

SLEEP QUALITY IN PATIENTS WITH CHRONIC MEDICAL CONDITIONS: A CROSS-SECTIONAL STUDY FROM RURAL SOUTHERN TAMIL NADU

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ABSTRACT

Introduction: Sleep quality remains a significantly underappreciated aspect of managing chronic medical conditions. Poor sleep quality may impact the quality of life, morbidity, and mortality outcomes in patients with these conditions. To objectively quantify the burden of poor sleep quality, this study aimed to assess sleep quality using the Pittsburgh Sleep Quality Index (PSQI) and to identify its associated factors.

Methods: This cross-sectional study was done among 203 patients with chronic medical conditions attending a tertiary care hospital in Kanyakumari district. Purposive sampling of patients with cancer or chronic cardiac, renal, hepatic, or pulmonary conditions was done with an interviewer-administered questionnaire. A PSQI score of more than 5 indicated poor sleep quality. Descriptive statistics, chi-square test, and independent t-tests were used for statistical analysis, with 5% significance level.

Results: The mean age of the patients was 54.57 years, with males being the predominant group (63%). Almost all of the patients (80.3%) were considered poor sleepers with a PSQI score of more than 5, with the highest scores mainly seen in patients with liver disease and respiratory diseases. Male gender and kidney disease were statistically significant factors associated with poor sleep quality.

Conclusion: The Majority of the subjects with chronic diseases had poor quality of sleep, with only a few seeking treatment for the same. Early identification and management of sleep disorders in patients with chronic diseases is a critical gap in patient care that needs to be addressed urgently.

Keywords: Chronic Diseases, Pittsburgh Sleep Quality Index, Sleep Quality

INTRODUCTION

India has been facing the double burden of non-communicable diseases (NCDs) as well as infections and parasitic diseases. The primary challenges in addressing NCDs are a lack of adequate awareness and insufficient access to healthcare (Arokiaswamy, 2018). Even when healthcare services are utilized, they are often limited to addressing polypharmacy alone. Lifestyle management often plays second fiddle to polypharmacy in the management of NCDs like coronary artery disease (CAD), cancer, chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), and chronic liver disease (CLD).

Sleep quality remains a grossly neglected part of the patients' health management. The quality of sleep is often not elicited in clinical history-taking unless patients themselves complain of major sleep disturbances. Even then, it is sometimes dismissed as "part of the disease" and not managed medically. The pain and fatigue experienced by people with chronic illness have a serious impact on their daily lives, including sleep routines. Because of their illness, they have trouble sleeping at night and consequently sleep more during the day. Disturbed sleep has been identified both as a contributing factor for the advancement of chronic diseases and also as a side effect of the treatment of chronic conditions.

Restless sleep in individuals with chronic medical conditions has been associated with illness intrusiveness, defined as the inability to participate in desired activities due to one's illness, which may account for the association between sleep disorders in individuals with chronic medical conditions (Devins et al., 1993). Poor sleep quality may impact the quality of life, medication patterns, and morbidity or mortality outcomes (Parish, 2009). Insomnia increases the risk of occupational injuries and traffic accidents. Patients with sleep disorders also have problems accomplishing their daily tasks. Insomnia in chronically ill patients is associated with global decrements in Health Related Quality of Life (Katz & McHorney, 2002).

Studies done among patients with chronic liver disease showed an 81% prevalence of poor sleep and revealed its association with daytime somnolence and decreased quality of life (Ghabril, 2017). Similar findings were also reported in cancer patients undergoing chemotherapy by Mystakidou et al. (2007). Coronary artery disease patients also have been reported to have poor quality of sleep, similar to patients suffering from hypertension alone (Sharma et al., 2014; Zhang et al., 2019). Scharf et al. (2010) reported respiratory symptoms, snoring, witnessed apnoea, daytime sleepiness, and poor sleep quality in patients with chronic pulmonary diseases.

With the alarming rise in prevalence of major chronic illnesses in India -with 17.2% prevalence of Chronic Kidney disease, 7.7% COPD, 6% chronic liver disease, 25% cancer and 32% CAD-there is an urgent need to document the quality of sleep in these patients in a systematic way (Singh et al., 2013; Mc Kay et al., 2012; Ray, 2014; Gupta et al., 2016; National Cancer Institute, 2020). Research on sleep in such patients has been limited by the lack of an effective measurement tool for measuring sleep quality. There is limited empirical data on the prevalence of sleep disturbances in these patients, using psychometrically sound measures from the South Indian region.

