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# Sleep quality during hospitalization in critically ill cancer patients in Sri Lanka.

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## ABSTRACT

**INTRODUCTION:** Sleep is vital for physical, psychological, emotional, and cognitive well-being. Cancer becomes life-threatening once it affects major organs and their ability to function. Sleep disturbance is one of the most common complaints in patients with cancer which interferes with the symptom burden, coping ability, and treatment effectiveness. Current study aimed to assess sleep quality and its associated factors among critically ill cancer patients who were admitted to the Apeksha Hospital, Sri Lanka.

**MATERIAL AND METHODS:** A descriptive cross-sectional study was conducted among 384 patients with cancer, who were admitted to Apeksha Hospital. Pretested interviewer-administered questionnaire was used for data collection. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Sleep quality was classified as good (Global PSQI score ≤5) and poor (Global PSQI score >5). The data were analyzed using descriptive statistics and associations between categorical variables were assessed by performing a Chi-square test. IBM SPSS Version 26 was used as the analytical tool.

**RESULTS:** Of 384 patients with cancer, 58.9% (n=226) were females. Most of the patients (78.4%, n=301) were adults (25-64 years), and 63.0% (n=242) were married. Breast cancers (20.1%), blood cancers (19.3%), and ovarian cancers [13.8%) were the most common cancers reported by the study participants. The mean Global PSQI score was 10.27±3.48 (range 3-20) and 95.3% of the participants were categorized as having poor sleep quality. Age (p=0.002), income (p=0.050), engaging in leisure time activities (p=0.036), social media use (p=0.022), and fatigue (p=0.012), and level of pain (p<0.001) were significantly associated with the sleep quality of patients with cancer.

**CONCLUSIONS:** Poor sleep quality is highly prevalent among patients with cancer and evidence-based interventions should be implemented to improve sleep quality.

**KEY WORDS**: Sleep quality, cancer, patients. factors.

# INTRODUCTION

Cancer has been identified as a major public health concern and it is a leading cause of death worldwide, accounting for approximately 10 million deaths in 2020 [1]. Cancer is a disease involving abnormal cell growth and it might be life-threatening due to late diagnoses and the destruction of functions of the body organs [2]. The cancers are categraise into four stages. The specific stage is determined by a few different characteristics, including the tumor's size and location. Stage IV cancers are more critical and able to spread to other organs or areas of the body. This stage is also referred to as metastatic or advanced cancer [3]. The burden of cancer in Sri Lanka is rising [4] and the incidence of cancer has doubled over the past 25 years, it has become the second commonest cause of hospital mortality in Sri Lanka [5]. Cancer causes severe pain and related symptom burden impact every aspect of the patient's life including sleep. Sleep is an essential component of the physical, psychological, emotional, and cognitive well-being of a person [6]. Over the recent years, researchers have reveleted that, the sleep quality among patients with cancer may be impaired due to various reasons including cancer symptoms, cancer treatments, and psychological and behavioral alterations [7]. Recent studies reported that 20% to 78% of cancer patients have poor sleep quality [8]. Poor sleep quality defines as the inability of initiating and maintaining sleep, frequent awakening, and feelings of unrest [9]. Poor sleep quality trigger more physical and psychological consequences [10] including poor quality of life, cardiovascular problems, reduced immune function, poor healing, cancer recurrence, medication misuse and abuse, and early death in patients with cancer [7]. Sufficient sleep is crucial for cancer patients to achieve better therapeutic outcomes [11].

Medical or psychiatric illness, sleep disorders, medications, environmental factors, and poor sleep habits can contribute to sleep quality [12]. Moreover, researchers have identified that behavioral characteristics such as tea consumption [13], alcohol usage [14], and engagement in activities [15] have a greater influence on sleep quality. Identification of the prevalence of poor sleep quality and associated factors for poor sleep quality may pave the way to mitigate the impact of sleep-related problems. There is a paucity of empirical evidence of the sleep quality of patients with cancer from Sri Lanka. Thus, the present study aimed to assess the prevalence of sleep quality and its associated factors among patients with cancer, who seek treatments from Apeksha Hospital, Sri Lanka.

