

The Sleep Disturbances in Elderly Patients with Chronic Liver Disease

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Abstract

Background: Sleep disturbances complaints are common problems among elderly patients. There is a high prevalence among older adults especially those with chronic liver disease and this greatly affect their quality of life

Aim: To study the relationship between chronic liver disease and sleep disturbances among elderly patients

Methods: Case control study included 100 elderly participants, divided equally to cases and controls, cases are further divided into child A and child B. Pittsburgh sleep quality index using Arabic version was used to detect sleep disturbance

Results: The study showed significant relationship between chronic liver disease and sleep disturbances as 29% of total number of cases did have sleep disturbances while only 14% of controls did. Moreover, 32 % of child A group and 56% among child B group did have sleep disturbances. As regard component of Pittsburg sleep quality index, the study showed that there was significant difference in subjective sleep quality, sleep latency, sleep efficiency, daytime dysfunction.

Conclusions: Sleep disorders prevalence among elderly increases with the presence of chronic liver disease.

Keywords: sleep disturbances, elderly, chronic liver disease, Pittsburgh sleep quality index, Child-Pugh score

Background:

Sleep disturbances are a major health issue affecting all elderly population and the prevalence continue to increase among elderly with higher prevalence among older adults. For example primary sleep disorders have higher prevalence among older adults.⁽¹⁾

Sleep related disorders among elderly have a multifactorial etiology. This includes primary and secondary causes. Primary causes include sleep-disordered breathing, periodic limb movements in sleep, restless legs syndrome, rapid eye movement (REM), sleep behavior disorder, insomnia, and circadian rhythm disturbances. Secondary causes such as lifestyle and environmental factors, multiple comorbid medical conditions, the use of medication for comorbid and psychiatric conditions.⁽¹⁾

Chronic liver disease is one of the medical comorbidities that are associated with sleeping disturbances especially among elderly and this can be due to several factors such as pain, discomfort from ascites ,fatigue associated with the disease, poor sleep hygiene, medications affecting sleep, as well as

pruritus (especially in primary biliary cirrhosis)⁽²⁾, but also the pathophysiology of liver disease itself represent a direct consequence of sleep dysfunction for example Insomnia is documented in well-compensated cirrhotic patients with no other causes explaining disturbed sleep such as itching, tense ascites, or diuretics treatment⁽³⁾.

Sleep disturbances among patients with chronic liver disease was first described in 1954 among cirrhotic patients with severe overt hepatic encephalopathy (HE) as it was presented with sleep-wake inversion (the combination of restless nights and excessive daytime sleepiness), latter on with more studies conducted on sleep disturbance they found that an extreme wide range of sleep disturbances can be seen among cirrhotic patients even without signs of overt HE and these studies documented that the prevalence of sleep difficulties include falling asleep, multiple night awakenings and daytime sleepiness varying from 27 to 70% among patient with chronic liver disease⁽⁴⁾⁽⁵⁾.

Studies found that patients with cirrhosis usually presented with delayed sleep habits/evening preference,

these features are associated with increase sleep latency and so worse sleep quality⁽³⁾.

Montagnese et al. explained that one of the causes of disturbed sleep among patient with chronic liver disease is the abnormal interaction between the two primary components that regulate sleep the homeostatic process that builds up during wakefulness and declines during sleep, and the circadian process (6).

Also there are suggestions that there is multiple unexplored pathophysiological mechanisms through which cirrhosis and its complications might affect sleep-wake patterns, as sleep abnormalities have also been reported in patients with little or no evidence of neuropsychiatric disturbance related to HE⁽⁷⁾

In patients with cirrhosis the use of 24-h rhythm of skin temperature and the distal proximal gradient showed impaired thermoregulation, in terms of absolute values and time-course. These alterations may be explained by the hyperdynamic circulatory syndrome, caused by the generalized state of vasodilatation which affects heat dissipation in these patients, these abnormalities reflect the severity of the disease and the associated sleep-wake abnormalities^{(8) (9)}.

Another method used to confirm the evidence of sleep disturbance among chronic liver disease is glucose fluctuations, as greater fluctuations were associated with higher Pittsburgh sleep quality index scores, studies showed that 70% of cirrhotic patients suffer from glucose intolerance or diabetes, so it partly explains the disturbed sleep patterns in these patients.⁽¹⁰⁾

This study was conducted to investigate the relationship between chronic liver disease and sleep disturbances among elderly patients.

