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Comorbidity of common mental disorders with cancer and their treatment gap: Findings from the World Mental Health Surveys

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Abstract

Objective—To study the comorbidity of common mental disorders (CMDs) and cancer, and the mental health treatment gap among community residents with active cancer, cancer survivors and cancer-free respondents in 13 high- and 11 low-middle income countries.

Methods—Data were derived from the World Mental Health Surveys (N=66,387; n=357 active cancer, n=1,373 cancer survivors, n=64,657 cancer free respondents). The WHO/Composite International Diagnostic Interview was used in all surveys to estimate CMDs prevalence rates. Respondents were also asked about mental health service utilization in the preceding 12 months. Cancer status was ascertained by self-report of physician's diagnosis.

Results—Twelve month prevalence rates of CMDs were higher among active cancer (18.4% SE=2.1) than cancer free respondents (13.3%, SE=0.2) adjusted for socio-demographic confounders and other lifetime chronic conditions (Adjusted Odds Ratio (AOR)=1.44 95% CI 1.05–1.97). CMD rates among cancer survivors (14.6% SE=0.9) compared with cancer-free respondents did not differ significantly (AOR=0.95 95% CI 0.82–1.11). Similar patterns characterized high and low-middle income countries. Of respondents with active cancer who had CMD in the preceding 12 months 59% sought services for mental health problems (SE=5.3). The pattern of service utilization among people with CMDs by cancer status (highest among persons with active cancer, lower among survivors and lowest among cancer-free respondents) was similar in high- (64.0% SE=6.0, 41.2% SE=3.0, 35.6% SE=0.6) and low-middle income countries (46.4% SE=11.0, 22.5% SE=9.1, 17.4% SE=0.7).

Conclusions—Community respondents with active cancer have relatively higher CMD rates and relatively high treatment gap. Comprehensive cancer care should consider both factors.

Keywords

Introduction

Cancer is a leading cause of death. It accounted for eight million deaths worldwide (around 15% of all deaths) in 2010 (38% more than in 1990) [1]. According to the World Bank classification of countries by income, rates for all cancers combined (excluding non-melanoma skin cancers) rise as the country income rises. The age-adjusted incidence rate in high income countries in 2008 was 255.8 per 100,000 population for all cancers combined, compared with the rate in low-middle income countries, 146.8 per 100,000 population [2]

A significant proportion of persons with cancer at different stages of the disease trajectory develop mental disorders, primarily affective and anxiety disorders (henceforth, common mental disorders) [3–8]. In this paper we examined the comorbidity of common mental disorders and cancer and their respective mental health treatment gap (i.e., the proportion of individuals with active cancer and a mental disorder who have received no treatment for their mental disorder). Also, we explored the universality of the findings by looking at data in countries with contrasting income levels.

Comorbidity of cancer and mental disorders

Recent meta-analyses showed that approximately one-third of persons with cancer in acute care hospitals are affected by common mental disorders [5, 9]. Of these, depression has been the one most studied [9, 10, 11]. Although more limited, epidemiological studies using diagnostic instruments also found associations between cancer and increased rates of major depression and anxiety disorders [10].

Psychiatric morbidity post-cancer onset increases in direct association with the level of disability, advanced illness and pain [3, 5], following, e.g., the biological effects of the malignancy, side effects of certain chemotherapeutic drugs, grief about current and anticipated losses, mutilation, and fear of death [11]. Accordingly, timely and accurate diagnosis and appropriate treatment of comorbid mental disorders is required in an effort not only to increase quality of life but also to reduce adverse effects on cancer course, length of hospital stay, treatment adherence and efficacy, and possibly prognosis and survival [12–17].

Treatment for common mental disorders among persons with cancer

The research evidence on both the success and limitations of psychological and pharmacological treatments for common mental disorders is mounting [18]. The National Institute of Health and Clinical Excellence (NICE) has published intervention guidelines for these disorders [19], and so has the World Health Organization (WHO), with the main focus on primary care practitioners (cf. the Mental Health Gap Action Program, that also made available in its website the effect sizes of recommended interventions [20]).

