Journal of Radiation Research, Vol. 58, No. 2, 2017, pp. 217–224
doi: 10.1093/jrr/rrw094
Advance Access Publication: 7 October 2016

Evaluation of the prevalence of burnout and psychological morbidity among radiation oncologist members of the Kyoto Radiation Oncology Study Group (KROSG)

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Received May 18, 2016; Revised July 11, 2016; Accepted August 30, 2016

ABSTRACT

This study aimed to evaluate the self-reported prevalence of burnout and psychological morbidity among radiation oncologists members of the Kyoto Radiation Oncology Study Group (KROSG) and to identify factors contributing to burnout. We mailed an anonymous survey to 125 radiation oncologists members of the KROSG. The survey included; the demographic data, the Maslach Burnout Inventory – Human Services Survey (MBI-HSS) and the 12-item General Health Questionnaire (GHQ-12). There were 87 responses out of 125 eligible respondents (69.6% response rate). In terms of burnout, three participants (3.4%) fulfilled the MBI-HSS criteria of having simultaneously high emotional exhaustion (EE), high depersonalization (DP) and low sense of personal accomplishment (PA). Eighteen (20.6%) reported a high score for either EE or DP meeting the alternative criteria for burnout with three of these simultaneously having high EE and high DP. The prevalence of psychological morbidity estimated using GHQ-12 was 32%. A high level of EE and low level of PA significantly correlated with high level of psychological morbidity with $P < 0.001$ and <0.01 respectively. Having palliative care activities other than radiotherapy and number of patients treated per year were the only factors associated with burnout. This is the first study investigating the prevalence of burnout and psychological morbidity among radiation oncologists in Japan. Compared with other studies involving radiation oncologists, the prevalence of low personal accomplishment was particularly high in the present study. The prevalence of psychological morbidity was almost the double that of the Japanese general population and was significantly associated with low PA and high EE.

KEYWORDS: burnout, depression, radiation oncologists, Japan

INTRODUCTION

Burnout is a stress-induced syndrome defined by three dimensions: emotional exhaustion (EE; a loss of enthusiasm for work), depersonalization (DP; a feeling of cynicism) and low sense of personal accomplishment (PA; perspective that work is meaningful). Burnout is frequently observed in workers that spend considerable time in intense involvement with other people. This is the case for physicians in general, and oncologists in particular [1, 2]. Burnout has been linked to job turnover, absenteeism and low morale; in physicians it has also been linked to poor quality of life, increased suicidal ideation, poorer quality of care, increased medical errors and lawsuits, and decreased empathy [1, 3–5].

The practice of oncology, although rewarding, is by nature one of the most demanding and stressful areas in medicine, since the

oncologist needs to face life-and-death decisions, deal with patients' existential questions, and deal with the conflict between the curative goals (on which most training is based) and the palliative goals (of much cancer care) on a daily basis [2, 6]. This probably explains the high level of burnout reported among oncologists. In a survey of 1000 randomly selected physician subscribers to the *Journal of Clinical Oncology*, 56% reported to be suffering burnout [7]. Trufelli *et al.* (in a systematic review and meta-analysis including 10 observational studies) reported a prevalence of 36% [95% confidence interval (CI) (31–41)], 34% [95% CI (30–39)] and 25% [95% CI (0.16–34)], respectively, for EE, DP and PA. Severe involvement by any one of the three dimensions ranged from 8% to 51%, revealing the heterogeneity of the different studies. This heterogeneity may result from differences in culture, national labor policies, personal philosophic background and the manner of facing difficult issues such as death and suffering [8, 9]. Hence, there is a need to investigate the prevalence of and factors associated with burnout in various contexts in order to better define the most appropriate strategies to be implemented.

