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ORIGINAL RESEARCH ARTICLE

PREVALENCE OF SLEEP – WAKE CYCLE DISTURBANCE AMONG CANCER PATIENTS OF BHAKTAPUR CANCER HOSPITAL, NEPAL

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ABSTRACT

Cancer patients are at great risk for developing insomnia and disorders of the sleep-wake cycle. Insomnia is the most common sleep disturbance in this population and is most often secondary to physical and/or psychological factors related to cancer and/or cancer treatment. It is estimated that nearly 45% of cancer patients experience sleep disturbances; this is nearly three times the estimate of its occurrence in the general population. The purpose of the study is to determine the prevalence of sleep-wake cycle disturbance in patient receiving chemotherapy. A descriptive cross-sectional study was carried out in 2013. A total of 205 respondents, visiting Bhaktapur Cancer Hospital and who met criteria were purposively sampled and interviewed face to face. Insomnia Severity Index Scale was used to grade insomnia. Descriptive statistics such as frequency and percentage was used to describe demographic data. Chi-square test was done to find out the association between prevalence of sleep-wake cycle disturbance and selected variables. Among the total respondents (205), 70.7% had sleep-wake cycle disturbances. Majority (71.21%) of respondents had some form of clinically significant insomnia. The ages of the respondents ranged from 20 to 81 years with the mean age of 56.25 (SD ± 13.87). More than half i.e. 69.3% of the respondents were female. Patients being treated with Methotrexate were found to be more associated with the development of sleep-wake cycle disturbance. The significant association was found on drinking tea/coffee with the prevalence sleep-wake cycle disturbance. Sleep disorders are a common and often chronic problem for patients with cancer. Recently, such symptoms have attracted little attention. This might be the reasons for increased prevalence of sleep-wake cycle disturbance. It is recommended to take early and adequate intervention for the reduction of increased prevalence rate of sleep-wake cycle disturbance.

Key words: *Chemotherapy, Prevalence, Sleep-wake cycle.*

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INTRODUCTION

Sleep is an area of functioning that is frequently impaired in cancer patients. Sleep disorders, such as difficulty in falling asleep, poor sleep efficiency, early awakening and excessive daytime sleepiness are prevalent in patients with cancer.[1] It is estimated that nearly 45% of cancer patients experience sleep disturbances; which is nearly three times of the general population.[2]

The sleep of cancer patients is often disturbed, yet sleeps disorders and their health consequences are often neglected in this population.[3,4] Sleep disturbances affect 30% to 75% of newly diagnosed or recently treated cancer patients, a rate that has been reported as double that of the general population.[5] Surveys have suggested that sleep complaints in cancer patients consisted of difficulty falling asleep and difficulty staying asleep, with frequent and prolonged nighttime awakenings. Patients reported these complaints both before treatment and during treatment.[6,7] Sleep dysfunction has unfortunately become an increasingly problematic issue for many

and is a significant issue for many patients with cancer and their caregivers. Patients may fail to report their sleep difficulties to their physicians. The consequences of insomnia are often minimized relative to those of the cancer itself.[8]

Sleep is an essential component of a healthy life. Disrupted sleep can lead to a variety of physical and psychological dysfunctions, including insomnia, chronic pain, respiratory dysfunction, obesity, stress, and anxiety. Patients with cancer often are affected by side effects such as pain or depression that can manifest as insomnia. They also can experience sleep deprivation from side effects of the treatment, such as anemia, daytime fatigue, and the physiologic effects of medications.[8]

Sleep disturbance is one of the most frequent side effects experienced by patients with cancer. Several studies have shown that many cancer patients do not mention their sleep problems, with approximately 80% assuming it is due to treatment, while 60% wrongly assuming that the symptoms will not last, and almost half believing that their physicians cannot do anything to help them.

Furthermore, sleep disorders lead to pronounced symptom distress. Sarna and colleagues gathered symptom distress data on female lung cancer patients an average of 1.8 years after treatment and found that insomnia was a major concern, as the third highest cause of distress after fatigue and pain.[9] Despite these concerns, insomnia is often undetected and under-treated when detected, with only 16.6% of patients in one study having spoken to their physician about their sleep problems.[7,10] Evidence suggests that patients may be hesitant to voluntarily report symptoms associated with cancer-related insomnia.