Importantly for our inquiry, psycho-oncological research in recent decades has documented the efficacy of interventions for common mental disorders among persons with cancer [21–23]. For example, Li et al., [24], following a comprehensive review, suggested that both psychosocial and pharmacological interventions can alleviate depression in persons with cancer. Although further research is needed to overcome lingering limitations [24], the US Institute of Medicine did recommend in its 2008 report *Cancer care for the whole patient* [12] that appropriate integrated psychosocial services should be provided.

Treatment gap in mental health care among persons with cancer

The difference between true and the treated prevalence rates for psychiatric disorders is generally substantial [25, 26]. It exceeds 50% worldwide, and it approaches 90% in the least resourced countries for common mental disorders [27–31]. A WHO review of 37 studies worldwide estimated that the treatment gap for major depression and dysthymia reached

56%, and for generalized anxiety disorder, 58% [26]. In the World Mental Health Surveys (WMHS), the largest international psychiatric epidemiological study ever conducted, Wang et al. [25] documented the gaps in the mental health service-delivery for common mental disorders in 17 countries. Their findings showed that at least two-thirds of the roughly 30% of the population worldwide expected to have common mental disorders every year [32] do not receive any treatment in the countries studied [see also 27].

Psycho-oncological research has shown similar treatment gaps for mental disorders among persons with cancer [8, 12, 13, 33]. For example, a US community-based study found that only 35% of cancer survivors who reported mental problems accessed specialized services [34]. In another US study conducted among persons with cancer in a public hospital, barely 12% of those diagnosed with depression received antidepressant medications, and even fewer (5%) accessed a mental health counselor [35]. The frequent failed recognition of mental problems due to objective barriers, e.g., availability and accessibility of services [13, 16, 36], and subjective factors, e.g. stigma [37, 38], may lead to the treatment gap.

The WMHS provides a unique opportunity to assess the comorbidity of common mental disorders and the respective treatment gap in individuals with cancer residing in the community in a multiplicity of countries. As mentioned above, to overcome existing limitations in the literature, WMHS relied on a large sample size and used uniform and well-tested methods of case ascertainment and diagnosis of mental disorders. The data jointly collected in 24 countries provide the case for action for both advocacy efforts and program and service planning.

Objectives

We investigated: 1) the 12-month prevalence of comorbid common mental disorders in persons with active and past cancer, in all countries combined and in countries grouped by country income level; 2) the associations between 12-month prevalence rates of common mental disorders and lifetime cancer, with adjustment for key covariates; and 3) the prevalence rate of mental health service use in the preceding 12 months among those with a common 12-month mental disorder, comparing those with active cancer to cancer survivors, to individuals with no cancer history, and to individuals with other chronic physical conditions. Data were drawn from the WMHS conducted in 24 high income- and low-middle income countries.

Methods

Survey samples and procedures

The World Mental Health Surveys are psychiatric epidemiologic studies of community-dwelling adults in Africa, the Americas, Asia, Europe, the Middle East and the Pacific conducted between the years 2001–2011. Survey procedures followed similar guidelines in all sites, and they were planned and coordinated by a team of researchers from the University of Michigan, Harvard Medical School, and the World Health Organization (see details in [39]).

Data from all of the WMH Surveys that had collected the requisite data on cancer status were included in this report. The surveys included in this study came from 13 countries classified by the World Bank as high income (Belgium, France, Germany, Israel, Italy, Japan, New Zealand, Northern Ireland, Portugal, Poland, Spain, The Netherlands, and USA), and 11 countries classified as low-middle income (Brazil, Bulgaria, Colombia, Iraq, Lebanon, Mexico, Nigeria, People's Republic of China -the survey included two sites-, Peru, Romania, and South Africa). Most surveys were based on stratified multi-stage, clustered area probability household samples and all were conducted face-to-face by trained lay interviewers. Response rates ranged from 45.9% in France to 95.2% in Iraq, with a weighted average response rate of 79.9%. Two countries (Colombia and Mexico) selected representative urban areas, one selected states (Nigeria) and four selected metropolitan areas (Brazil, India, Japan, People's Republic of China).

