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Prevalence of Burnout and Career Satisfaction Among Oncologists in China: A National Survey

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Key Words. Burnout • Career satisfaction • Oncologist • Maslach Burnout Inventory-Human Service Survey • China

Abstract

Background. Burnout and career satisfaction has been extensively studied among U.S. and European oncologists, although little is known about the situation among Chinese oncologists. Therefore, we conducted this national survey to investigate the prevalence of burnout and career satisfaction among Chinese oncologists.

Patients and Methods. Between September 2015 and December 2016, a cross-sectional field survey was conducted through the Chinese Society of Clinical Oncology and the Chinese Committee of Rehabilitation and Palliative Care. The full-length survey consisted of 59 questions investigating personal and professional characteristics and standardized instruments to measure burnout (Maslach Burnout Inventory-Human Service Survey) and career satisfaction. An additional six questions, derived from the National Survey on the Practice of Medicine by Chinese Physicians related to burnout or career satisfaction, were also included.

Results. In total, 3,500 oncologists received the questionnaire, and 2,700 (77.1%) responded, of whom 1,620 (46.3%) were eligible for analysis (median age, 36 years; 56.1% male). Overall, 827 oncologists (51.0%) were burned out. Five factors (lower curative rate of patients, more hours devoted to patient care, more nights on call per week, fewer minutes allocated for return outpatient visits, and more weekends rounding per year) were associated with burnout. Meanwhile, burnout was also strongly associated with a negative view of the physician-patient relationship ($p < .001$; odds ratio [OR], 2.07). Notably, the career satisfaction (34.4% for career and 52.1% for specialty) of Chinese oncologists was far less than U.S. colleagues, which may result from low compensation ($p < .001$; OR, 1.660).

Conclusion. The overall prevalence of burnout among oncologists in China was similar to oncologists in the U.S., whereas personal accomplishment and career satisfaction were lower. Interestingly, the reasons were different. Beside high workload, the low curative rate of patients was found to be another factor associated with Chinese physicians' burnout. The ongoing Chinese health care system reform may improve the current situation. ***The Oncologist*** 2019;24:e480–e489

Implications for Practice: Burnout and career satisfaction has been extensively studied among physicians and oncologists in the U.S. and Europe, but little is known about the situation among Chinese oncologists. This study is the first large-scale national study of Chinese oncologists using standardized instruments to evaluate burnout and career satisfaction. The experience of burnout has been linked to a long list of negative implications. However, this issue has not aroused enough concern in China until now. This study may have a vital significance for the ongoing Chinese health care reform aiming to improve the Chinese health care system.

Introduction

The practice of oncology can be extremely rewarding; it is also one of the most demanding and stressful areas of medicine [1]. Oncologists are constantly exposed to death and suffering, administering incredibly toxic therapies with narrow therapeutic windows and continually walking a fine line between providing palliation and administering toxic

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treatments [2, 3]. All these characteristics place oncologists at high risk of burnout, a syndrome characterized by emotional exhaustion, feelings of depersonalization, and reduced personal accomplishment [4]. The experience of burnout has been linked with a long list of negative outcomes—personal, social, and organizational. Within health care, these outcomes include negative implications for the individual, the patients in his or her care, and the provision of effective health care [5–10].

Burnout of health professionals and oncologists has been studied in depth in the U.S. and Europe. National research exploring the prevalence of physician burnout found that approximately 46% of U.S. physicians experienced burnout at the time of the study [9]. Studies among oncologists suggest an overall burnout incidence of 32% assessed by the Maslach Burnout Inventory-Human Service Survey [11]. For different disciplines, a point prevalence of 25%–48% among medical oncologists [12–16], 20%–40% among radiation oncologists [10, 17], and 28%–36% among surgical oncologists [8, 18, 19] is reported.

China has a large population of 1.37 billion people; the ratio of physicians to the general population is 1:735, which is significantly lower than in Western countries (1:280–1:640) [20]. Chinese physicians experience heavy workloads and receive low compensation. Statistics from the White Paper on the Practice of Medicine by Chinese Physicians by the Chinese Medical Doctor Association in 2014 (the White Paper) [21] revealed that 32.7% of physicians worked more than 60 hours every week, and 65.9% of physicians felt they were not fairly compensated. Furthermore, deterioration of the physician-patient relationship has become a huge problem in the Chinese health care system [22, 23]. All of these factors indicate that Chinese physicians may suffer more from burnout. However, little is known about the situation among Chinese oncologists. So, we conducted this survey to investigate (a) the prevalence of burnout and career satisfaction among Chinese oncologists and (b) potential personal and professional factors, as well as several important issues derived from the National Survey on the Practice of Medicine by Chinese Physicians related to burnout and career satisfaction.

Materials and Methods

Participants

Between September 2015 and December 2016, a cross-sectional field survey was conducted among 3,500 oncologists, including medical, radiation, surgical, and hematology specialists, through the Chinese Society of Clinical Oncology (CSCO) and the Chinese Committee of Rehabilitation and Palliative Care (CRPC). All participants were volunteers and fully informed of the general purpose of our study prior to enroment. Specialized training oncologists and students handled the investigation for quality control and to ensure the reliability of the data.