According to the Journal of Clinical Oncology,[11] rate of insomnia in patients with cancer is found to be nearly three times higher than the rates in the general population. Insomnia is prevalent, under recognized, undermanaged and understudied among patients with cancer receiving chemotherapy. The aim of the study is to determine the prevalence of sleep-wake cycle disturbance in patient receiving chemotherapy.

METHODS

Descriptive cross sectional research design was used in inpatient and outpatient departments of Bhaktapur Cancer Hospital. It is specialized cancer hospital of Nepal. Study population consisted of all patients who have received at least one cycle of chemotherapy and above 20 yrs of age attending this hospital and who were present at the time of data collection. A total of 205 respondents, who met eligible criteria were purposively sampled and interviewed face to face.

A structured and semi-structured interview schedule consisting of questions related demographic characteristics, type of cancer and Insomnia Severity Index for assessment of sleep-wake cycle disturbance was used. The content validity of the instrument was established seeking opinion of oncologist and related expert nurses and doctors. Insomnia Severity Index (ISI) is a standard scale whose validity and reliability is established. The instrument was then translated into Nepali language and opinion of language expert was obtained for comprehensibility and simplicity of language and for consistency of the content. The study was conducted after obtaining approval from the concerned authority. Anonymity, privacy and confidentiality were maintained during as well as after data collection.

All patients who met the criteria and gave informed consent were interviewed. Review of the patient's medical record file was done to confirm the diagnosis and number of cycle of chemotherapy. The collected data were reviewed daily for completeness and accuracy. Edited data were entered into the Statistical Package for Social Science Software (SPSS) version 16.0 for statistical analysis using descriptive and inferential statistics.

RESULTS

Table 1: Socio-demographic Information of Respondents

n = 205

Variables	Freq.	%
Age in year		
Age 20 to 30	11	5.4
Age 30 to 40	16	7.8
Age 40 to 50	31	15.1
Age 50 to 60	43	21.0
Age 60 and above	104	50.7
Mean age is 56.25 years and SD ±13.87.		
Sex		
Male	63	30.73
Female	142	69.26
Smoking		
Smoker	22	10.73
Non-Smoker	183	89.26
Alcohol		
Drinker	26	12.7
Non-Drinker	179	87.3
Tea/Coffee		
Drinker	151	73.7
Non-Drinker	54	26.3

Among total respondents, 50.7% of the total respondents fall under age 60 and above, which is the largest age group. The ages of the patients ranged from 20 to 81 years with the mean age of 56.25 (SD ± 13.87) at the time of study. Regarding gender of the respondents, 69.3% were female and remaining was male.

Among the total respondents, majority (89.26%) of the patients in the study were non-smokers. Most (87.3%) of them were non alcohol drinker and majority (73.7%) of them were tea/coffee drinker. (Table1)

Table 2: Description about Disease Related Information of Respondents n = 205

Cancer Diagnosis	Freq.	%
Gyaenecological Cancer	52	25.4
Breast Cancer	35	17.1
Head & Neck Cancer	29	14.1
Stomach Cancer	20	9.8
Lung Cancer	19	9.3
Colorectal Cancer	14	6.8
Bladder Cancer	8	3.9
Others	7	3.4
Osteosarcoma	6	2.9
Non-Hodgkin's Lymphoma	5	2.4
Thyroid Cancer	5	2.4
Leukemia	5	2.4

Out of total respondents, 25.4% had gynaecological cancer and minimal (2.4% each) had non-hodgkin's lymphoma, thyroid cancer and leukemia. (Table2)

Table 3: Treatment related Information of Respondents* n = 205

Type of Cytotoxic Drugs	Freq.	%
Oxali/Cis/Carboplatin Methotrexate	89 40	43.41 19.51
Fluorouracil Adriamycin/Doxorubicin	37 36	18.04 17.56
Paclitaxel	32	15.60
Cyclophosphamide	27	13.17
Vincristine	13	6.34
Ifosphamide Decarbazine	10 10	4.87 4.87
Others(Anthracycline,Bleomycin, Docetaxel, Epirubicin)	4	1.95
Cytrabine	4	1.95
Gemcitabine	4	1.95

(Note * = Multiple response)

Among the total respondents, less than half (43.41%) were administered Oxali/Cis/Carboplatin and

minimal (1.95% each) were administered cytrabine, gemcitabine and others. (Table3)

Table 4: Chemotherapy Cycle Related Information
n = 205

Chemotherapy Cycle	Frequency	Percentage
Second	75	36.6
Third	35	17.1
Fourth	29	14.1
Fifth	28	13.7
Sixth	38	18.5

