Objectives: This study aimed to assess the sense of difficulty in providing support for balancing cancer treatment and work among occupational health nurses (OHNs).

Methods: Based on our previous qualitative study, we established a questionnaire including 11 items about the sense of difficulty in providing support to workers with cancer and their workplaces. The questionnaire was distributed to OHNs by mail. The 4-point Likert scale was used to obtain a higher score associated with a higher degree of difficulty. Factor analysis of the 11 items was conducted, and the difficulty score was calculated for each factor. To compare the difficulty scores among the factors, the Wilcoxon signed-rank test was conducted after the Friedman test. Rank correlation analysis was used to identify the relationship between the sense of difficulty and other variables.

Results: The sense of difficulty was divided into the following four factors: difficulty in supporting along with the feelings of the worker with cancer, difficulty in collaborating with people concerned outside the company, difficulty in supporting the supervisors and workplaces, and difficulty in collaboration within the company. Significant difference among the factors was detected by Freidman test. Wilcoxon signed-rank test revealed that the second factor showed significantly higher difficulty score than others. A significant association was observed between greater sense of difficulty and less implementation of support.

Discussion: Collaboration with people outside the company, such as hospital staffs and family members, seemed to be the most difficult activities for OHNs. Development of training programs based on this study will help OHNs overcome these difficulties and promote support to balance cancer treatment and work.

Key words: balance support, cancer treatment and work, sense of difficulty, occupational health nurse

Introduction

Returning to work has been found to be beneficial for many patients at working age from various viewpoints. Thus, identifying ways to support cancer survivors to return to work has been an important topic worldwide. Not only medical aspects, such as type of cancer and treatment condition, but...
also workplace factors, including qualitative and quantitative work demand, level of discretion, and whether the workplace has a supportive atmosphere or not, are considered essential.

The importance of the healthcare professional roles has been investigated from the hospital– and workplace–based standpoints. Yagil et al. reported studies that conducted interviews using questionnaires on specialties, showing that social workers and psychologists jointly discussed options and implications with the cancer survivor, while physicians and nurses provided information and suggestions. In a qualitative study, Stone et al. reported about the supportive roles of occupational health nurses (OHNs) such as influencing survivor-self, sustaining work ability, gatekeeping (employment opportunities, return to work), and accessing support for young adult cancer survivors.

In Japan, OHNs play varying roles from primary to tertiary prevention at workplaces and collaborate with occupational health physicians and other professionals. Recently, the balance between cancer treatment and work has been an issue in workplaces because the number of cancer survivors in the working population has significantly increased with the progress in medical treatment. Support to workers with cancer and their workplaces are the new challenges faced by relevant health professionals. In our previous study, we conducted focus group interview (FGI) with OHNs, the topic of which was defined as “the difficulties faced in providing support for balancing work and cancer treatment”, and qualitatively extracted nine categories related to the sense of difficulty, such as assessing unstable health conditions by cancer treatment, supporting cases of terminal cancer survivors, promoting decision-making, protecting personal information, creating sound workplace culture, building support system at the workplace, collaborating with occupational physicians, and collaborating with hospital staff. However, little is known about the level of the sense of difficulty in providing support for cancer survivors among OHNs.

Thus, this study aimed to assess the sense of difficulty in providing support to balance cancer treatment and work among OHNs. In addition, this study was designed to investigate the association between the sense of difficulty and implementation of support and other factors. These findings can be used to assess the training needs of OHNs for contributing more to balance between 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 who were working at companies, except nurses working at education facilities or medical institutions; this was because we intended to investigate the difficulties among OHNs who support cancer survivors at their workplaces.

Making the questionnaire

Because there was no precedent study about the sense of difficulty among OHNs when we conducted this study, the items about sense of difficulty in the questionnaire were created by repeated discussions among the authors based on the results of our previous study using FGI with OHNs and relevant literatures. Finally, we determined 11 items related to the sense of difficulty experienced by OHNs in providing support.

