

Sleep Disorders and Sleep Quality in Moroccan Adult Patients with Cancer during Treatment

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Abstract

Background: Sleep disruption is a common problem for patients with cancer. Several recent studies have reported an incidence of 30% to 50% in this group, compared to 15% in the general population, but it has received little attention from the oncology community compared with other symptoms accompanying cancer.

Patients and methods: It is a cross-sectional study where we included a total of 284 patients with cancer during treatment. All patients were offered brief sleep questionnaires, judgment criteria were based on the Pittsburgh Sleep Quality Index (PSQI), the Insomnia Severity Index (ISI), and the Epworth Sleepiness Scale (ESS) to assess respectively sleep quality, insomnia, and sleepiness. We analyzed data by calculation of Cronbach's alpha coefficient for the reliability of measurements, and by simple and multiple logistic regressions.

Results: Internal consistency measurement of the ISI, ESC, PSQI subscales questionnaires found a Cronbach's alpha coefficient of 0.895, 0.618 and 0.669, respectively. 52% of patients have no clinically significant insomnia, 12.5% have Subthreshold insomnia, 25% have clinical insomnia (moderate severity) and 10.5% have severe clinical insomnia. Patients with urologic, head and neck, and gastro-intestinal cancer had higher scores than patients with breast and gynecologic cancer. As for patients receiving surgery and chemotherapy, the ISI average score was respectively 14.3 ± 4.4 and 13.8 ± 4.9 . It was statistically different ($p < 0.001$) in post-hoc correction from the average scores of patients receiving radiotherapy (13.2 ± 3.8). In multivariate analysis, the strongest associated factors with insomnia were lowest SES (OR=3.849 [1,684-5,159]), head and neck cancer (OR=3.129 [1,985-5,129]), urologic cancer (OR=2.919 [1,985-5,295]), Surgery (OR=3.201 [1,993-8,157]), and Chemotherapy (OR=3.154 [2,869-7,818]). Regarding daytime sleepiness, 49.6% of patients were in normal range in healthy adults 32% have moderate sleepiness and 18.4% have severe sleepiness. Multivariate analysis of age, sex, marital status, SES, cancer type, and treatment type show that older patients more than 60 years, single patients, surgery and chemotherapy were the independent associated factors with somnolence and this was statistically significant. While married status was a protector factor. 28.2% of patients tested did not have impaired quality of sleep, 39.1% had moderate sleep quality, while 32.7% reported severe impaired sleep quality. According to the in PSQI score, independent factors associated with poor quality of sleep found in multivariate analysis were primarily younger patients (OR>8.8, $p=0.001$), followed by urologic cancer (OR>4, $p=0.001$), head and neck cancer (OR=1.979, $p=0.006$), and lowest level of SES (OR=4.119, $p=0.001$), regarding type of treatment there is no significant difference between different treatment. 74% of patients with sleep disturbances report that their sleep disorders decrease quality of life, 41% report fatigue, 53% experienced mental capacity degradation and 39% of patients report that affect interpersonal relationship, and their humor in 42%.

Conclusion: Patients with head and neck cancer and urological cancer, patients receiving chemotherapy and surgery should be investigated especially among younger ones, in order to detect those at risk of sleep disruption and offer them appropriate support.

Keywords: Cancer; Sleep disorders; Quality; insomnia; Sleepiness; Oncology

Introduction

Sleep disorders are a group of conditions that affect the ability to sleep well on a regular basis. Whether they are associated with various medical conditions, sleep disorders are very common in people with cancer. Cancer diagnosis and treatment are able to bring sleep disturbances or to exacerbate pre-existing sleep problems [1-4].

The third edition of the international classification of sleep disorders (ICSD) [5] published in 2014 classifies sleep disorders under 6 major categories: insomnia, sleep related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep-wake disorders, parasomnias, and sleep related movement disorders.

This survey study was designed to collect sleep-related data in patients with cancer that could determine prospectively the prevalence of sleep disorders among patients with cancer receiving chemotherapy and/or radiation therapy with special attention to insomnia, to examine the nature of reported disorders including type, duration, identified

contributors and describe the influence of age, sex, socio-economical level, type of cancer and treatment in the installation of this disorder.

Methods

Participants and procedures

This study was performed using data from an observational, prospective survey and resource utilization of health-related services in people with cancer who were undergoing chemotherapy and /or

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radiotherapy in national institute of oncology Rabat-Morocco from 1 November 2015 to 14 August 2016. Those eligible were all people with non-metastatic cancer diagnosed in this site; breast, gynecologic, neck and head, gastrointestinal, and urologic. There was also no age-limitation. Exclusion criteria were malignant tumors of the central nervous system, patients with psychological disorders and metastatic disease.