Among the total respondents, 36.6% were receiving second cycle of chemotherapy. (Table 4)

Table 5: Prevalence of Sleep-Wake Cycle Disturbance
n = 205

Sleep-Wake Cycle Disturbances	Freq.	%
Absent	60	29.3
Present	145	70.7

The prevalence of sleep-wake cycle disturbance in the study was found to be 70.7% in Bhaktapur Cancer Hospital. (Table 5)

Table 6: Insomnia Problem Related Information of the Respondents
n = 205

Variables	Freq.	%
Difficulty falling asleep	101	49.26
Difficulty staying asleep	112	54.63
Problem waking up too early	87	42.43
Dissatisfied with current sleep pattern	87	42.43
Sleeping problems noticeable to others	68	33.17
Worried/distressed about current sleep problem	69	33.65
Sleep problem interference with daily functioning	86	41.95

In this study, more than half (54.63%) of the respondents had difficulty staying asleep. (Table6)

Table 7: Grading of insomnia
n = 205

Grade of Insomnia	Freq.	%
No Clinically Significant Insomnia	59	28.8
Sub threshold Insomnia	50	24.4
Moderate Insomnia	39	19.0
Severe Insomnia	57	27.8
(Mean ISI score is 2.46 and SD±1.17)		

Majority (71.21%) of respondents had some form of clinically significant insomnia. The mean Insomnia Severity Index score was 2.46 (±1.17) in the study (Table7).

Table 8: Age and Sleep-Wake Cycle Disturbance of the Respondents n=205

Age	Sleep-Wake Cycle Disturbance		Total	p value	odd ratio
	Present	Absent			
65years and below	104(75.9%)	33(24.1%)	137	0.021	2.07
65years and above	41(60.3%)	27(39.7%)	68		
Total	145	60	205		

The prevalence of sleep-wake cycle disturbance in 65 years and above age group was more than in 65 years and below age group. The differences seen in these two age group was statistically significant (p=0.021). (Table8)

Table 9: Tea/Coffee Drinking and Sleep-Wake Cycle Disturbance n=205

Tea/Coffee Drinking	Sleep-Wake Cycle Disturbance		Total	p value	o d d ratio
	Present	Absent			
Drinker	115(76.2%)	36(23.8%)	151	0.004	2.55
Non-drinker	30(55.6%)	24(44.4%)	54		
Total	145	60	205		

The prevalence among the respondents drinking tea/coffee was 76.2% whereas among non-drinker was 55.6%. The differences seen in these two group was statistically significant (p= 0.004). (Table 9)

Table 10: Use of Methotrexate & Sleep-Wake Cycle Disturbance of the Respondents n=205

Methotrexate	Sleep-Wake Cycle Disturbance		Total	p value	o d d ratios
	Present	Absent			
Yes	123 (74.5%)	42 (25.5%)	165	0.01	0.41
No	22 (55.0%)	18 (45.0%)	40		
Total	145	60	205		

The prevalence among the respondents using methotrexate was 74.5%. The differences seen in these two group was statistically significant (p= 0.01). (Table10)

DISCUSSION

In this study, the ages of the patients involved ranged from 20 -81 years with the mean age of 56.81 (SD ± 13.87) at the time of study. The study group was categorized into six age groups. The majority (50.7%) of the patients were of age 60 years and above. More than half i.e.69.26% of the patients was female. This was quite similar to the study done in Canada, in which the ages ranged from 22 – 93 years, with mean age of 58 years and majority (72%) of the patients were female.[11]

This study shows the prevalence of sleep-wake cycle disturbance to be 70.7% in Bhaktapur Cancer Hospital. This is consistent with the prospective study done in 2010 in which the prevalence was 87%.[12] Similarly, in the study done by Davidson et al in 2002 found a prevalence of 32% in a diverse group

of more than 1000 cancer patients, while the figure rose to 63% in a sample of 97 patients with breast cancer.[13] Similarly, in the descriptive retrospective study done by Laura Boonstra in 2010, among 69 patients found a prevalence of 74% as measured by the Insomnia Severity Index.[14] In contrary, the findings of different studies have shown great variability in the prevalence rate of this disorder in cancer patients, ranging between 30-50%, though some studies have found much higher figures.[15] Other studies say the rate may actually be much higher 75 percent of all cancer patients reporting long and short term insomnia. Similarly, in the study done by Portenoy et al. (1994), found the prevalence rates of insomnia varying from 48.6% to 60%.[16]

These discrepancies are considered to be due to the different methodologies used in the evaluation and the characteristics of the population studied or even due to the sample size used.

