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The Impact of Intermittent Fasting on Sleep Patterns and Disorders: An Overview

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Abstract:
Intermittent fasting (IF), a structured pattern of timed eating and fasting, has gained popularity for its metabolic and physiological benefits. Recent studies have explored the possible interactions between intermittent fasting and sleep, recognizing that the timing of food intake can influence the body's circadian rhythm. This review aims to examine the impact of intermittent fasting on sleep parameters such as sleep quality, duration, insomnia severity, and the risk of obstructive sleep apnea. By consolidating findings from controlled human trials, it highlights how intermittent fasting may contribute to improved sleep by promoting weight loss, hormonal regulation, and alignment with natural circadian cycles. However, the evidence remains mixed, with some studies showing minimal or no significant change in sleep outcomes. The review also emphasizes that while intermittent fasting may support better sleep through improved metabolic health and reduced inflammation, its effectiveness can vary among individuals. A deeper understanding of this interplay could aid in formulating dietary strategies that support both metabolic and sleep health. Further well-designed clinical trials are warranted to establish clearer causal relationships and practical applications.

Introduction:
Fasting , mealtime and sleep may interact with each other and can have impact in many young adults.[1] Intermittent fasting is an eating plan that alternates between periods of eating and fasting, in another term it is also a tradition that's has been seen in different practices by many societies around the world.[2]
Recently Intermittent fasting became very popular and has great effect to the physiological and metabolic health of young adults.[3] In recent times many studies have been speculated that intermittent fasting may improve sleep.[4] By restricting eating to specific time of the day, helping the body to stay in sync with its internal clock. This can lead to improve sleep quality, increased energy and better focus during the day. [5]
Even many studies have shown that the person who practice Intermittent fasting trend to have higher levels of growth hormone, which is produced during sleep and helps with fat burning, muscle restoration and cellular repair. As fasting has been associated to increased production of orexin-A, neurotransmitter that promote alertness during the day and helps to feel more rested at night. [6] However, it's proved that the timing of meal have an significant effect on sleep. Eating at irregular patterns or consuming heavy metals close to bed time can disrupt sleep patterns.

Method :
The literature search started with the following key words: **"sleep"**,**"sleeppatterns"**, **"sleep** quality", "sleep duration", "daytime **sleepiness"**, **"sleep efficiency"**, **"insomnia"**, **"sleep apnea"** , **"weight loss"**, **"body**

weight", "intermittent fasting","fasting","meal timing", "meal frequency", "meal type", "intermittent fasting type" , "5:2 diet", "16:8 diet", "clinical trial ", "circadian rhythm", "metabolic health" using **PubMed, clarivate** and **Google scholar.** The inclusion criteria for research article were as follows:[1]Adult participants both male and female [2]randomised or non- randomised controlled trial [3] End point that included changes in bodyweight, sleep patterns, metabolic health and circadian cycle . The exclusion criteria were applied as follows: [1] Cohort studies ,fasting that has been performed for short period of time [3] trial duration of less period of time. A total 150 studies were found. Out of those after examination of title, abstract and full text, finally 5 studies were included in this review.

1. Effect on sleep by changes in body weight:-

Alot of research evidence says that changes in body weight, particularly weight loss can significantly impact sleep quality. Time restricted fasting, a form of intermittent fasting found that eating in accordance with the body's natural circadian rhythms can improve cardio metabolic health which may also translate to better sleep quality.[7]

Linked of intermittent fasting to health benefits like reducing inflammation and oxidative stress helps in sleeps duration.[8]Weight loss can alleviate sleep apnea and snoring by reducing fat around the neckandthroat.[9]

Having BMI in normal range boost energy levels, making it easier to establish a consistent sleep schedule.[10]Excess weight can affect body temperature regulation which can lead to sweating at night. Losing weigh helps in regulating body temperature.[11]Excessiveweightgain brings discomfort that can disrupt sleep, losing weight helps to get rid of it.