Study Measures

The full-length survey consisted of 59 questions investigating a variety of personal and professional characteristics (31 questions) and standardized instruments to measure burnout (22 questions) and career satisfaction (2 questions). An additional six questions thought to relate to burnout and career satisfaction, derived from the National Survey on the Practice of Medicine by Chinese Physicians [24], were also included.

Burnout was measured using the gold standard tool: the Maslach Burnout Inventory-Human Service Survey (MBI-HSS) [25]. The MBI-HSS is a 22-item questionnaire consisting of three subscales to evaluate each domain of burnout: emotional exhaustion (EE), comprising 9 items; feelings of depersonalization (DP), comprising 5 items; and reduced personal accomplishment (PA), comprising 8 items. Each question is scored from 1 (never) to 7 (every day). The three subscales of the MBI-HSS were specified as three separate criterion variables. The summation of raw scores on the three subscales was determined and then categorized into three levels: low, moderate, and high. The cutoff scores for health care workers for EE, DP, and PA were (18, 27), (5, 10), and (33, 40), respectively. Burnout is characterized by a high score on the EE and/or DP subscale (≥27 and ≥ 10, respectively) [26–28]. Career satisfaction was assessed using two questions regarding career and specialty choice [18, 29, 30].

Statistical Analysis

Statistical analyses were performed by SPSS version 20.0 (IBM, Armonk, NY) statistical packages. All questionnaires received by December 31, 2016, were included in the analysis. Descriptive statistics were conducted to characterize responding oncologists. Associations between variables were evaluated using the independent-sample *t* test, one-way analysis of variance (continuous variables), and the Kruskal-Wallis or chi-squared test (categorical variables). To identify independent risk factors associated with burnout, multivariable analysis was performed using logistic regression analysis. All statistical tests were two-tailed, and $p < .05$ was considered significant.

Results

Personal and Professional Characteristics

A total of 3,500 questionnaires were sent out, and 2,700 oncologists (77.1%) responded. After the exclusion of missing and invalid data, 1,620 (46.3%) eligible full-length surveys no less than 80% complete were analyzed. Comparison of eligible responders with ineligible responders was conducted to evaluate selection bias, and no statistically significant differences were found with respect to age, sex, relationship status, or years in practice. Subsequent analysis focused on eligible participants.

Personal and professional characteristics of oncologists with different specialties are listed in Tables 1 and 2. Younger oncologists (aged <36 years) were more likely to respond than older oncologists (aged ≥46 years). A vast majority of participants worked in public hospitals (93.6%), whereas smaller proportions worked in private practice (4.0%) or in other settings (2.0%, including veterans' hospitals, active military practice, industry, and so on). Differences

Table 1. Personal characteristics of oncologists (n = 1,620)

Characteristics	All (n = 1,620), *n* (%)	Medical oncology (*n* = 993), *n* (%)	Hematology (*n* = 165), *n* (%)	Radiation oncology (*n* = 215), *n* (%)	Surgical oncology (*n* = 244), *n* (%)	*p* value[a]
Gender						.000
Male	909 (56.1)	521 (52.5)	94 (57.0)	130 (60.5)	163 (66.8)	
Female	709 (43.8)	470 (47.3)	71 (43.0)	85 (39.5)	81 (33.2)	
Missing data	2 (0.1)	2 (0.2)	0 (0)	0 (0)	0 (0)	
Age, yr						.005
Median (range)	36 (20–97)	36 (22–97)	36 (25–62)	36 (24–71)	38 (20–75)	
Missing data	14 (1.4)	10 (1.0)	0 (0)	1 (0.5)	3 (1.2)	
< 36	746 (46.0)	484 (48.7)	74 (44.8)	99 (46.0)	89 (36.5)	
36–45	583 (36.0)	345 (34.7)	60 (36.4)	78 (36.3)	98 (40.2)	
≥ 46	277 (17.1)	154 (15.5)	31 (18.8)	37 (17.2)	54 (22.1)	
Relationship status						.733
Married	1275 (78.7)	782 (78.8)	135 (81.8)	166 (77.2)	191 (78.3)	
Single	340 (21.3)	207 (20.8)	30 (18.2)	49 (22.8)	53 (21.7)	
Missing data	5 (0.3)	4 (0.4)	0 (0)	0 (0)	0 (0)	
Children						.308
Yes	1150 (71.0)	710 (71.5)	123 (74.5)	150 (69.8)	165 (67.6)	
No	465 (28.7)	279 (28.1)	41 (24.8)	65 (30.2)	79 (32.4)	
Missing data	5 (0.3)	4 (0.4)	1 (0.6)	0 (0)	0 (0)	
Age of youngest child, median (range), yr	8 (0–42)	7 (0–42)	8 (0–32)	8 (0–41)	12 (0–35)	.174

[a]Statistical difference of oncologists with different specialties.

between oncologists working in private and public practice are listed in supplemental online Tables 1 and 2. The proportions of medical oncologists, radiation oncologists, surgical oncologists, and hematologists were 61.3%, 13.3%, 15.2% and 10.2%, respectively.

Participants were evenly divided by gender, with a median age of 36 years. A majority of participants were currently married (78.7%). Seventy-one percent of oncologists reported having children, and approximately 50% of these oncologists had a child aged less than 8 years (Table 1).