Interview schedules

Section I included the core diagnostic assessment of mental disorders (see below), while in Section II additional information was collected regarding a wide range of survey aims, including self-reports on cancer (see below), and other chronic physical conditions (e.g., diabetes, epilepsy, HIV). All respondents completed Section I, and those who met criteria for any mental disorder in addition to a probability sample of remaining respondents were administered Section II. Service utilization items (see below) were asked from all respondents. The proportion of respondents that completed Section II was weighted by the inverse of the probability of the selection to adjust for differential sampling. Additional weights were used to adjust for differential probabilities of selection within households, for non-response and to match the samples to population socio-demographic distributions. The analyses presented in this paper used the Section II subsample (N=66,387).

The central WMHS staff trained bilingual supervisors in each country. A WHO protocol was used to translate instruments and training materials [39]. Some surveys were carried out in more than one language, while in others the country's single official language was utilized. Quality control protocols were standardized across countries to check for interviewer accuracy and to specify data cleaning and coding procedures. Each country obtained approval by IRB or ethics committees, including for informed consent and the protection of human rights (for further details on methods see [39]).

Measures

Psychiatric diagnostic assessment—All surveys used the WMHS version of the WHO Composite International Diagnostic Interview (CIDI 3.0) [40]. The CIDI is a fully-structured lay-administered interview which ascertains lifetime prevalence of disorders (disorder occurring at any age up to the time of the interview) as well as recent episodes or symptoms, allowing estimation of 12-month prevalence rates. Disorders were assessed using the criteria of the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (*DSM-IV* [41]). In the current study we focused on anxiety disorders (panic disorder, generalized anxiety disorder, agoraphobia without panic, post-traumatic stress disorder, social phobia, specific phobia, obsessive-compulsive disorder) and mood disorders (major depressive disorder and dysthymia). Organic exclusion criteria were taken into account in

determining *DSM-IV* diagnoses. CIDI showed high test-retest reliability [42], and the WMHS clinical reappraisal studies showed good CIDI-Structured Clinical Interview for *DSM-IV* (SCID) agreement, and provided support for the construct validity of the interview [43].

Cancer and other chronic physical conditions—These were assessed using a checklist adapted from the US Health Interview Schedule [43]. Respondents were asked whether a physician or any other health professional ever told them they have cancer. Participants who answered positively were further asked to indicate cancer site and whether they were currently in "active treatment for your cancer", "in remission" or "cured". As in past research [8], the latter two groups were combined ("cancer survivors").

Respondents were also asked whether a doctor or any other health professional ever told them they had one or more of the following conditions: arthritis, back and neck pain, frequent or severe headaches, heart disease, high blood pressure, asthma, diabetes, peptic ulcer, other chronic lung diseases, stroke, other chronic pain, epilepsy and HIV. For conditions that could have remitted, respondents were asked whether the condition was present at the time of the interview. Methodological research has shown that such checklists provide useful information about treated or currently undetected chronic conditions [44], and that they predict outpatient health care use, hospitalization and mortality [45]. Self-report of chronic physical conditions shows moderate to high agreement with medical records data [46].

Mental health service utilization—All respondents were asked whether they had ever visited, and specifically within the past 12 months, any one of a list of the following agents from different sectors for problems with emotions or mental health as follows: mental health sector (psychiatrist, psychologist, social worker and counselor in mental health); general medical sector (general practitioner, other physician, nurse, occupational therapist or any healthcare professional); human services sector (religious or spiritual advisor or social worker or counselor in any setting other than a specialty mental health setting); complementary and alternative medicine sector (any other type of healer, such as herbalist or homeopath, participation in an internet support group, or in a self-help group) [43].