Several studies on burnout in oncology professionals have been recently published [10–14]. In Japan, research on burnout in healthcare professionals has been mostly carried out on nurses; few studies have involved physicians in general, and even fewer have involved oncology professionals [15–20]. Asai *et al.* reported a prevalence of 22% for EE, 11% for DP and 62% for low PA among clinical oncologists and palliative care physicians involved in end-of-life care of cancer patients in Japan. However, no study has been conducted in Japan to evaluate the prevalence of burnout and its characteristics in Japanese radiation oncologists. In a survey investigating the burden on radiation oncologists working either alone or with only one colleague in community hospitals in Japan, 60% of the 51 respondents (out of 250 surveyed) reported to be satisfied with their work. However, they also reported insufficient vacation time, the difficulty of getting other colleagues' opinions about a case, insufficient time for continued medical education, and a need for more part-time radiation oncologists, radiation oncology nurses and paramedical staff to reduce their heavy workload. Job satisfaction has also been reported in many studies investigating burnout among physicians; yet in those studies, insufficient personal and/or vacation time and heavy workload were frequently reported as reasons explaining the existence of burnout [7].

The present study is the first aiming to determine the prevalence of burnout and depression among radiation oncologists and to reveal the various associated factors. This study targeted radiation oncologist members of the Kyoto Radiation Oncology Study Group (KROSG).

METHODS

The study received the approval of the board members of the KROSG. In December 2015, a cross-sectional survey was mailed to all board-certified and in-training radiation oncologists registered in the KROSG membership list (see supplemental material). Non-respondents were reminded to complete the survey on a subsequent meeting of the association held early January 2016. The study questionnaire consisted of the following instruments:

Table 1. Description of the study population ($N = 87$)

Variables	*N*	%
Sex		
Male	70	80
Female	17	20
Age		
20–29	10	12
30–39	27	31
40–49	23	26
50–59	20	23
60–69	6	7
≥70	1	1
Marital status		
Married	77	89
Single	10	11
Children <22 years old		
Yes	58	67
No	29	33
No. of years of experience		
≤5	17	19
6–10	20	23
11–20	24	28
21–30	20	23
≥31	6	7
Board certification		
Yes	63	73
No	23	27
Data missing	1	
Work sector		
University hospital	38	44
Research institute	4	5
Public medical institution	27	31
General hospital	18	20
Working days/week		
≤2	5	6
3	2	2

Continued

Table 1. Continued

Variables	*N*	%
4	4	5
≥5	76	87
Hours worked/week		
<32	8	9
32–40	9	10
41–50	23	26
51–60	31	36
≥61	16	18
Dedicated time for CME		
Yes	67	78
No	19	22
Data missing	1	
Research activities		
Yes	47	54
No	40	46
Practice of pediatric oncology		
Yes	27	31
No	60	69
Practice of diagnostic radiology		
Yes	25	29
No	62	71
Practice of chemotherapy		
Yes	14	16
No	72	84
Data missing	1	
Palliative care activities other than RT		
Yes	16	18
No	71	82
Number of patients treated/year		
<120	22	25
120–250	48	55
>250	17	20

CME = continuing medical education, RT = radiotherapy.

Demographic parameters

The demographic data, including sex, age, current marital status and professional status, number of children <22 years old, years in practice, as well as variables related to practice patterns (Table 1).

Burnout

Among the psychometric instruments used to measure burnout, the Maslach Burnout Inventory (MBI) has shown to be the most widely used standardized measure of burnout. The MBI-HSS is comprised of a 22-item questionnaire that evaluates all of the three dimensions of burnout (EE, DP and PA) and has been validated in several languages, including Japanese [21]. The MBI-HSS uses a 7-point Likert scale ranging from 0 (never) to 6 (every day). The total score for each subscale was categorized as low, medium or high. Based on normative data from 1104 medical professionals, a high level of burnout is considered to be indicated by a score ≥27 in the EE subscale, ≥10 in the DP subscale and ≤33 in the PA subscale [22]. Although the classic definition of burnout implies the combination of high EE, high DP and low PA, an alternative definition of burnout commonly found in the literature only requires a high score in the EE and DP subscales, defined as the core burnout dimensions [3, 12, 23, 24].

