OHNs provided support in terms of these factors. The Friedman test revealed that there was significant difference among the six factor scores ( $p<0.01$ ). And the Wilcoxon signed-rank test with Bonferroni correction showed that the support score for ‘provision of information regarding resources inside and outside the company’ was significantly lower than the other five factors as well as the score for ‘support towards return to work’ was significantly lower than the higher four factors.

Regarding the support provided to superiors and colleagues, items were divided into three factors. The leading factor was ‘advices for starting a basic assistance in the workplace’ of which the support rates were approximately 70–80%, followed by ‘support for fostering mutual consideration in the workplace’ and ‘support in stabilizing and continually providing assistance in the workplace’ (Table 4). The support scores of these three factors were

significantly different each other by the Wilcoxon signed-rank test with Bonferroni correction. The Cronbach’s  $\alpha$  value was 0.92–0.78 for each factor.

Regarding the support for HR managers, items were grouped into the following two factors, i.e., ‘provision of information for appropriate accommodation’, and ‘support for enhancing collaboration with physicians’ (Table 5). Over 0.90 Cronbach’s  $\alpha$  value was observed for each factor. The former factor showed slightly but significantly higher support scores than the latter one ( $p<0.05$ ).

The comparison analyses revealed that some scores of OHNs’ support showed the significant differences between the groups with and without full-time physician (Table 6). Regarding the support to individual workers, significantly increased scores in OHNs who worked without full-time physician were found in the following two factors, ‘support towards return to work’ and ‘provision of information about resources inside and outside the company’. And regarding support to HR managers, all the two support scores were significantly higher in OHNs who worked without full-time physician (Table 6).

As for the other related factors, neither years of experience as OHNs nor number of employees in the workplace



**Table 4. Support provided by occupational health nurses to superiors and colleagues**

Factors Items	Factor loadings			Support rate (%)	Support score (Mean ± SD)	Wilcoxon signed-rank test <sup>#</sup>
	Factor 1	Factor 2	Factor 3			
<b>Advices for starting a basic assistance in the workplace (<math>\alpha=0.920</math>)</b>				-	3.2 ± 0.8	a
Consultation about appropriate communication and measures with workers with cancer	0.760	0.388	0.193	84.3	3.3 ± 0.8	
Advising superiors and colleagues to help workers with cancer to carry out self-care in the workplace	0.705	0.299	0.396	80.2	3.3 ± 0.9	
Provision of information regarding predictable influence of cancer treatment on work	0.671	0.283	0.429	74.4	3.1 ± 0.9	
Advising superiors regarding information that can be discussed with colleagues	0.621	0.362	0.334	74.4	3.2 ± 0.9	
Provision of advices to frequently confirm the health conditions of the workers with cancer for appropriate continuation of work	0.509	0.488	0.453	76.0	3.2 ± 0.9	
Hearing from superiors and colleagues about the work conditions of the workers with cancer to confirm support system in the workplace	0.518	0.258	0.539	72.7	3.1 ± 1.0	
Provision of information about appropriate timing to consult with occupational health staffs	0.449	0.425	0.389	76.9	3.2 ± 1.0	
<b>Support for fostering mutual consideration in the workplace (<math>\alpha=0.913</math>)</b>				-	2.9 ± 0.9	b
Providing suggestion for making mutual consideration in the workplace	0.248	0.839	0.300	62.0	2.8 ± 1.0	
Providing advice regarding sometimes asking about the physical conditions of the workers with cancer	0.418	0.716	0.181	76.0	3.1 ± 1.0	
Confirming stress or burden experienced by superiors and colleagues in providing support to workers and helping them when needed	0.466	0.628	0.407	67.8	2.9 ± 1.0	
Providing advice regarding periodic opportunity to talk with workers with cancer	0.392	0.583	0.468	64.5	3.0 ± 1.0	
<b>Support for stabilizing and continually providing assistance in the workplace (<math>\alpha=0.777</math>)</b>				-	2.7 ± 0.9	c
Promoting the required measures for business	0.347	0.232	0.759	54.5	2.7 ± 1.0	
Provision of information about good practices in a company for balancing cancer treatment and work	0.223	0.409	0.564	43.0	2.4 ± 1.0	
Confirmation and advice for a successor of a former superior regarding support in the workplace	0.331	0.473	0.443	63.6	2.8 ± 1.1	
Average score of support to superiors and colleagues				-	3.0 ± 0.8	

n=121. SD: standard deviation.

