

Fiber intake is inversely associated with the prevalence of circadian syndrome among adults attending NHANES 2005-2016

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It is well-known that many modern lifestyles, including the use of artificial light, shift work, irregular or short sleep, sedentary activity, and unhealthy diet can disrupt the circadian rhythm. This disruption can result in the so-called Circadian Syndrome (CircS) which has been identified as a risk factor for a variety of chronic diseases. The concept of Circadian Syndrome (CircS) was first proposed by Zimmet et al in 2019. CircS has been shown to be a better predictor for cardiovascular diseases (CVD) than the metabolic syndrome (MetS) in adults in China and USA ^{1,2}. Dietary patterns are found to be associated with CircS ³, whereby western dietary pattern was positively related, while prudent pattern was inversely associated, with CircS in the US adults. However, no prior study has investigated the association between fiber intake and CircS. We, thus, aimed to fill this research gap. We analysed data from 10,486 adults aged 20 years and above years who attended the 2005-2016 National Health and Nutrition Examination Survey (NHANES). Fiber and other nutrients intake were assessed using two days 24 hours recall. CircS was derived from all five components of MetS (i.e. central obesity, elevated fasting glucose, elevated triglyceride, reduced HDL-Cholesterol and elevated blood pressure), in addition to short sleep (sleep duration <6 hours/day) and depressive symptoms (PHQ-9 score ≥ 5). A cut-off for CircS was set as ≥ 4 components. Multivariable logistic regression was used to assess the association between fiber intake and CircS. Mean age of participants was 50.3(SD 17.6) years, and 41.3% had CircS. The mean (SD) fiber intake was 7.8 (2.1), 12.9 (1.3), 17.9 (1.7), and 28.9 (8.2) g/day across the quartiles of fiber intake. The prevalence of CircS decreased across quartiles of fiber intake (44.5% in Q4 and 37.1% in Q1). In the multivariable logistic model adjusting for age, gender, ethnicity, energy intake, education and lifestyle factors, across the quartiles of fiber intake, the odds ratios (ORs) (95%CI) for CircS were: 1.00, 0.91 (0.76-1.08), 0.82 (0.70-0.96), 0.79 (0.63-0.98) (p trend 0.012), respectively. No significant interactions were found between fiber intake and race, gender, smoking, alcohol drinking, and physical activity, in relation to CircS. In conclusion, a high fiber intake was associated with a lower prevalence of CircS among US adults. The findings highlight the importance of fiber intake for the prevention of metabolic and circadian syndrome, suggesting a potentially accessible and cost-effective lifestyle approach to improve public health. Our results underscore the concern that most of the US adults had fiber intake below the recommended level. Longitudinal studies are needed to validate the findings in different populations.

Keywords: fiber intake; circadian syndrome; NHANES; adults

Ethics Declaration

Yes

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References

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