The median time in practice of all participants was 9 years. A majority of participants (84.0%) served in a multispecialty department, whereas 15.6% of participants were in a single-specialty department. Participants spent an average of 70.47 hours each week devoted to professional activities, of which 44.54 hours were mainly spent on direct patient care. On average, oncologists had 1.36 night shifts per week, cared for 47.50 patients in the outpatient setting each week, and went ward rounds on 28.78 weekends every year in the inpatient setting (Table 2).

Extensive differences in both personal and professional characteristics were observed among oncologists with different specialties (Tables 1 and 2). Medical oncologists were more likely to be women (47.3%, $p < .001$) and slightly younger (median age, 36 years; $p = .001$). In surgical oncology practice, the proportion of female workers was the lowest (33.2%), and physicians were oldest (median age, 38 years). With respect to years in practice, the median years of surgical oncologists were longest (11 years), whereas medical and radiation oncologists were shortest (8 years). The vast majority of oncologists (84%) dealt with multiple types of cancer. Surgical oncologists were more likely to focus on treating patients with one specific type of cancer (27.5%), whereas only 9.3% of radiation oncologists focused on one specific type of cancer. Surgical oncologists saw nearly twice as many patients each week (71.89) as those in other disciplines (42.48 in medical oncology, 51.42 in hematology, 38.85 in radiation oncology). In total, medical oncologists had shorter working hours per week (70.07 vs. 73.81) and the lowest curative rate of patients (20% vs. 40%) compared with surgical oncologists.

Prevalence of Burnout and Career Satisfaction

The prevalence of burnout and career satisfaction among participating oncologists is presented in Table 3. Thirty-nine percent of participants experienced high EE, 37% experienced high DP, and 57.2% had a low sense of PA. In aggregate, 827 (51%) of oncologists had at least one symptom of burnout (high EE and/or high DP), and 338 (20.9%) participants had a sense of high PA. Although medical oncologists (30.97 vs. 29.03; $p = .039$) and radiation oncologists (32.01 vs. 29.03; $p = .008$) had higher PA scores than surgical oncologists, no difference in the rate of PA was observed among different specialties ($p = .229$). The burnout rate among medical oncologists was a little higher than that of radiation oncologists (52.8% vs. 49.3%; $p = .026$). No statistically significant differences were observed among other specialties.

Quite a number of oncologists indicated that they would not choose to become a physician (47.7%) or an oncologist (26.1%) again if they could revisit their career

Table 2. Professional characteristics of oncologists (*n* = 1,620)

Characteristics	All (*n* = 1,620), *n* (%)	Medical oncology (*n* = 993), *n* (%)	Hematology (*n* = 165), *n* (%)	Radiation oncology (*n* = 215), *n* (%)	Surgical oncology (*n* = 244), *n* (%)	*p* value[a]
Retirement						.159
Yes	28 (1.7)	14 (1.4)	4 (2.4)	2 (0.9)	8 (3.3)	
No	1,546 (95.4)	946 (95.3)	150 (94.5)	209 (97.2)	232 (95.1)	
Missing data	46 (2.8)	33 (3.3)	5 (3.0)	4 (1.9)	4 (1.6)	
Time of completing resident standard training[b]						.044
Before 1970	10 (0.6)	4 (0.4)	1 (0.6)	0 (0)	5 (2.0)	
1970–1975	8 (0.4)	5 (0.5)	0 (0)	1 (0.5)	2 (0.8)	
1976–1980	18 (1.1)	14 (1.4)	1 (0.6)	2 (0.9)	1 (0.4)	
1981–1985	18 (1.1)	9 (0.9)	2 (1.2)	2 (0.9)	5 (2.0)	
1986–1990	44 (2.8)	24 (2.4)	5 (3.0)	6 (2.8)	9 (3.7)	
1991–1995	98 (6.0)	59 (5.9)	16 (9.7)	14 (6.5)	9 (3.7)	
1996–2000	188 (11.6)	104 (10.5)	25 (15.2)	22 (10.2)	36 (14.8)	
2001–2005	283 (17.5)	168 (16.9)	26 (15.8)	36 (16.7)	51 (20.9)	
2006–2010	381 (23.6)	246 (24.8)	38 (23.0)	53 (24.7)	44 (18.0)	
After 2010	549 (33.9)	349 (35.1)	49 (29.7)	76 (35.3)	75 (30.7)	
Missing data	23 (1.4)	11 (1.1)	2 (1.2)	3 (1.4)	7 (2.9)	
Years in practice[c]						.000
Mean	10.57 (8.13)	10.00 (7.69)	11.19 (8.54)	10.46 (8.08)	12.49 (9.27)	
Median (range)	9 (0–43)	8 (0–40)	10 (0–40)	8 (0–40)	11 (1–43)	
Missing data	30	13	1	5	11	
Fellows in department (No.)						.000
1	7 (0.4)	4 (0.4)	0 (0)	0 (0)	3 (1.2)	
2–5	215 (13.3)	127 (12.8)	32 (19.4)	17 (7.9)	37 (15.2)	
6–10	695 (42.9)	453 (45.6)	86 (52.1)	77 (35.8)	79 (32.4)	
>10	693 (42.8)	401 (40.4)	47 (28.5)	121 (56.3)	123 (50.4)	
Missing data	10 (0.6)	8 (0.8)	0 (0)	0 (0)	2 (0.8)	
Focused on specific type of cancer						.000
Yes	253 (15.6)	146 (14.7)	20 (12.1)	20 (9.3)	67 (27.5)	
No	1,361 (84.0)	843 (84.9)	145 (87.9)	195 (90.7)	175 (71.7)	
Missing data	6 (0.4)	4 (0.4)	0 (0)	0 (0)	2 (0.8)	
Curative rate of patients						.000
Median (range)	30 (0–100)	20 (0–90)	22.5 (0–95)	30 (0–95)	40 (0–100)	
Missing data	81	43	7	13	18	
Working hr/wk, mean (SD)						
Hours devoted to patient care	44.54 (18.99)	45.27 (19.41)	44.00 (17.17)	43.30 (18.29)	43.00 (18.99)	.262
Administrative work	8.91 (10.07)	8.63 (9.67)	8.30 (8.67)	8.66 (10.09)	10.58 (12.14)	.085
Research work	5.60 (7.06)	5.24 (6.83)	5.50 (7.23)	6.30 (8.00)	6.51 (6.94)	.034
Teaching work	3.33 (4.71)	3.15 (4.78)	3.66 (4.80)	3.54 (4.68)	3.66 (4.37)	.279
Hours to keep abreast of developments	6.63 (6.22)	6.53 (5.58)	6.75 (6.68)	7.47 (6.91)	6.21 (7.52)	.213
Others	1.24 (3.95)	1.10 (3.50)	1.49 (3.39)	1.43 (5.80)	1.51 (4.04)	.313
Total working hours[d]						.031
Mean/SD	70.47 (21.63)	70.07 (21.18)	67.58 (22.52)	71.14 (22.18)	73.81 (22.08)	
Median	68.0	66.0	60.0	70.0	71.5	
Missing data	77	48	2	11	16	