<sup>#</sup>Significantly different between the different letters by the Wilcoxon signed-rank test with Bonferroni correction ( $a>b>c$ ,  $p<0.017$  ( $=0.05/3$ )).

in charge was significantly related to those support scores but age of OHNs showed positive correlation only with 'provision of information about resources inside and outside the company' ( $r=0.289$ ,  $p<0.01$ ).

## Discussion

This is the first Japanese study that grasped the structure and implementation status of support provided by OHNs for balancing cancer treatment and work quantitatively, which will be useful to develop training programs for

OHNs to enhance their balance supports at workplaces. Comparisons of the support scores revealed that the support provided to individual workers with cancer was significantly greater than that provided to the superiors and colleagues, or HR managers. This results suggests that, support to individual workers seems to be fundamental and consistently provided by OHNs as a frontline professional<sup>21)</sup> regardless of work settings. In contrast, support to superiors and colleagues or to HR managers seemed to be provided depending on the situation. Characteristics of the support to each stakeholder will be discussed below.

**Table 5. Support provided by occupational health nurses to human resource managers**

Factors Items	Factor loadings		Support rate (%)	Support score (Mean ± SD)	Wilcoxon signed-rank test <sup>#</sup>
	Factor 1	Factor 2			
<b>Provision of information for appropriate accommodation (<math>\alpha=0.918</math>)</b>			-	2.9 ± 0.9	a
Providing information about the possibility of work continuation among cancer survivors by appropriate consideration and support in the workplace	0.764	0.282	80.2	3.3 ± 0.9	
Informing privacy policy regarding workers with cancer	0.754	0.423	66.1	3.0 ± 1.1	
Providing advices for concrete consideration to support self-care among cancer survivors in the workplace	0.727	0.453	62.0	2.9 ± 1.1	
Suggesting confirmation and coordination about sick leave and flexible work pattern that the worker with cancer can use	0.698	0.281	67.8	2.9 ± 1.1	
Provision of information regarding predictable influence of cancer treatment on work	0.649	0.453	59.5	2.8 ± 1.1	
Providing suggestions about periodic meeting to share information among workers, superiors, human resource managers and occupational health staffs	0.637	0.285	51.2	2.7 ± 1.1	
Suggesting transfer of post or rank of cancer survivors when needed	0.634	0.252	49.6	2.6 ± 1.2	
<b>Support for enhancing collaboration with physicians (<math>\alpha=0.915</math>)</b>			-	2.8 ± 1.1	b
Providing advices for content and timing to ask physicians in charge	0.316	0.948	53.7	2.7 ± 1.1	
Providing advices for content and timing to ask occupational health physicians	0.533	0.593	60.3	2.9 ± 1.1	
Average score of support to HR managers			-	2.9 ± 0.9	

n=121. SD: standard deviation.

<sup>#</sup>Significantly different between the different letters by the Wilcoxon signed-rank test ( $a > b, p < 0.05$ ).

### *Characteristics of the supports for individual workers with cancer*

Regarding the support provided to individual workers with cancer, six factors were found. The authors had discussed and considered that the six factors could be divided into the following two types of support. The highly implemented four factors (Factor 1, 2, 4, 5) are the basic support as OHNS; 'identifying worker's intention and conditions', 'psychological support', 'support before and after the diagnosis' and 'support after returning to work'. OHNS are generally focusing on assessing worker's intention and conditions<sup>16, 21</sup> and such attitude may be quite essential for encouraging worker's initiatives to balance treatment and work. The psychological support by OHN for the worker with cancer seems to be more important than usual because the sentiments of workers with cancer vary depending on several factors, such as the course of treatment and workplace situation<sup>3, 5, 6</sup>. An interview-based study, which focused on patients with breast cancer, found that patients experienced various barriers to return to work<sup>22, 23</sup>. Key barriers were psychological after effects of treatment, fear of lack of understanding from the work

environment, and intrusive negative thoughts not being able to work as they did previously and anxious whether they will be accepted at work<sup>22, 23</sup>. The implementation levels of support provided before and after the diagnosis and that after returning to work were the highest, showing that these supports to the worker with cancer were most essential as OHNS.

