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ASSOCIATION BETWEEN QUALITY OF SLEEP AND OTHER PARAMETERS IN PATIENTS WITH GASTROESOPHAGEAL REFLUX DISEASE.

Physiology

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ABSTRACT

Background: Night time reflux has been shown to be associated with fragmented sleep. However, few studies have assessed the quality of sleep on gastroesophageal reflux and the impact of gastroesophageal reflux on reported quality of sleep and quality of sleep on gastroesophageal reflux. The aims of this study were to evaluate the quality of sleep and other parameters in patients with gastroesophageal reflux disease.50 Subjects with typical GERD symptoms ≥3 times a week and All subjects were administered 3 questionnaires: PSQI , ESS, GERD-HRQL . All the subjects underwent nocturnal polysomnography and completed a all 3 questionnaire before NPSG.

Results: Overall ,the mean percentage of N1 was 9.10±9.74 ,N2 was 83.97±13.81 , N3 was 3.44±4.16 , N4 was 0.60±2.04 , REM was 2.14±3.79 , PSQI was 12.48±1.23 , ESS was 11.80±0.76 , TST (hr) was 5.19±0.74 , SPT(hr) was 6.58±0.77 , sleep efficiency(%) was 52.50±27.16 , Latency (mint) was 22.79±30.85 , REM Latency (mints) was 96.99±151.86 ,and Microarousal index was 36.05±25.93 . To assess the potential impact of sleep quality via nocturnal polysomnography on severity of gastroesophageal reflux , we performed correlations between the GERD questionnaire and nocturnal polysomnography reports . We observed that PSQI(r= -0.285, p<0.045) , ESS(r=0.206, p=0.05) , N1(r=0.202 , p>0.160) , N2(r=-0.045 ,p>0.758) , N3(r=-0.079, p>0.583) , N4(r-0.209 ,p>0.145),REM(r=0.045 ,p>0.756) , TST(r=0.036 ,p>0.803), SPT(r=0.015,p>0.917) , Sleep Efficiency (r=-0.113,p>0.435) , Sleep Latency (r=-0.045 ,p>0.756), REM Latency (r=0.165, p >0.253), Microarousal index (r=0.058 , p>0.683).

Conclusions: Gastroesophageal reflux disease and sleep disorders are extremely prevalent conditions, and it seems intuitive that there must be some overlap between the two. Sleep disorders may in fact be one of the most prevalent of the extraesophageal complications of GERD and often goes unrecognized.

KEYWORDS

GERD, sleep, PSQI,ESS,PSG, heartburn

INTRODUCTION-

Gastroesophageal reflux disease (GERD) is a chronic condition that develops when reflux of gastric acid in to the oesophagus causes annoying symptoms like pain and dyspepsia.[1]Heartburn and acid regurgitation are the peculiar symptoms of this disease.[2] And prevalence is about 2.5% to 8.5% in Asian countries[3]. GERD produces considerable financial burden to society and patients, mainly through loss of work productivity.[4]Whereas anxiety, depression, respiratory symptoms, gastrointestinal symptoms, cardiovascular symptoms, and low socioeconomic status[5] have been linked with an increased prevalence of GERD. Most GERD patients have both night time and daytime symptoms, a very small number (13%) experience only night time symptoms and majority experience only daytime symptoms.[6] GERD during night time sleep has been shown to affect patients' sleep quality and their capacity to function the next day.[7]

Disorders of sleep have a strong effect on gastrointestinal diseases, and, conversely, several gastrointestinal disease processes influence the sleep quality and sleep-wake cycle. Given the current research that has shown a strong link , clinicians should not deny the relationship between sleep and gastrointestinal diseases . The aim of our study was to evaluate the quality of sleep and other parameters in patients with gastroesophageal reflux disease.