## MATERIAL AND METHODS

### Study design and setting

A descriptive cross-sectional study was conducted in Apeksha Hospital to evaluate sleep quality and its associated factors among patients with cancer who seek treatments from Apeksha Hospital, Sri Lanka. Ethical approval was obtained from the Ethics Review Committee of KIU (KIU/ERC/21/186). The National Cancer Institute (NCI) widely known as Apeksha Hospital, Maharagama is the largest hospital in Sri Lanka which provide tertiary care for patients with cancer, under the Ministry of Health [16]. Further approval was obtained from the authorities of the Apeksha Hospital before data collection.

## Participants

All the cancer patients who were admitted to the Apeksha Hospital during the data collection period were verbally invited to participate in the study. Information sheets and consent forms were provided, and further details were verbally explained regarding the study, for the patients who were interested in participating in the study. A convenient sampling technique was used to approach study participants. Volunteer-consented patients who were ≥18 years of age, with a pathologically confirmed diagnosis of cancer, and who are receiving cancer treatment from Apeksha Hospital were included in this study; however, those suffering from acute psychological conditions were excluded. Thus, 384 patients with cancer were recruited for the study.

## Methods of assessment

Data were collected from the patients with cancer using an interviewer-administered questionnaire which was pretested with 10 patients who are obtaining treatment at Apeksha Hospital. The questionnaire consisted of 4 sections including Socio-demographic characteristics (e.g., gender, age, religion, etc.), Clinical characteristics (e.g., type of cancer, pain, fear, and fatigue related to disease condition), Behavioral Characteristics (e.g., alcohol drinking, coffee drinking, engaging religious activities, etc.), and Sleep quality.

Sleep quality was assessed by using the validated Pittsburgh Sleep Quality Index (PSQI) for the Sri Lankan context (Cronbach's alpha = 0.85) [17]. It contains 19 self-rated items, which generate seven subscale components, namely subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction. Each component score ranges from 0 (no difficulty) to 3 (severe difficulty). Global PSQI score was generated by adding seven subscale components scores which range from 0 to 21 with higher total scores indicating poor sleep quality. Based on the Global PSQI score sleep quality was categorized as good sleep (≤5) and poor sleep (>5) [18]. We assessed the perceived level of pain, fear, and fatigue related to disease condition by the participants using 10 points numerical scale. Low, moderate, and high levels of pain, fear, and fatigue were respectively considered as 0-4, 5-7, and 8-10 points.

## Data analysis

There were no missing data because questionnaires were administered by the investigators. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to describe the interesting variables. Association between categorical variables was assessed using the Chi-square test. SPSS version 26 was used to analyze the data.

## RESULTS

### Enrollment of the participants

Three hundred and eighty-four patients with cancer were recruited for the study. The enrollment of the participants was depicted in figure 1.