Hence, this study was designed to assess the quality of sleep in patients with chronic medical conditions such as CKD, COPD, CLD, CAD, and Cancer using the Pittsburgh Sleep Quality Index (PQSI) and to identify the factors associated with poor sleep quality in them.

METHODS

This cross-sectional study was conducted among patients with chronic medical conditions attending medical and super-specialty outpatient departments (OPDs) in a tertiary care hospital located in a rural area of Kanyakumari district, southern Tamil Nadu. Adult patients above 18 years who had been previously diagnosed with CKD, CLD, COPD, CAD, or cancer for at least six months prior to the start of the study were included in the study. Patients with neuropsychiatric illnesses, obstructive sleep apnoea, those on anti-convulsant therapy or thyroid medications, as well as critically ill patients, were excluded from the study. The study subjects were selected through purposive sampling from among hospital attendees over two months, from July to August 2021. Based on the previously reported prevalence of 50% poor sleep quality in individuals with chronic illness, as reported in a study, the sample size was calculated to be 200 subjects for a significance level of 5%, relative precision of 15%, and an anticipated non-response rate of 10% (Katz & McHorney, 2002).

After obtaining Institutional Human Ethical Committee approval (IHEC) [IHEC no. 1/27/2021 dated March 25, 2021] and informed consent from the participants, patient details were collected with an interviewer-administered pilot-tested structured questionnaire incorporated with the Pittsburgh Sleep Quality Index (PQSI). PQSI is a validated tool that assesses seven components: sleep quality, sleep latency, habitual sleep efficiency, sleep duration, sleep disturbances, daytime dysfunction, and the use of sleep medication (Buysse et al., 1989). Each component is scored from 0 to 3, yielding a global PSQI score ranging from 0 to 21. A score of more than 5 indicates poor sleep quality. There are 19 self-rated questions for calculating the global PQSI score and five questions to be rated by the bed partner if available. However, most spouses were not available at the time of data collection, and therefore only the self-rated questions were included for analysis.

Data entry was performed in MS Excel 2016, and analysis was conducted using IBM SPSS Statistics Version 20.0. Independent variables, including age, gender, type of medical condition, and disease duration, were analyzed for statistical association. Descriptive statistics, Chi-square test, Fisher's exact test, and independent t-tests were used for statistical analysis, with a significance level set at 5%.

RESULTS

Baseline characteristics:

In this study, a total of 203 patients attending the General Medicine, Nephrology, Oncology, and Surgery OPD at the tertiary care centre were interviewed. The ages of the study participants range from 18 to 81 years, with a mean age of 54.57 ± 12.1 years. Among the participants, 62.6% (127) were male and 37.4% (76) were female. Out of 203 patients in the study, 71 patients had a clinical diagnosis of CKD (35%) at presentation, 52 had CAD (25.6%), 46 had cancer (22.7%), 18 had COPD (8.9%), and 16 had CLD (7.9%).

Associated medical conditions:

Regarding pre-existing medical conditions associated with clinical diagnoses of the study participants, the majority of the patients suffered from hypertension alone (31.5%). About 28.6% (58) of patients had diabetes mellitus, while 18.7% (38) had both hypertension and diabetes. Less than a quarter of the patients (21.2%) had no pre-existing medical conditions.

Quality of Sleep:

The subjective sleep quality was reported to be very bad in 29.1%, fairly bad in 30% and fairly good in 28.6% patients. Only 12.3% reported having very good sleep quality. Around 36.9% patients had a long sleep latency, as it took them more than one hour to fall asleep every night for the past month. Only 13.3% patients had a short sleep latency of less than fifteen minutes. More than half of the patients (52.7%) had less than 5 hours of actual sleep each night. Adequate sleep duration of more than 7 hours was claimed by a small portion of 11.3% patients.

Habitual sleep efficiency was calculated as a percentage of actual hours of sleep out of total hours spent in bed. Habitual sleep efficiency ranged from 40% to 100%, with females having higher mean sleep efficiency than males (72.75% versus 68.4%). Almost half of the patients (43.8%) had a sleep efficiency pattern of less than 65%. The majority of participants reported daytime dysfunction due to poor sleep as a problem of varying degrees. Only a quarter (26.6%) of the study population had no issues staying awake for daytime routine activity.