Patients had to express their agreement to participate in the study by signing an informed consent. They were interviewed either during treatment (surgery, chemotherapy, radiation therapy and endocrine therapy).

All participants completed a symptom questionnaire that included the Arabic version of: Pittsburgh Sleep Quality Index, Epworth Sleepiness Scale, and the Insomnia Severity Index.

320 patients invited to participate, 16 declined because of lack of interest or lack of time and 9 did not return their questionnaire, 4 patients were subsequently excluded because they had a history of another cancer, and 7 because they had a history of psychological disorder. Thus, the final sample was composed of 284 patients. We are informed the respondents of the study's purpose, content, duration, and potential benefits. Then The patient's medical folder was reviewed to collect all medical information. All patients had a singular interview with their physician. The main variables identified were age, sexes, diagnosis, Socio-economic level, and treatment.

Questionnaires

Pittsburgh sleep quality index

The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates "poor" from "good" sleep quality by measuring seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. A total score of "5" or greater is indicative of poor sleep quality.

Epworth sleepiness scale

The Epworth Sleepiness Scale (ESS) is a self-administered questionnaire with 8 questions. Respondents are asked to rate, on a 4-point scale (0-3), their usual chances of dozing off or falling asleep while engaged in eight different activities. The total score gives an estimate of a more general characteristic, the person's average sleep propensity, across a wide range of activities in their daily lives.

Insomnia severity index

The Insomnia Severity Index (ISI) is a brief instrument that was designed to assess the nature and severity of both nighttime and daytime components of insomnia. It is available in several languages and is increasingly used as a metric of treatment response in clinical research [6].

Analysis

Data were analyzed with SPSS® software for Windows version 11.0. Analysis included summary statistics to examine the range, distribution, mean, and standard deviation for each subscale. Relations among symptoms and different variables were evaluated with bivariate correlations. Distribution normality was assessed by Kolmogorov-Smirnov Test for quantitative variables (age, scores). The different modalities of each variable were compared regarding ISI, ESC, PSQI.

Student's t-test was used to compare the result score in different categories of age (less than 30 years, between 30 and 60 years, and more than 60 years) The relationship between all the above-mentioned independent variables and each dependent factor was analyzed by simple logistic regression. We fixed a significance threshold of 0.250 in univariate analysis to include variables in the multivariate model where multiple logistic regression was performed. The error risk was set at 0.05 to assess result statistical significance.

Results

284 patients were enrolled, 75.7% of women and 24.3% of men, the population was relatively young with a mean age of 49.5 ± 13 years (ranges 17-80). 39.4% had breast cancer, 18% had gynecological cancer, 14.4% had cancer of head and neck, 13.4% had digestive cancer and 14.4% had an urologic cancer (bladder or prostate). 75.7% were married, 12.7% were single and just 1.4% were without family.

Analysis of patient's Socio-Economic Status (SES) find that 50.7% were in the lowest level of SES, 38.7% in the middle and 10.6% in the highest level. Also 38% of patients were illiterate even if just 37% lived in rural areas. 60% were employed, most of them claimed having workstation reassignment after cancer diagnosis. 26.9% reported living difficult financial and/or professional situation.

Regarding treatment type, 51.8% have undergone surgery, 83% have received chemotherapy and 85% have undergone radiotherapy. 35.9% of patients were taking analgesics drugs and 28.4% were taking corticosteroids.

Internal consistency measurement of the ISI, ESC, PSQI subscales questionnaires found a Cronbach's alpha coefficient of 0.895, 0.618 and 0.669 respectively.

Results of insomnia

Insomnia was assessed by the severity index of insomnia, 52% of patients have no clinically significant insomnia, 12.5% have Subthreshold insomnia, 25% have Clinical insomnia (moderate severity) and 10.5% have severe clinical insomnia (Table 1).

With regard to clinical characteristics we found that female gender and older patients had higher ISI scores. Also, patients with urologic, head and neck, and gastro-intestinal cancer had higher scores than patients with breast and gynecologic cancer. As for patients receiving surgery and chemotherapy, the ISI average score was respectively 14.3 ± 4.4 and 13.8 ± 4.9 . it was statistically different ($p < 0.001$) in post-hoc correction from the average scores of patients receiving radiotherapy (13.2 ± 3.8).

As regards social demographic variables, patients married and widower, and patients with lowest level of SES had a higher ISI score than other categories (Table 2).

In multivariate analysis adjusted for sex, age, marital status, SES, cancer type and treatment type we found that younger age (≤ 30 years), living in lowest level of socio economic status were independent associated factors with insomnia and this was statistically significant. Regarding clinical characteristics we found that head and neck, Gastro-intestinal, and urologic cancer were the types of cancer most associated with insomnia. The strongest associated factors were lowest SES (OR= 3.849 (1,684-5,159)), Head and neck cancer (OR=3.129 (1,985-5,129)), urologic cancer (OR= 2.919 (1,985-5,295)), Surgery (OR= 3.201 (1,993-8,157)), and Chemotherapy (OR= 3.154 (2,869-7,818)).