## Sociodemographic characteristics of the participants

Of 384 participants, most were Sinhala (n=306, 79.7%) Buddhist (n=252, 65.6%) females (n=226, 58.9%). The mean age of the participants was 50 ± 15 years (range =18 - 86) and 63.0% (n=242) were married. The socio-demographic characteristics of the participants were depicted in table 1.
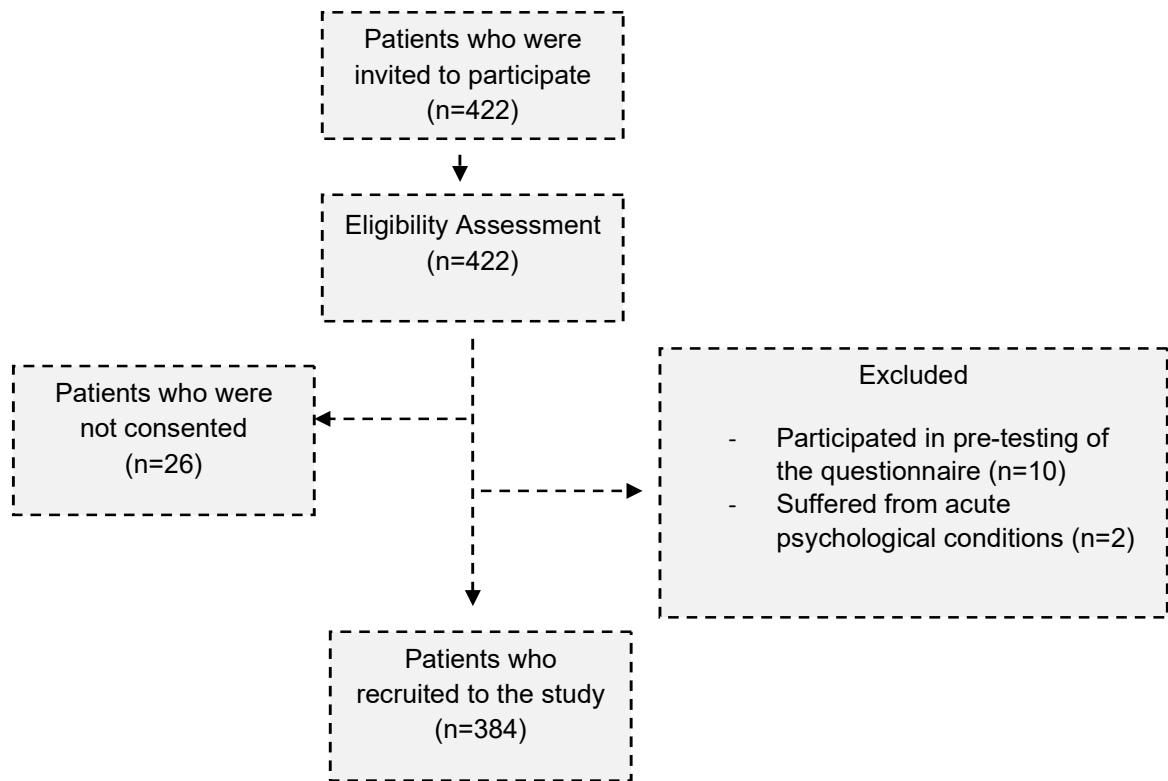


**Figure 1.** Enrollment of the participants.

## Clinical characteristics of the participants

Breast cancer (20.1%, n=77), blood cancer (19.3%, n=74), and ovarian cancer (13.8%, n=53) were the most common cancers reported by the study participants followed by cervical cancers (11.2%, n=43), colon cancers (7.0%, 27), lung cancers (5.7%, n=22), oral cancers (4.9%, n=19) and other cancers (18%, n=69). Of the participants, 36.9% (n=142) perceived high levels of pain, 9.6% (n=37) perceived high levels of fear, and 20.6% (n=79) had high levels of fatigue (Table 2).

## Behavioral characteristics of the participants

Only 7.3% (n=28) usually use alcohol while 14.3% (n=55) usually drink coffee/tea. Nealy one-third of the participants frequently (37.5%, n=144) engaged in religious activities and 34.1% (n=131) of the participants stated that they sometimes engaged in leisure activities. The behavioral characteristics of the participants were presented in table 3.

