Occupational Medicine
https://doi.org/10.1093/occmed/kqab121

Occupational burnout in oncologists in Kazakhstan

D. Vinnikov[1,2], Z. Romanova[1], G. Ussatayeva[1], Z. Tulekov[1], Z. Dushimova[3], I. Khussainova[3] and A. Dushpanova[1,4]

[1]School of Public Health, al-Farabi Kazakh National University, Almaty, Kazakhstan, [2]Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation, [3]Kazakh Institute of Oncology and Radiology, Almaty, Kazakhstan, [4]Scuola Superiore Sant'Anna, Pisa, Italy.

Correspondence to: D. Vinnikov, School of Public Health, al-Farabi Kazakh National University, al-Farabi avenue 71, Almaty 050040, Kazakhstan. Tel: +7 705 2068036; e-mail: denisvinnikov@mail.ru

Background	Although burnout levels in oncologists are likely high, its predictors remain poorly understood.
Aims	This study was aimed to verify the prevalence of occupational burnout in oncology doctors and nurses in the major cancer centre in Kazakhstan and to elucidate its predictors to plan future prevention activities.
Methods	In the leading tertiary-level cancer centre in Kazakhstan, we recruited 256 subjects (67% doctors and 33% nurses, 62% women, median age 37.5 [interquartile range 15] years) and offered them Maslach Burnout Inventory to quantify emotional exhaustion (EE), depersonalization (DP) and personal accomplishment (PA). Demographics, fatigue, health-related quality of life with SF-8 and lifestyle were tested as predictors of burnout in multivariate logistic regression models.
Results	Number of subjects with high EE was 121 (47%), high DP was 161 (63%) and high PA was 152 (59%). Fatigue, worse mental component score (MCS), being single and not exercising regularly predicted more burnout in EE. Fatigue, worse physical component score (PCS) and worse MCS predicted more burnout in DP. Finally, more burnout in PA was independently associated with fatigue, worse PCS, being married or divorced and having a university or academic degree.
Conclusions	The prevalence of occupational burnout in oncologists was high, necessitating early burnout prevention programmes, addressing, among other, fatigue reduction and regular exercise.
Key words	Fatigue; logistic regression; occupational; oncologists; prevention.

Introduction

Physician burnout is a widely recognized occupational problem around the globe with varying prevalence and usually corresponding to emotional exhaustion (EE), depersonalization (DP) and altered personal accomplishment (PA) [1]. Albeit occupational burnout is expected and has been described in various occupations, firstly in those with high risk and where facing disaster and loss are common, such as in firefighters [2], physician burnout also involves close personal contact with a patient and relatives for a prolonged period of time, possibly entailing greater degree of involvement and resulting exhaustion.

Reports of the prevalence of physician burnout are abundant in the biomedical literature with contrasting and inconsistent outcomes, likely associated with a cross-sectional design of most studies. Besides, the measures and tools to quantify burnout vary between studies, hampering direct comparisons. Furthermore, burnout involves occupational, social, work–family conflict and even lifestyle contributors; therefore, unmeasured confounding is likely present in most studies. This results in a wide range of estimates, from 12% of high EE [3] to 53% of occupational burnout during the COVID-19 epidemic [4]. Although proactive burnout prevention may be effective [5], occupational burnout in selected specialties in medicine may still remain high because of poor treatment outcomes, as in oncology.

In Kazakhstan, burnout in medical has been poorly characterized with only one report summarizing predictors and the prevalence of occupational burnout in cardiologists [6]. That study demonstrated high DP in

Key learning points

What is already known about this subject:

- Burnout prevalence and severity in oncologists have never been published in Central Asia, including Kazakhstan, and remain unknown.
- Data on burnout prevalence and its predictors in oncologists in other countries remain contradictory.

What this study adds:

- The prevalence of all three dimensions of occupational burnout in Kazakhstan oncologists is high.
- Age, sex and doctors versus nurses do not affect the occupational burnout of Kazakhstan oncologists.
- Fatigue, health-related quality of life and physical activity are associated with burnout in this occupational group.