Results of sleepiness

Sleepiness was assessed by Epworth Sleepiness Scale, 49.6% of

Characteristic	Category	N (%)	ISI score		
			mean	SD	P
Sex	Men	69(24.3)	14.1	3.65	P=0.821
	Women	215 (75.7)	15.6	4.81	
Age	≤ 30	37 (13)	20.2	1.55	P=0.058
	30-60	191 (67.3)	16.2	4.97	
	≥ 60	56 (19.7)	11.1	1.87	
Marital status	Married	215 (75.7)	16.1	3.54	P=0.291
	Single	36 (12.7)	12.8	2.74	
	widower	29 (10.2)	14.1	4.98	
	Without family	4 (1.4)	11.9	2.05	
SES	Lowest	144 (50.7)	20.9	5.42	P=0.154
	Middle	110 (38.7)	14.5	3.11	
	Highest	30 (10.6)	12.4	2.84	
Cancer type	Breast	112 (39.5)	10.2	3.25	P=0.097
	Gynecologic	52 (18.3)	12.2	4.89	
	Head and neck	41 (14.4)	16.6	4.18	
	Gastro-intestinal	38 (13.4)	13.2	4.65	
	Urologic	41 (14.4)	18.7	5.92	
Treatment type	Surgery	147 (51.8)	14.2	4.38	P=0.001
	Chemotherapy	236 (83)	14.8	4.91	
	Radiotherapy	243 (85)	10.2	3.78	

ISI: Insomnia Severity Index

Calculated by Student's independent-samples t-test.

Table 1: Shows the distribution of social demographic and clinical characteristics of patients according to the ISI score.

Characteristic	Category	CI (%)	Univariate analysis			Multivariate analysis		
			OR	(95%CI)	p	OR	(95%CI)	p
Sex	Man	37.2	1.078	[0,892-1,117]	0,209	1.787	[0,742-1,588]	0.208
	Women	8.1	1.345	-	-	1.854	-	-
Age	≤ 30	50	2.621	[1,763-4,157]	0.058	2.749	[1,964-5,057]	0.091
	30-60	25	1.854	[0,962-2,737]	0.078	1.864	[0,962-2,939]	0.099
	≥ 60	13.5	0.841	[0,685-1,019]	0.001	0.719	[0,612-1,015]	0.001
Marital status	Married	33.5	2.101	[0,987-3,014]	0.059 0.021	2.811	[1,551-4,257]	0.012
	Single	20	1.054	[0,902-1,587]	0.098	1.064	[0,873-1,799]	0.035
	Widower	31	2.049	[1,895-4,092]	0.089 -	2.709	[1,852-5,445]	0.128
	Without family	20	1.119	[0,798-1,948]		1.289	[1,617-2,945]	0.278
SES	Lowest	50.2	3.251	[2,003-5,821]	0.008	3.849	[1,684-5,159]	0.001
	Middle	21.2	2.021	[0,862-3,117]	0.078	2.264	[2,002-4,931]	0.119
	Highest	5.3	0.852	[0,585-1,059]	0.111	0.971	[0,712-1,755]	0.582
Cancer type	Breast	52.7	1.001	[0,053-1,111]	0.019 0.091	1.021	[0,773-1,871]	0.029 0.088
	Gynecologic	27.4	1	[0,562-1,007]	0.008	1.002	[0,982-1,027]	0.001
	Head and neck	55.8	2.509	[1,985-3,829]	0.029	3.129	[1,985-5,129]	0.011
	Gastro-intestinal	42	1.829	[1,005-2,429]	0.025	1.229	[1,005-2,239]	0.009
	Urologic	60	3.459	[1,985-6,105]		3.519	[1,985-6,295]	
Treatment type	Surgery	41	3.221	[1,993-7,157]	0.007	3.201	[1,993-7,157]	0.003
	Chemotherapy	62	3.454	[2,762-7,792]	0.018	3.554	[2,869-7,818]	0.001
	Radiotherapy	22	1.022	[0,685-1,059]	0.091	1.121	[0,685-1,159]	0.087

CI: clinical insomnia

Table 2: Shows the distribution of social demographic and clinical characteristics of patients with clinical insomnia in the ISI with univariate and multivariate analyzes.

patients were in Normal range in healthy adults 32% have moderate sleepiness and 18.4% have severe sleepiness (Table 3).