Methods

A case control study was conducted on 100 elderly participants (60 years and older) divided into two groups and they were recruited from outpatient clinics of both the Geriatric department and Tropical department of Ain Shams University hospitals:

Cases included 50 chronic liver disease patients which are further divided into 2 groups according to Child-Pugh criteria into child A and child B

Exclusion criteria of cases:

Chronic liver disease patient Child-Pugh criteria child C, history of hepatic encephalopathy, history of any Psychiatric disorder, any end organ failure as heart failure and renal failure.

Control group included 50 healthy non-hepatic elderly individuals. Matched with the cases in age, sex and comorbidities

Study tools

All participants were subjected to

1. Oral consent that they agree to participate
2. Assessment including detailed history taking and examination.

3. Evaluation of sleeping pattern by Pittsburgh sleep quality test (11)
4. Investigations as INR, liver enzymes, bilirubin level, Albumin, and Pelvi-abdominal ultrasound to confirm the diagnosis of chronic liver disease and to classify the patients according to child score

Statistical analysis

Analysis of data was performed by using the Statistical Package for Social Science (SPSS 16). Comparison between quantitative variables was done using t-test to compare two groups. Comparison of qualitative variables was done using the Chi-square test or Fisher's exact test when appropriate. Significant level was measured according to P value (probability), P>0.05 is insignificant, P<0.05 is significant and p<0.01 is highly significant.

Ethical consideration

Informed oral consent was taken from every patient after explanation of the study aim and procedure and the study methodology was reviewed and approved by the Research Review Board of the Geriatrics and Gerontology Department, Faculty of medicine, Ain Shams University.

Results

The study was conducted on 100 participants classified into equal number of control and cases and cases were further divided into two groups child A and child B, all participants are 60 years and older and were classified into different age groups, the three groups are statically matched as regard age and gender (Table 1).

The study results showed significant relationship between sleep disturbances and chronic liver disease as 24% of cases with hepatic disease had sleep disturbances in comparison to only 14% of controls, comparing the two group of cases together (Child A and Child B) the results showed that in child A 32% had sleep disturbances while in child B 56% of participants complained of sleep disturbances and these difference were statically significant (P-value of 0.001) (Table 2).

Comparing each component of Pittsburgh sleep quality index among cases and control showed a statistically significant relationship between each Pittsburgh sleep quality index component and chronic liver disease (Table 3).

Except for Component 6 of Pittsburgh sleep quality index (use of sleep medication) had no statistical difference as none of cases in the child A or child B candidates used sleep medications. (Table 3)

Table 1: Demographic data of the participants:

		Child							
		Control		Child A		Child B		Total	
		N	%	N	%	N	%	N	%
Age	60-65 Years	15	30.00	7	28.00	7	28.00	29	29.00
	66-70 Years	15	30.00	11	44.00	10	40.00	36	36.00
	71-75 Years	12	24.00	6	24.00	7	28.00	25	25.00
	76-80 Years	8	16.00	1	4.00	1	4.00	10	10.00
Gender	Female	25	50.00	12	48.00	12	48.00	49	49.00
	Male	25	50.00	13	52.00	13	52.00	51	51.00

Table 2: Relationship between Pittsburgh sleep quality index total score and hepatic and non-hepatic patients

		Participant								Chi-Square	
Pittsburgh		Control		Child A		Child B		Total		X ²	P-value
		N	%	N	%	N	%	N	%		
Total Component	Less than 5	43	86	17	68	11	44	71	71	14.424	0.001*
	More than 5	7	14	8	32	14	56	29	29		

Table 3: The relationship between Pittsburgh sleep quality index components in hepatic and non-hepatic participants