The majority of study participants (85.2%) had not used medication to help them fall asleep in the previous month. Only 6.4% patients claimed to use sleep medications more than three times a week. Only 8.9% patients reported not having any trouble sleeping in the last month.

The global PSQI score of the patients was calculated by adding up the scores of all 7 components. The PSQI scores ranged from 0 to 19. Almost all of the patients (80.3%), ie, 163 patients, had a PSQI score of more than 5 and were considered 'poor sleepers'. Approximately 40 patients (19.7%) had a score of 5 or less and reported good sleep quality (considered good sleepers). The mean global PSQI score of the patients was 10.33 ± 4.67 , with a statistically significant difference between males and females (11.06 versus 9.09; $p = 0.004$). The mean PQSI scores for patients with various chronic conditions are presented in detail in Table 1 below.

Table 1: Mean PSQI scores of patients according to gender and clinical profile

Clinical condition	Number	PSQI SCORE Mean (SD) [†]			
		Male	Female	P value	Overall score
CKD	71	12.45 (3.68)	11.2 (4.67)	0.292	12.1 (3.99)
COPD	18	12.27 (4.08)	12.28 (4.23)	0.995	12.28 (4.01)
CLD	16	12 (4.16)	13.5 (0.58)	0.247	12.38 (3.63)
Cancer	46	13.48 (3.97)	7.8 (4.91) *	0.000*	10.43 (5.28)
CAD	52	6.5 (2.96)	6.5 (2.91)	0.978	6.5 (2.91)
TOTAL	203	11.06 (4.49)	9.09 (4.72) *	0.003*	(4.66)

*Statistically significant (Independent t test); † SD- standard deviation

Among cancer patients, a statistically significant lower PSQI score was observed in females compared to male patients, with a p-value of less than 0.001. The distribution of the proportion of patients with poor sleep quality across the various disease groups studied is given in detail in Table 2 below.

Table 2: Distribution of poor sleepers according to clinical profile (N=203)

Clinical condition	Poor sleep quality (PQSI > 5) n (%)	Good sleep quality (PQSI < 5) n (%)
CKD	64 (90.1)	7 (9.9)
COPD	16 (88.9)	2 (11.1)
CLD	15 (93.8)	1 (6.2)
Cancer	35 (76.1)	11 (23.9)
CAD	33 (63.5)	19 (36.5)
TOTAL	163 (80.3)	40 (19.7)

Factors associated with Sleep quality:

The mean PSQI score for males was higher than that for females when compared across all patients (p-value = 0.004) and also among cancer patients specifically (p-value < 0.001). Males comprised a higher proportion of poor sleepers (66.3%) compared to females (33.7%), and this difference was statistically significant (χ^2 value = 4.8, p value = 0.028). A weak positive correlation was observed between age and PSQI score, and a negative correlation was found between age and sleep efficiency; however, neither correlation was statistically significant. Across the various clinical profiles, the higher prevalence of poor sleepers among CKD patients compared to patients with other conditions was statistically significant (χ^2 value = 12.64, p value = 0.002).

DISCUSSION

The present study found that 80.3% of chronically ill patients with CKD, COPD, CLD, and cancer suffered from poor quality of sleep. This indicates an overall increased pattern of poor sleep quality among the patients in our study. This is much higher than the 50% prevalence of poor sleep quality in chronically ill patients reported by Katz, D.A. et al from Indiana (2002). A weak positive correlation was observed between age and PSQI score, and a negative correlation was found between age and sleep efficiency in our study; however, neither correlation was statistically significant. Hsu et al. (2021) also reported a significantly lower prevalence of 27.9% poor sleep, as measured by the PSQI, among middle-aged and elderly patients. However, this could be because their patients were from a rehabilitation clinic, and many were on treatment for depression and sleep disorders already. These conditions were already excluded in our study.

Mary Kemple et al. (2016), who had done a qualitative study among patients with chronic illness, had also reported that poor sleep quality had a profound impact on their quality of life and that it was not considered a medical problem that could be professionally addressed. Similarly, in our study, most patients with poor sleep quality had never used medications to improve their sleep. This shows there is an unrecognized and unmet need for treating sleep disorders.

Luyster et al. (2011) found that the mean (SD) PSQI global score was 6.6 ± 3.7 among T2DM patients.¹⁸ In our study, we have found that the PSQI value for the T2DM patients in our centre in Kanyakumari is 8.78 ± 4.73 . Although this indicates poorer sleep quality among the T2DM patients in our study compared to Luyster et al. (2011), it may be because our patients also had other coexisting chronic diseases. Zhang H et al. (2019) also found that higher PSQI scores were associated with increased odds of prevalent hypertension in both genders. No such association was seen in our study despite the mean PSQI score for hypertensive patients being 11.39 ± 4.38 .