We notice that older patients had higher ESS scores (p=0.002). Inversely patients married had lower ESS scores (p=0.009). Patients receiving surgery and chemotherapy had respectively a ESS average score of 13 ± 1.8 and 11 ± 3.1, significantly different from the average score of 6 ± 2.4 found among those receiving radiotherapy (p<0,001). On the other hand, the difference was not significant according to sex

and type of cancer (Table 4). Multivariate analysis of age, sex, marital status, SES, cancer type, and treatment type show that older patients more than 60 years, single patients, surgery and chemotherapy were the independent associated factors with somnolence and this was statistically significant. While married status was a protector factor.

Results of sleep quality

Sleep quality was assessed by The Pittsburgh Sleep Quality Index (PSQI), 28.2% of patients tested did not have impaired quality of sleep,

Characteristic	Category	Values			ESS P score
		N (%)	mean	SD	
Sex	Man	69 (24.3)	9.15	2.71	0.214
	Women	215 (75.7)	11.7	4.11	
Age	≤ 30	37 (13)	7.69	3.02	0.002
	30-60	191 (67.3)	9.1	2.14	
	≥60	56 (19.7)	13.5	3.92	
Marital status	Married	215 (75.7)	7	1.25	0.009
	Single	36 (12.7)	13.1	4.21	
	widower	29 (10.2)	12.2	232	
	Without family	4 (1.4)	15.1	1.2	
SES	Lowest	144 (50.7)	6.2	1.3	0.158
	Middle	110 (38.7)	6.9	1.6	
	Highest	30 (10.6)	9.1	2.3	
Cancer type	Breast	112 (39.5)	7	1.6	0.391
	Gynecologic	52 (18.3)	7.5	1.9	
	Head and neck	41 (14.4)	11.6	2	
	Gastro-intestinal	38 (13.4)	6.1	1.6	
	Urologic	41 (14.4)	7.2	1	
Treatment type	Surgery	147 (51.8)	11	1.8	0.004
	Chemotherapy	236 (83)	11	3.1	
	Radiotherapy	243 (85)	9	2.4	

ESS: Epworth Sleepiness Scale
Calculated by Student's independent-samples t-test.

Table 3: Shows the distribution of social demographic and clinical characteristics of patients according to the ESS score.

Characteristic	Category	CS (%)	Univariate analysis			Multivariate analysis		
			OR	[95%CI]	p	OR	[95%CI]	p
Sex	Men	50	1.108	[0,878-1,197]	0,249	1.337	[0,942-1,988]	0.298
	Women	41	1.055	-	-	1.794	-	-
Age	≤ 30	41	1.941	[0,893-2,087]	0.178	1.449	[0,664-2,057]	0.131
	30-60	35	2.996	[1,769-3,737]	0.121	1.994	[1,762-3,239]	0.019
	≥ 60	70	3.188	[1,879-6,059]	0.001	3.419	[2,892-7,115]	0.001
Marital status	Married	12	0.381	[0,117-0,664]	0.002 0.001	0.311	[0,221-0,957]	0.003
	Single	31	2.054	[1,882-4,587]	0.058	2.064	[1,873-4,799]	0.001
	Widower	24	3.049	[2,895-5,092]	0.129	3.209	[2,852-5,845]	0.198
	Without family	30	2.119	[1,898-4,948]	-	2.289	[1,617-2,995]	0.078
SES	Lowest	42.2	1.251	[1,003-1,821]	0.128	1.849	[1,444-2,169]	0.017
	Middle	22.2	1.721	[0,862-2,117]	0.418	1.574	[1,012-1,939]	0.119
	Highest	15	0.452	[0,185-1,059]	0.181	0.471	[0,141-1,005]	0.092
Cancer type	Breast	33.7	1.051	[0,893-1,211]	0.319 0.291	1.101	[0,723-1,371]	0.329 0.331
	Gynecologic	29.6	1.098	[0,882-1,157]	0.098	1.128	[0,889-1,227]	0.102
	Head and neck	35	1.889	[1,585-2,279]	0.329	1.809	[0,915-2,199]	0.411
	Gastro-intestinal	39.1	1.111	[1,005-1,520]	0.125	1.091	[1,085-1,239]	0.107
	Urologic	34.6	0.985	[0,583-1,105]	-	0.813	[0,697-1,171]	-
Treatment type	Surgery	61.5	1.591	[1,393-2,257]	0.111	1.208	[1,993-1,757]	0.181
	Chemotherapy	73.3	4.054	[3,062-6,194]	0.001	4.199	[3,821-7,118]	0.001
	Radiotherapy	31	1.192	[0,537-1,359]	0.181	1.246	[0,715-1,389]	0.129

CS: Clinical Sleepiness

Table 4: Shows the distribution of social demographic and clinical characteristics of patients with clinical sleepiness in ESS score with univariate and multivariate analyzes.