Data collection

The participants were instructed to answer their level of sense of difficulty about each item based on the following four choices: not difficult, not very difficult, slightly difficult, and difficult. In addition, several basic information items, such as years of
experience working as an OHN, type of employing institution, and whether an occupational health physician was employed full-time at their workplace, were included. The level of implementation of support to balance between cancer treatment and work was also investigated using 35 items related to workers with cancer, 14 items related to superiors and colleagues, and nine items related to human resource managers. These items were also generated by repeated discussions among the authors based on the results of our previous FGI study. The participants were instructed to answer their level of implementation on the aforementioned items based on the following four choices: not implemented, rarely implemented, somewhat implemented, and always implemented.

Analysis

Regarding the level of sense of difficulty, the response choices were assigned with scores ranging from 1 to 4, with higher scores assigned to greater levels of difficulty. These numerical values were referred to as difficulty score.

To examine the factor structure of the sense of difficulty, a factor analysis (maximum likelihood method, varimax rotation) of the 11 items on the sense of difficulty was conducted. We determined the number of factors considering the interpretability of each factor, eigenvalues > 1.0, and scree plot characteristics. Internal consistency was confirmed by calculating Cronbach’s alpha, and the average difficulty score was calculated for each factor. To compare the difficulty scores among the factors, the Wilcoxon signed-rank test was conducted after the Friedman test.

Spearman’s ranked correlation coefficient was calculated to identify relationships among each factor of the sense of difficulty and other variables, including basic information of the participants and the level of support provided for each subject. Similar with difficulty score, the response choices for the level of support implementation were assigned with scores ranging from 1 to 4, with higher scores assigned to greater levels of support.

A two-tailed p-value of 0.05 was used to define statistical significance. The Bonferroni correction, which sets the alpha value for the entire set of n comparisons equal to alpha by taking the alpha value for each comparison equal to alpha/n, was used at Wilcoxon signed-rank test as a multiple-comparison correction.

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, written explanations of the study objectives and ethical considerations, which include information about voluntary cooperation with no penalty for not responding to a questionnaire, anonymous response, and guaranteed privacy, were sent to the OHNs. The participants 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 the responses were then analyzed. In this group, 79 (65.3%) were public health nurses, and 99 (81.8%) belonged to companies (Table 1).

Results of the exploratory factor analysis (maximum likelihood method, varimax rotation) showed that the items on sense of difficulty were classified into four factors.

Although the eigenvalue of the fourth factor was slightly less than one, the four-factor structure was adopted because of the interpretability of each factor. The four factors were identified as ‘difficulty in supporting along with the feelings of the worker with cancer’ (three items), ‘difficulty in collaborat-
### Table 1  Demographic characteristics of the respondents

| Variables                        | n (%)     |
|----------------------------------|-----------|
| **Age group (years)**            |           |
| ≦39                              | 27 (22.3) |
| 40–49                            | 47 (38.8) |
| ≧50                              | 47 (38.8) |
| **Years of experience working as an OHN** | mean±SD   |
| <10                              | 24 (19.8) |
| 10–19                            | 51 (42.1) |
| ≧20                              | 46 (38.0) |
| **Qualification**                |           |
| Public health nurse              | 79 (65.3) |
| Registered nurse                 | 42 (34.7) |
| **Affiliated institution**       |           |
| Company                          | 99 (81.8) |
| Health insurance society         | 13 (10.7) |
| Others                           | 9 (7.4)   |
| **Main workplace in charge**     |           |
| **Number of employees**          |           |
| ≧3000                            | 19 (15.7) |
| 1000–2999                        | 27 (22.3) |
| 500–999                          | 25 (20.7) |
| 50–499                           | 48 (39.7) |
| ≧49                              | 2 (1.7)   |
| **Frequency of support**         |           |
| 4–5 times/week                   | 95 (78.5) |
| 2–3 times/week                   | 2 (1.7)   |
| approximately 1 time/week        | 3 (2.5)   |
| 1–3 times/month                  | 15 (12.4) |
| several times/year               | 6 (5.0)   |
| **Occupational health physician**|           |
| Full-time                        | 53 (43.8) |
| Part-time                        | 68 (56.2) |

n=121

OHN; Occupational Health Nurses
ing with the people concerned outside the company’ (three items), ‘difficulty in supporting superiors and workplaces’ (two items), and ‘difficulty in collaboration within the company’ (three items). The Cronbach’s alpha values for the four factors and the whole 11 items were 0.89, 0.68, 0.73, 0.61, and 0.87, respectively (Table 2).

