Prevalence and risk factors of insomnia in solid tumor patients in a tertiary care hospital

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ABSTRACT

Background: Though cancer-related insomnia is a grave issue, it is often overlooked by caregivers and patients alike. This study examined insomnia's prevalence in solid tumor patients and the risk factors associated with it.
Methods: The prevalence of insomnia and overall sleep quality were assessed using the Pittsburgh Sleep Quality Index (PSQI). The Hospital Anxiety and Depression Scale (HADS) aided in measuring anxiety and depression, while the Wong-Baker FACES® Pain Rating Scale was employed to measure pain. Analysis was carried out using SPSS 21.0 version software.
Result: The prevalence of insomnia over two months in a group of solid tumor patients comprising 56 (34.1%) males and 108 (65.9%) females with a mean age of 57.72 ± 12.78 years was found to be 65.9%, and the group's mean PSQI score was 9.12 ± 5.38. The mean anxiety, depression, and pain scores were 7.60 ± 4.09, 7.50 ± 4.07, and 2.51 ± 2.78, respectively. We found a significant influence of anxiety, depression, and pain on insomnia ($P < 0.001$ for all three parameters).
Conclusion: More than 50% of the patients were poor sleepers, and there were significant positive associations of anxiety, depression, and pain ($P < 0.001$) with insomnia.

1. Introduction

Sleep is fundamental for the normal functioning, repair, and maintenance of the body, and sleep disturbances can adversely affect a person's physical and mental well-being. Quality of life (QOL), which is a cluster of physical, psychological, and social well-being, is one of the markers that treating physicians focus on for their patients.[1] Many studies have shown bi-directional correlations of pain, anxiety and depression with insomnia, and vice versa. This may explain why patients with solid tumors experience insomnia frequently, which is often not given due importance.[2,3]

To date, there is very little data providing a clear-cut prevalence of insomnia in cancer patients. A lot of patients with cancer are relatively old and have other co-existing diseases. This, along with the burden of cancer therapy, takes a toll on these patients and decreases their functioning ability. Patients with cancer report a variety of symptoms, with pain, fatigue, insomnia, and mood disturbances topping the list throughout the disease and treatment periods. Also, a point to be noted is that these symptoms mostly occur alongside each other rather than in isolation. A combination of all these problems can negatively affect the patient and his/her outcomes. Though numerous studies have tried to shed light on the association between insomnia and other factors like age, gender, type of cancer, and treatment approach, the results have been conflicting.[4] The purpose of our study was to determine the prevalence and risk factors associated with insomnia in solid tumor patients. This would help draw attention to this grave problem and the need for better treatment alternatives.[5]

2. Patients and methods

This was a single-centred questionnaire-based prospective observational study conducted in the Medical Oncology Department of a tertiary care hospital in Kochi. The protocol for conducting the study was approved by the ethical committee of the institution (IEC-AIMS-2017-PHRM 150). In total, 526 patients were screened to assess the prevalence of insomnia. After preliminary exclusions, 164 patients who satisfied the inclusion criteria were selected to participate. Inclusion criteria included being above the age of 18 years and the ability to read, write, and speak either English or Malayalam. Patients who were not willing to give consent or who had hematological malignancies were excluded from the study.

All included patients were asked to complete the Pittsburgh Sleep Quality Index (PSQI) to assess their overall sleep quality, the Hospital Anxiety and Depression Scale (HADS) to measure anxiety and depression, and the Wong-Baker FACES® Pain Rating Scale to assess pain in the cancer population. The demographic details, as well as other relevant data required for the study, were obtained by direct patient interviews and using the Amrita Health Information System (AHIS). The collected data were then transcribed into a specifically designed data collection form. The form included demographic details, primary diagnosis, cancer stage, current treatment (chemotherapy, radiotherapy, or hormone therapy), any recent surgeries (within the past two months), duration from the diagnosis of cancer, other co-morbidities, patient problems (for example, pain, gastric irritation, itching, cough, breathlessness, nocturia) and other personal details including education level, and marital status. In our study, we tried to assess whether cancer, its therapy, and other personal factors had any impact on the development and progression of insomnia in these patients.