39.1% had moderate sleep quality, while 32.7% reported severe impaired sleep quality (Tables 5 and 6). With regard to clinical characteristics we found that women, younger patients, and patients with urologic, digestive, and head and neck cancer had higher PSQI scores. As type of treatment we note that the difference between the average score of each treatment was not significant. Concerning social characteristics, married patients had the lowest score of PSQI, on the other hand higher score is observed in lowest level of SES (Table 7). According to the in PSQI score, independent factors associated with poor quality of sleep

found in multivariate analysis, after adjustment for age, sex, marital status, SES, and cancer type, were primarily younger patients (OR > 8.8, p=0.001), followed by urologic cancer (OR >4, p=0.001), Head and neck cancer (OR=1.979, p=0.006), and lowest level of SES (OR=4.119, p=0.001), regarding type of treatment there is no significant difference between different treatment. We notice also that married status and older age is not associated with sleep disorders. The highest correlation was found between sleep quality and interference of pain with sleep (OR=8.231, p=0.001), (pain is one of component of PSQI score).

Impact of sleep disorders on quality of life

74% of patients with sleep disturbances report that their sleep disorders decrease quality of life, 41% report fatigue, 53% experienced mental capacity degradation and 39% of patients report that affect Interpersonal relationship and humor in 42%.

Discussion

Sleep disturbance is a common problem among cancer patients. But unlike other psychologic and physiologic (eg, nausea, pain) troubles correlates of cancer, cancer-related insomnia has received little attention, from either clinicians or researchers [7]. Thus, general sleep disruption is frequently evaluated as part of a cluster of symptoms including depression, fatigue, anorexia, and nausea. The prevalence of sleep disturbance varies among studies owing to differences in the populations studied, disease type, definition of sleep disorders, and mode of assessment, most studies report that 30% to 50% of newly diagnosed patients with cancer have sleep difficulties [8,9]. In the general population, insomnia is the most common sleep disorder [10]. Insomnia is defined as difficulty falling asleep, difficulty staying asleep and/or early awakening, or non-restorative sleep. Approximately 33% of the general population have some insomnia symptoms [9]. Insomnia can begin before cancer treatment [11] continue during treatment [12], and persist for years after the treatment has been completed [13].

In the current study, we used the ISI to assess the patient's

Component Scores (0-3)	Mean	SD
Subjective sleep quality	1.91	0.87
Sleep latency	1.62	0.79
Sleep duration	2.01	1.02
Habitual sleep efficiency	1.54	0.91
Sleep disturbances	1.74	0.88
Use of sleeping medication	0.42	1.19
Daytime dysfunction	1.68	0.63

Table 5: shows the mean and standard deviation for each component score of (PSQI).

perception of his or her insomnia and the severity of both nighttime and daytime components of insomnia since it has been subject to several validation studies, and its psychometric qualities are highlighted by many publications [14-19]. It is available in several languages and is increasingly used as a metric in clinical research. We have used the Arabic version which has already demonstrated sufficient reliability and validity [20].

In this study, the insomnia incidence rate of 48% found in Moroccan newly diagnosed patients with cancer remained comparable to those of

Characteristic	Category	N (%)	PSQI score		
			mean	SD	P
Sexe	Man	69 (24.3)	8.7	4.2	0.381
	Women	215 (75.7)	10.2	4.7	
Age	≤ 30	37 (13)	11	5.5	0.092
	30-60	191 (67.3)	15	3.2	
	≥ 60	56 (19.7)	6.2	2.1	
Marital status	Married	215 (75.7)	7.1	2.1	0.001
	Single	36 (12.7)	16	3.6	
	widower	29 (10.2)	14	3.3	
	Without family	4 (1.4)	11	1.8	
SES	Lowest	144 (50.7)	16	3.9	0.128
	Middle	110 (38.7)	11.9	6.6	
	Highest	30 (10.6)	7.1	2.9	
Cancer type	Breast	112 (39.5)	8.1	3.2	0.011
	Gynecologic	52 (18.3)	9.8	2.5	
	Head and neck	41 (14.4)	11	3.7	
	Gastro-intestinal	38 (13.4)	15	3.2	
	Urologic	41 (14.4)	18	2.2	
Treatment type	Surgery	147 (51.8)	9	2.1	0.321
	Chemotherapy	236 (83)	9	1.9	
	Radiotherapy	243 (85)	10	3.5	

PSQI: Pittsburgh Sleep Quality Index

Table 6: Shows the distribution of social demographic and clinical characteristics of patients according to the (PSQI) score.