Statistical analysis

All cancer sites were aggregated to increase statistical power. Prevalence estimates of mental disorders comparing "active cancer", "cancer survivors" and "cancer free" respondents were derived using cross-tabulations. Logistic regression models were used to calculate associations (odds ratios (ORs) and 95% confidence intervals (95% CI)) between cancer status and mental disorders. These models accounted for the potential confounding effects of socio-demographic factors and other lifetime chronic health conditions. As the WMH data are both clustered and weighted, the design-based Taylor series linearization [47] implemented in version 10 of the SUDAAN software system [48] was used to estimate standard errors and evaluate the statistical significance of coefficients.

Results

Sample characteristics

Several demographic characteristics differed significantly by cancer status across participating countries (Table 1). Respondents with active cancer and cancer survivors were older, had fewer years of formal education and were more likely to be currently or previously married than cancer-free respondents. A higher percentage of women than men reported they had active cancer or were cancer survivors. In addition, a higher percentage of respondents with active cancer and cancer survivors had one or more chronic physical condition/s compared with cancer-free respondents.

The reported rates of cancer were higher in high income countries compared with low-middle income countries (Table 2).

Psychiatric morbidity

Twelve-month rates of common mental disorders were higher among respondents with active cancer (18.4% SE=2.1) than among cancer survivors (14.6% SE=0.9) and cancer-free respondents (13.3%, SE=0.2) in all countries combined (Table 3). A similar pattern emerged in separate analyses of high and low-middle income countries (Table 3).

Having active cancer, relative to being cancer-free was significantly associated with mood disorders after adjustment for age, gender and country income group (OR= 1.81 95% CI 1.26–2.61). There was no such significant association between being a cancer survivor and mood disorders. The association between active cancer and mood disorders was unaffected by adjustment for socio-demographic variables (education and marital status), and was reduced, but remained significant, after adjustment for comorbid lifetime physical conditions (OR= 1.69 95% CI 1.15–2.48). The same pattern, albeit of somewhat lesser magnitude, was evident for associations between active cancer and anxiety disorders (Table 4).

Mental health service utilization

Of all respondents across participating countries with active cancer and CMDs in the preceding 12 months, 59% reported seeking services for mental health problems (SE=5.3). Most frequently they consulted general physicians (37.9% SE=6.0) and/or mental health specialists (29.9% SE=5.4). This service utilization pattern was higher than those reported by cancer survivors (39.1% SE=2.9) and cancer-free respondents (27.7% SE=0.5). The reported higher mental health service utilization among persons with active cancer compared with survivors and cancer-free respondents was consistent across all types of services (i.e., mental health specialty, general medical, human services, and complementary and alternative medicine) (Table 5).

Although the treatment gap was present in both high- and low-middle income countries, mental health service utilization was higher in the former than in the latter group. The pattern of service utilization by cancer status was similar: higher among persons with active cancer compared with cancer survivors and cancer-free respondents across both high (64.0%

SE=6.0, 41.2% SE=3.0, 35.6% SE=0.6, respectively) and low-middle income countries (46.4% SE=11.0, 22.5% SE=9.1, 17.4% SE=0.7, respectively) (Table 5). The most frequently reported service sector sought by respondents in high income countries was the general physician (43.6% SE=6.7), while in low-middle income countries it was the mental health specialty sector (35.4% SE=11.9) (Table 5). However, due to the small cell sizes for those with cancer in low-middle income countries in this analysis, these patterns require further confirmation.

Discussion

This epidemiological study examined the prevalence of common mental disorders and mental health related service utilization patterns among community respondents with active cancer and cancer survivors compared to people who informed that they were cancer-free. The study advances the existing literature by virtue of being conducted in large community-based population samples, using similar research methods and procedures and relying on valid and reliable diagnostic measures of mood and anxiety disorders. The fact that the study was conducted in countries of contrasting income level allowed an investigation of the consistency of findings.