(continued)

Table 2. (continued)

Characteristics	All (*n* = 1,620), *n* (%)	Medical oncology (*n* = 993), *n* (%)	Hematology (*n* = 165), *n* (%)	Radiation oncology (*n* = 215), *n* (%)	Surgical oncology (*n* = 244), *n* (%)	*p* value[a]
Hours spent at home on work tasks per week						.822
Mean (SD)	9.15 (10.52)	8.88 (10.05)	9.05 (11.15)	9.76 (10.22)	9.56 (11.79)	
Missing data	838	541	102	107	86	
Nights on call per wk						.002
Mean (SD)	1.36 (0.96)	1.41 (0.94)	1.50 (1.21)	1.21 (0.92)	1.24 (0.86)	
Missing data	28	18	1	3	6	
Outpatient practice per week, mean (SD)						
Outpatients in clinic	47.50 (57.77)	42.48 (49.03)	51.42 (74.95)	38.85 (39.09)	71.89 (78.95)	.000
Minutes allocated per new outpatient	16.37 (13.27)	16.86 (11.05)	16.92 (10.10)	17.11 (10.86)	13.33 (21.94)	.007
Minutes allocated per return outpatient	10.89 (10.22)	11.27 (11.12)	10.43 (8.15)	11.03 (7.47)	9.40 (9.34)	.135
Missing data	334	200	30	60	44	
Inpatient practice						.423
Round own patients when hospitalized (A)	363 (22.4)	227 (22.9)	29 (17.6)	49 (22.8)	58 (23.8)	
A + D	38 (2.4)	24 (2.4)	3 (1.8)	7 (3.3)	4 (1.6)	
Share rounding with partners in blocks (B)	800 (49.4)	469 (47.2)	101 (61.2)	105 (48.8)	123 (50.4)	
B + D	251 (15.5)	176 (17.7)	23 (13.9)	28 (13.0)	23 (9.4)	
Share rounding with partners on weekend	61 (3.8)	36 (3.6)	6 (3.6)	8 (3.7)	11 (4.5)	
Attend oncology teaching service (D)	24 (1.5)	16 (1.6)	0 (0)	4 (1.9)	4 (1.6)	
Do not round in hospital	30 (1.9)	13 (1.3)	2 (1.2)	5 (2.3)	10 (4.1)	
Missing data	53 (3.1)	32 (3.2)	1 (0.6)	9 (4.2)	11 (4.5)	
Inpatient work, mean (SD)						
No. of inpatients on average hospital day	13.44 (10.31)	13.34 (10.35)	11.80 (8.49)	16.15 (12.50)	12.72 (8.75)	.000
Missing data	60	29	1	15	15	
No. of weekends rounding in hospital per yr	28.78 (14.87)	29.44 (144.79)	28.72 (14.54)	26.37 (14.83)	28.11 (15.31)	.059
Missing data	106	59	3	17	27	
Personal time						.240
Mean (SD)	14.70 (8.37)	14.10 (18.00)	14.78 (16.28)	15.20 (16.96)	16.84 (22.15)	
Missing data	86	42	9	15	20	
Compensation method						.426
Salary, no incentive	106 (6.6)	62 (6.2)	7 (4.2)	18 (8.4)	19 (7.8)	
Salary with bonus	1,454 (89.7)	895 (90.1)	153 (92.7)	189 (87.9)	215 (88.1)	
Pure incentive	9 (0.6)	6 (0.6)	1 (0.6)	0 (0)	2 (0.8)	
Others	18 (1.1)	11 (1.1)	1 (0.6)	2 (0.9)	4 (1.6)	
Missing data	33 (2.0)	19 (1.9)	3 (1.8)	6 (2.8)	4 (1.6)	