What impact this may have on practice or policy:

- Burnout prevention in oncologists in Kazakhstan must be directed to reduce fatigue and involve the staff in regular recreational physical activity.

doctors (up to 52% scored high), but the prevalence of high EE was moderate (32% in doctors and 26% in nurses), which was not associated with age, sex, work duration or physical activity. Exploring other predictors of burnout in Kazakhstan medicals, especially in those dealing with patients with poorer prognosis, is important and may help plan prevention strategy. Because poorer prognosis in cancer care may be an important contributor to burnout, despite burnout is found in other medical specialties [7], quantitative assessment of burnout in oncologists may be of interest. We, therefore, conducted the current study to verify the prevalence of occupational burnout in oncology doctors and nurses in the major cancer centre in Kazakhstan and to elucidate its predictors in order to plan future prevention activities.

Methods

This was a cross-sectional analysis of burnout prevalence and its associations with lifestyle and demographic predictors of the medical personnel of Kazakh Research Institute of Oncology, which had a capacity of 430 beds and 16 clinical departments. The facility is the leading diagnostic, treatment and research facility in oncology in the Republic of Kazakhstan and located downtown Almaty (population around 2 million). Patients on inpatient, outpatient and palliative care in this medical facility represent the population of all provinces of the country referred to the centre as a tertiary care centre. The typical workload of an oncologist in the centre includes daily inpatients' examinations, followed by consultations and medical manipulations for both in- and outpatients. Managing paper and electronic documents of patients takes much of work time. Because this tertiary-level facility is a leading venue for cancer research, oncologists are involved in one or more research projects, recruit patients, analyse data, report them at the meetings and work on the manuscripts. In addition, the centre is used for interns and practicing doctors for continuous medical education.

Doctors and nurses were invited to participate during the morning briefings by the administration. Participation in this study was voluntary. Of the overall staff working in the centre $N = 410$ (157 medical doctors and 253 nurses), 256 volunteered to participate (response rate 62%). With the purpose to detect selection bias, if any, we compared age, sex, education and years in service of the participants with those who declined to participate and found no significant difference in three variables of the four studied. Therefore, we concluded that study volunteers were representative of the overall sample and selection bias was minimal, if any. Four visits to the centre were organized with the purpose to gather participants in the conference room, providing them with the information on the study, instructions to fill in the questionnaires and obtain informed written consent. Data were collected in 2020 prior to the breakout of COVID-19 epidemic.

Questionnaires were offered in Russian or Kazakh and comprised section on basic demographics, including name, age, sex, current position, work duration (the overall years in service since qualification was obtained), highest attained education and marital status; lifestyle, including questions classifying subjects to never, former, current occasional and current daily cigarette smokers, alcohol use from never to daily, and regular physical exercise at least 3 days a week; fatigue; burnout and health-related quality of life (HRQL). In daily smokers, we also ascertained smoking intensity and total years of smoking. Fatigue was quantified with a validated version of the Fatigue Severity Score (FSS) tool, which consisted of nine questions, each graded from 1 to 7, with the overall score from 9 to 63. Total FSS score below or equal to 36 was indicative of no fatigue, whereas 37 and more corresponded to significant fatigue. In any subsequent regression analyses, we included FSS as a continuous variable.

Burnout was measured using validated Russian or Kazakh language Maslach Burnout Inventory (MBI) Human Services Survey for Medical Personnel, which contained 22 items with the range of answers from '0' corresponding to 'never' and '6' (every day). The tool produces the total score for three domains of burnout, including EE from nine questions, DP from five questions and PA from the remaining eight questions. Questions for these domains are dispersed across the questionnaire. Greater total score for EE and DP indicates more burnout, whereas the association is opposite with regard to PA. PA scale measures the feelings of competence and successful achievement in one's work. We report the actual score for three domains as continuous variables in all comparisons of doctors with nurses, males with females. In addition, we converted the scores of each three domains into categorical variables, reflecting 'low', 'average' and 'high' burnout. The corresponding cutoffs for EE were ≤16 (low), 17–26 (average) and ≥27 (high); ≤6 (low), 7–12 (average) and ≥13 for DP (high); and ≥39 (low), 32–38 (average) and ≤31 (high) for PA.