The results showed elevated risk of comorbid common mental health disorders among persons who at the time of the study were undergoing treatment for cancer across all countries studied compared with either cancer survivors or cancer-free respondents. Our findings thus confirm the results of the few prior community-based studies that found high rates of comorbid mental disorders among people with active cancer [8, 10]. Notably, the comorbidity rates were lower in our study than in a previous study conducted in the US, the National Comorbidity Survey (NCS) [10], likely due to the fact that the current study included respondents spanning the full adult age range (compared to a restricted age range of 15–54 in the NCS) and from a wide range of countries. This underlies the universality of these findings. Our findings further showed that cancer survivors did not differ from cancer-free respondents in the prevalence rates of common mental disorders, a likely proxy measure of eventual psychological adjustment.

Because these are cross-sectional data, the question whether the common mental disorders associated with active cancer in this study preceded or resulted from the cancer diagnosis remains open. Past research has documented that the psychiatric morbidity post-cancer onset increases in direct association with the level of disability, advanced illness and pain [3, 5]. Further research is needed to clarify the timing of the mental disorders. However, the fact that we found that the 12-month mental disorders were elevated among those with active cancer but not among cancer survivors, may suggest that they developed after the cancer diagnosis. They may further suggest that common mental disorders among persons with cancer represent an adjustment problem to the illness and that these comorbid disorders are less etiologically intertwined [see also 49, 50]. This hypothesis is supported by research documenting that cancer survivors compared with respondents with no cancer history show resilience in important domains of psychosocial adjustment such as social well-being, spirituality and personal growth [51].

Whether the comorbid mental disorders preceded or followed cancer onset, our findings show that the treatment gap for mental health problems among persons with cancer is frequent and universal, and it appears to be more pronounced in low-middle income countries compared with high income countries. The treatment gap among individuals with cancer is consistent with findings based on the general population [25]. Although the treatment gap among persons with cancer is substantial (59% of persons with active cancer and comorbid mental disorder accessed treatment across all countries), it is lower than the one observed for other chronic conditions (i.e., only 32% of respective respondents accessed care), and or the general population (approximately 27% of respective respondents accessed care). It is thus, plausible to state that access to care for mental health disorders is improved among persons with cancer compared with the general population. In this regard, we observed a pattern such that respondents in low-middle income countries sought services from mental health specialists, whereas their counterparts in high income countries sought services more frequently from general physicians, although specialized services are more available in the latter group. However, as noted earlier, the small sample size of those with cancer in lower income countries in this study means that these patterns can only be taken as suggestive.

Importantly, access to care examined in the current paper does not guarantee appropriateness and quality of services. Thus, continued efforts should be directed to closing the treatment gap alongside improving correct identification of need (without over- or under-diagnosis) and the quality of services [52].

This study has several limitations. First, as cancer status was ascertained through self-report some misclassification may have occurred. Notably, however, self-report of chronic physical conditions shows moderate to high agreement with medical records data [46]. Second, due to statistical power constraints analyses were performed on aggregate types of cancer and across genders and national groups. These may have concealed differences. Third, no information was available on cancer stage, which may have an effect on the association with the mental health-related variables. Fourth, sampling strategies varied somewhat among countries, with some including samples that were not nationally representative. These and other factors, such as country differences in identification of cancer and transmission of information to the respondents, differences in treatment and odds of survival, and uneven respondents' readiness to disclose the existence of an illness that still carries stigma, may account for some of the differences in the cancer rates among the countries included in our study. Yet, with regard to the last point, the cancer rates in our study compared with the WHO data on cancer morbidity and mortality [49] showed minimal differences (for countries where data on morbidity exists, the rank order of countries was identical or differed by one place for Israel, Italy, New Zealand, Poland, Romania and South-Africa, and differed by 2–3 places for Belgium, Bulgaria, Germany, Netherland, Portugal, Spain, and the US [53]). It is thus plausible to assume that our results ultimately reflect a conservative estimation of both the prevalence and treatment gap rates, particularly in low-middle income countries [29, 54], since those respondents who answered the question about cancer "negatively" and were identified as "cancer free" may have indeed been "cancer -active" or "cancer survivors". Overall, in our opinion, the study strengths noted earlier in the discussion balance the limitations.

