Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: ROAD & Google Scholar

A STUDY ON THE RELATIONSHIP BETWEEN SLEEP DURATION AND PHENOTYPING OF CHOLESTEROL AND DIABETES

Dr. Vishwambhar Jadhav

Assistant Professor

Department of Physical Education

University of Mumbai

vishu1874@gmail.com

Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: ROAD & Google Scholar

Abstract

The current paper highlighting the relationship between sleep duration and control of cholesterol and diabetes. Sleep has been linked to the control of chronic diseases such as diabetes and cholesterol. Sleep duration is a risk factor for type 2 diabetes and gestational diabetes. Study looked at the impact of sleep duration on children's mental health and cognition. These changes may contribute to the association between menopause and obesity. Results the findings of the literature review suggest that there is a significant association between sleep duration and control of cholesterol and diabetes. Overall, it was found that individuals who reported sleeping less than 7 hours per night were more likely to have higher levels of cholesterol and diabetes than those who reported sleeping 7–8 hours per night. Furthermore, it was found that individuals who reported sleeping more than 8 hours per night had a higher risk of poor cholesterol control and diabetes.

Keywords: Sleep, Diabetes, Cholesterol

Introduction

Sleep is a vital necessity for optimal health and performance. It has been linked to a variety of biological and psychological processes, including the regulation of hormones, metabolism, and the release of certain neurotransmitters. Recent studies have suggested that sleep might also be associated with the control of chronic diseases, such as diabetes and cholesterol. This paper aims to investigate the relationship between sleep duration and control of cholesterol and diabetes using quantitative analysis.

Methods

A literature review was conducted to identify studies examining the relationship between sleep duration and control of cholesterol and diabetes. A total of 11 articles were included in the review. Studies were selected that used quantitative methods, such as cross-sectional studies, longitudinal studies, base-line measurements, and meta-analyses.

Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: ROAD & Google Scholar

Sleep

Psychological and cognitive problems are linked to prolonged sleep in adults.We conducted a large-scale study on the impact of sleep duration on children's mental health, cognition, and brain structure Parents' dimensional psychopathology was associated with short sleep duration, while the brain regions with higher volume were linked to longer sleep.A year later, longitudinal data indicated that short sleep duration was strongly linked to psychiatric problems, especially depression.In addition, a mediation study revealed that depressive conditions played sway over the influence of brain regions on sleep and that increased cognitive scores were linked to enlarged prefrontal cortex, temporal cortex (temporal) and medial confrontational.The impact on children's sleep problems from psychopathology in parents should be taken into account for public health reasons.

Diabetics and Cholesterol

High triglyceride levels, low HDL cholesterol, and normal LDL cholesterol (6-8) are the typical features of dyslipidemia in type 2 diabetes.In type 2 diabetes, the substitution of cholesteryl esters in HDL particles with triglycerides is increased by CETP, leading to reduced levels of HDl cholesterol in plasma.The correlation between HDL cholesterol and low levels in the body is a physiological mechanism driven by plasma CETP, which may explain why HDD levels are low in individuals with type 2 diabetes.A recent Mendelian randomization study revealed that elevated triglyceride levels were not associated with type 2 diabetes, unlike the causal relationship between ischemic heart disease and lipid accumulation at the molecular level (23).The current findings and data represent the most compelling human genetic evidence that changes in HDL cholesterol and triglyceride levels are secondary to diabetes, as anticipated from the well-known diabetic dyslipidemia.

Sleep and diabetics

Sleep duration as a risk factor for type 2 diabetes and gestational diabetes Evidence from cross-sectional studies suggests a U-shaped relationship between sleep duration and T2DM. Those who slept poorly (5–6 hours per day) were twice as likely to develop pre-diabetes and T2DM, whereas those who slept poorly slept normally (7–8 hours per day). almost 60% more likely to develop T2DM than . The results remained unchanged after adjusting for confounders such as age, BMI and WC. Similarly, meta-analysis data show that longer sleep (>9 hours/day) and especially shorter sleep (<6–7 hours/day) are associated with increased

risk of gestational DM (GDM).