The distribution and scores for difficulty among OHNs were also described in Table 2. Significant difference was found among the four factors by Friedman test ($p < 0.001$). The Wilcoxon signed-rank test with the Bonferroni correction (adjusted $p$-value was $0.05/6 = 0.008$) revealed significant differences in all comparisons between the factors except for the comparison between factor 1 and 3. The score of the second factor, ‘difficulty in collaborating with the people concerned outside the company’, was significantly higher than those of other factors, indicating that OHNs find these items most difficult. The score of the fourth factor, ‘difficulty in collaboration within the company’, was the lowest among the four factors. Particularly, the item, ‘difficulty in getting the good timing of coordination with the occupational health physician, such as providing information to him/her’, had the lowest score because approximately 60% of OHNs answered “not difficult” and more than 30% of OHNs felt “not very difficult.” The total average score ($\pm$ standard deviation) for the sense of difficulty in providing support for balancing cancer treatment and work was $2.3 \pm 0.5$.

Regarding the correlation between the sense of difficulty and basic information, the score for difficulty in collaboration within the company had a significant positive correlation with the number of workplaces in charge and a significant negative correlation with the frequency of support at the workplace (Table 3).

A greater sense of difficulty was significantly associated with less support implementation in almost all items except for the correlation between difficulty in supporting along with the feelings of the worker with cancer and support implementation from human resource managers (Table 3).

**Discussion**

This study quantitatively measured the sense of difficulty experienced by OHNs in providing support for balancing cancer treatment and work to workers with cancer and their workplaces for the first time.

We found that the greatest challenge among OHNs was collaboration with people concerned outside the company, such as family members and staffs of medical institutions. Collaboration with people outside the company may be essential in cases of cancer progression because the required coordination and collaboration must go beyond the workplace in such cases. These findings are similar to previous studies that reported that occupational health physicians had difficulties in collaboration with people outside the company because of the lack of necessary medical information disclosure and concrete advices from hospitals in patient referral documents. People outside the company, such as family members or hospital staffs, are not usually knowledgeable about general business structure and key work-related considerations, and this is the reason why OHNs find it difficult to coordinate and collaborate with family members, medical social workers, and nurses and physicians of medical institutions for cancer survivors. In such cases, OHNs and occupational health physicians must assess the peoples’ situation and needs for providing necessary information and useful advice in promoting the worker’s balance between the cancer treatment and continuation of work. The Guideline for Supporting Balance between Medical Treatment and Work at Workplace was published in 2016, and our study was performed before this
Table 2: Results of the factor analysis and response distributions about the sense of difficulty in providing support for balancing cancer treatment and work