Conclusion

The findings raise an important case for action both by acting collectively and by single country efforts. This is particularly important given that the literature indicates both the existence of effective treatments [24] and the adverse impact of the comorbid mental disorders on quality of life [55], adherence with recommended care, increased health-care costs [56] and, possibly, reduced survival [22, 57, 58].

Our findings regarding the prevalence of common mental disorders and mental health treatment gap are overall consistent across countries of contrasting income level, highlighting the universality of the importance of bridging the treatment gap. Mental health treatment gap is a public health problem that stubbornly remains in general and for highly vulnerable populations, and this despite the existence of proven interventions for anxiety and depressive disorders, e.g., psychopharmacological [59] and psychotherapeutic (e.g., cognitive-behavioral therapy [19]) interventions.

Actions to bridge the gap through improved availability and accessibility of the services and the reduction of the subjective barriers such as stigma, would facilitate access to the benefits derived from evidence-based mental health treatments in both primary care and/or in specialized services [22, 60]. Also, for a more complete remedy of the situation, specific training should be made available for the medical staff in identifying and treating the comorbid mental disorders [33], and wherever possible, to include specialized mental health providers as an integral part of the multidisciplinary team caring for person with cancer.

Acknowledgments

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Table 1

Respondents by sociodemographic characteristics, cancer status and other comorbid chronic conditions.

	Active cancer (n = 357)		Cancer survivors (n = 1373)		Cancer-free (n = 64657)		Test of difference χ^2	[p]
Age (Mean, SE)	61.0	1.1	60.4	0.6	41.4	0.1	677.6*	<0.0001
Gender (% female, SE)	57.4	3.7	63.7	1.8	51.6	0.3	24.4*	<0.0001
Marital status (%, SE)								
Married/Cohabitating	69.3	3.8	70.1	1.7	63.0	0.3	8.9*	0.0001
Previously married (Separated/ Widowed/Divorced)	23.9	3.6	24.9	1.6	10.9	0.2	37.4*	<0.0001
Never married	6.9	1.6	5.1	0.7	26.1	0.3	181.1*	<0.0001
Education (%, SE)[a]								
0–11 years education	27.7	3.6	25.9	1.7	17.6	0.2	14.1*	<0.0001
12 years education	25.7	3.4	23.5	1.6	24.1	0.2	0.3	0.7288
13–15 years education	25.1	3.1	27.4	1.7	36.2	0.3	20.3*	<0.0001
>= 16 years education	21.5	3.1	23.3	1.5	22.1	0.3	0.2	0.8639
Other chronic conditions (%, SE)[b]	83.1	2.9	80.4	1.6	53.7	0.3	136.5*	<0.0001

[a] Missing education in France.

[b] Percentage of respondents with 1 or more other chronic conditions: arthritis, back and neck pain, frequent or severe headaches, heart disease, high blood pressure, adult onset asthma, diabetes, peptic ulcer, other chronic lung diseases, stroke, other chronic pain, epilepsy and HIV.

Table 2

Respondents' cancer status by country.

Country	Sample size	Active cancer (unweighted number)	Weighted (%)	Cancer survivors (unweighted number)	Weighted (%)	Cancer-free (unweighted number)	Total number of respondents with cancer per country
High-income Countries							
Belgium	1043	4	0.29	37	3.13	1002	41
France	1436	8	0.41	45	3.66	1383	53
Germany	1323	11	0.80	45	3.13	1267	56
Israel	4859	47	0.85	132	2.58	4680	179
Italy	1779	9	0.45	40	2.15	1730	49
Japan	1682	9	0.35	49	2.57	1624	58
Netherlands	1094	5	0.91	45	2.65	1044	50
New Zealand	7312	75	0.99	323	4.93	6914	398
Northern Ireland	1986	10	0.47	34	1.90	1942	44
Poland	4000	27	0.47	47	0.93	3926	74
Portugal	2060	8	0.27	67	2.40	1985	75
Spain	2121	7	0.15	37	0.86	2077	44
US	5692	48	0.87	335	5.72	5309	383
Low-middle income Countries							
Brazil	2942	15	0.66	19	0.65	2908	34
Bulgaria	2233	11	0.32	19	0.55	2203	30
Colombia	2381	13	0.40	16	0.53	2352	29
Iraq	4332	7	0.16	3	0.13	4322	10
Lebanon	1031	1	0.16	1	0.12	1029	2
Mexico	2362	1	0.02	6	0.12	2355	7
Nigeria	2143	2	0.04	1	0.04	2140	3
Peru	1801	3	0.17	6	0.40	1792	9
PRC China (Beijing+Shanghai)	1628	3	0.09	3	0.06	1622	6
PRC Shenzhen	2475	1	0.01	6	0.14	2468	7
Romania	2357	12	0.43	16	0.57	2329	28
South Africa	4315	20	0.44	41	1.09	4254	61