The PSQI is a sleep questionnaire designed to judge sleep quality over a month. It consists of 19 self-report questions that sum up to yield a score ranging from 0 to 21, with a score of 21 indicating the worst sleep quality. A cut-off score of 5 differentiates normal and poor sleepers. The questionnaire also evaluates subjective quality, latency, efficiency, duration, and disturbances in sleep along with sleep medication consumption and daytime dysfunction. The PSQI global score was used to measure the prevalence of insomnia in this subset of the population. Patients with a global PSQI score of <5 were categorized as normal sleepers.[6]

The Hospital Anxiety and Depression Scale (HADS) was used to evaluate anxiety and depression. It contains two sets of questions that measure anxiety and depression (seven components for each set). Each question is indexed on a 4-point scale. Both the anxiety (HADS-A) and depression (HADS-D) indexes have a range of total scores from 0 to 21, with 21 indicating the most severe anxiety or depression. A score of ≤7 is classified as 'normal', scores ranging from 8 to 10 are classified as 'borderline', and scores of ≥11 are classified as 'abnormal'.[7]

Pain ratings were attained using the Wong-Baker FACES pain rating scale after obtaining permission from the owner. The scale depicts a series of emoticons ranging from a happy face at 0 "no pain" to a crying face at 10 "hurts the worst". The patients were instructed to choose the face that best described how much pain they were in. Analysis was carried out using SPSS 21.0 version software. The data are presented as frequency and percentage.

3. Results

The mean age of our population (n = 164) was 57.72 ± 12.78 years, with most patients in the age group of 40–60 years. Of the patients, 56 (34.1%) were male [Table 1].

4. Prevalence of insomnia

The mean PSQI score of the study population was 9.12 ± 5.38. Out of 164 patients, 108 (65.9%) were poor sleepers with PSQI scores of >5.

Table 1
General characteristics of patients.

Characteristics	Number (n = 164)	Percentage (%)
Age groups		
<40 yrs	15	9.1
40–60 yrs	81	49.4
>60 yrs	68	41.5
Gender		
Male	56	34.1
Female	108	65.9
Menopausal status		
Pre-menopausal	42	38.9
Post-menopausal	66	61.1
Marital status		
Married	142	86.6
Single/Divorced/Widow	22	13.4
Educational status		
Educated	142	86.6
Illiterate	22	13.4
Cancer type		
Breast	62	37.8
Gastrointestinal	31	18.9
Lung	19	11.6
Gynecological	17	10.4
Lymphoma	12	7.3
Head and Neck	11	6.7
Prostate	3	1.8
Others	9	5.5
Stage		
I	4	2.4
II	38	23.2
III	54	32.9
IV	68	41.5
Metastasis		
Localized	96	58.5
Metastasized	68	41.5
Surgery		
Yes	24	14.6
No	140	85.4
Therapy		
Chemotherapy	87	53
Radiation therapy	28	17.1
Hormonal therapy	24	14.6
No therapy	25	15.2
Time from diagnosis		
<1 year	89	54.3
1–5 years	65	39.6
6–10 years	9	5.5
>10 years	1	0.6
Co-morbidities		
Hypertension	63	38.4
Diabetes mellitus	52	31.7
Dyslipidemia	19	11.6
Respiratory diseases	16	9.8
GI and hepatic diseases	15	9.1
Heart diseases	13	7.9
Thyroid diseases	8	4.9
Others	29	17.7
Other factors		
Alcoholic	6	3.7
Smoking	9	5.5
Caffeinated drinks	39	23.8
Cough	44	26.8
Dyspnoea	45	27.4
Acidity	31	18.9

4.1. Risk factors of insomnia

a) Age and gender

The majority of patients in the insomnia group (51.9%) were in the age group of 40–60 years. A greater proportion of males (36.1%) belonged to insomniacs when compared to normal sleepers. Most of the female participants (69.6%) did not complain of insomnia. However, when compared to males, insomnia was found to be more prevalent in

females. Post menopausal females (65.2%) were also higher in insomnia group. Age and gender showed no significant correlation with insomnia [Table 2].