| Items                                                                 | Component factors of the sense of difficulty | Factor loading | Response distribution (%) | Average score | Wilcoxon signed rank test p-value |
|----------------------------------------------------------------------|-----------------------------------------------|----------------|---------------------------|---------------|-----------------------------------|
|                                                                      | (Cronbach's α)                                | Factor 1       | Factor 2                  | Factor 3      | Factor 4                           | Mean ± SD |
| 1. Difficulty along with the feelings of the worker with cancer      | (α = 0.881)                                   |                |                           |               |                                   |           |
| Difficulty in supporting the worker to strike a balance between work and treatment | .862                                          | .302           | .182                      | .295          |                                     | 2.4 ± 0.7 <0.001* |
| Difficulty in encouraging the worker to think that he/she can live and work with cancer | .801                                          | .210           | .207                      | .244          |                                     | 2.3 ± 0.8 |
| Difficulty in encouraging the worker to be open and accepting the feelings and concerns expressed | .720                                          | .217           | .187                      | .157          |                                     | 2.4 ± 0.9 |
| 2. Difficulty in collaborating with people concerned outside the company | (α = 0.678)                                   |                |                           |               |                                   |           |
| Difficulty in coordinating with the worker’s family to ensure providing the necessary support | .073                                          | .743           | .117                      | .305          |                                     | 2.8 ± 0.8 |
| Difficulty in sharing information and collaborating with the hospital staff | .210                                          | .546           | .180                      | .097          |                                     | 2.6 ± 0.8 |
| Difficulty in collecting information about medical institutions specializing in cancer, methods of cancer treatment, etc. | .298                                          | .432           | .062                      | .121          |                                     | 2.5 ± 0.9 |
| 3. Difficulty in supporting superiors and workplaces                  | (α = 0.727)                                   |                |                           |               |                                   |           |
| Difficulty in identifying the embarrassment felt by the supervisor on how to appropriately support and accommodate the worker | .240                                          | .188           | .914                      | .266          |                                     | 2.2 ± 0.7 |
| Difficulty in providing assistance for establishing a workplace in which all the members are supportive to the worker with cancer | .409                                          | .252           | .457                      | .142          |                                     | 2.5 ± 0.8 |
| 4. Difficulty in collaboration within the company                     | (α = 0.610)                                   |                |                           |               |                                   |           |
| Difficulty in proposing stakeholders, including human resource managers, regarding job accomodation and needed considerations at the workplace in accordance with the health condition and treatment status of the worker with cancer | .337                                          | .306           | .133                      | .626          |                                     | 2.1 ± 0.8 |
| Difficulty in coordinating with other departments while ensuring the protection of privacy as the worker wishes | .417                                          | .174           | .045                      | .586          |                                     | 2.3 ± 0.9 |
| Difficulty in obtaining a good timing for coordination with the occupational health physician, such as providing information to him/her | .037                                          | .124           | .164                      | .366          |                                     | 1.5 ± 0.7 |
| Total score of sense of difficulty                                   | (α = 0.874)                                   |                |                           |               |                                   | 2.3 ± 0.5 |

n = 121
Significant difference was found among the four factors by Friedman test (p < 0.001).
*Significantly different from Factor 2 by Wilcoxon signed rank test with Bonferroni correction (p < 0.008 = 0.05/6).
guideline was published. Because the sample sheets for information exchange between companies and hospitals have been included in the guideline, companies’ situations regarding cooperation with the medical personnel in hospitals might be changing; therefore, this should be clarified in the future.

On the other hand, our results showed the difficulty in collaborating within the company was the lowest. Particularly, the difficulty score of the item regarding coordination with the occupational health physician was quite low, indicating that OHNs usually collaborate with occupational health physicians in addition to balance support. Okahisa and Nishikido reported that OHNs play an important role as care coordinators when cancer survivors return to work24). Kono et al. showed that coordinating competency is one of the important competencies of OHNs25). The results of the present study suggest that OHNs demonstrate their competencies and contribution to promote support systems in the company by supporting cancer survivors as well as by cooperating with managers, human personnel departments, and other occupational health staff members including occupational health physicians.

Concerning the related factors, rank correlation analyses indicated that those with more work experience as OHNs had less sense of difficulty in collaborating with people concerned outside the company. If the competency of experienced OHNs can be clearly identified, novice OHNs will be able to learn from it. Recently, some Japanese studies reported OHNs’ competencies or career anchor, which will contribute to improving OHNs’ nursing practices26-27). It is necessary to integrate these findings to develop education or training programs to promote OHN activities. As for the collaboration within the company, the increased number of workplace in charge and less frequency of support affected the increased sense of difficulty among OHNs, indicating that collaborations within the company can be fostered by cumulative cooperation and communication among OHNs and relevant people in the company. In Japan, because the Industrial Safety and Health Act does not require companies to hire OHNs, the employment and number of OHNs might depend on the company’s

| Score for the sense of difficulty | Demographic variables | Support implementation score |
|---------------------------------|-----------------------|-----------------------------|
|                                 | Years of experience working as OHNs | Frequency of support for the main workplace | Support for the worker with cancer | Support for supervisors and colleagues | Support for human resource managers | Total |
| Difficulty along with the feelings of the worker with cancer | −0.028 | 0.126 | 0.093 | −0.211 * | −0.301 * | −0.132 | −0.241 ** |
| Difficulty in collaborating with people concerned outside the company | −0.193 * | 0.057 | −0.022 | −0.321 ** | −0.356 ** | −0.208 * | −0.339 ** |
| Difficulty in supporting superiors and workplaces | 0.099 | 0.147 | 0.071 | −0.179 * | −0.321 ** | −0.185 * | −0.239 ** |
| Difficulty in collaboration within the company | 0.141 | 0.273 ** | −0.184 * | −0.301 ** | −0.317 ** | −0.205 * | −0.314 ** |
| Total score of sense of difficulty | −0.047 | 0.199 * | −0.042 | −0.315 ** | −0.399 ** | −0.222 * | −0.351 ** |