Pittsburgh		Participants								Chi-Square	
		Control		Child A		Child B		Total		X ²	P-value
		N	%	N	%	N	%	N	%		
Component 1 Subjective sleep quality	No difficulty	40	80	0	0	0	0	40	40	98.333	<0.001*
	Mild difficulty	10	20	25	100	13	52	48	48		
	Moderate	0	0	0	0	12	48	12	12		
Component 2 Sleep latency	No difficulty	30	60	0	0	0	0	30	30	54.240	<0.001*
	Mild difficulty	20	40	17	68	13	52	50	50		
	Moderate	0	0	8	32	12	48	20	20		
Component 3 Sleep duration	No difficulty	26	52	17	68	0	0	43	43	30.428	<0.001*
	Mild difficulty	16	32	8	32	15	60	39	39		
	Moderate	8	16	0	0	10	40	18	18		
Component 4 Sleep efficiency	No difficulty	50	100	0	0	9	36	59	59	93.066	<0.001*
	Mild difficulty	0	0	18	72	5	20	23	23		
	Moderate	0	0	7	28	8	32	15	15		
	Severe	0	0	0	0	3	12	3	3		
Component 5 Sleep disturbances	No difficulty	2	4	0	0	0	0	2	2	20.988	<0.001*
	Mild difficulty	48	96	18	72	16	64	82	82		
	Moderate	0	0	7	28	9	36	16	16		
Component 6 Use of sleep Medication	No difficulty	46	92	25	100	25	100	96	96	4.167	0.125
	Mild difficulty	4	8	0	0	0	0	4	4		
Component 7 Daytime dysfunction	No difficulty	20	40	0	0	1	4	21	21	61.023	<0.001*
	Mild difficulty	28	56	18	72	11	44	57	57		
	Moderate	2	4	7	28	2	8	11	11		
	Severe	0	0	0	0	11	44	11	11		

Discussion

Sleep disturbance affect function and daytime activity of elderly thus affect quality of life, so special attention should be given to recognize causes of sleep disturbance among elderly with chronic liver disease, and to identify which part of sleep is affected so a management plan could be done to improve the sleep quality of elderly.

This study included 100 male and female elderly, with ages ranging from 60-80 divided into cases and controls and cases are then divided into Child A and Child B.

Studies concerned with sleep disturbances and chronic liver disease was not conducted before on Egyptian elderly and this study intended to investigate the effect of heterogeneity as regards nationality, race and ethnicity.

our study showed a statistical significance between sleep disturbances and chronic liver disease as assessed by Arabic version of Pittsburgh sleep quality index , we concluded that sleep disturbance is more frequent among participants with chronic liver disease than the control (24% of cases with hepatic disease had sleep disturbances in comparison to only 14% of controls)

Moreover, sleep disturbances increase with increased severity of chronic liver disease. when comparing the two groups of cases together (Child A and Child B) the results showed that 32 % of child A patients had sleep disturbances while in child B 56% of participants complained of sleep disturbances and these differences were statistically significant.

this agrees with other studies as **Montagnese S, et al., 2009⁽³⁾**, **Marques DM, et al., 2016⁽¹³⁾** and **Tsai CF et a., 2016⁽¹²⁾** all showed that cirrhotic patients were identified as 'poor' sleepers (PSQI > 5).

Our study revealed that the most affected component of Pittsburgh sleep quality index in comparison to control individual are sleep quality, sleep latency , sleep efficiency and daytime dysfunction, moreover, the sleep disturbances increased with the increased severity of hepatic condition.

Similar findings have been obtained by **AL-Jahdali H et al., 2014⁽¹⁵⁾** and **Bruyneel M et al., 2018⁽¹⁴⁾** their results showed that there was a significant relationship between severity of liver cirrhosis and prevalence of sleep disturbances when compared to healthy subjects.

When studying the relation between sleep medications use (component 6 in PSQI) in different study groups there was no significant relation among groups that may be due to fear of use sleep medications in elderly hepatic patients

This agrees with a study made by **Franz CC et al., 2012⁽¹⁶⁾** which showed that Antidepressants, benzodiazepines and other psychotropic and central nervous system agent should be used with caution or avoided in chronic liver disease patients.

Conclusion

Sleep disorders percentage among elderly increases with the presence of chronic liver disease patients and this significantly causes them to have daytime dysfunction.

The most affected components Subjective sleep quality, sleep latency, sleep efficiency and daytime dysfunction are common complaints among chronic liver disease elderly patients.

Percentage of sleep disturbances increase with severity of chronic liver disease

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