Psychological morbidity

The 12-item General Health Questionnaire (GHQ-12) is a self-administered screening questionnaire, designed for use in consulting settings and aimed at either detecting individuals with a diagnosable psychiatric disorder or as a general measure of psychiatric well-being [25]. We used the validated Japanese version to assess depression and general psychiatric well-being [26–28]. We used the bimodal scaling system, in which the four options for each question were scored 0, 0, 1 and 1, respectively. This scaling has been reported to agree better with the 12-item version of the GHQ than the other two scaling systems, namely the Likert scoring system and the C-GHQ. Psychological morbidity was defined as a score of 4 or more on the GHQ-12 [25].

Statistical analysis

Correlation between the GHQ-12 and MBI-HSS scores was evaluated using multiple linear regression instead of logistic regression, following the recommendation by Maslach to use the individual domain score as continuous data when comparing symptoms of burnout and other outcomes [12, 22, 29].

We also performed multivariate linear regression analysis to identify patient characteristics associated with burnout and psychological morbidity.

All statistical analysis was undertaken using SPSS v.20.0 (SPSS Inc., 2003, Chicago, USA). P values < 0.05 were considered significant.

RESULTS

Demographic parameters

Of the 125 board-certified and in-training radiation oncologists to whom the questionnaire was mailed, 86 responded within 3 weeks, and 2 after a reminder. One response didn't meet the criteria for analysis, so 87 responses were analyzed, representing an overall response

rate of 69.6%. Eighty percent of the participants were male, and there was a median age of 43 years. They were mostly board certified (73%), with 44% working in university hospitals and 31% in public medical institutions. The average weekly working time was 49 h, with 55% treating between 120 and 250 patients per year. Other relevant demographic parameters are summarized in Table 1.

Prevalence of burnout and psychological morbidity

The prevalence of burnout is shown in Fig. 1. Three participants (3.4%) fulfilled the MBI-HSS criteria of having simultaneously high EE, high DP and low PA. Eighteen (20.6%) reported a high score for either EE or DP, meeting the alternative criteria for burnout, with three of these simultaneously having high EE and high DP. A simultaneous high score in EE and DP was always associated with a low score in the PA subscale (100%). Forty-nine (56%) of the respondents scored low in the PA subscale, while 10 respondents (11%) scored low in all three subscales of the MBI-HSS.

Overall, the psychological morbidity rate was 32% among all the respondents. The three respondents who scored high in the EE and DP subscales and low in the PA subscale all had a GHQ-12 score ≥4. Table 2 shows the association between high level of burnout and psychological morbidity. A high level of EE and a low level of PA were significantly associated with a high level of psychological morbidity, with $P < 0.001$ and <0.01, respectively. On the other hand, without being statistically significant, the DP score tended to be negatively associated with the GHQ-12 score ($P = 0.48$).

Factors associated with burnout and psychological morbidity

Table 3 shows the association between participants' characteristics and burnout level/psychological morbidity. Having palliative care activities other than radiotherapy and a high number of patients treated per year were significantly associated with a high level of EE ($P = 0.04$ and $P = 0.01$ respectively), while having palliative care activities other than radiotherapy was the only factor that was significantly associated with a high level of DP ($P = 0.01$). On the other hand, none of the factors investigated were significantly associated with a low PA.

DISCUSSION

Several studies have recently been published on burnout in oncology professionals [2, 6–8, 18]. However, only a few of them specifically deal with burnout in radiation oncologists. Table 4 summarizes some of the studies that used the MBI as a tool for evaluation of burnout, for better comparison with the present study. Our study, to the best of our knowledge, is the first study to investigate the prevalence of burnout and psychological morbidity in radiation oncology professionals in Japan. Our results show that 14% of the respondents had a high level of EE, 10% had a high level of DP, and 56% had a low level of PA. In comparison with previous studies carried out in Western countries, our study shows a lower level of EE and DP and a higher level of low PA [12, 13, 30–32]. However, our results are consistent with those of another study carried out among palliative care physicians and clinical oncologists in Japan by Asai *et al.*, in which the rate of EE, DP and low PA were 22%, 11% and 62%, respectively [18]. It is notable that a particularly high rate of low PA is reported in most Japanese studies compared with the rates reported in studies in Western countries [18, 19, 33]. This may be due to cultural differences from the West regarding work attitude [19]. In our study, participants who were not board-certified (in-training) had a high level of DP (17% vs 8%) and low PA (61% vs 54%) compared with those who were board certified, while the latter had a higher level of EE (14% vs 13%). Very few studies have directly compared burnout patterns between radiation oncology residents and specialists, but it is well documented that the risk factors associated with burnout differ between residents and specialists [32, 34]. Panagopoulou *et al.* reported a higher level of EE and DP in internal medicine residents compared with specialists. In their study, medical residents reported working more hours per week (which strongly correlated with DP) and perceived their job as more