**Table 1.** Demographic characteristics of the participants.

| Demographic characteristics | Category | Good Sleep Quality | | Poor Sleep Quality | | Total | | p-value |
|---|---|---|---|---|---|---|---|---|
| | | Frequency | % | Frequency | % | Frequency | % | |
| Gender | Female | 11 | 4.9% | 215 | 95.1% | 226 | 100% | 0.842 |
| | Male | 7 | 4.4% | 151 | 95.6% | 158 | 100% | |
| Age | Youth (18-24 years) | 2 | 11.1% | 16 | 88.9% | 18 | 100% | **0.002** |
| | Adults (25-64 years) | 14 | 4.7% | 287 | 95.3% | 301 | 100% | |
| | Seniors (≥ 65 years) | 2 | 3.1% | 63 | 96.9% | 65 | 100% | |
| Religion | Buddhist | 10 | 4.0% | 242 | 96.0% | 252 | 100% | 0.682 |
| | Christian | 4 | 5.5% | 69 | 94.5% | 73 | 100% | |
| | Islam | 3 | 9.7% | 28 | 90.3% | 31 | 100% | |
| | Hindu | 1 | 4.0% | 24 | 96.0% | 25 | 100% | |
| | Other | 0 | 0.0% | 3 | 100% | 3 | 100% | |
| Nationality | Sinhala | 13 | 4.2% | 293 | 95.8% | 306 | 100% | 0.593 |
| | Tamil | 2 | 4.8% | 40 | 95.2% | 42 | 100% | |
| | Muslim | 3 | 9.4% | 29 | 90.6% | 32 | 100% | |
| | Other | 0 | 0.0% | 4 | 100% | 4 | 100% | |
| Marital status | Married | 10 | 4.1% | 232 | 95.9% | 242 | 100% | 0.639 |
| | Single | 5 | 6.8% | 68 | 93.2% | 73 | 100% | |
| | Divorced | 0 | 0.0% | 14 | 94.5% | 14 | 100% | |
| | Widowed | 3 | 5.5% | 52 | 95.3% | 55 | 100% | |
| Educational level | Never go to school | 0 | 0.0% | 18 | 100.0% | 18 | 100% | 0.269 |
| | Up to grade 5 | 2 | 2.8% | 70 | 97.2% | 72 | 100% | |
| | Up to O/L | 5 | 3.8% | 128 | 96.2% | 133 | 100% | |
| | Up to A/L | 8 | 9.3% | 78 | 90.7% | 86 | 100% | |
| | Diploma | 3 | 6.5% | 43 | 93.5% | 46 | 100% | |
| | Degree | 0 | 0.0% | 25 | 100% | 25 | 100% | |
| | Postgraduate | 0 | 0.0% | 4 | 100% | 4 | 100% | |
| Working status | Unemployed | 3 | 3.4% | 85 | 96.6% | 88 | 100% | 0.466 |
| | Government employed | 5 | 7.5% | 62 | 92.5% | 67 | 100% | |
| | Private employed | 4 | 3.2% | 122 | 96.8% | 126 | 100% | |
| | Self-employed | 3 | 4.3% | 67 | 95.7% | 70 | 100% | |
| | Retired | 3 | 9.1% | 30 | 90.9% | 33 | 100% | |
| Monthly income | <10000 | 1 | 1.2% | 84 | 98.8% | 85 | 100% | **0.050** |
| | 10000-30000 | 7 | 5.9% | 111 | 94.1% | 119 | 100% | |
| | 30000-70000 | 6 | 4.5% | 128 | 95.5% | 135 | 100% | |
| | >70000 | 4 | 8.9% | 43 | 91.1% | 45 | 100% | |

**Table 2.** Levels of pain, fear, and fatigue of the participants.

| Factor | Intensity | Good Sleep Quality | | Poor Sleep Quality | | Total | | p-value |
|---|---|---|---|---|---|---|---|---|
| | | Frequency | % | Frequency | % | Frequency | % | |
| Pain | Low | 1 | 7.1% | 13 | 92.9% | 14 | 100% | **0.000** |
| | Moderate | 15 | 6.6% | 213 | 93.4% | 228 | 100% | |
| | High | 2 | 1.4% | 140 | 95.6% | 142 | 100% | |
| Fear | Low | 1 | 3.2% | 30 | 96.8% | 31 | 100% | 0.500 |
| | Moderate | 16 | 5.1% | 300 | 94.9% | 316 | 100% | |
| | High | 1 | 2.7% | 36 | 97.3% | 37 | 100% | |
| Fatigue | Low | 0 | 0.0% | 15 | 100% | 15 | 100% | **0.012** |
| | Moderate | 17 | 5.9% | 273 | 94.1% | 290 | 100% | |
| | High | 1 | 1.3% | 78 | 98.7% | 79 | 100% | |