Country	Sample size	Active cancer (unweighted number)	Weighted (%)	Cancer survivors (unweighted number)	Weighted (%)	Cancer-free (unweighted number)	Total number of respondents with cancer per country
Total	**66387**	**357**		**1373**		**64657**	**1730**

Table 3

Prevalence rates of 12-month mental disorders by respondents' cancer status and income-group countries.

	12-month mental disorders								
	Any mood[a]			Any anxiety[b]			Common mental disorders[c]		
	n	**%**	**SE**	**n**	**%**	**SE**	**n**	**%**	**SE**
All countries									
Active cancer	48	**9.3**	1.5	79	**14.9**	1.9	96	**18.4**	2.1
Cancer survivors	152	**5.9**	0.6	292	**12.2**	0.8	355	**14.6**	0.9
Cancer-free	6019	**5.3**	0.1	10351	**10.4**	0.2	13566	**13.3**	0.2
High-income countries									
Active cancer	35	**8.9**	1.7	54	**13.5**	2.1	68	**17.5**	2.3
Cancer survivors	143	**6.0**	0.6	271	**12.5**	0.9	330	**15.1**	1.0
Cancer-free	3658	**6.0**	0.1	6348	**11.1**	0.2	8183	**14.3**	0.2
Low-middle income countries									
Active cancer	13	**10.5**	3.4	25	**19.2**	4.6	28	**21.1**	4.6
Cancer survivors	9	**4.3**	1.8	21	**9.5**	3.1	25	**10.6**	3.2
Cancer-free	2361	**4.5**	0.1	4003	**9.5**	0.2	5383	**12.1**	0.2

[a] Respondents with any of the following 12-month mood disorder: Major depressive episode, Dysthymia and Bipolar disorders.

[b] Respondents with any of the following 12-month anxiety disorder: Panic

[c] Respondents with any 12-month mood disorder or 12-month anxiety disorder.

Table 4

Associations (odds ratios) between respondents' cancer status and 12-month mental disorders (all countries combined).

	12-month mental disorders		
	Any mood[a]	Any anxiety[b]	Common mental disorders[c]
	OR (95% C.I.)	OR (95% C.I.)	OR (95% C.I.)
1) Adjusted for age + gender + countries			
Active cancer	1.81[*] (1.26–2.61)	1.57[*] (1.14–2.17)	1.52[*] (1.13–2.05)
Cancer survivors	0.97 (0.78–1.21)	1.04 (0.88–1.22)	0.98 (0.84–1.14)
Cancer-free	1.00	1.00	1.00
2) Adjusted additionally for education and marital status			
Active cancer	1.81[*] (1.23–2.66)	1.58[*] (1.13–2.20)	1.53[*] (1.12–2.08)
Cancer survivors	0.97 (0.78–1.21)	1.04 (0.88–1.23)	0.98 (0.84–1.15)
Cancer-free	1.00	1.00	1.00
3) Adjusted additionally for other chronic physical conditions			
Active cancer	1.69[*] (1.15–2.48)	1.49[*] (1.07–2.09)	1.44[*] (1.05–1.97)
Cancer survivors	0.94 (0.75–1.17)	1.01 (0.86–1.19)	0.95 (0.82–1.11)
Cancer-free	1.00	1.00	1.00

[*] Significant at the .05 level, two-sided test.