b) Co-morbidities

Hypertension was found to be the most prevalent co-morbidity in the sample population (44.4%), followed by diabetes mellitus and dyslipidemia. These co-morbidities were found to have a significant relationship with insomnia in our study [Table 2].

c) Therapy

Chemotherapy was the most common treatment modality, with 64 insomniacs (59.3%) and 23 (41.1%) of the normal sleepers receiving it. Radiation was the second most common therapy received by the sample population (24 patients, 22.2%), while it was the third most common in normal sleepers (four patients, 7.1%). Both chemotherapy (P = 0.027) and radiation therapy (P = 0.015) were found to have a significant relationship with insomnia [Table 2].

d) Cancer

The most common type of cancer in the insomnia population (33.3%) was breast cancer, followed by gastrointestinal (19.4%), lung (14.8%),

Table 2
Factors and their relationship with Insomnia.

Factors	Insomnia (n = 108) (%)	No Insomnia (n = 56) (%)	P value
Age			
<40 yrs	7 (6.5)	8 (14.3)	0.241
40–60 yrs	56 (51.9)	25 (44.6)	
>60 yrs	45 (41.7)	23 (41.1)	
Male	39 (36.1)	17 (30.4)	0.461
Female	69 (63.9)	39 (69.6)	
Post-Menopausal	45 (65.2)	21 (53.8)	0.266
Pre-Menopausal	24 (34.8)	18 (46.2)	
Breast	36 (33.3)	26 (46.4)	0.309
Gastrointestinal	21 (19.4)	10 (17.9)	
Lung	16 (14.8)	3 (5.4)	
Gynaecological	11 (10.2)	6 (10.7)	
Lymphoma	6 (5.6)	6 (10.7)	
Head and Neck	8 (7.4)	3 (5.4)	
Prostate	2 (1.9)	1 (1.8)	
Stage I	3 (2.8)	1 (1.8)	0.863
Stage II	23 (21.3)	15 (26.8)	
Stage III	36 (33.3)	18 (32.1)	
Stage IV	46 (42.6)	22 (39.3)	
Time of diagnosis <1year	61 (56.5)	28 (50)	0.719
Time of diagnosis 1–5 years	40 (37)	25 (44.6)	
Time of diagnosis 6–10 years	6 (5.6)	3 (5.4)	
Time of diagnosis >10 years	1 (0.9)	0 (0.0)	
Anxiety	21 (19.4)	2 (3.6)	<0.001
Depression	23 (21.3)	4 (7.1)	<0.001
Pain score >4	35 (32.4)	1 (1.8)	<0.001
Alcoholics	4 (3.7)	2 (3.6)	1.000
Smoking	5 (4.6)	4 (7.1)	0.758
Use of caffeinated drinks	27 (25)	12 (21.4)	0.610
Cough	28 (25.9)	16 (28.6)	0.717
Dyspnoea	37 (34.3)	8 (14.3)	0.007
Acidity	21 (19.4)	10 (17.9)	0.806
Surgery	16 (14.8)	8 (14.3)	0.928
Metastasis	46 (42.6)	22 (39.3)	0.406
Hypertension	48 (44.4)	15 (26.8)	0.027
Diabetes mellitus	42 (38.9)	10 (17.9)	0.006
Dyslipidemia	17 (15.7)	2 (3.6)	0.040

and gynecological malignancy (10.2%). Also, 42.6% of the patients were in stage IV of cancer, and 33.3% were in stage III. Patients whose cancer was diagnosed <1 year prior to the study presented the highest percentage of insomniacs (56.5%). However, there was no significant relationship with cancer type, cancer stage and time from diagnosis of cancer [Table 2].

e) Other factors

The mean anxiety, depression, and pain scores were 7.60 ± 4.09, 7.50 ± 4.07, and 2.51 ± 2.78, respectively. We found a significant influence of anxiety, depression, and pain on insomnia (P < 0.001 for all three parameters). More patients in the insomnia group experienced breathing difficulty at night (34.3%; P = 0.007) relative to patients without insomnia (14.3%). Breathing difficulty was especially prevalent in patients with lung cancer. However, insomnia did not appear to be significantly correlated with coughing, acidity, alcohol consumption, smoking, caffeine consumption, metastasis, or surgery [Table 2].