Characteristic	Category	PSQI score >5 (%)	Univariate analysis			Multivariate analysis		
			OR	[95%CI]	p	OR	[95%CI]	p
Sex	Man	30	1.098	[0,888-1,137]	0,249	1.129	[0,888-1,237]	0.218
	Women	45	1.095	-	-	1.154	-	-
Age	≤ 30	49	8.881	[6,293-11,488]	0.008	8.981	[6,793-9,998]	0.001
	30-60	55	8.236	[6,009-13,557]	0.155	8.936	[6,009-9,957]	0.001
	≥ 60	33	1.422	[0,511-1,539]	0.099	1.392	[0,711-1,409]	0.089
Marital status	Married	12	0.481	[0,117-0,664]	0.089 0.001	0.466	[0,155-0,869]	0.003
	Single	51	1.994	[1,182-2,227]	0.008	2.774	[1,582-3,427]	0.001
	widower	44	2.789	[2,095-4,092]	0.029	2.009	[1,995-2,992]	0.001
	Without family	16	2.768	[2,448-3,888]	-	2.278	[1,573-3,122]	0.009
SES	Lowest	42	3.871	[3,003-9,258]	0.001	4.119	[3,119-8,992]	0.001
	Middle	39	3.521	[2,862-4,517]	0.001	4.321	[3,438-5,663]	0.001
	Highest	21	0.452	[0,155-1,059]	0.021	0.489	[0,207-0,979]	0.001
Cancer type	Breast	14	1	[0,993-1,011]	0.009 0.101	1	[0,993-1,141]	0.002 0.091
	Gynecologic	25	1.001	[0,895-1,057]	0.008	1.001	[0,895-1,157]	0.006
	Head and neck	43	1.999	[1,588-2,559]	0.001	1.979	[1,435-2,719]	0.001
	Gastro-intestinal	52	1.991	[1,815-2,120]	0.001	1.955	[1,444-2,440]	0.001
	Urologic	67	4.215	[3,553-8,009]	-	4.117	[3,119-6,229]	-
Treatment type	Surgery	35	1	[0,993-1,007]	0.551	1	[0,993-1,007]	0.622
	Chemotherapy	39	1.004	[0,972-1,094]	0.651	1.004	[0,972-1,094]	0.411
	Radiotherapy	42	1.002	[0,993-1,011]	0.701	1.002	[0,993-1,011]	0.666

Table 7: Shows the distribution of social demographic and clinical characteristics of patients with clinical sleepiness in PSQI score with univariate and multivariate analyzes.

30% to 50% reported by many previous series [8,21]. Unlike the general population, insomnia in oncology more often affects young patients with no significant difference between men and women, [9] Bixler et al. study finds the same results.

We found significant differences in insomnia prevalence by cancer type. Unlike the previous reports in literature [9,13], this work found that patients with head and neck cancer and urologic cancer had the highest insomnia prevalence, surprisingly breast and gynecological cancer had lowest prevalence of insomnia. Regarding treatment type, we found in this study that clinical insomnia was the most associated with chemotherapy (62%), this result agrees with the findings of the literature [9,22]. Berger and Fair reported that women undergoing chemotherapy for breast cancer who had more objectively measured daytime sleep and nighttime awakenings reported more chemotherapy-related fatigue [23]. Sleepiness in cancer patients has seldom been studied, it's often evaluated as clinical manifestation of fatigue. Epworth Sleepiness Scale used in the current study is a questionnaire developed by Dr. Murray Johns of Melbourne to measure daytime sleepiness. It has been subject to several validation studies in several languages [24-28]. This study shows that sleepiness is prevalent, especially in older patients (≥ 60 years) who have recently received surgery or chemotherapy. Faithfull noted that severe, unexpected sleepiness following treatment can be distressing for patients [29]. Thus, treatment-related sleepiness requires further investigation. A remaining question is the extent to which patients with cancer experience fatigue versus daytime sleepiness [30]. Davidson et al. published a study where they found an enhanced association between radiation to the head and hypersomnolence [21], in agreement with a report by Faithfull [29]. In children, excessive daytime sleepiness was the most common sleep problem, seen in 60% of children with cancer and in 80% of children with CNS neoplasms involving the hypothalamus, thalamus, and brainstem [31,32]. Sleep quality is an important clinical concept because it affects quality of life and well-being [33-35]. It includes quantitative aspects of sleep, and more purely subjective aspects, such as depth or restfulness of sleep [34]. Poor sleep quality in cancer patients may result from physical complaint, side effects of treatment, and other aspects of disease, and they may be related to psychiatric disorders such as depression and anxiety [36]. In this work, sleep quality was evaluated by the Pittsburgh Sleep Quality Index (PSQI), it is an effective instrument used to measure the quality and patterns of sleep in the older adult. It was validated by many studies representing a 89.6% sensitivity and a 86.5% specificity and psychometric evaluation supports its internal consistency (reliability) and construct validity in cancer patients [34,37]. In our study, examination of global sleep quality revealed that the majority of patients had scores equal or greater than the cutoff score of 5, similar to those of Carpenter et al [36-38] and Mystakidou et al [33]. There was no statistically significant difference between male and female PSQI mean scores, in agreement with Mystakidou results [33] and contrary to other findings [39]. In addition, there was statistically significant difference between PSQI mean scores on family status, similar to the findings of Dogan et al [40] and unlike the results of Mystakidou [33]. Although, in many series, sleep quality gets worse in old patients [4,33,40] contrary to our results. The results of our study concerning mean and standard Deviation for each component of PSQI score (Table 5) were similar to other findings in literature [33,35].

