

# Correlation between obesity and chronic kidney disease: is obstructive sleep apnea an interfering factor?

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## Dear editor

The increasing prevalence of obesity can be considered an alarming issue throughout the world.<sup>1</sup> In only 4 years, for example, the People's Republic of China has experienced an increase in the overweight population from 29.1% to 34.4%.<sup>2</sup> Therefore, we would like to congratulate Xu et al<sup>3</sup> for conducting an elegant study on a less explored topic: the accumulation of visceral fat in kidney disease. The rise in obesity may result, at least in part, from changes in lifestyle, currently characterized by sedentary, poor eating, and sleep habits. The reduction in sleep duration is known to predispose individuals to obesity by increasing the white adipose tissue deposits such as visceral fat.<sup>4,5</sup> Of note, obesity and visceral fat accumulation are etiopathological factors for both chronic kidney disease (CKD) and sleep disorders.<sup>6,7</sup>

A sleep disorder that is closely related to obesity and CKD is obstructive sleep apnea (OSA).<sup>8,9</sup> OSA is characterized by partial or complete obstruction of the pharyngeal airway during sleep, leading to repeated breathing pauses, oxygen desaturation, and arousals.<sup>10</sup> It is known that 70% of patients with OSA are overweight and have higher intra-abdominal visceral fat accumulation<sup>11</sup> and 40% of obese people have OSA.<sup>7</sup> In CKD, the situation may be worse as OSA affects up to 94% of these patients.<sup>12</sup> In obese people, the obstruction of pharyngeal airway becomes more frequent during sleep due to the local accumulation of fat in the neck region, which anatomically blocks the airways in the lying position.<sup>9</sup> In CKD, this occurs also due to the accumulation of body liquids and its shift to the neck region, which compresses the pharynx, leading to apneas.<sup>13</sup> It is important to consider that OSA and visceral fat accumulation represent risk factors for the development and progression of CKD.<sup>14</sup>

In this context, we believe that OSA screening in individuals with visceral fat accumulation can be very relevant to predict the decline in glomerular filtration rate. As indicated by the authors, visceral fat accumulation acts as a predictive factor for CKD; thus, evaluation of OSA may be relevant since it has been considered as a new risk factor for CKD. There are some questionnaires that evaluate sleep-disordered breathing risk subjectively, and, in addition, there is the polysomnography, the gold standard examination for diagnosis of OSA. In conclusion, we believe that implementing OSA screening in clinical practice when dealing with obesity and CKD is very important and may help future research in acquiring evidence for complementary therapeutic treatments based on sleep, since OSA can act as a possible aggravating factor in CKD.

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## Disclosure

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## References

1. McAllister EJ, Dhurandhar NV, Keith SW, et al. Ten putative contributors to the obesity epidemic. *Crit Rev Food Sci Nutr*. 2009;49(10):868–913.
2. WHO. Overweight (Body Mass Index  $\geq 25$ ) (Age-Standardized Estimate) Data by Country. China: WHO; 2014.
3. Xu X, Zhao Y, Zhao Z, et al. Correlation of visceral adiposity index with chronic kidney disease in the People's Republic of China: to rediscover the new clinical potential of an old indicator for visceral obesity. *Ther Clin Risk Manag*. 2016;12:489–494.
4. French S, Story M, Jeffery R. Environmental influences on eating and physical activity. *Annu Rev Public Health*. 2001;22:309–335.
5. Van Cauter E, Spiegel K, Tasali E, Leproult R. Metabolic consequences of sleep and sleep loss. *Sleep Med*. 2008;23:S28.
6. Rhee CM, Ahmadi SF, Kalantar-Zadeh K. The dual roles of obesity in chronic kidney disease: a review of the current literature. *Curr Opin Nephrol Hypertens*. 2016;25(3):208–216.
7. Schwartz AR, Susheel PP, Alison ML, Vsevolod P, Hartmut S, Philip LS. Obesity and obstructive sleep apnea. *Proc Am Thorac Soc*. 2008;5(2):185–192.
8. Vgontzas AN, Papanicolaou DA, Bixler EO, et al. Sleep apnea and daytime sleepiness and fatigue: relation to visceral obesity, insulin resistance and hypercytokinemia. *J Clin Endocrinol Metab*. 2000;85(3):1151–1158.
9. Shelton KE, Woodson H, Gay S, Suratt PM. Pharyngeal fat in obstructive sleep apnea. *Am Rev Respir Dis*. 1993;148(2):462–466.
10. AASM. International Classification of Sleep Disorders. Diagnostic and Coding Manual (ICSD-2). 2nd ed. Westchester, IL: American Academy of Sleep Medicine; 2007.
11. Kritikou I, Basta M, Tappouni R, et al. Sleep apnea and visceral adiposity in middle-aged male and female subjects. *Eur Respir J*. 2013;41(3):601–609.
12. Fleischmann G, Fillafer G, Mattereder H, Skrabal F, Kotanko P. Prevalence of chronic kidney disease in patients with suspected sleep apnoea. *Nephrol Dial Transplant*. 2010;25(1):181–186.
13. Elias RM, Chan CT, Paul N, et al. Relationship of pharyngeal water content and jugular volume with severity of obstructive sleep apnea in renal failure. *Nephrol Dial Transplant*. 2013;28(4):937–944.
14. Noori N, Hosseinpanah F, Nasiri AA, Azizi F. Comparison of overall obesity and abdominal adiposity in predicting chronic kidney disease incidence among adults. *J Ren Nutr*. 2009;19(3):228–237.

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