HRQL was assessed using a validated eight-item short version of the general quality of life (QL) tool, SF-8. This instrument allows to quantify eight domains of self-reported QL, including bodily pain (BP), role physical (RP), physical and social functioning (PF and SF), role emotional (RE), general health (GH), mental health (MH) and vitality (VT). We calculated the scores for each of eight domains but report the summary of physical and mental components of these domains (PCS and MCS), calculated using the formula from the original SF-8 manual [8]. These two variables are included in the relevant tests and analyses as separate predictors of HRQL. The study was approved by the Committee of Bioethics of the Faculty of Medicine and Healthcare of al-Farabi Kazakh National University. Each participant signed an informed written consent to participate.

The primary endpoints in this study were the scores of three domains of burnout, including EE, DP and PA. These are reported both as continuous and categorical (low, average and high burnout) variables. All variables were first screened for normality and correlations with each other, and because most variables showed non-normal distribution using Shapiro–Wilk test, we reported their means as medians with the corresponding interquartile ranges (IQRs). Moreover, we utilized non-parametric tests in the univariate comparisons. The means of two groups were compared using Mann–Whitney *U*-test with regard to continuous data, whereas binary data were tested in contingency tables using χ^2 test. Significant differences were considered when *P* was below 0.05. We also report the prevalence of burnout as per cent from the entire group. With the purpose to ascertain the contribution of selected predictors in high burnout, we used logistic regression to report the odds ratios (ORs) with the corresponding 95% confidence intervals (CI) of sociodemographic and lifestyle variables along with HRQL (as PCS and MCS), assuming linear association. During regression analysis, we also quantified collinearity and excluded variables highly correlating with each other. In such regression models, we only included variables which showed significant difference in the univariate comparisons, and in the adjusted models all such confounders were tested. In these regression models, PCS, MCS and FSS were continuous predictors, whereas the remaining confounders were treated as binary variables (yes or no). All testes were completed in NCSS 2020 (Utah, USA).

Results

One-third of study sample were males (Table 1), the median age was 37.5 (IQR 15) years and 56% were married. Only 19% exercised regularly, 28% smoked daily and 36% were never-alcohol users. We found high correlation between age and work duration (Pearson $r = 0.86$). Men did not differ from women in age, work duration, fraction of single staff and the number of regular exercisers. In men, there were significantly more subjects with the university or academic degree (96% versus 67%), daily smokers (43% versus 17%) and fewer never-alcohol users (26% versus 42%), $P < 0.01$ in all three comparisons. Men smoked more cigarettes compared to women (median 10 versus 5, $P < 0.01$) for longer (median 10 versus 8 years, $P < 0.05$).

The median EE score was 26 (IQR 19) (25 in doctors and in 30 nurses, $P = 0.09$); the median DP score was 15 (IQR 10) (15 in doctors and 17 in nurses, $P = 0.08$); and the median PA score was 29 (IQR 15.8) (29 in doctors and 30 in nurses, $P > 0.05$) (Figure 1). Number of subjects with high EE was 121 (47%), high DP was 161 (63%), and high PA was 152 (59%). There was no difference in the number of subjects with high burnout between doctors and nurses, except in EE domain (42% versus 59%, $P < 0.01$). We found no differences in the number of subjects with high burnout between men and women in all three domains.