[a]Statistical difference of oncologists with different specialties.
[b]A 3-year training system for Chinese medical graduates before they become a general or specific physician.
[c]Since completion of resident standard training.
[d]Sum of above six categories.

and specialty choices. Career satisfaction, as measured by these two items, was much lower than in other countries. No statistically significant differences were observed among different disciplines (p = .751 for career choice and p = .555 for specialty choice; Table 3). Subgroup analysis according to different age groups showed that younger oncologists felt lower career satisfaction despite their specialties (p = .001 for career choice and p = .071

Table 3. Prevalence of burnout and career satisfaction among oncologists

Characteristics	All (*n* = 1,620), *n* (%)	Medical oncology (*n* = 993), *n* (%)	Hematology (*n* = 165), *n* (%)	Radiation oncology (*n* = 215), *n* (%)	Surgical oncology (*n* = 244), *n* (%)	*p* value[a]
Burnout indices[b]						
Emotional exhaustion[c]						
Mean (SD)	23.18 (12.17)	23.38 (12.15)	21.48 (11.68)	23.34 (12.20)	23.45 (12.60)	.335
Median (range)	22 (0–54)	23 (0–54)	20 (0–52)	23 (2–54)	22 (0–54)	
Low score	607 (37.5)	356 (35.9)	72 (43.6)	80 (37.2)	97 (39.8)	.113
Intermediate score	340 (21.0)	208 (20.9)	37 (22.4)	43 (20.0)	51 (20.9)	
High score	632 (39.0)	400 (40.3)	51 (30.9)	88 (40.9)	93 (38.1)	
Missing data	41 (2.5)	29 (2.9)	5 (3.0)	4 (1.9)	3 (1.2)	
Depersonalization[c]						
Mean (SD)	8.62 (6.38)	8.79 (6.39)	8.26 (6.66)	8.28 (6.40)	8.53 (6.18)	.611
Median (range)	7 (0–30)	7 (0–30)	6 (0–26)	8 (0–26)	8 (0–28)	
Low score	586 (36.2)	338 (34.0)	72 (43.6)	88 (40.9)	87 (35.7	.047[d]
Intermediate score	401 (24.8)	255 (25.7)	39 (23.6)	47 (21.9)	59 (24.2)	
High score	600 (37.0)	382 (38.5)	50 (30.3)	74 (34.4)	93 (38.1)	
Missing data	33 (2.0)	18 (1.8)	4 (2.4)	6 (2.8)	5 (2.0)	
Personal accomplishment[c]						
Mean (SD)	30.70 (9.74)	30.97 (9.80)	29.83 (9.31)	32.01 (8.87)	29.03 (10.33)	.006[e]
Median (range)	31 (0–48)	31 (0–48)	31 (7–48)	32 (5–48)	29 (0–48)	
Low score	927 (57.2)	563 (56.7)	96 (58.2)	115 (53.5)	151 (61.9)	.229
Intermediate score	310 (19.1)	180 (18.1)	36 (21.8)	48 (22.3)	46 (18.9)	
High score	338 (20.9)	220 (22.2)	26 (15.8)	48 (22.3)	43 (17.6)	
Missing data	45 (2.8)	30 (3.0)	7 (4.2)	4 (1.9)	4 (1.6)	
Burnout[f]	827 (51.0)	524 (52.8)	67 (40.6)	106 (49.3)	129 (52.9)	.038[g]
Missing data	50 (3.1)	29 (2.9)	6 (3.6)	10 (4.7)	5 (2.0)	
Career satisfaction						
Would become physician again (career choice)	558 (34.4)	327 (32.9)	63 (38.2)	78 (36.3)	88 (36.1)	.751
Would become oncologists again (specialty choice)	844 (52.1)	529 (53.3)	81 (49.1)	128 (59.5)	105 (43.0)	.555

[a]Statistical difference of oncologists with different specialties.
[b]As assessed using the full Maslach Burnout Inventory-Human Service Survey (MBI-HSS).
[c]Per the standard scoring of the MBI-HSS for health care workers, physicians with scores ≥27 on emotional exhaustion subscale, ≥10 on depersonalization subscale, or < 33 on personal accomplishment subscale are considered to have a high degree of burnout in that dimension.
[d]Levels of depersonalization show no statistical significance among oncologists with different specialties.
[e]Multiple comparison indicates that the mean of personal accomplishments of medical oncologists is higher than that of surgical oncologists.
[f]High score on emotional exhaustion and/or depersonalization subscales of the MBI-HSS (see Study Measures).
[g]Multiple comparison indicates that rate of burnout among medical oncologists is higher than that of radiation oncologists.

for specialty choice; Fig. 1, supplemental online Fig. 1, Table 3).