5. Discussion

The results elucidate the fact that a significant proportion of patients with cancer had sleep problems (65.9%). On average, more than 50% of our patients were poor sleepers with a mean PSQI global score of 9.12 ± 5.38. A large proportion of the included patients were females, but we did not find any significant correlation between female gender and insomnia—however, a meta-analysis by Zhang and Wing (2006)[8] confirmed a female predisposition for insomnia. Also, more than half of females in the present study had already attained menopause. Terauchi et al. (2012)[9] affirmed that post-menopausal women suffer from a higher level of depression and anxiety when compared to pre-menopausal women.

We studied the effect of anxiety and depression on insomnia and found a significant correlation between them. This was in agreement with a study by Taylor et al. (2005)[10] that revealed that insomniacs were 9.82 times more prone to have clinically considerable depression and 17.35 times more susceptible to anxiety when compared to normal sleepers. Pain was one of the major factors contributing to insomnia. This was in line with a study conducted by Grond et al. (1994)[11] that showed that patients experiencing very severe or maximal pain complained more frequently of insomnia than other patients.

We found that significantly more patients in the insomnia group were experiencing breathing difficulty at night relative to patients without insomnia. Breathing difficulty was more prevalent in patients with lung cancer. Hence, we assumed that breathing difficulty was related to lung cancer, which may have contributed to insomnia. The findings of the present study confirm an observation reported earlier by Hartz et al. (2007).[12] Another reason for the breathing difficulty may be season-related.

In our study, hypertension was found to be a major risk factor for insomnia among co-morbidities, which was on par with the study by Palagini et al. (2013),[13] who found that perpetual insomnia, experimental sleep deprivation, and short sleep duration are related to high blood pressure and, subsequently, a high chance of developing hypertension.

Diabetes mellitus was significantly associated with insomnia in our population. This may be a result of nocturnal hypoglycemia, nocturia, peripheral neuropathy, restless leg syndrome, and other factors associated with uncontrolled diabetes mellitus, which significantly tamper with the normal sleep of patients, thereby leading to poor quality of life as discussed by Surani et al. (2015).[14]

Our study showed a correlation between dyslipidemia and insomnia, and we found a similar correlation in a study by Laugsand et al. (2011).[15]

The largest number of patients received chemotherapy, followed by radiation and hormonal therapy. There was a predominant association

between chemotherapy and insomnia, and this result is supported by results published in an earlier study by Osoba et al. (1996–97).[16,17] Radiation therapy also showed a significant correlation with insomnia. Unlike the other two therapy types, hormonal therapy showed no significant correlation with insomnia.

Also, our study found no significant correlation of insomnia with coughing, acidity, alcohol consumption, smoking, caffeine consumption, cancer type and stage, time since diagnosis, metastasis, or surgery.

6. Conclusion

Our results indicate that more than half the cancer population suffered from insomnia, and most of these cases are untreated. The majority of the patients refused to receive any sort of treatment, be it drugs or counselling. The severity of their disease forces them to ignore even severe problems like insomnia and instead consider them trivial. However, it is important to understand that sleep is essential to repairing the body and helping treatments bring about their desired effects. Risk factors such as breathing difficulty, hypertension, diabetes, dyslipidemia, radiotherapy, and chemotherapy had a significant association with insomnia.

CRediT authorship contribution statement

Amrita Asok: Data curation, Writing – original draft, Formal analysis. **Anagha C. C:** Data curation, Writing – original draft, Formal analysis. **Radhika T. K:** Data curation, Writing – original draft, Formal analysis. **Sreelakshmi Sreekumar:** Data curation, Writing – original draft, Formal analysis. **Merin Babu:** Writing – review & editing. **Uma Devi Padma:** Conceptualization, Methodology, Software, Project administration, Visualization, Project administration. **Keechilat Pavithran:** Conceptualization, Methodology, Software, Project administration, Visualization, Project administration.

Declaration of competing interest

We wish to confirm that there are no known conflicts of interest associated with this publication.

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