This study showed that 71.21% of the participants have some degree of clinically significant insomnia. Similarly, in the descriptive retrospective study done by Laura Boonstra,[14] among 69 respondents, 74% of patients had some form of clinically significant insomnia. This is consistent with the prospective study done in Florida in which 75% of the participants had some degree of clinically significant insomnia.[17] This study showed that 46.82% of the patient had moderate to severe insomnia. This is consistent with the findings of the study done by Engstrom in 1999 which showed that 50% of the patients rated their sleep problem as moderate, severe or intolerable.[7] Similarly, in the study done by Degner in 1995 found that 30.9% of the patients' had moderate to severe insomnia.[18] In contrary the findings of the study done by Harrison in 1997, showed that 41% of the patients had insomnia, out of which 78% reported moderate to severe insomnia.[19]

This study showed that 49.26% had difficulty initiating sleep, 54.63% reported difficulty maintaining sleep and 42.43% reported both initiating and maintaining sleep. This is consistent with the study conducted by Savard et al in 2005 which found that 4% had difficulty initiating sleep, 34% reported difficulties maintaining sleep and 52% reported both initiating and maintaining sleep issues.[20] In the study done in Oncology Department, UK found that 54% had conciliation insomnia, 18% complained of maintenance insomnia and 16% early morning awakening.[21] They also found, age to be associated with sleep-wake cycle disturbance which is similar in the study done in Quebec, Canada (2008) in which there was a statistically significant association of overall insomnia complaints and prevalence of insomnia syndrome with age.[22]

Female had majority (71.8%) of insomnia prevalence which is consistent with some of the previous studies that had indicated that the female gender constitutes a significant risk factor for sleep-wake cycle disturbance.[14] Similarly in a study done in New York found that male patients had a lower rate of insomnia complaints than female patients.[22]

Our study clearly revealed that absence of association between sleep-wake cycle disturbance and patients with history of smoking and alcohol consumption. These findings are inconsistent with the findings in a prospective study done in Philadelphia.[23] These differences are considered due to different characteristics of the population studied or even due to the different sample size.

This study had revealed that the presence of association between sleep-wake cycle disturbance and patients who had a history of tea/coffee consumption and/or currently drinking tea/coffee. These findings are consistent with the findings in a prospective study done in Philadelphia (2004) that predicts caffeine use as patient related risk factors.[23] Similarly, in the study done by Higdon J in 2006 showed that as with other caffeinated beverages, such as coffee and colas, the caffeine contained in many tea products could potentially cause adverse effects, including insomnia and restlessness.[24]

Methotrexate was found to be significantly associated with sleep-wake cycle disturbance in this study. It is consistent with a study done by Mills.M (2004) where it is well documented that chemotherapy agents, such as antimetabolites, can lead to insomnia.[25] It is also consistent with a study done by National Cancer Institute which states that side effects of chemotherapy can be a source of sleep disturbances due to disrupted sleep cycles.[13] Similarly, in the study done by Catherine showed that antimetabolites cause the risk of developing sleep

disturbance in about 10 – 29% of the patients.[26]

In this study, cycle of chemotherapy was not significantly associated with the prevalence of sleep-wake cycle disturbance. This is consistent with a study done in California (2012) that revealed that there was also no significant association between insomnia and chemotherapy cycles,[27] but was inconsistent with the findings of Savard et al. (2009) that sleep-wake patterns progressively worsened as the number of treatments received increased. [28]

Limitations: The first limitation is that the study sample was taken using purposive sampling technique so this is not representative of all types of patients. Hence, this might possibly affect the results. The second limitation was the Insomnia Severity Index Scale which is used for this study has highest validity and reliability when self administered. But since majority of our study sample were illiterate, they could not administer it by themselves, and so all the patients were interviewed.

CONCLUSION

The prevalence of sleep-wake cycle disturbance in the patients with cancer is quite high. So, focus should be given on reduction of the prevalence rate of sleep-wake cycle disturbance. This can be done by: Making the health personnel and patients conscious towards preventing sleep disturbances and promoting good sleep habit and Setting up insomnia-counseling clinic in every cancer hospital to be launched by the trained nurses.

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