n = 121, Spearman’s rank correlation analysis: *p < 0.05, ** p < 0.01, *** p < 0.001
initiative. OHNs face some limitations such as the lack of opportunities to receive supervision and professional advice from other occupational health professionals in the company because they often work as full-time health professionals in medium-sized companies. Promoting continuous support network among OHNs is important by providing on-job training within the company as well as off-job training with the support of academic institutions and professional associations.

Moreover, the significant negative correlations between the average scores for the level of difficulty and provision of support clearly indicate that OHNs provided less support when they experience more difficulties. Therefore, training programs should be established to help OHNs learn appropriate knowledge and skills for balancing cancer treatment and work, especially for the required collaborations with people concerned outside the company. Understanding different professionals and related organizations might result in a remarkable spread of support implementation by OHNs collaborating with multi-professionals to balance cancer treatment and work.

There were several limitations in this study. The subjects of the study were OHNs certified by the Japan Society of Occupational Health, supposed to be more advanced than usual OHNs. Thus, the result of this study might be the lower level of sense of difficulty than usual. Another limitation was the use of a newly developed questionnaire that was not fully validated because of the lack of the other authorized scale to assess the difficulty in providing support for balancing cancer treatment and work among OHNs, the results of this study provided useful information that can help assess the training needs among OHNs.

Further study is needed to investigate the sense of difficulty in providing support for balancing cancer treatment and work among OHNs with broader backgrounds than this study. It is also important to develop a more reliable and validated scale for measuring the sense of difficulty in providing support for workers with cancer and their workplaces, which will be useful to evaluate the training programs whether the sense of difficulty can be reduced.

**Conclusion**

The present study demonstrated the feature of sense of difficulty among OHNs in providing support for balancing cancer treatment and work. The sense of difficulty was divided into the four factors. The second factor, ‘difficulty in collaborating with the people concerned outside the company’, was significantly higher than the other three factors, i.e., ‘difficulty in supporting along with the feelings of the worker with cancer’, ‘difficulty in supporting superiors and workplaces’, and ‘difficulty in collaboration within the company’. A significant negative association was observed between the sense of difficulty and the implementation of support among OHNs. These findings will contribute to developing the training programs for OHNs.

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Sense of Difficulty in Providing Support for Balancing Cancer Treatment and Work Among Occupational Health Nurses

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和文抄録

目的：本研究は，がん治療と仕事の両立支援における産業看護職の困難感の程度を評価することを目的とした。

方法：研究者らが過去に実施した質的研究の成果に基づき，がん治療と仕事の両立支援において産業看護職が抱える困難感に関する11の質問項目を作成し，郵送法による産業看護職への質問紙調査を実施した。回答には4件法のリカート尺度を用い，困難感が高いほど高得点となるように設定した。因子分析により困難感に関する項目を因子に分け，因子ごとのスコアをフリードマン検定およびウィルコクソンの符号検定により比較した。困難感と他項目との関連を順位相関分析により検討した。

結果：がん治療と仕事の両立支援に関する困難感は4つの因子に分けられた。第1因子はがんを持つ労働者の気持ちに寄りそう支援をする際の困難，第2因子は企業外の関係者との連携における困難，第3因子は上司や職場を支援する際の困難，第4因子は企業内での連携に関する困難，である。フリードマン検定により有意な因子間差を認め，ウィルコクソン検定を行った結果，第2因子が他の因子より有意に高値であった。また，困難感が高く高いほど，がん治療と仕事の両立支援の実施割合が低いという有意な関連が認められた。

考察：病院スタッフや家族などの企業外関係者との連携は，産業看護職にとって最も難しい支援活動の1つであることが示された。本研究成果を活かした研修プログラムの開発により，産業看護職が困難感を払拭し，がん治療と仕事の両立支援の推進に寄与することが期待される。