Factors Associated with Burnout and Career Satisfaction

Personal and professional characteristics associated with burnout on univariate analysis among oncologists are listed in supplemental online Table 4. We then performed multivariable analysis to identify factors related to burnout (Table 4). In addition to an overall model, separate models among different specialties were also developed because of the profound differences in personal and professional characteristics of oncologists with different disciplines. There existed a strong relationship between heavy workload and burnout in all models. In the overall model, five factors—lower curative rate of patients (Fig. 2, supplemental online Fig. 2), more hours devoted to patient care, more nights on call per week, fewer minutes allocated for return outpatient visits, and more weekends rounding per year—were associated with burnout.

Risks specific to different specialties were also observed. Total working hours per week was only seen to be a risk in hematology ($p < .001$; odds ratio [OR], 1.036) but was not a significant factor for oncologists with other specialties. Meanwhile, in the practice of radiation oncology, two factors—age of youngest child ($p = .012$; OR, 0.933) and days of personal time per year ($p = .047$; OR, 0.979)—were specifically related to burnout (Table 4).

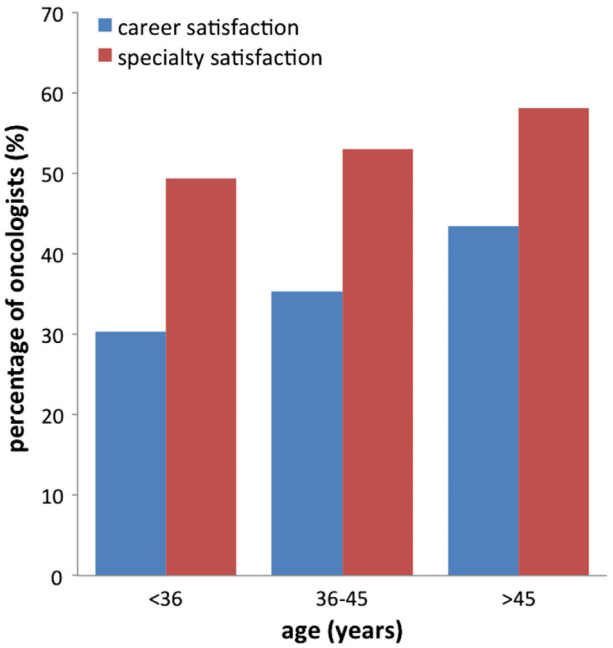

Figure 1. Career satisfaction in different age groups among all oncologists. Career satisfaction (*y*-axis: career [p = .001] and specialty [p = .071] choices) would escalate as oncologists grow older (*x*-axis).

Discussion

To our knowledge, this is the first large-scale national study of Chinese oncologists using standardized instruments to evaluate burnout and career satisfaction. Approximately 51% of oncologists had at least one symptom of burnout at the time of the survey, which was similar to Western countries evaluated using the MBI-HSS and reported in recent years [1, 30–32]. Consistent with U.S. oncologists, high workload (more hours devoted to patient care, more nights on call per week, fewer minutes allocated to returning outpatient visits, and more weekends rounding per year) was associated with burnout among Chinese oncologists in multivariable analysis (Table 4).

Interestingly, a low curative rate of patients was also found to be associated with Chinese physicians' burnout. In the current study, we found medical oncologists had a highest burnout rate, although their working hours were lower compared with colleagues in other therapeutic specialties. This finding supported that the low curative rate of patients was another central factor of burnout in Chinese physicians (Table 4, Fig. 2). The low curative rate of cancer in China results from multifaceted reasons, and further study is needed to illuminate this issue. Increasing curative rate may be an effective way to improve oncologists' burnout. Currently, the Chinese Food and Drug Administration is making new policies to improve the outcomes of Chinese patients, including encouraging innovative drugs and accelerating new drug application to reduce drug lag, increasing spending on health care to enlarge the coverage of insurance, and gradually establishing early screening and early diagnosis systems for cancers to reduce the mortality of patients with cancer. We believe the outcomes of Chinese patients with cancer will be gradually improved in the future.

Table 4. Personal and professional factors related to burnout on multivariable analysis

Predictors	OR (95% CI)	*p* value
All oncologists		
Curative rate of patients (OR for each additional percentage)	0.986 (0.980–0.991)	.000
Hours devoted to patient care (OR for each additional hr)	1.010 (1.003–1.018)	.004
Nights on call per wk (OR for each additional night)	1.185 (1.033–1.359)	.015
Minutes allocated per return outpatients (OR for each additional min)	0.961 (0.945–0.977)	.000
Weekends rounding per yr (OR for each additional weekend)	1.014 (1.0055–1.023)	.002
Medical oncology		
Curative rate of patients (OR for each additional percentage)	0.989 (0.980–0.997)	.009
Nights on call per wk (OR for each additional night)	1.325 (1.090–1.611)	.005
Minutes allocated per return outpatient (OR for each additional min)	0.978 (0.959–0.998)	.028
Hematology		
Total working hours (OR for each additional hr)	1.036 (1.016–1.056)	.000
Minutes allocated per return outpatient (OR for each additional min)	0.927 (0.870–0.987)	.018
Radiation oncology		
Age of youngest child (OR for each additional yr old)	0.933 (0.884–0.985)	.012
Weekends rounding per yr (OR for each additional weekend)	1.037 (1.013–1.062)	.002
Personal time (OR for each additional day)	0.979 (0.960–1.000)	.047
Surgical oncology		
Curative rate of patients (OR for each additional percentage)	0.989 (0.979–1.000)	.050
Minutes allocated per return outpatient (OR for each additional hr)	0.953 (0.910–0.997)	.036

Abbreviations: OR, odds ratio; CI, confidence interval.