Weight loss also helps people with any sleeping disease as it can improve lung function and reduce sleep apnea.[12] It also helps in regulating hormone that affect sleep, such as leptin and ghrelin.[13]

Although sleep improvement across individuals, weight loss may not always lead to better sleep, it's unable to eliminate sleep disorders such as insomnia or restless leg syndrome.[13]

2. Effect of Intermittent Fasting on sleep and problem related to sleep

- **Sleep quality:**

Effect of fasting on sleep quality was measured in some studies using Pittsburgh Sleep Quality Index (PSQI) over a month of time interval. It consisted of 24 questions total, among those 19 were individually answered questions. In some of those studies, the total PSQI score of >5 indicates poor sleep quality and <5 indicates good sleep quality. It was done by questioning before and after fasting. It was noticed that biochemical parameters and blood pressure changed during fasting. BMI and C-Reactive Protein decreased during fasting whereas blood glucose levels increased within normal limits. It evaluated that there was no such effect of intermittent fasting on lipid profile and sleep quality. [14]

In another study where Saedeh hosseini hooshiar et.al. investigated the effect of intermittent fasting intervention compared with daily caloric restriction on sleep quality an anthropometric indices. It evaluated sleep quality over 4 weeks. In this study 7 components of sleep with 19 items measured. Each component score has a range of 0 to 3, greater score indicated lower sleep quality.

Although the effect of intermittent fasting on sleep quality was limited.[15] Some other studies indicate IF has been shown to increase melatonin levels, which can help to regulate sleep wake cycle.[16]

- **Sleep duration:**

A study was conducted by Faiza Kalam et al. to evaluate the effect of alternate day fasting on sleep duration. No changes in sleep duration or timing during the Alternate Day Fasting – Low Carbohydrate (ADF-LC) intervention was found. However it should be noted that participants had a mean sleep

duration of 7h/night at baseline, which is close to the recommended 7h stipulated by the national sleep foundation. This evidence indicates that 7 to 8 hours of sleep per night is associated with better health and lower weight. Alternatively short time of sleep, poor quality and later bed times associated with higher food consumption and obesity.[4]

This study also suggested that overlay restricting eating window or late night hunger can disrupt sleep and shorten total sleep time.

- **Insomnia severity and the risk of obstructive sleep apnea:-**

Sofia cienfuegos, Kelsey gobal et.al conducted a study to compare the effects of 4h versus 6h time restricted fasting on insomnia severity and the risk of obstructive sleep apnea.

Participants with obesity were randomized into three groups. Those who were practicing 4 hours time restricted fasting, 6 hours time restricted fasting or a control group of no meal timing restrictions for 8 weeks. After 8 weeks body weight decreased ($p<0.001$). Insomnia severity did not change by 4h time restricted fasting or 6h time restricted fasting versus controls.

Participants also reported that obstructive sleep apnea symptoms have not changed. All those findings suggested that 4h and time restricted fasting have no effect on insomnia severity and the risk of obstructive sleep apnea.[17]

Another study was done to measure changes in insomnia severity. The ISI score indicates imperceptible insomnia at baseline. In good sleepers the ISI score indicated an absence of clinically significant insomnia and in poor sleepers the ISI indicated subthreshold insomnia. However those score was not statistically significant.[4]

In this study the risk of obstructive sleep apnea did not change during the trial. The percentage of subjects at risk for sleep apnea decreased numerically throughout the trial. Thus it suggest that intermittent fasting in combination with carbohydrate restriction may not decrease the risk of obstructive sleep apnea in adults with obesity.

Conclusions:

In conclusion, current scholarly findings suggest that intermittent fasting may influence various aspects of sleep among young adults. Some studies indicate improvements in sleep quality, sleep latency, and circadian rhythm regulation, potentially linked to better metabolic health and hormonal balance. However, the findings are not universally consistent, with some research neutral or even adverse effects were observed , depending on the type, timing, and duration of fasting. Additionally, variations in individual lifestyle stress levels, and chronotype may further mediate these outcomes. While intermittent fasting holds potential as a strategy to support sleep health in young adults, more comprehensive and controlled studies are needed to clarify its long-term effects and to identify the most effective fasting patterns for this population.

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