MATERIALS AND METHODS-

The 50 Cases was taken from department of Medical Gastrointestinal , KGMU , Lucknow and sleep study was conducted in the sleep laboratory, Department of Physiology of KGMU. Approval by the ethics committee of King George's Medical University, Lucknow, was taken before conducting the study. Subjects were included with Age >18 years and <60 years ; irrespective of sex. Patients with gastrointestinal symptom- reflux symptom , upper abdominal pain , fullness , dyspepsia , belching was selected for the study. Pittsburgh Sleep Quality Index (PSQI) => 5 ,Epworth Sleepiness Scale (ESS) =>10,GERD- Health Related Quality of Life Questionnaire (GERD-HRQL)=>10 . And subjects were excluded with Tobacco chewers , alcoholics , pan masala user , smokers , drugs user such as psychotropics, narcotics or benzodiazepines , asthma, COPD, renal failure, heart failure, sleep apnoea , and History of upper gut surgery .The subjects were refused to sign the informed consent form or unable to complete all steps of study .All the subjects face nocturnal polysomnography (NPSG) , and they were complete all 3 questionnaire before NPSG. Pittsburgh Sleep Quality Index (PSQI) - quality of sleep, latency, duration, efficiency.[8]Epworth somnolence Scale (ESS) - Excessive day time sleep[9],GERD - Health connected Quality of Life Questionnaire (GERD-HRQL) - to live changes of typical GERD symptoms as symptom and regurgitation.[10]Each study included recording of the EEG, EMG, PLMS, ECG, upper airway sound recording – microphone, Respiration: Measures of airflow - Nasal cannula and thermistor, Respiratory Effort - Rib and abdomen belts, Blood oxygenation (spo2) - pulse oximeter. Total time in bed (TIB) , Total sleep time (TST) ; Sleep period time (SPT), Wakefulness after sleep onset (WASO), R latency. Sleep efficiency was calculated as TST divided by SPT and TST divided by the time in bed

DATA ANALYSES

Data were assembled using Excel software , then transferred to SPSS. Descriptive statistics were assessed and results are presented as mean ± SD. The median is provided as well for some data . Auxiliary analyses were assessed as follows.

The ANOVA test was used to compare between group variances and within group amongst the study groups. ANOVA provided "F" ratio, where a higher "F" value depicted a higher inter-group difference.

First, associations between subjective sleep habits and GERD symptoms was evaluated by assessing Pearson correlation coefficients using the severity and repetition variable from the GERD - HRQL questionnaire, in addition to assessed symptoms, PSQI, EDSS Questionnaire.

Second, to determine the severity of gastroesophageal reflux, and its potential impact of poor quality of sleep on GERD symptoms ,correlations were evaluated between responses to the Sleep Quality Questionnaire(PSQI,ESS) and GERD - HRQL questionnaire before nocturnal sleep study .Third, to evaluate the association between frequency and severity of reflux episodes and quality of sleep.

RESULTS

Mean age of GERD subjects enrolled in the study was 38.38±11.29 years (Range 20-60 years). Most of the subjects were male (78.0%) and rest were female.

(Table no.1,2) - No significant association of severity of GERD (tertiles of GERD scores) did not show significant association with above parameters of Stage of sleep.

We observed that PSQI(r= -0.285, p<0.045) , ESS(r=0.206, p=0.05) , N1(r=0.202 , p>0.160) , N2(r=-0.045 ,p>0.758) , N3(r=-0.079, p>0.583) , N4(r-0.209 ,p>0.145),REM(r=0.045 ,p>0.756) , TST(r=0.036 ,p>0.803), SPT(r=0.015,p>0.917) , Sleep Efficiency (r=-0.113,p>0.435) , Sleep Latency (r=-0.045 ,p>0.756), REM Latency (r=0.165, p >0.253), Microarousal index (r=0.058 , p>0.683**).(Table no-3)**

Correlation of GERD score with all the above sleep parameters were found to be of weak level. Statistically significant correlation was found only with PSQI. Direction of correlation was inverse for PSQI, N2, N3, N4, Deep sleep, Sleep efficiency, Sleep latency, Sleep latency N2. For rest of the parameters linear correlation was observed.

DISCUSSION

Over the past decade, there has been a gush of analysis assessing disturbances in sleep and consequence on health. Nocturnal GERD symptoms are shown to have an effect on sleep quality and resulting daytime operate. Sleep quality in subjects with GERD might also be plagued by short arousals -related to acid reflux, that the subject is usually amnesic, however these arousals result in fragmentation in sleep.