[a] Respondents with any of the following 12-month mood disorders: Major depressive episode, Dysthymia and Bipolar disorders.

[b] Respondents with any of the following 12-month anxiety disorders: Panic disorder, Generalized anxiety disorder, Social phobia, Specific phobia, Agoraphobia without panic disorder, Post-traumatic stress disorder and Obsessive compulsive disorder.

[c] Respondents with any 12-month mood disorder or 12-month anxiety disorder.

Table 5

Prevalence rates of 12-month service use among respondents with 12-month mental disorders by cancer status and country income level.

	Number of respondents			Among respondents with 12-month mental disorders[a]																
				Any treatment[b]			Mental health specialty[c]			General medical[d]			Human services[e]			CAM[f]		
	n	%	SE	n	%	SE	n	%	SE	n	%	SE	n	%	SE	n	%	SE
All countries																		
Active cancer	357	0.5	0.0	53	59.0	5.3	25	29.9	5.4	37	37.9	6.0	7	7.8	3.5	9	11.2	3.8
Cancer survivors	1373	2.0	0.1	169	39.1	2.9	74	16.6	2.0	119	28.4	2.6	23	5.6	1.2	23	5.0	1.3
Cancer-free	64657	97.5	0.1	4694	27.7	0.5	2219	12.9	0.3	2903	17.0	0.4	579	3.7	0.2	601	3.7	0.2
Other chronic conditions	39291	54.3	0.3	3832	32.4	0.6	1760	14.7	0.4	2453	20.7	0.5	495	4.6	0.3	492	4.3	0.3
High income countries																		
Active cancer	89	0.3	0.0	43	64.0	6.0	19	27.7	5.8	33	43.6	6.7	5	9.9	4.8	8	15.2	5.0
Cancer survivors	137	0.4	0.1	160	41.2	3.0	68	17.1	2.0	117	31.3	2.7	21	5.3	1.2	22	5.0	1.3
Cancer-free	29774	99.3	0.1	3520	35.6	0.6	1688	17.0	0.5	2340	23.5	0.5	425	4.4	0.3	447	4.7	0.3
Other chronic conditions	15685	46.8	0.4	2926	38.7	0.8	1359	18.0	0.6	1990	26.2	0.6	380	5.1	0.4	378	5.2	0.35
Low-middle income countries																		
Active cancer	268	0.7	0.1	10	46.4	11.0	6	35.4	11.9	4	23.4	12.8	2	2.3	1.7	1	1.0	1.1
Cancer survivors	1236	3.3	0.1	9	22.5	9.1	6	12.7	7.0	2	4.7	4.2	2	7.9	5.4	1	5.2	4.8
Cancer-free	34883	96.1	0.1	1174	17.4	0.7	531	7.5	0.4	563	8.6	0.5	154	2.8	0.4	154	2.4	0.3
Other chronic conditions	23606	60.5	0.4	906	22.2	1.0	401	9.4	0.6	463	11.9	0.7	115	3.6	0.5	114	2.8	0.3

[a] Percentages are based on respondents with any 12-month mental disorders.

[b] Respondents who sought any form of professional treatments listed in the footnotes below.

[c] The mental health specialist sector, which includes psychiatrists and non-psychiatrist mental health specialists (psychiatrist, psychologist or other non-psychiatrist mental health professional; social worker or counsellor in a mental health specialty setting; use of a mental health helpline; or overnight admissions for a mental health or drug or alcohol problems, with a presumption of daily contact with a psychiatrist).

[d] The general medical sector (general practitioner, other medical doctor, nurse, occupational therapist or any healthcare professional).

[e] The human services sector (religious or spiritual advisor or social worker or counsellor in any setting other than a specialty mental health setting.

f The CAM (complementary and alternative medicine) sector (any other type of healer such as herbalist or homeopath, participation in an internet support group, or participation in a self-help group).