The median FSS score was 33 (IQR 18.5) with no difference between doctors and nurses (Figure 2). About one-third of participants ($n = 97$; 38%) had high fatigue score based on the cutoff of 37. Similarly, we could not find significant differences in HRQL, both physical and mental components between doctors and nurses (Figure 2). Table 2 summarizes univariate comparisons of selected predictors of greater burnout. Thus, age, sex and years in work consistently showed no association with any burnout dimension, but fatigue predicted more burnout in all three dimensions with very high power. There were more nurses, more single staff, more staff with less education, more smokers, more staff with sedentary lifestyle, more drinkers and staff with worse mental component of HRQL in those with greater EE burnout. The subjects

Table 1. Demographic and lifestyle profile of study participants

	Overall	Doctors	Nurses	*P*
N (%)	256 (100)	171 (67)	85 (33)	–
Women, *n* (%)	159 (62)	80 (47)	79 (93)	<0.001
Age, years	37.5 (15)	38 (13)	37 (15.5)	NS
Work duration, years	12 (11)	11 (11)	13 (15)	<0.05
Marital status, *n* (%)				
Single	64 (25)	43 (25)	21 (25)	NS
Married	143 (56)	94 (55)	49 (58)	
Divorced	49 (19)	34 (20)	15 (17)	
Education, *n* (%)				
Secondary or high school	5 (2)	0 (0)	5 (6)	<0.001
College	49 (19)	4 (2)	45 (53)	
University	128 (50)	101 (59)	27 (32)	
Academic degree	74 (29)	66 (39)	8 (9)	
Daily smokers, *n* (%)	71 (28)	48 (28)	21 (25)	NS
Regular exercise, *n* (%)	48 (19)	42 (25)	6 (7)	<0.001
Never alcohol, *n* (%)	92 (36)	54 (32)	38 (45)	<0.05

Continuous variable comparisons were done using Mann–Whitney *U*-test, and binary variables with χ^2 test in contingency tables. NS, non-significant.

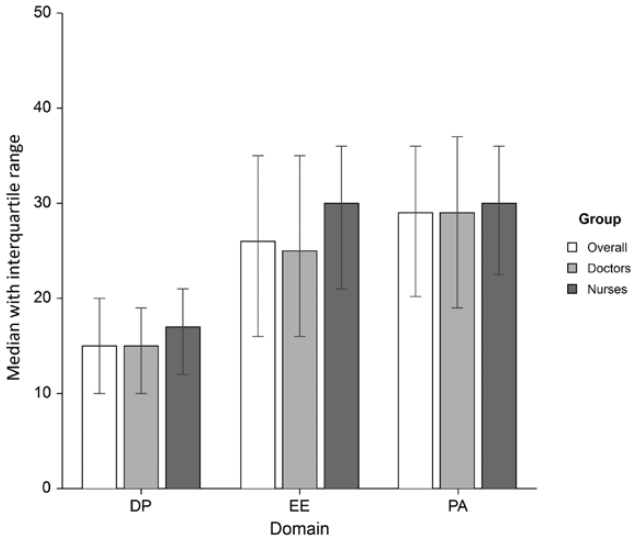

Figure 1. Medians with IQR for EE, DP and PA in doctors and nurses; differences between doctors and nurses are non-significant.

exercising less and having poorer physical and mental HRQL components demonstrated more DP burnout. Finally, advanced PA burnout was found in married participants compared to their single counterparts, in those with more education, in those using alcohol and subjects with poorer physical component of quality of life.

We then tested whether significant burnout predictors in each dimension were independently from each other associated with burnout using adjusted regression models. Fatigue (OR 1.17 [95% CI 1.12, 1.23]), worse MCS (OR 1.10 [95% CI 1.05, 1.14]), being single (OR 5.19 [95% CI 1.88, 14.4]) and not exercising regularly (OR 9.91 [95% CI 2.92, 27.2]) predicted more burnout in EE, whereas this model explained almost 50% of EE variability (R^2 = 0.47). Fatigue (OR 1.11 [95% CI 1.08, 1.15]), worse PCS (OR 1.05 [95% CI 1.01, 1.10]) and worse MCS (OR 1.05 [95% CI 1.02, 1.09]) predicted more burnout in DP in the adjusted model with R^2 = 0.29. Finally, more burnout in PA was independently associated with fatigue (OR 0.97 [95% CI 0.94, 0.99]), worse PCS (OR 1.05 [95% CI 1.01, 1.09]), being married or divorced (OR 3.42 [95% CI 1.80, 6.50]) and having a university or academic degree (OR 2.47 [95% CI 1.24, 4.92]) in a model with R^2 = 0.14.