**Table 3.** Behavioral characteristics of the participants.

| Factor | Good Sleep Quality | | Poor Sleep Quality | | Total | | p-value |
|---|---|---|---|---|---|---|---|
| | Frequency | % | Frequency | % | Frequency | % | |
| **Engaging leisure activities** | | | | | | | |
| Usually | 3 | 4.6% | 62 | 95.4% | 65 | 100% | **0.036** |
| Frequently | 3 | 10.3% | 26 | 89.7% | 29 | 100% | |
| Sometimes | 7 | 5.3% | 124 | 94.7% | 131 | 100% | |
| Occasionally | 5 | 5.6% | 84 | 94.4% | 89 | 100% | |
| Never | 0 | 0.0% | 70 | 100% | 70 | 100% | |
| **Using social media** | | | | | | | |
| Usually | 3 | 4.7% | 61 | 95.3% | 64 | 100% | **0.022** |
| Frequently | 7 | 9.3% | 68 | 90.7% | 75 | 100% | |
| Sometimes | 2 | 2.6% | 76 | 97.4% | 78 | 100% | |
| Occasionally | 4 | 5.5% | 69 | 94.5% | 73 | 100% | |
| Never | 2 | 2.1% | 92 | 97.9% | 94 | 100% | |
| **Engaging religious activities** | | | | | | | |
| Usually | 6 | 6.2% | 91 | 93.8% | 97 | 100% | 0.247 |
| Frequently | 9 | 6.3% | 135 | 93.8% | 144 | 100% | |
| Sometimes | 1 | 0.9% | 112 | 99.1% | 113 | 100% | |
| Occasionally | 1 | 5.3% | 18 | 94.7% | 19 | 100% | |
| Never | 1 | 9.1% | 10 | 90.9% | 11 | 100% | |
| **Coffee/tea drinking** | | | | | | | |
| Usually | 0 | 0.0% | 55 | 100% | 55 | 100% | 0.288 |
| Frequently | 2 | 7.7% | 24 | 92.3% | 26 | 100% | |
| Sometimes | 4 | 4.4% | 86 | 95.6% | 90 | 100% | |
| Occasionally | 5 | 4.2% | 115 | 95.8% | 120 | 100% | |
| Never | 7 | 7.5% | 86 | 92.5% | 93 | 100% | |
| **Alcohol drinking** | | | | | | | |
| Usually | 1 | 3.6% | 27 | 96.4% | 28 | 100% | 0.980 |
| Frequently | 0 | 0.0% | 5 | 100% | 5 | 100% | |
| Sometimes | 2 | 4.1% | 47 | 95.9% | 49 | 100% | |
| Occasionally | 3 | 4.8% | 60 | 95.2% | 63 | 100% | |
| Never | 12 | 5.0% | 227 | 95.0% | 239 | 100% | |

## Sleep quality of the participants

The mean global PSQI score was 10.27±3.5 (range 3- 20) and the majority (95.3%, n=366) of study participants had poor sleep quality. The mean value of each subscale component (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleep medication, and daytime dysfunction) was presented in table 4. Sleep medication use repoted by the participants were 47.1% (n=181), 20.3% (n=78), 16.7% (n=64), and 15.9% (n=61) respectively for not during the past month, less than once a week, once or twice a week and three or more times a week.

## Factors associated with sleep quality

Sociodemographic characteristics such as age (p=0.002) and monthly income (p=0.050) were significantly associated with the sleep quality of cancer patients (Table 1). Suffering from pain (p<0.001) and fatigue (p= 0.012) were shown significant associations with the sleep quality of the patients with cancer (Table 2). Behavioral characteristics such as engaging in leisure time activities (p=0.036), and using social media (p=0.022) were associated with the sleep quality of the patients with cancer (Table 3).

| Component | Subcomponent | Mean and SD | Range |
|---|---|---|---|
| Component 1 | Subjective sleep quality | 1.79±0.78 | 0-3 |
| Component 2 | Sleep latency | 1.91±0.71 | 0-3 |
| Component 3 | Sleep duration | 1.26±1.05 | 0-3 |
| Component 4 | Habitual sleep efficiency | 1.23±1.22 | 0-3 |
| Component 5 | Sleep disturbances | 1.26±1.05 | 0-3 |
| Component 6 | Use of sleeping medications | 1.01±1.13 | 1-2 |
| Component 7 | Daytime dysfunction | 1.48±0.65 | 0-3 |

**Table 4.** Sleep quality of the participants.

## DISCUSSION

This study aimed to assess sleep quality and its associated factors among patients with cancer, who seek treatment from Apeksha Hospital, Sri Lanka. According to the current study, 95.3% of patients with cancer reported poor sleep quality. Age, monthly income, suffering from pain and fatigue, not engaging in leisure time activities, and using social media were significantly associated with the sleep quality of cancer patients.