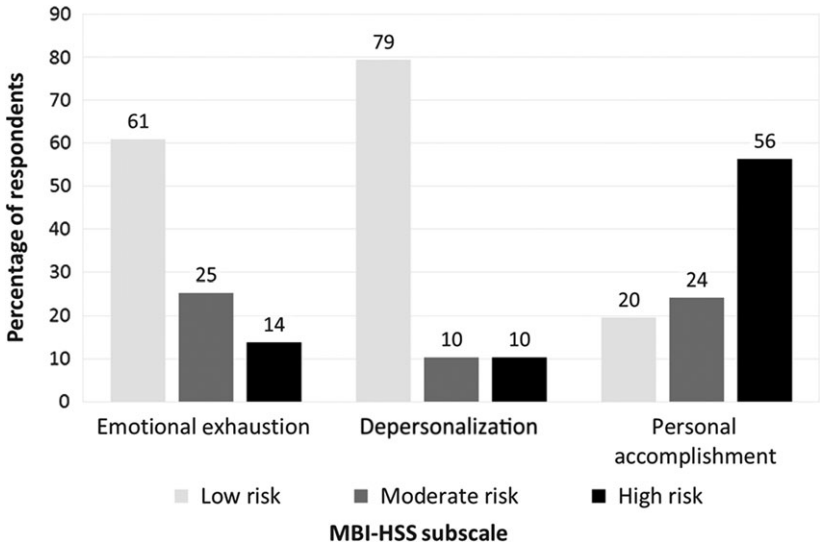

Fig. 1. Percentage of respondents in each MBI-HSS subscale score.

demanding in terms of time pressure and mental effort than medical specialists [34]. Working hours and lack of control, probably due to inexperience, have also been identified as factors contributing to residents' burnout in a systematic review [35]. In our study, respectively 35% and 11% of in-training and board-certified radiation oncologists reported to work ≥61 h per week. This might be a possible explanation for the difference observed between in-training and board-certified radiation oncologists in this study (especially for DP rate), although the difference between the two groups did not reach statistical significance. Blanchard *et al.* reported an overall burnout rate of 46% among French radiation oncology residents, with EE and DP rates of 25% and 41%, respectively [12]. They did not report the PA rate, but their EE and DP rates were higher than that of in-training radiation oncologists in our study, confirming the overall tendency discussed above.

Table 2. Association between MBI-HSS scores and psychological morbidity

	Psychological morbidity		
	Coefficient (SD)	95% CI	*P* value
EE score	0.16 (0.04)	0.08–0.24	<0.001
DP score	−0.05 (0.08)	−0.22–0.10	0.48
PA score	−0.1 (0.03)	−0.18– −0.03	<0.01

EE = emotional exhaustion, DP = depersonalization, PA = sense of personal accomplishment.

Several definitions of clinical burnout have been proposed in the literature [12, 22, 23, 36]. In this study, participants were considered as suffering clinical burnout if they had a coexistence of high EE, high DP and low PA scores in the three subscales of the MBI-HSS (classic definition) or they scored high in the core components of the MBI-HSS, that is EE or DP subscales (alternative criteria). Based on the classic definition and the alternative criteria for the existence of burnout, 3.5% and 20.6% of the respondents were, respectively, suffering clinical burnout. Considering the classic definition, our result was comparable with the results of other studies that reported 3%, 0% and 6% among Australian and New Zealand radiation oncologists, the chairs of radiation oncology programs,