Across the various clinical profiles, there was a higher prevalence of poor sleepers among CKD patients compared to patients with other conditions in our study, and this difference was statistically significant. Samara AM et al. (2019) reported the prevalence of poor sleep quality (PSQI > 5) among CKD patients undergoing haemodialysis as 76.65% in their study. Anwar N et al. (2018) also had similar values of 72.6% poor sleep quality from Pakistan. Another study done in Iran by Parvan K et al. (2013) has a poor sleep quality proportion of 83.3% among dialysis patients. In the present study, 90.9 % of the CKD patients were poor sleepers, showing the detrimental nature of sleep quality among CKD patients undergoing hemodialysis in this region. Santhosh Pai et al. (2020) also reported a high prevalence of sleeplessness in Indian CKD patients, as assessed using the PSQI scale. However, some patients exhibited snoring and other symptoms of sleep apnea, which may have contributed to poorer sleep quality. Their study also reported a higher PSQI score among patients in the initial months of HD. Our study did not study the effect of HD duration on sleep quality. We had also excluded patients with sleep apnea from our study.

Mystakidou K et al. (2007) conducted a similar study in Athens, Greece, among advanced cancer patients, obtaining a mean global sleep quality score of 12 (± 4.6). They also examined the influence of pain and opioids on sleep quality. However, this could be because their study was done on terminal cancer patients requiring palliative care. In our study, the mean PQSI score was 10.43 ± 5.28 , indicating that the sleep quality is better among cancer patients in Kanyakumari. Our prevalence of poor sleep quality of 76.1% among cancer patients was, however, much higher than the 57.6% prevalence of poor sleepers reported by Ananth Pai et al from Manipal (2020). They had also included patients with early cancer, which could be the reason for their lower prevalence.

Ghabril M et al. (2017) did a study in Indiana among chronic liver disease patients and found that 81% had disturbed sleep with a PSQI score of more than 5. In our study, we found the prevalence of poor sleepers to be 93.8% among CLD patients; however, this high value may be due to the smaller sample of CLD cases reporting to the OPD during the COVID-19 pandemic. A male preponderance for poor sleep quality was also observed in their study. Similarly, the mean PSQI score for males was higher than for females in our study. However, the quality of sleep has been attributed to the severity of liver disease in their study, but this was beyond the scope of our study.

Assari et al. (2013) in Iran found that female patients with CAD have poorer sleep quality than males, which contrasts with our study, where a male preponderance is observed. Sharma et al. (2014) conducted a study in India and reported a mean PSQI score of 16.62 in patients with Coronary artery disease. In contrast, our study found that the PSQI score for CAD patients was significantly lower, at 6.5 ± 2.9 . This suggests improved sleep quality among the CAD patients at our centre.

Our findings were also similar to those of Scharf SM et al. (2010) in the USA, who studied quality of life and poor sleep quality among COPD patients, with similar mean PSQI values for COPD patients (11.39 ± 3.9 versus 11.0 ± 5.4). Shorofsky et al. (2019) found that males have poorer sleep quality (58.2%) than females, which corresponds with the findings of the present study. Also, they attributed the higher frequency of exacerbations of COPD to poorer sleep quality.

The present study aimed to provide an overview of sleep quality across various chronic diseases prevalent in the region. However, the study's low sample size, poor generalizability, and potential selection bias, due to its hospital-based design, are major limitations. Longitudinal studies with a larger sample size are needed to confirm the high prevalence of impaired sleep quality in each of the above chronic conditions. The PSQI survey is a straightforward tool that provides comprehensive information on sleep quality. The use of the PSQI scale during follow-up visits can be very useful for identifying impaired sleep quality and managing it with medical or non-medical interventions. This, in turn, may improve the quality of life and reduce morbidity in patients with chronic diseases.

CONCLUSION

A vast majority of our subjects with chronic diseases had poor quality of sleep, and only a few of them sought treatment for the same. The risk of poor sleep quality can potentially impact their quality of life and exacerbate their existing health issues. Early identification and better management of sleep disorders in patients with chronic diseases is a critical gap in patient care that needs to be addressed urgently.

Conflict of interest

The authors declare that they have no conflicts of interest.

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