

REVIEW ARTICLE

Polycystic Ovarian Disorder and Sleep: A Review

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ABSTRACT

Polycystic ovary is now one of the common problems in our society. There are numerous reasons which include physical inactivity, hormonal imbalance, lack of Nutrition sleep and many more. PCOD is associated with cardiovascular factor and also many more complication like insulin resistance, infertility obesity, and malignancy. The most common problem seen in PCOD women is insomnia, psychiatric illness such as anxiety depression, overeating and non-alcoholic steatohepatitis. The objective of the review was to analyze the relationship of PCOD with sleep. By using following key words like "PCOD" "Sleep Apnea" "Insulin Resistance" "Diabetes Mellitus" About 25 Research paper has been studied related to Polycystic Ovarian Disease and its effect on sleep from various scientific platforms like Pub med, research article, Google Scholars, Journal of advance in medicines, Journal of sleep disorder and management. The previous clinical researches on PCOD have showed that the prevalence of sleep apnea is higher among PCOD patients as compared to healthy people. PCOD women have seen with sleeping disorder such as letharginess, Insomnia, Daytime sleep, obstructive sleep apnea. Due to poor sleep pattern the PCOD patient suffer from various problems like metabolic problem, anxiety, eating disorder, obesity, and cardiovascular diseases etc.

Key words: Sleep Pattern, Diabetes Mellitus, PCOD

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INTRODUCTION

In reproductive age PCOD is most common disorder in women, Nowadays, Epidemiological investigation have shown that in large number of women are suffering from this disease [1].The polycystic ovarian disorder is basically defined only by ovaries in ultrasound examination, clinically biochemical oligomenorrhea, hyperandrogenemia or amenorrhea [2] The diagnosis of PCOD is long -lasting association including metabolic syndrome, obesity, Diabetes Mellitus and increase the risk of having endometrial carcinoma if untreated for long [3]. Polycystic ovary is also associated with cardiovascular factor and also many more complication like insulin resistance, infertility obesity, and malignancy. The most common problem seen in PCOD women is insomnia, psychiatric illness such as anxiety depression, overeating and non-alcoholic steatohepatitis [4]. In recent study disturbance in quantity and quality or timing of the sleep directly effecting hormonal activity and metabolism. Due to insufficient sleep pattern it cause insulin resistance in healthy adults also. The sleep disturbance is negatively affected the life of PCOD patient. So, Ayurveda is providing different techniques for pacification of body and mind which can improve the sleep pattern in PCOD women [5].

LIFESTYLE CHANGES IN PCOD

The first line of treatment in management of women suffering from PCOD is lifestyle changes. By adapting a healthy dietary pattern and doing a physical activity for maintaining healthy body weight can help to cure PCOD easily. Nutritional counseling is very important for PCOD patient so that they can easily understand and also aware from this disease. The overall mental health and well-being is important step towards the healthy life.[6]

METHODOLOGY

By using following key words like “PCOD” “Sleep Apnea” “Insulin Resistance” “Diabetes Mellitus” About 25 Research paper has been studied related to Polycystic Ovarian Disease and its effect on sleep from various scientific platforms like Pub med, research article , Google Scholars, Journal of advance in medicines , Journal of sleep disorder and management.

RESULT AND DISCUSSION

The previous clinical researches on PCOD have showed that the prevalence of sleep apnea is higher among PCOD patients as compared to healthy people. [7]

PCOD women have seen with sleeping disorder such as lethargicness, Insomnia, Daytime sleep, obstructive sleep apnea. Due to poor sleep pattern the PCOD patient also suffer from various problems like metabolic related issue, anxiety, Eating disorder, obesity and cardiovascular diseases etc.[8]

Ayşe Filiz Gökmen Karasu (2021), investigated regarding chronotype and sleep quality assessment of patient with polycystic ovarian disease. The Nulliparous women diagnosed with PCOD and healthy controls without having any medical conditions participated in this study. Around 219 subjects have participated and 108 were in control group and 111 in uncontrolled group. The (PSOIQ- Pittsburgh sleep quality index questionnaire) and (MEQ- Morningness and Eveningness questionnaire) were used for the data collection. The result revealed that both of the group age is similar with each other ($p=0.24$) prevalence of Hirsutism was 33% and body mass index ($p=0.9$) sleep latency (<0.001) subjective sleep quality (<0.001) habitual sleep efficiency (0.003) sleep medication pills (0.03) among PCOD women and daytime dysfunction (<0.001). It was found that PCOD patients are more engaged to eveningness chronotype and have bad sleep quality compared to control group and have extra difficulty in falling asleep as compared to those without explicit hyperandrogenism.[9]

In a study conducted by Stacey L et al (2019), worked on morning circadian alignment is associated with insulin resistance in girls with obesity and polycystic ovarian disease. In the present study a group of 59 adolescent girl with PCOD and 33 girls from control group with obesity and no PCOD were taken. The result indicated that 112 and 21 years of age group girls were physically in active and have a high body mass index too , irregular menstrual cycle from past 2 years were recorded, also have high testosterone levels. Among those some of the PCOD subjects were treated with oral medications. Around 9 were given a onetime dose of short acting insulin GLP-1 agonist, 2 were given a metformin (200mg) for at least 6 months before laboratory tests.