Discussion

This is the first report of the prevalence and predictors of the occupational burnout in doctors and nurses dealing with cancer patients in Central Asia. The fraction of subjects with high burnout in all three domains was high, close to or exceeding 50%, suggesting that oncologists may have been a group among those with most advanced burnout. We found that neither age nor sex was associated with burnout, as it was not more prevalent in nurses compared to doctors. Fatigue, worse HRQL and no recreational exercise predicted burnout in this group. Thus, burnout prevention should be targeted at greater involvement in regular physical activity, fatigue prevention through reduced workload and at the ways to address individual health associated with HRQL.

Burnout direct comparison with other specialties in medicine and other occupational groups may be challenging, because no uniform methodology of burnout assessment exists, including the questionnaires. Most studies used MBI and reported three burnout dimensions, such as EE, DP and PA, also offering multivariate analyses of selected predictors for each of these dimensions. These predictors may include work duration and age [9,10], HRQL [2], alcohol use [6], distance from

Table 2. Univariate comparisons of selected demographic, lifestyle, fatigue and HRQL predictors for three domains of burnout

	EE		DP		PA	
	Low	High	Low	High	Low	High
N	135	121	95	161	104	152
Age, years	38 (15)	37 (14)	38 (14)	37 (15)	36 (16)	38 (12)
Work duration, years	11 (10)	13 (13.5)	11 (10)	12 (14)	11 (15)	12 (9.8)
Doctors, *n* (%)	100 (74)	71 (57)*	66 (69)	105 (65)	63 (61)	108 (71)
Men, *n* (%)	50 (37)	47 (39)	34 (36)	63 (39)	34 (33)	63 (41)
Single, *n* (%)	25 (19)	39 (32)*	18 (19)	46 (29)	43 (41)	21 (14)*
University and higher, *n* (%)	114 (84)	88 (72)*	78 (82)	124 (77)	73 (70)	129 (85)*
Daily smokers, *n* (%)	25 (19)	44 (36)*	19 (20)	50 (31)	26 (25)	43 (28)
Regular exercise, *n* (%)	39 (29)	9 (7)*	26 (27)	22 (14)*	18 (17)	30 (20)
Never alcohol, *n* (%)	57 (42)	35 (29)*	46 (48)	73 (45)	33 (32)	100 (66)*
FSS score	27 (13)	41 (13.5)*	25 (14)	38 (17)*	38 (17.7)	30 (16)*
PCS score	56.1 (12.8)	54.7 (9.3)	59.8 (12)	53.6 (9.3)*	57.6 (10.5)	52.2 (10.7)*
MCS score	55.1 (12.2)	49.5 (12.5)*	58.6 (13.9)	50.4 (12.9)*	51.5 (19.1)	51.8 (11.6)

*$P < 0.05$.

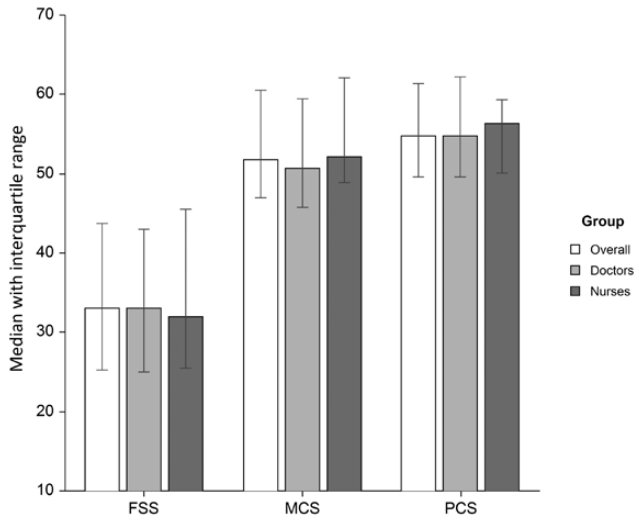

Figure 2. FSS and HRQL MCS and PCS scores in the groups; differences between doctors and nurses are non-significant.