Table 3. Factors associated with burnout and psychological morbidity

	Emotional exhaustion β (*P* value)	Depersonalization β (*P* value)	Personal accomplishment β (*P* value)	Psychological morbidity β (*P* value)
Sex	−0.03 (0.84)	0.07 (0.58)	−0.08 (0.55)	−0.10 (0.48)
Age (<40 vs ≥40)	0.01 (0.97)	−0.08 (0.60)	0.13 (0.41)	−0.15 (0.35)
Marital status	0.00 (0.98)	0.06 (0.64)	−0.20 (0.17)	0.16 (0.29)
Children <22 years old	−0.08 (0.53)	0.11 (0.40)	0.16 (0.26)	−0.06 (0.66)
Years of experience (≤5 vs >5)	0.14 (0.52)	0.23 (0.31)	0.10 (0.67)	0.21 (0.37)
Board certification	−0.21 (0.33)	−0.32 (0.14)	−0.04 (0.85)	−0.10 (0.68)
Work sector[a]	0.03 (0.83)	0.24 (0.14)	−0.02 (0.89)	0.02 (0.90)
Working days/week (<5 vs ≥5)	0.04 (0.74)	−0.04 (0.75)	0.17 (0.22)	−0.09 (0.55)
Hours worked/week (≤50 vs >50)	−0.14 (0.28)	−0.01 (0.96)	−0.06 (0.68)	0.19 (0.20)
Dedicated time for CME	−0.12 (0.31)	0.12 (0.35)	0.03 (0.83)	−0.08 (0.56)
Research activities	0.08 (0.59)	−0.07 (0.62)	0.00 (0.99)	0.14 (0.38)
Practice of pediatric oncology	0.04 (0.75)	0.02 (0.89)	0.00 (0.98)	0.02 (0.86)
Practice of diagnostic radiology	−0.15 (0.22)	−0.17 (0.17)	−0.02 (0.88)	−0.05 (0.73)
Practice of chemotherapy	0.04 (0.74)	−0.04 (0.77)	0.17 (0.23)	−0.15 (0.30)
Palliative care activities other than radiotherapy	0.26 (0.04)[b]	0.35 (0.01)[b]	0.02 (0.87)	0.01 (0.95)
Number of patients treated/year[c]	0.35 (0.01)[b]	0.18 (0.22)	0.16 (0.27)	0.10 (0.49)

β = standardized coefficient, CME = continued medical education.
[a]Coded as: 0 = public medical institution, 1 = general hospital, 2 = university hospital or research institutions.
[b]Statistically significant variable ($P < 0.05$).
[c]Coded as: 0 = <120, 1= between 120 and 250, 2 = >250.

Table 4. Recent studies on burnout evaluated with the MBI among radiation oncologists

Authors and year of publication	Country	Type of interview	Total number of surveyed (response rate)	Type of oncology professional who participated in the survey	GHQ-12 (%)	EE (%)	DP (%)	PA (%)
Leung *et al.* (2014) [30]	Australia and New Zealand	Online survey	348 (63.2%)	Radiation oncologists	Not applied	21.8	19.2	24.1
Kusano *et al.* (2014) [13]	United states	Online survey	87 (76%)	Academic chairs of radiation oncology programs	Not applied	25	10	15
Aggarwal *et al.* (2015) [31]	United states	Online survey	88 (53%)	Radiation oncology residency program directors	Not applied	28	15	32
Ciammella *et al.* (2013) [32]	Italia	Mailed survey	400 (28%)	Radiation oncologist aged < 40 years old	Not applied	9	26	8
Blanchard *et al.* (2010) [12]	France	Handed/mailed survey	340 (60%)	Medical, radiation and hemato-oncology residents	Not applied	25[a]	41[a]	
Our study	Japan	Mailed survey	125 (69.6%)	Board-certified and in-training radiation oncologists	32	14	10	56

[a]MBI = Maslach Burnout Inventory, EE = emotional exhaustion, DP = depersonalization, PA = low sense of personal accomplishment, GHQ-12 = 12-item general health questionnaire.

and radiation oncology residency program directors in the USA, respectively [13, 30, 31]. However, based on the alternative definition, our study shows a relatively lower level of burnout (20.6%) than that reported in the literature among radiation oncologists (>30%). Despite that, we would like to emphasis that one out of five respondents in this study reported to be suffering clinical burnout, and 35% of respondents met the criteria for moderate burnout. Additionally, a significant number of respondents had at least one manifestation of burnout. These are grounds for concern.