The deteriorated physician-patient relationship is a major challenge in the current Chinese health care system. This issue results from multifaceted causes. For oncologists, a heavy workload and unmatched low compensation may be two major reasons. Another important reason is

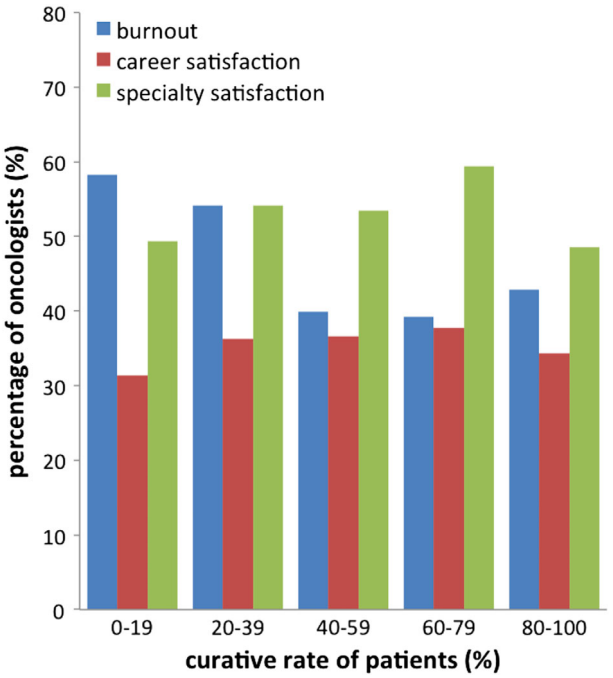

Figure 2. Relationship of curative rate of patients with burnout and career satisfaction. Burnout of oncologists (*y*-axis) was related to curative rate of patients (*x*-axis); $p < .001$. Career satisfaction showed numerical improvement with escalating curative rate of patients ($p = .123$ for career choice and $p = .874$ for specialty choice).

patients' heavy economic burden. Our study indicated physician's burnout was strongly associated with the poor physician-patient relationship among Chinese oncologists ($p < .001$; OR, 2.07; 95% confidence interval [CI], 1.44–2.975). Further analysis revealed that a higher percentage of oncologists (71%) experiencing burnout had a negative view of the physician-patient relationship, and a higher percentage of those without burnout (11.2%) had a positive view (Fig. 3A; results of oncologists with different specialties are listed in supplemental online Fig. 3). The total number of patients treated by each oncologist was much higher in China than in the U.S. (114.7 vs. 86.7 per week). Thus, time to interact with each patient was often insufficient in China (minutes allocated to each new and return outpatient visit in China were 16.37 and 10.89, whereas these two times were 49.1 and 18.2 in the U.S., respectively; supplemental online Table 5), which may impair patients' experience and lead to increasing tension between doctors and patients. Furthermore, previous reports indicated that a lower rate of burnout was associated with good physician-patient relationships [33, 34]. Therefore, our study suggests that improvement of physicians' burnout may be an effective way to improve physician-patient relationship. In recent years, the Chinese government has devoted great efforts to reform the health care system and improve the health care environment. One of the measures is reconstructing the hierarchical medical system to reasonably allocate health care resources and reduce doctors' workload. Hopefully, these policies can reduce oncologists' burnout and eventually improve physician-patient relationships.