Adolescent girls having PCOD had later clock of melatonin offset and also relative to sleep timings and longer secretion of melatonin than control subjects and high levels of testosterone and worse SI group. It was concluded that circadian misalignment in girls with PCOS is characterized by later melatonin offset relative to clock time and sleep timings and morning circadian misalignment was associated with metabolic deregulation in subject with PCOD and obesity and also found that adolescent girls with PCOD has sleep issue and daytime illness high BMI and high secretion of melatonin for longer duration as compared to control subjects. [10]

In a study conducted by Moran LJ et al (2014), assessed the sleep disturbances in a community-based sample of women with polycystic ovarian syndrome in Australia. In the present study a group of 724 women were taken. The anthropometric measurements, questionnaire related to their sleeping hours, working hours and lifestyle were used for finding the actual data of this research. The result revealed that the One third of women has not completed their high school at the age of 30 year. Out of 724 women (64%) of women were (married) ,(56%) of women have one child and (12%) were suffering from PCOD. 78% of women were recorded suffering from difficulty in sleep at night and 85% were reported never waking in morning and remain awake for short period of time. About 57% were not affected by waking early, 59% of women were suffering from drowsiness in daytime and about 78% were reported irritability or moodiness due to poor sleep pattern. It is concluded that the sleep disturbance were twice in women having PCOD and having not PCOD there is increasing in sleeping difficulty confidence interval is associated but still it is significant after calculating for the depressive symptoms and BMI.[11]

In a study conducted by Shreve N et al (2013), “titled” the poor sleep pattern of PCOD women. the present study was conducted in Southampton UK. Around 52% of women aged (18-40) years had participated and (71%) were diagnosed with PCOD by the procedure of ultrasound scanning 57% recorded having amenorrhoea or oligomenorrhoea. Out of them 2 patients were recorded having a complete amenorrhoea. It was found that there is not any significant difference of BMI values between the PCOD and the controlled groups and there is a significant difference in age when we compare the study group with the control group $p=0.04$ women suffering from PCOD have a higher percentage of difficulty in sleep or we called as less sleep duration as compared to the controlled group ($p=0.054$) women having PCOD. It was found that they are

more lethargic as compared to control group ($p < 0.05$) sleeping efficiency shown lower in PCOD group as compared to control ($p < 0.05$). Methods used in this study was the proper questionnaire given for a month and over a 24 hours of time period urine sample were collected about 3 days their sleep duration sleeping efficiency and morning waking have been monitored women suffering from PCOD had been elevated that they have night time urinary levels of metabolite 6 – sulfatoxymelatonin, melatonin and (8-OHdG ($P < 0.05$) and also seen the bad sleep quality ($p < 0.05$). It was concluded that the women suffering from PCOD have a poor sleep pattern and also difficulty in sleeping as compared to the normal women. [12]

Zangeneh Z et al (2014), investigated the less sleep hours and its effect on hormonal imbalance in women. In the present study 174 subjects were participated. Out of 174 (97) women were participated with PCOD infertile women and 77 were participated from controlled group. The result was collected by method of clinical and laboratory investigation, questionnaire and statistical analysis and the actual data revealed that the women in controlled group have more education as compared to PCOD group ($p < 0.001$), the menstrual irregularities were more in control group as compared to PCOD group and the symptom hirsutism showed more in PCOD women. Women with PCOD have lower melanin there is higher levels of adrenaline in women with PCOD. The hormone cortisol, melatonin and beta end showed normal distribution but adrenaline progesterone and non- adrenaline hormone were not showed normal distribution. The Percentage of women sleeping more than 8 hours ($p = 0.006$) in night and waking before the 7 am ($p = 0.408$) are same in both the group there is not any difference in control group women and PCOD women. The cortisol level more than 8 hours sleep was significantly less than women having not 8 hours of sleep. It was concluded that there is relationship between the sleep quality and neurohormones in women having PCOD and also shown that less sleep duration and bad sleep can affect the health of the women having PCOD and normal women also. [13]

Hassan K et al. (2017) conducted a study titled “Obstructive sleep apnea and polycystic ovarian disease : A comprehensive review of clinical interactions and underlying pathophysiology”. In the present study the researcher itself searches so many review papers from pub med and other websites by using the keywords obstructive sleep apnea and polycystic ovarian disease. There were so many clinical studies showed the presence of sleep apnea in PCOD women and most of the result was also critically appraised. As we know PCOD is an endocrine disorder whereas obstructive sleep apnea is also a common medical condition and associated with same expansion of co-morbidities to that observed in PCOD and including the expressions of metabolic syndrome also the data showed that obesity is common in both. Among those researches around 30-88% of women were found obese and overweight. Obesity can pass the development of PCOD though the increase of lipotoxicity and adiposity. The sex hormones insulin resistance, oxidative stress, Endothelial Dysfunction, Sympathetic activity all these imbalances in PCOD patients due to lack of sleep. So it is presumable that the relationship between PCOD and obstructive sleep apnea is bidirectional. PCOD pass to the growth of obstructive sleep apnea. And vice versa, Obstructive sleep apnea allows to the clinical presentation of PCOD and worsened its symptomatology and creating a cunning cycle between the two conditions. [14]