Conclusion

Sleep disorders in cancer patients have received very little attention despite the impact of sleep quality on quality of life. This study tried to assess sleep disorders and sleep quality with associated factors in

patients with cancer through a fairly large sample of patients during treatment. This study is one of the first to examine sleep disruption in its entirety in a large diverse sample of patients with cancer during chemotherapy and radiotherapy longitudinally in Morocco, however it has some limitations: we did not inquire about stage of disease on the questionnaire, use of self-report and do not imply clinical diagnoses, nor reflect sleep laboratory measures, heterogeneity among patients with cancer, and inability to assess impact of insomnia on daytime functioning. This study provides basic information on the nature and prevalence of sleep problems, more investigation into its prevalence in specific cancer populations is needed to further characterize the nature of sleep problems in patients with cancer and their management in fragile patients receiving several treatments.

References

1. Costa AR, Fontes F, Pereira S, Gonçalves M, Azevedo A, et al. (2014) Impact of breast cancer treatments on sleep disturbances— A systematic review. *The Breast* 23: 697-709.
2. Palesh O, Peppone L, Innominato PF, Janelins M, Jeong M, et al. (2012) Prevalence, putative mechanisms, and current management of sleep problems during chemotherapy for cancer. *Nat Sci Sleep* 4: 151-162.
3. Fleming L, Gillespie S, Espie CA (2010) The development and impact of insomnia on cancer survivors: A qualitative analysis. *Psychooncology* 19: 991-996.
4. Savard J, Hervouet S, Ivers H (2013) Prostate cancer treatments and their side effects are associated with increased insomnia. *Psychooncology* 22: 1381-1388.
5. Sateia MJ (2014) International classification of sleep disorders. (3rd edn). *Chest* 146: 1387-1394.
6. Morin CM, Belleville G, Lynda Bélanger, Hans Ivers (2011) The insomnia severity index: Psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep* 34: 601-608.
7. Savard J, Morin CM (2001) Insomnia in the context of cancer: a review of a neglected problem. *J Clinical Oncol* 19: 895-908.
8. Palesh OG, Roscoe JA, Mustian KM, Roth T, Savard J, et al. (2010) Prevalence, demographics, and psychological associations of sleep disruption in patients with cancer: University of Rochester Cancer Center-community clinical oncology program. *J Clin Oncol* 28: 292-298. Bixler EO, Kales A, Soldatos CR, Kales JD, Healey S (1979) Prevalence of sleep disorders in the Los Angeles metropolitan area. *Am J Psychiatry* 136: 1257-1262.
9. Berger M, Farr LA, Kuhn BR, Fischer P, Agrawal S (2007) Values of sleep/wake, activity/rest, circadian rhythms, and fatigue prior to adjuvant breast cancer chemotherapy. *J Pain Symptom Manage* 33: 398-409.
10. Chen ML, Yu CT, Yang CH (2008) Sleep disturbances and quality of life in lung cancer patients undergoing chemotherapy. *Lung Cancer* 62: 391-400.
11. Savard J, Simard S, Blanchet J, Ivers H, Morin CM (2001) Prevalence, clinical characteristics, and risk factors for insomnia in the context of breast cancer. *Sleep* 24: 583-590.
12. Bastien CH, Vallières A, Morin CM (2001) Validation of the insomnia severity index as an outcome measure for insomnia research. *Sleep Med* 2: 297-307.
13. Morin CM, Belleville G, Bélanger L, Ivers H (2011) The insomnia severity index: Psychometric indicators to detect insomnia cases and evaluate treatment response. *Sleep* 34: 601-608.
14. Savard MH, Savard J, Simard S, Ivers H (2005) Empirical validation of the insomnia severity index in cancer patients. *Psychooncology* 14: 429-441.
15. Smith MT, Wegener ST (2003) Measures of sleep: The insomnia severity index, medical outcomes study (MOS) sleep scale, Pittsburgh Sleep Diary (PSD), and Pittsburgh Sleep Quality Index (PSQI). *Arthritis Rheum* 49: 184-196.
16. Omachi TA (2011) Measures of sleep in rheumatologic diseases: Epworth Sleepiness Scale (ESS), Functional Outcome of Sleep Questionnaire (FOSQ), Insomnia Severity Index (ISI), and Pittsburgh Sleep Quality Index (PSQI). *Arthritis Care Res (Hoboken)* 63: 287-296.
17. Thorndike FP, Ritterband LM, Saylor DK, Magee JC, Morin CM, et al. (2011) Validation of the insomnia severity index as a web-based measure. *Behav Sleep Med* 9: 216-223.