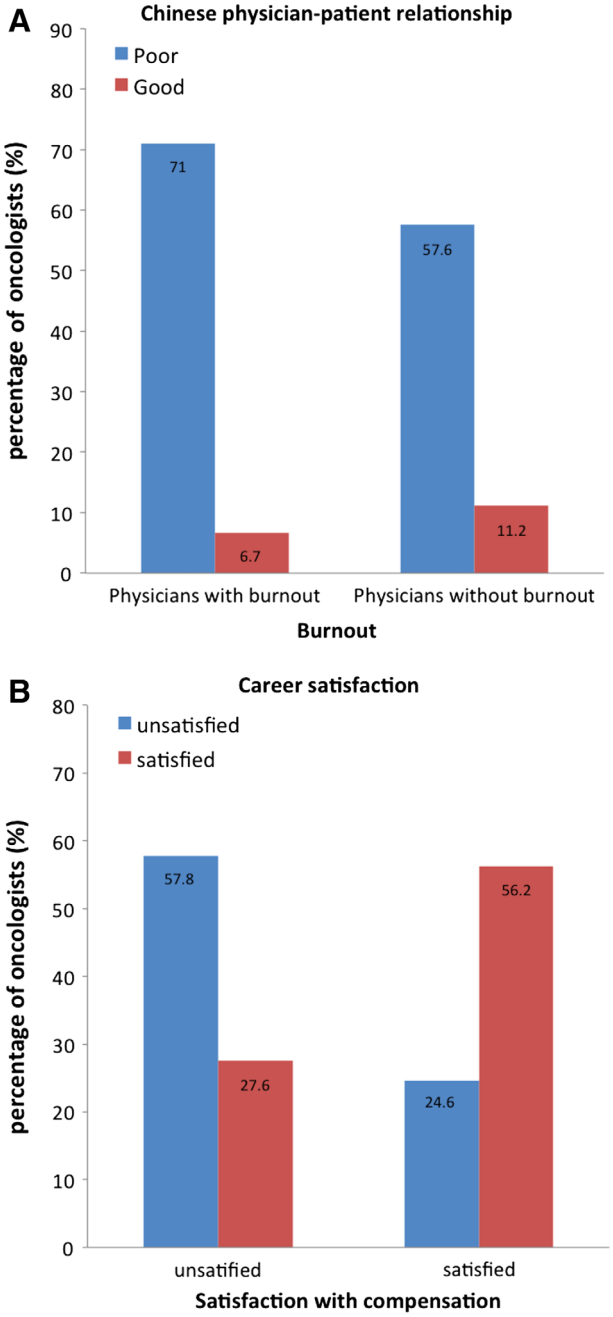

Figure 3. Relationship between Chinese physician-patient relationship and physicians' burnout and relationship between career satisfaction and physicians' satisfaction with compensation. A higher percentage of oncologists experiencing burnout (71%) had a negative view of the physician-patient relationship, whereas a higher percentage of those without burnout (11.2%) had a positive view **(A)**. A higher percentage of oncologists (57.8%) unsatisfied with salary had a low level of career satisfaction, whereas a higher percentage of those (56.2%) satisfied with salary had a high level of career satisfaction **(B)**.

Although the burnout prevalence in our study was similar to that in the U.S. [30], rates of PA (20.9% vs. 63.0%) and career satisfaction (34.4% vs. 82.5% for career choice and 52.1% vs. 80.4% for specialty choice) were much lower compared with oncologists in the U.S. Previous studies had already found a strong relationship between satisfaction with compensation and career satisfaction [35, 36]. The average

compensation of Chinese oncologists was merely 1.95 times the gross domestic product per capita in 2015, whereas this proportion is as high as 4.3-fold worldwide and even 5.8-fold in the U.S. [21, 37]. Data from the White Paper also indicated that 65.9% of physicians were unsatisfied with their salary in 2014 (the rate was 65.5% in our study). Therefore, we thought low career satisfaction among Chinese oncologists may result from low compensation. We then assessed the relationship between career satisfaction and satisfaction with compensation. A higher percentage of oncologists (57.8%) unsatisfied with salary had a low level of career satisfaction, whereas a higher percentage of those satisfied with salary (56.2%) had a high level of career satisfaction (Fig. 3B; results of oncologists with different specialities are listed in supplemental online Fig. 3). Dissatisfaction with compensation was strongly associated with a low level of career satisfaction ($p < .001$; OR, 1.66; 95% CI, 1.431–1.925). One of the aims of Chinese health care system reform is establishing a reasonable compensation system to improve doctors' incomes [38, 39]. The hope is that this will fundamentally ameliorate Chinese medical staffs' PA and career satisfaction.

Participants in our survey were younger than those in the U.S. study (median age, 36 vs. 52 years). In fact, our study did not intentionally target the young doctors group. The results reflect the true age distribution of Chinese oncologists, which is consistent with the statistics provided by the White Paper. In our study, the percentage of physicians aged 25 to 35, 36 to 45, and 46 to 60 years were 46%, 36%, and 17.1%, respectively, whereas data from the White Paper indicated that proportions of this three age groups were 51.2%, 32.5%, and 16.2%, respectively. Why are Chinese oncologists generally younger than those of Western countries? Generally, in China, it takes 8 years for medical students to become specialist physicians (5 years of university education and 3 years of resident standard training; the latter is a 3-year training system for Chinese medical graduates before they become general or specialist physicians), whereas in Western countries, this time interval is 13–20 years (4 years of university education; 4 years of medical school education; 3–8 years of training after medical school, of which 1 year of intern training and 2–7 years of resident training; and 2–4 years of specialty training).

Our study is subject to a number of limitations. First, participants in our survey were younger than that of U.S. (median age, 36 vs. 52). Second, the time interval of our survey was 15 months, a little longer than other studies. These limitations may result in selection and response bias. Despite the above limitations, our study also has several important strengths. Our study is the largest national survey among Chinese oncologists. The sample of our study was drawn from the CSCO and the CRPC, which are two major associations in China. In addition, the participants came from all therapeutic specialties. Therefore, the results of our survey are representative and convincing.

Conclusion

The overall prevalence of burnout among oncologists in China was similar to that in the U.S., whereas personal accomplishment and career satisfaction were lower. Interestingly, the reasons of burnout among Chinese and U.S. oncologists were different. High workload and low curative rate of patients was found to be associated with Chinese physicians' burnout. The ongoing Chinese health care system reform may improve the current situation.

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Data analysis and interpretation: Shuxiang Ma, Yan Huang, Yunpeng Yang, Yuxiang Ma, Li Zhang
Manuscript writing: Shuxiang Ma, Yan Huang, Yunpeng Yang, Yuxiang Ma, Ting Zhou, Hongyun Zhao, Likun Chen, Ningning Zhou, Li Zhang
Final approval of manuscript: Shuxiang Ma, Yan Huang, Yunpeng Yang, Yuxiang Ma, Ting Zhou, Hongyun Zhao, Likun Chen, Ningning Zhou, Li Zhang

Disclosures

The authors indicated no financial relationships.

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