The link between sleep and gastroesophageal reflux disease (GERD), is being recognized with the evolution of sleep laboratories.[11]

In the gift study we tend to didn't found any statistically vital distinction (p>0.05) between GERD score with completely different sleep parameters, which could ensue the continuation of drugs (prescribed by the gastroenterologist) throughout the sleep watching. the study done by Johnson et.al.[12], people with sleep disturbances related to GERD and nocturnal reflux were treated with a nucleon pump matter, and had a major recovery in each their sleep problems and GERD.

Dickman et.al.[13] found that exposure of acid during the supine position and quality of sleep were reduced with associated longer durations of individual acid reflux events. During sleep in supine position acid exposure, has been frequently shown to be associated with sleep disturbances, extra-esophageal manifestations of GERD .

In this study another important finding is the Statistically significant (p=0.045) PSQI score which shows a positive correlation between sleep disturbances and disease activity in GERD.

SIGNIFICANCE: It is clear from the above discussion that no sleep parameters showed major association with severity of GERD. But there is significant relation present between the deep sleep and poor sleep, may be possibly due to unhealthy lifestyle.

LIMITATIONS : Present study has few limitation being- Some patients had difficulty in sleeping in a new setup/environment and medicines prescribed by the gastroenterologist were not stopped before and during sleep study which may have influenced the outcome of the sleep parameters.

CONCLUSION:

Gastroesophageal reflux disease and sleep disorders are extremely prevalent conditions, and it seems intuitive that there must be some overlap between the two.one of the most prevalent of the extraoesophageal complications of GERD is sleep disorders and often goes unrecognized. Our understanding of the compound interplay between gastrointestinal disease and sleep is still elementary. Further work is required to give techniques to evaluate normal sleep and circadian -related physiology and to what extent this physiology is disrupted with disease..

Table 1: Association of Severity of GERD with Stages of Sleep

SN		T1 (n=11)		T2 (n=19)		T3 (n=20)		ANOVA	
		Mn	SD	Mn	SD	Mn	SD	F	'p'
1-	N1 (%)	5.05	5.03	10.57	10.64	9.94	10.57	1.255	0.294
2-	N2 (%)	85.36	9.14	82.98	14.84	84.14	15.40	0.102	0.903
3-	N3 (%)	4.48	4.62	3.13	3.99	3.17	4.18	0.433	0.651
4-	N4 (%)	1.15	2.97	0.61	2.29	0.30	0.92	0.619	0.543
5-	REM (%)	1.36	3.36	2.53	4.25	2.20	3.66	0.326	0.724
6-	PSQI	12.73	0.79	12.58	1.30	12.25	1.37	0.621	0.542
7-	ESS	11.55	0.82	11.84	0.69	11.90	0.79	0.822	0.446

Table 2: Association of Severity of GERD with Sleep Profile

SN		T1 (n=11)		T2 (n=19)		T3 (n=20)		ANOVA	
		Mn	SD	Mn	SD	Mn	SD	F	'p'
1-	TST (hrs)	5.14	0.97	5.17	0.62	5.25	0.75	0.083	0.920
2-	SPT (hrs)	6.45	0.77	6.64	0.65	6.60	0.90	0.217	0.806
3-	Sleep efficiency (%)	54.03	30.81	56.59	22.80	47.78	29.47	0.526	0.595
4-	Sleep latency (mins)	27.15	41.59	18.66	25.98	24.32	29.57	0.296	0.745
5-	REM latency	19.91	58.96	113.55	169.00	123.65	161.64	1.906	0.160
6-	Microarousal index	30.24	2.94	38.81	29.79	36.61	29.35	0.378	0.687

Table 3: Correlation of GERD score with Sleep Parameters

	Correlation coefficient 'r'	Level of correlation (Direction)	Statistical Significance 'p'
PSQI	-0.285	Weak (Inverse)	0.045
ESS	0.206	Weak (Linear)	0.152
N1	0.202	Weak (Linear)	0.160
N2	-0.045	Weak (Inverse)	0.758
N3	-0.079	Weak (Inverse)	0.583
N4	-0.209	Weak (Inverse)	0.145
REM	0.045	Weak (Linear)	0.756
TST	0.036	Weak (Linear)	0.803
SPT	0.015	Weak (Linear)	0.917
Sleep efficiency	-0.113	Weak (Inverse)	0.435
Sleep latency	-0.045	Weak (Inverse)	0.756
REM latency	0.165	Weak (Linear)	0.253
Microarousal index	0.058	Weak (Linear)	0.687

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