home to workplace [11] and a range of conflicts, such as work–family or between-colleagues ones. Studies yielded inconsistent outcomes of the association of age and sex with burnout. Thus, in a study of occupational doctors, where burnout prevalence was lower compared to other specialties, women and older doctors had greater odds of burnout [10]. In nurses, younger age was also predictive of more burnout [12]. However, other studies found no association of age with burnout in multivariate analyses, as a study of cardiologists in Kazakhstan [6]. We believe that the effect of age may be confounded by a wide range of unmeasured variables, for example, individual health, naturally deteriorating with years.

A study with one of the largest samples of oncology personnel was published from China [3]. They also confirmed that self-rated HRQL, but not age itself, predicted burnout, although the overall prevalence of burnout in all three dimensions in this report was surprisingly low. In general, given the effect of age and HRQL on burnout is hard to separate in cross-sectional studies and in many studies advanced age protects against burnout, more insightful research and longer observations are needed to understand whether that was a pure effect of age or age acts as a confounder mediating other age-related determinants of burnout.

Other published reports in oncologists focused on both work-related and non-work-related predictors of burnout. Thus, subjective time pressure at work was a key predictor of burnout, but also of compassion fatigue in a study of 312 Canadian oncologists [13], consistent with another study showing that work-related stressors explained much more variability of three domains of MBI burnout as compared to non-work-related characteristics [14]. In another large study of 637 oncologists from 19 countries, 72% were at high risk of burnout, and PA correlated with years of service, percentage of cancer deaths and availability of the number of oncologists [15]. In an anonymous Japanese study of 125 radiation oncologists, having palliative care activities other than radiotherapy and number of patients treated per year were the only factors associated with burnout [16]. Although findings from various studies in different locations may not always be consistent, identification and understanding burnout predictors in oncologists may help plan efficient coping strategies.

The use of a popular tool to quantify burnout, MBI, which allows to directly compare the prevalence and burnout predictors in this analysis with other studies is indeed a strength of this report, moreover, inclusion of both nurses and doctors of the leading cancer treatment facility in the country is another perceived strength of the current presentation. Cross-sectional study design is,

however, a limitation precluding from making causal inferences about the selected predictors and from assessing the change of burnout levels with time. Moreover, we could not embrace cancer centres located in other Kazakhstan cities and did not directly compare burnout of oncologists with other medical specialties. In addition, we did not aim to test various conflicts as burnout predictors, such as work–family conflict, known to have an association with burnout with selected occupational elsewhere. Even more, we might have missed some other unmeasured confounding, because burnout is a very complex interaction of work demand with capacities and opportunities, social expectations and individual health. Identification of powerful burnout predictors, which could explain more variability in the multivariate analyses, will indeed guide future research in oncology doctors and nurses. Given that burnout is also a subjective feeling, using mixed methodology with the interviews could have provided more insight into the nature and predictors of burnout but could not be accomplished in this study, which we believe is another limitation.

Our outcomes can guide not only future research but also clear implications for public health policy in burnout prevention. In addition to reduced workload and conventional burnout prevention programmes, we propose to re-evaluate important contribution of regular physical recreational exercise to burnout, because the association of exercising regularly has a strong protective effect in the current presentation. Engagement in recreational physical activity off work is cheap, does not require a lot of time and has other distinct positive effects for health. Despite the effect of exercise has not been shown consistent across studies in other populations, promoting regular physical activity in oncologists by the medical facility administration could be an option to combat burnout in this group with probably the highest levels of occupational burnout. Finally, the impact of COVID-19 on the burnout in oncologists will also have to be ascertained in future studies.