The remaining two factors (Factor 3, 6), 'provision of information regarding resources inside and outside the company' and 'support towards return to work', were less implemented than the above four factors. One of the possible reasons for the lowest implementation for provision of information about resources inside and outside the company could be that the need for such assistance differs with the status of treatment and stage of cancer. And, although appropriate assistances are needed along the treatment phases<sup>20</sup>, a smaller amount of support toward return to work may indicate that this period is primarily devoted to treatment according to medical institutions; thus, there is presumably less opportunity for OHNS to provide support towards return to work.



**Table 6. Comparison of average support scores between groups with or without full-time occupational health physician**

Support factors	With full-time physician (n=53)	Without full-time physician (n=68)	U-test <sup>a)</sup>
	Mean ± SD	Mean ± SD	
Support to individual workers with cancer			
Identifying the worker's intention and conditions	3.1 ± 0.9	3.4 ± 0.6	
Psychological support	3.0 ± 0.9	3.3 ± 0.7	
Provision of information regarding resources inside and outside the company	2.3 ± 0.8	2.6 ± 0.7	*
Support after returning to work	3.3 ± 0.9	3.4 ± 0.6	
Support before and after the diagnosis	3.3 ± 0.8	3.5 ± 0.5	
Support towards return to work	2.6 ± 1.1	3.2 ± 0.7	**
Support to superiors and colleagues			
Advices for starting a basic assistance in the workplace	3.1 ± 0.9	3.3 ± 0.7	
Support for fostering mutual consideration in the workplace	2.9 ± 0.9	3.0 ± 0.9	
Support for stabilizing and continually providing assistance in the workplace	2.5 ± 0.9	2.8 ± 0.8	
Support to human resource managers			
Provision of information for appropriate accommodation	2.6 ± 1.0	3.1 ± 0.7	**
Support for enhancing collaboration with physicians	2.5 ± 1.1	3.0 ± 1.1	*
Average score of all support factors	2.9 ± 0.8	3.2 ± 0.5	*

<sup>a)</sup>Mann-Whitney's U-test. \* $p < 0.05$ , \*\* $p < 0.01$ . SD: standard deviation.

#### *Characteristics of the supports for superiors and colleagues*

Regarding the support provided to superiors and colleagues, 'advices for starting a basic assistance in the workplace' is considered the key in situations where workers have chronic illnesses not limited to cancer. This is probably the main reason why the score for this factor was the highest among the three factors.

The scores of 'support for fostering mutual consideration in the workplace' and 'support in stabilizing and continually providing assistance in the workplace' were not so high, probably because advanced skills are required and proactive approaches need to be taken for the provision of such supports. Such assistance requires being aware of the entire workplace, determining the timing of workplace activities, and continuously dealing with details; therefore, the proportion of support implemented may have been low owing to the depth of engagement required and the proficiency of the OHNs and other professionals in the workplace.

However, these supports should be also necessary for balancing work and cancer treatment in the workplace. Interview-based study of cancer survivors who had returned to work revealed the two important barriers associated with returning to work<sup>13)</sup>: insufficient communication with the workplace prior to reinstatement, and lack of awareness regarding the long-term health impacts of the illness and treatment among concerned superiors and colleagues.

Creating a favorable workplace without such barriers will be an extremely important form of support. OHNs must be equipped with skills required to provide this type of assistance; thus, training policies must be investigated to strengthen these skills in the future.

#### *Characteristics of the supports for HR managers*

As for the supports for HR managers, the extracted two factors of 'Provision of information for appropriate accommodation' and 'support for enhancing collaboration with physicians' seemed to be useful for HR managers, although the support scores were not high. The amount of support provided to HR managers was lower than that provided to individual workers with cancer probably because the support to HR managers were depends on with conditions of the workplace. However, if the worker with cancer needs job rotation, the collaboration with HR managers is essential. A collaborative and cooperative information-sharing system with the HR department must be established to review and address workplace accommodations for employees who require cancer treatments.