In a review paper titled “ Major sleep disorder among women “ by Sadeka Tamanna and Stephen A. Geraci (2013), The result was revealed that women have a higher rate of sleep disorder (insomnia, obstructive sleep apnea and restless leg syndrome) as compared to men and also have a complain of anxiety, depression and fatigueness and daytime illness. As we know that hormone plays an important role in sleep pattern. In US population around 41% of Women are recorded having a complain of insomnia and also a higher risk of cardiovascular diseases if Obstructive sleep apnea untreated for long. There were several treatment recommended medication like dopaminergic and PAP therapy and also advised to improve the levels of iron deficiency. 8 hours of sleep is essential for women to live a productive and functional life. [15]

Balachandran Kumarendran, Dana sumilio, Michael W O Reilly et al, (2019), conducted a study on increased risk of sleep apnea in women with polycystic ovarian syndrome: A population-based cohort study. In a present study around 76978 women with PCOD and 143077 BMI, Age without PCOD were taken. All of the women aged (18-50) years were participated in this study. Patient having obstructive sleep apnea were excluded from this study. The result was recorded through Statistical analysis the median age was 30 IQR 25-35 years median follow up .3.5 9 IQR 1.4-7.1) years. 298 cases of obstructive sleep apnea in PCOD women vs. 222 in control group and the rate of incidence for Obstructive sleep apnea is 8.1 and 3.1 per 10,000 person years. The women having PCOD are at higher risk of having obstructive sleep apnea (adjusted HR=2.26, 95% CI: 1.89-2.69 $P < 0.001$ with similar HRs for overweight, normal weight and obese for PCOD women. It was concluded that women with PCOD have higher risk of Obstructive sleep apnea as compared to control women. [16]

In a review article Mauli Vaishnav and Navoday Raju N.R (2020), concluded that there is an impact of ayurvedic techniques to improve the quality of sleep among PCOD women. The life of PCOD patient having

sleep issue can be improved by some of the ayurvedic interventions like Nidana Parivarjuna, Panchakarma, Shamana Chikitsa, Vamana, Virechana, Nashya Doshas, Abhyanga, Ashtanga Pranayam, Yogasana. [17] Halena Hachul, Daniel N, Polesel, Lucina Tack, Glauca Carneiro, Andrea Z. Periera et al, (2018), conducted a study on sleep disorder in polycystic ovarian disease: influence of obesity and hyperandrogenism. In the present study around 44 women were participated 14 healthy women and 30 women with PCOD and 14 had a hyperandrogenism. The Biochemical Parameters, clinical and polysomnographic methods were used to diagnose PCOD and hyperandrogenism also sleep quality questionnaire was made using validated polysomnography test. The result revealed that a higher BMI recorded in PCOD women ($F_{1,42}=36.404$; $p<0001$) as compared to control group women, (poor sleepers $p<0.01$) Obstructive sleep apnea ($p>0.05$) snorers ($P>0.05$). There was no difference seen in women having hyperandrogenism in comparison of without hyperandrogenism. It was concluded that hyperandrogenism did not have any effect on sleep related issue. The hypothesis has confirmed that sleep is basically effected by obesity. [18]

A study by Chris Kite, Lou Atkinson, Godon Mc Gregor, Cain C. T Clark et al, (2021), titled "Sleep disruption, depression, stress, and anxiety levels in women with polycystic ovarian disease during the lockdown measures for COVID-19 in UK". In the present study 333 women were participated. The researcher did the survey through online during the covid-19 lockdown. The questionnaire included COVID-19 relevant question and socio demographic profile as well as validated questionnaire Depression anxiety stress scale and Insomnia Severity Index. The result revealed based on ISI 44.2% of women have negative effect of sleep and quality of life and also recorded a higher stress level and depression compared to the former. It was concluded that in UK the majority of women suffering from PCOD recorded that COVID-19 had badly affected the sleep pattern, mental health, daytime illness due to COVID-19 pandemic. [19]

In a review article by Danielle Lee, Bishoy Kolta et. al, (2017), titled "Polycystic Ovarian Disease and Narcolepsy: A coincidental Relationship" investigated that there is not any relationship between PCOD and Narcolepsy well examined. The co-morbidities between two are common including Obstructive sleep apnea, obesity, excessive daytime sleepiness. Low levels of hypocretin levels as well as other hormonal abnormalities may be explain this copulation. It was concluded that the correlation between PCOD and narcolepsy can multi-factorial and complex. The researcher has explained that more studies should be done to assess the co-occurrence and prevalence of these two disorders.

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