In conclusion, this first report of burnout in oncologists of Kazakhstan has demonstrated high proportions of employees with severe burnout in three dimensions, including EE, DP and PA, with no differences between doctors and nurses. Neither sex or age, but fatigue, HRQL and physical activity, determined burnout in this occupational group. Burnout prevention programmes in oncologists may tackle fatigue, and the effect of reduced workload along with engagement in regular physical activity should be further elucidated in future studies.

Funding

There was no funding for this study.

Competing interests

None declared.

References

1. West CP, Dyrbye LN, Shanafelt TD. Physician burnout: contributors, consequences and solutions. *J Intern Med* 2018;**283**:516–529.
2. Vinnikov D, Tulekov Z, Akylzhanov A, Romanova Z, Dushpanova A, Kalmatayeva Z. Age and work duration do not predict burnout in firefighters. *BMC Public Health* 2019;**19**:308.
3. Chen Z, Leng J, Pang Y, He Y, Heng F, Tang L. Demographic, occupational, and societal features associated with burnout among medical oncology staff members: cross-sectional results of a cancer center in Beijing, China. *Psycho-oncology* 2019;**28**:2365–73.
4. Duarte I, Teixeira A, Castro L *et al*. Burnout among Portuguese healthcare workers during the COVID-19 pandemic. *BMC Public Health* 2020;**20**:1885.
5. Otto MC, Van Ruysseveldt J, Hoefsmit N, Van Dam K. Investigating the temporal relationship between proactive burnout prevention and burnout: a four-wave longitudinal study. *Stress Health* 2021. doi:10.1002/smi.3037
6. Vinnikov D, Dushpanova A, Kodasbaev A *et al*. Occupational burnout and lifestyle in Kazakhstan cardiologists. *Arch Public Health* 2019;**77**:13.
7. Sultana A, Sharma R, Hossain MM, Bhattacharya S, Purohit N. Burnout among healthcare providers during COVID-19: challenges and evidence-based interventions. *Indian J Med Ethics* 2020;**V**:1–6.
8. Ware JE, Kosinski M, Dewey JE, Gandek B. *A Manual for Users of the SF-8 Health Survey*. Lincoln RI: Quality Metric Inc., 2001; 4–19.
9. Poncet MC, Toullic P, Papazian L *et al*. Burnout syndrome in critical care nursing staff. *Am J Respir Crit Care Med* 2007;**175**:698–704.
10. Green-McKenzie J, Somasundaram P, Lawler T, O'Hara E, Shofer FS. Prevalence of burnout in occupational and environmental medicine physicians in the United States. *J Occup Environ Med* 2020;**62**:680–685.
11. Ndongo JM, Lélé CB, Manga LO *et al*. Epidemiology of burnout syndrome in four occupational sectors in Cameroon-impact of the practice of physical activities and sport. *AIMS Public Health* 2020;**7**:319–335.
12. Dyrbye LN, West CP, Johnson PO *et al*. Burnout and satisfaction with work–life integration among nurses. *J Occup Environ Med* 2019;**61**:689–698.
13. Kleiner S, Wallace JE. Oncologist burnout and compassion fatigue: investigating time pressure at work as a predictor and the mediating role of work–family conflict. *BMC Health Serv Res* 2017;**17**:639.
14. Paiva CE, Martins BP, Paiva BSR. Doctor, are you healthy? A cross-sectional investigation of oncologist burnout, depression, and anxiety and an investigation of their associated factors. *BMC Cancer* 2018;**18**:1044.
15. Kust D, Murgic J, Vukovic P *et al*. Oncologist burnout syndrome in Eastern Europe: results of the multinational survey. *JCO Oncol Pract* 2020;**16**:e366–e376.
16. Mampuya WA, Matsuo Y, Nakamura A, Hiraoka M. Evaluation of the prevalence of burnout and psychological morbidity among radiation oncologist members of the Kyoto Radiation Oncology Study Group (KROSG). *J Radiat Res* 2017;**58**:217–224.