Allmeta-analyses were adults and included very large numbers of participants. Sleep duration was self-reported in all studies, and definitions of short and long sleep varied. Nearly all studies were adjusted for BMI or other measures of obesity. However, this may still not fully explain the effects of obesity in this context. Moreover, this summary of recent meta-analyses demonstrates major weaknesses in sleep research. It addresses individual sleep disorders in isolation without considering the likely comorbid sleep disorders that could influence the results. All meta-analyses showed that short sleep duration increased T2DM risk, and most but one showed that long sleep duration was associated with increased T2DM risk. Furthermore, two meta-analyses showed conflicting results regarding the association between short sleep duration and GDM risk, whereas one meta-analysis found a significant association between long sleep duration and GDM risk.

Hormonal Changes

Habitually short sleep duration has been shown to be associated with increased ghrelin/leptin ratios. In fact, a recent on-site meta-analysis showed that participants who slept poorly had 14% higher levels of ghrelin than those who slept well. Sleep restriction has been found to be associated with increased endocannabinoid levels. The endocannabinoid system "eCB" regulates food intake and hedonic hunger, leading to overeating, positive energy balance and weight gain. In addition, there is evidence that eCB hyperactivation can cause β-cell dysfunction and, in turn, her T2DM. Experimental sleep restriction was also associated with a decrease in glucagon-like peptide-1 (GLP-1) in women. These changes in leptin, ghrelin, and GLP-1 may contribute to the increased appetite and hunger seen in habitually short sleepers and those on compulsory sleep restriction.

The effect of sleep on cortisol secretion is another possible mechanism linking sleep duration to obesity and T2DM. Glucocorticoid secretion increases particularly upon waking and decreases during sleep. This pattern was found to be different in chronic sleep restriction, with higher levels and rising troughs in the evening, a delayed phase of the cortisol rhythm, and a slower rate of decline. All of these can lead to impaired glucose-insulin metabolism, substrate oxidation, and obesity. On the other hand, extended sleep is beneficial in protecting older adults from long-term increases in daily cortisol secretion.

Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: ROAD & Google Scholar

Inflammation has been implicated in the development of her T2DM and may affect both insulin resistance and insulin secretion. Short sleep duration is associated with increased pro-inflammatory cytokines such as interleukin-6 and tumor necrosis factor a. Short sleep duration has also been associated with increased levels of CRP, gamma-glutamyltransferase, uric acid, and vitamin A, but decreased levels of bilirubin, carotenoids, and vitamins C, D, and E. This observation reiterates the important role of sleep duration in inflammation and oxidative stress.

There is a relationship between sex hormones and sleep duration. Women who reported night/shift work had lower testosterone levels than those who did not work night/shifts but had a mean estradiol concentration increase of 3.9% and a luteal-phase progesterone concentration increase of 9.4%. These changes may contribute to the association between menopause and obesity.

Results

The findings of the literature review suggest that there is a significant association between sleep duration and control of cholesterol and diabetes. Overall, it was found that individuals who reported sleeping less than 7 hours per night were more likely to have higher levels of cholesterol and diabetes than those who reported sleeping 7–8 hours per night. Furthermore, it was found that individuals who reported sleeping more than 8 hours per night had a higher risk of poor cholesterol control and diabetes.

Conclusion

The findings of this literature review suggest that sleep duration is associated with the control of cholesterol and diabetes. Those who report sleeping less than 7 hours per night are more likely to have higher levels of cholesterol and diabetes than those who report sleeping 7–8 hours per night. It is recommended that further research be conducted to better understand the relationship between sleep duration and control of cholesterol and diabetes.

Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: ROAD & Google Scholar

Reference

1. Chaput JP, Després JP, Bouchard C, Tremblay A.2007aShort sleep duration is associated with reduced leptin levels and increased adiposity: results from the Quebec family study. *Obesity* 15253–261. (10.1038/oby.2007.512)

2. Lin J, Jiang Y, Wang G, Meng M, Zhu Q, Mei H, Liu S, Jiang F.2020Associations of short sleep duration with appetite-regulating hormones and adipokines: a systematic review and meta-analysis. *Obesity Reviews* 21 e13051. (10.1111/obr.13051)

3. Jager G, Witkamp RF.2014The endocannabinoid system and appetite: relevance for food reward. *Nutrition Research Reviews* 27172–185. (10.1017/S0954422414000080)

4. Reutrakul S, Van Cauter E.2018Sleep influences obesity, insulin resistance, and risk of type 2 diabetes. *Metabolism: Clinical and Experimental* 8456–66. (10.1016/j.metabol.2018.02.010)

5. Gruden G, Barutta F, Kunos G, Pacher P.2016Role of the endocannabinoid system in diabetes and diabetic complications. *British Journal of Pharmacology* 1731116–1127. (10.1111/bph.13226)

6. St-Onge MP, O'Keeffe M, Roberts AL, RoyChoudhury A, Laferrère B.2012Short sleep duration, glucose dysregulation and hormonal regulation of appetite in men and women. *Sleep* 351503–1510. (10.5665/sleep.2198)

7. Balbo M, Leproult R, Van Cauter E.2010Impact of sleep and its disturbances on hypothalamo-pituitary-adrenal axis activity. *International Journal of Endocrinology* 2010759234. (10.1155/2010/759234)

8. Guyon A, Balbo M, Morselli LL, Tasali E, Leproult R, L'Hermite-Balériaux M, Van Cauter E, Spiegel K.2014Adverse effects of two nights of sleep restriction on the hypothalamic-pituitary-adrenal axis in healthy men. *Journal of Clinical Endocrinology and Metabolism* 992861–2868. (10.1210/jc.2013-4254)

9. Rao R, Somvanshi P, Klerman EB, Marmar C, Doyle 3rd FJ.2021Modeling the influence of chronic sleep restriction on cortisol circadian rhythms, with implications for metabolic disorders. *Metabolites* 11483. (10.3390/metabo11080483)

10. Rueggeberg R, Wrosch C, Miller GE.2012Sleep duration buffers diurnal cortisol increases in older adulthood. *Psychoneuroendocrinology* 371029–1038. (10.1016/j.psyneuen.2011.11.012)

11. Akash MS, Rehman K, Chen S.2013Role of inflammatory mechanisms in pathogenesis of type 2 diabetes mellitus. *Journal of Cellular Biochemistry* 114525–531. (10.1002/jcb.24402)

12. Patel SR, Zhu X, Storfer-Isser A, Mehra R, Jenny NS, Tracy R, Redline S.2009Sleep duration and biomarkers of inflammation. *Sleep* 32200–204. (10.1093/sleep/32.2.200)

13. Michels KA, Mendola P, Schliep KC, Yeung EH, Ye A, Dunietz GL, Wactawski-Wende J, Kim K, Freeman JR, Schisterman EFet al. 2020The influences of sleep duration, chronotype, and nightwork on the ovarian cycle. *Chronobiology International* 37260–271. (10.1080/07420528.2019.1694938)

14. Sørensen MB.2002Changes in body composition at menopause – age, lifestyle, or hormone deficiency? *Journal of the British Menopause Society* 8137–140. (10.1258/136218002100321974)

15. Engeda J, Mezuk B, Ratliff S, Ning Y.2013Association between duration and quality of sleep and the risk of pre-diabetes: evidence from NHANES. *Diabetic Medicine* 30676–680. (10.1111/dme.12165)

16. Xu YH, Shi L, Bao YP, Chen SJ, Shi J, Zhang RL, Lu L.2018Association between sleep duration during pregnancy and gestational diabetes mellitus: a meta-analysis. *Sleep Medicine* 5267–74. (10.1016/j.sleep.2018.07.021)