18. Suleiman KH, Yates BC (2011) Translating the insomnia severity index into Arabic. *J Nurs Scholarsh* 43: 49-53.
19. Davidson JR, MacLean AW, Brundage MD, Schulze K (2002) Sleep disturbance in cancer patients. *Soc Sci Med* 54: 1309-1321.
20. Ohayon MM (2002) Epidemiology of insomnia: What we know and what we still need to learn. *Sleep Med Rev* 6: 97-111.
21. Redeker NS, Lev EL, Ruggiero J (2000) Insomnia, fatigue, anxiety, depression, and quality of life of cancer patients undergoing chemotherapy. *Sch Inq Nurs* 14: 275-290.
22. Chen NH, Johns MW, Li HY, Chu CC, Liang SC, et al. (2002) Validation of a Chinese version of the Epworth sleepiness scale. *Qual Life Res* 11: 817-821.
23. Vignatelli L, Plazzi G, Barbato A, Ferini-Strambi L, Manni R, et al. (2003) Italian version of the Epworth sleepiness scale: External validity. *Neurol Sci* 23: 295-300.
24. Izci B, Ardic S, Firat H, Sahin A, Altinors M, et al. (2008) Reliability and validity studies of the Turkish version of the Epworth Sleepiness Scale. *Sleep Breath* 12: 161-168.
25. Chervin RD, Aldrich MS, Pickett R, Guilleminault C (1997) Comparison of the results of the Epworth sleepiness scale and the multiple sleep latency test. *J Psychosom Res* 42: 145-155.
26. Spira AP, Beaudreau SA, Stone KL, Kezirian EJ, Lui LY, et al. (2012) Reliability and Validity of the Pittsburgh Sleep Quality Index and the Epworth Sleepiness Scale in Older Men. *Journals Gerontol Ser A Biol Sci Med Sci* 67: 433-439.
27. Faithfull S (1991) Patients experiences following cranial radiotherapy: A study of the somnolence syndrome. *J Adv Nurs* 16: 939-946.
28. Shen J, Barbera J, Shapiro CM (2006) Distinguishing sleepiness and fatigue: Focus on definition and measurement. *Sleep Med Rev* 10: 63-76.
29. Rosen G, Brand SR (2011) Sleep in children with cancer: case review of 70 children evaluated in a comprehensive pediatric sleep center. *Support Care Cancer* 19: 985-994.
30. Dupuis LL, Milne-Wren C, Cassidy M, Barrera M, Portwine C, et al. (2010) Symptom assessment in children receiving cancer therapy: The parents' perspective. *Support Care Cancer* 18: 281-299.
31. Mystakidou K, Parpa E, Tsilika E, Pathiaki M, Patiraki E (2007) Sleep quality in advanced cancer patients. *J Psychosom Res* 62: 527-533.
32. Buysse DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ (1989) The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Res* 28: 193-213.
33. Beck SL, Schwartz AL, Towsley G, Dudley W, Barsevick (2004) A Psychometric evaluation of the Pittsburgh sleep quality index in cancer patients. *J Pain Symptom Manage* 27: 140-148.
34. Carpenter JS, Andrykowski MA (1998) Psychometric evaluation of the Pittsburgh Sleep Quality Index. *J Psychosom Res* 45: 5-13.
35. Backhaus J, Junghanns K, Broocks A, Riemann D, Hohagen F (2002) Test-retest reliability and validity of the Pittsburgh Sleep Quality Index in primary insomnia. *J Psychosom Res* 53: 737-40.
36. Tsai PS, Wang SY, Wang MY, Su CT, Yang TT, et al. (2005) Psychometric evaluation of the Chinese version of the Pittsburgh Sleep Quality Index (CPSQI) in primary Insomnia and control subjects. *Qual Life Res* 14: 1943-1952.
37. Tribl GG, Schmeiser-Rieder A, Rosenberger A, Saletu B, Bolitschek J, et al. (2002) Sleeping habits in the Austrian population. *Sleep Med* 3: 21-28.
38. Doğan O, Ertekin Ş, Doğan S (2005) Sleep quality in hospitalized patients. *J Clin Nurs* 14: 107-113.
39. Byles JE, Mishra GD, Harris MA, Nair K (2003) The problems of sleep for older women: Changes in health outcomes. *Age Ageing* 32: 154-63.