Previous telephone interview survey highlighted the importance of communication within the workplace with regard to the return-to-work process and the need to provide better support and guidance to cancer survivors, superiors and colleagues<sup>24)</sup>. Based on this evidence, multifaceted cooperation must happen, involving external medical institutions and family members of the workers. This coop-

eration should include appropriately supporting superiors, colleagues, HR managers, and the OHNs attending to the needs of the workers with cancer. Furthermore, it is essential for OHNs to broaden their perspectives and increase the breadth of their expertise. In addition, progress in the creation of a collaboration system among a wide variety of working organizations might result in a remarkable spread of support related to cancer treatment and working<sup>25</sup>).

#### *Roles of OHNs for balancing cancer treatment and work in workplaces*

Our current study revealed that roles of OHNs were varied depending the members of occupational health staff in companies. In smaller companies without full-time occupational health physicians, OHNs were found to implement greater support regarding support to individual workers for returning to work and provision of information about resources inside and outside the company, as well as support to HR managers in sharing information for appropriate accommodation and in enhancing collaboration with outside physicians. These results suggested that such kind of support was primarily handled by full-time occupational health physicians. When the occupational health physician was working part-time in small and medium-sized companies, this role might be primarily fulfilled by the OHNs, indicating that experienced OHNs can play flexible roles in accordance with various conditions of workplaces. Notably, large company where a law requires the employment of a full-time occupational health physician is currently less than 0.2% of all offices or factories in Japan<sup>26</sup>); hence, OHNs have an important role in providing support for balancing cancer treatment and work. Because provision of information about available resources to not only medical institutions but also to patient groups or non-profit support organizations can be useful for numerous workers with cancer<sup>27, 28</sup>), it is necessary to strengthen this type of assistance by OHNs.

Regardless of the existence of full-time occupational health physician, this study also demonstrated that responding full-time OHNs generally provided support consecutive to individuals with cancer and their workplaces. It seems to represent the OHN's own expertise, in which OHNs provide consecutive support from primary to tertiary prevention phases<sup>14, 16, 21</sup>).

Working does not only help individuals earn their living but also provide a sense of significance, identity, and a reason to live<sup>3, 29</sup>). Recently, the number of individuals who have been diagnosed with cancer but who still want to work has increased. Thus, OHNs must enhance their

support skills to provide active support through collaboration with various related occupations, departments, and agencies inside and outside the company. The findings of this study should be applied in developing support tools and training programs for OHNs and other support professions in the future.

#### *Limitations*

The response rate of this study was not high (32.0%) probably because our survey was conducted in 2011 which was about 5 yr earlier the announcement of the guideline on support for workers with cancer or other diseases to balance sustainable medical treatment and work, which was presented in February 2016 by the Japanese Ministry of Health, Labour and Welfare<sup>30</sup>). Thus, the respondents were considered to have somewhat broader concerns and greater experiences about this topic than ordinary OHNs, resulting that the current study would represent skilled Japanese OHNs. Even though the respondents might not represent the whole Japanese OHNs, it was meaningful to know the tendency of actual practices to support balancing cancer treatment and continuation of work provided by the experienced OHNs of the members of JSOH. For comparison with the present study, it will be useful to conduct a new survey to the wide-ranged OHNs not limiting to the members of JSOH, and get some more findings for the future.

#### **Conclusion**

This study revealed the characteristic structure and current implementation status of support provided by OHNs to individual workers with cancer, their superiors and colleagues, and HR managers. They provided significantly higher support to individual workers than to superiors, colleagues or HR managers. As for the support to individual workers with cancer, "provision of information regarding resources inside and outside the company" showed the lowest implementation among the 6 factors. Regarding the support to superior and colleagues, 'support for fostering mutual consideration in the workplace' and 'support for stabilizing and continually providing assistance in the workplace' showed the lower implementation than 'advices for starting a basic assistance in the workplace', indicating the latter factor was basic and the former two factors were advanced supports. OHNs who worked for smaller workplaces without full-time occupational health physician showed significantly increased support implementation for HR managers and some types of support for individual

workers, indicating that OHNs can play a flexible role in accordance with the workplace situation. Based on these results, training programs can be developed to enhance support activities by OHNs for balancing cancer treatment and continuation of work.

## Author Contributions

N.N. conceived the ideas; all the members collected and analyzed of the data; and N.N., E.Y., and M.S. led the writing.

## Conflict of Interest

The authors declare that there are no conflicts of interest.

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