A study conducted in the neighboring country of India reported that 57.6% of patients with cancer are having poor sleep quality [19]. However, Indian patients have shown greater sleep quality than our study participants. The reason for high sleep quality could be due to the lower symptom burden of cancer as a result of advanced cancer management techniques in India than in Sri Lanka [20]. In comparison, a study conducted in the United States reported a 64% prevalence of poor sleep quality among cancer

patients which is significantly lower than the prevalence of poor sleep quality unveiled by the current study. This discrepancy in prevalence is not only due to advanced cancer management treatments in developed countries but also advanced pain management techniques. Given the high prevalence of Opiate misuse in Sri Lanka [21], Opiate use for cancer pain management is discouraged even though opiates are commonly used in the management of cancer pain in developed countries [22].

The current study revealed a significant association between sleep quality and the age of the study participants. The sleep quality of older patients was poor than that of younger patients. It is known that 50% of adults worldwide report difficulties initiating and/or maintaining sleep [23] and the limitation of mobility, difficulties to perform activities of daily living, chronic illnesses, and psychological issues were the problems that arise with old age which directly impact sleep quality [24]. Therefore, it is evident that age could influence sleep quality. Similar findings were reported in a study conducted in Ethiopia [7].

The disease and symptoms burden of the patient with cancer make their inability to work and then unemployment which could cause a loss of income and the expenses for cancer treatment to aggravate the financial problems [25]. The current study revealed a significant association between monthly income and sleep quality, and those who are with low-income levels had shown a higher prevalence of poor sleep quality. Unemployment and lower income lead to financial insecurity which increases psychological distress and could affect sleep quality [26].

The current study found a significant association between pain, fatigue, and sleep quality. Ample evidence to indicate that sleep and pain are associated. As evidence, sleep complaints are reported in 67-88% of patients with chronic pain disorders [27] and chronic pain is a common symptom in cancer patients which can have a negative impact on health and well-being [28]. Individuals did not get adequate sleep which impairs their ability to perform daily activities [29]. As shown in the literature, cancer and side effects of the cancer treatment cause fatigue and drowsiness which are significantly associated with sleep quality [30]. In the present study patients who have low fatigue have a higher prevalence of good sleep quality than those who have moderate fatigue.

In our study coffee drinking was not associated with sleep quality. However, the study done in Ethiopia found a significant association between coffee drinking and sleep quality (p=0.003) [7]. This inconsistency could be due to the difference in coffee-drinking behavioral practices. Sleep disturbance is one of the signs of alcohol addiction [31]. However, the current study has not shown a relationship between alcohol-drinking behavior and sleep quality. This finding was in line with the study conducted in Ethiopia among patients with cancer [7].

Frequent usage of social media increases the handling of electronic devices by individuals. Blue light emitted by screens of electronic devices decreases the production of the melatonin hormone which controls sleep and it can contribute to poor sleep quality [32]. This might be the reason for the significant association between sleep quality and social media usage.

## Limitations of the Study

The self-report questionnaire used to assess sleep quality over a 1-month time interval can make recall bias, which may underestimate the prevalence of poor sleep quality. Since the study was only conducted at one institute study is not generalizable to a country as a whole.

## CONCLUSIONS

The present study revealed a high prevalence of poor sleep quality among patients with cancer which might be an added negative influence on their health and well-being. Age, monthly income, suffering from pain and fatigue, not engaging in leisure time activities, and using social media were significantly associated with the sleep quality of cancer patients. Healthcare professionals need to provide special consideration to those whose age is advanced, and who experience severe pain and fatigue to develop screening and manage sleep quality problems in cancer patients. Furthermore, policymakers are required to pay extra attention to improving cancer patients' management practices with a focus on contributory factors for sleep quality to ensure the well-being of cancer patients and provide a better quality of life. It would enhance the effectiveness of cancer treatments.

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