The prevalence of psychological morbidity was 32% in this study. This was higher than that among Japanese clinical oncologists and palliative care physicians reported by Asai *et al.* (20%) and almost the double of that of the general population of Japan [18, 37]. Studies using the GHQ-12 among radiation oncologists are scarce; however, the prevalence in this study (Fig. 1) compared well with that reported among oncology professionals in general (25–32%). In Asai's study, high level of EE and low level of PA were significantly associated with psychological morbidity. A significant association was also found between high level of EE and low level of PA with psychological morbidity in the present study ($P < 0.001$ and $P < 0.01$, respectively). This suggests that an increased sense of PA and low level of EE may reduce the risk of psychological morbidity.

Having palliative care activities other than radiotherapy, and the number of patients treated per year were the only factors associated with EE, while having palliative care activities other than radiotherapy was the only factor associated with DP. However, no associations were found between the participants' characteristics and PA or psychological morbidity. Among the 16 radiation oncologists doing palliative care other than radiotherapy, 8 were working at university hospitals and 8 (50%) reported chemotherapy as part of their practice. Thirteen treated >120 patients per year, and 4 (25%) treated >250 patients per year.. Treating more patients can result in excess workload, which has been reported to be one of the central factors contributing to burnout among physicians [2]. Palliative care physicians have been reported to have a lower burnout level compared with other oncology physicians [6, 18]. The association with EE and DP found in the present study may then be due to a lack of sufficient training of radiation oncologists regarding the administration of palliative care not related to radiotherapy (probably chemotherapy-related). However, a more complex interaction between several risk factors is highly probable and should be addressed in future research with a larger sample.

Our findings should be interpreted with caution due to several limitations. First of all, the cross-sectional nature of the study does not allow the establishment of a causal relationship between burnout and psychological morbidity, or between the respondents' characteristics and burnout or psychological morbidity. Second, like most studies evaluating burnout and psychological morbidity, the standardized questionnaire used relies on self-reporting and might not correspond to reality. Third, the limited number of participants recruited from one hospital network, even though geographically dispersed, limited the possibility of performing more subclass analysis and compromised our ability to generalize our results. Finally, since radiation oncology is a multidisciplinary field, including radiation therapists, nurses, physicists and dosimetrists might allow for a broader-based definition of factors associated with burnout in radiation oncology professionals.

Our study has several important strengths. First, to our knowledge, our study is the first to evaluate burnout among radiation oncologists in Japan, and achieved a good survey response rate. Second, the prevalence of burnout and psychological morbidity, and the trends in the various components of burnout in our study, are similar to those of other studies involving oncology professionals in Japan, which suggests that our results reflects the typical trends

observed among oncologists in Japan [18]. Last but not least, we used validated metrics to measure burnout and psychological morbidity, which allowed comparison with other studies involving radiation oncologists and the general population.

We believe that additional studies are needed to address the above-mentioned limitations, but this work, as a preliminary study, provides a basis for future research to help improve not only the professionals' well-being, but also quality of care for the patients.

In conclusion, this is the first study investigating the prevalence of burnout and depression among radiation oncologists in Japan. Compared with other studies involving radiation oncologists, the prevalence of low PA was found to be particularly high in the present study. The prevalence of psychological morbidity was almost the double that of the Japanese general population and was significantly associated with low PA and high EE.

SUPPLEMENTARY DATA

Supplementary data are available at *Journal of Radiation Research* online.

ACKNOWLEDGEMENTS

We are grateful to all the members of the Kyoto Radiation Oncology Study Group who kindly responded to our survey. This work will be presented in part at the 58th Annual Meeting of the American Society for Radiation Oncology in Boston, 25–28 September 2016.

FUNDING

This study was supported by the Japan Society for the Promotion of Science (JSPS) KAKENHI [Grant Number 15K09992].

CONFLICT OF INTEREST

The authors have declared that there are no conflicts of interest.

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