

Podcast of the *Journal of Clinical Sleep Medicine*

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Welcome to the regular podcast of the *Journal of Clinical Sleep Medicine*. I am Dr. Stuart Quan, editor of the *Journal*. These podcasts are a regular feature of each issue of the *Journal* and can be downloaded at the *Journal's* website. Each podcast features summaries of important articles published in the current issue of the *Journal*, as well as occasional interviews with authors of these papers.

The first paper to be highlighted in this podcast is entitled, "Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea," by Dr. Stuart Quan and colleagues from the Brigham & Women's Hospital, Boston, MA, Arizona Respiratory Center, University of Arizona, Tucson, AZ, Stanford University, Stanford, CA, Providence St. Mary Medical Center, Walla Walla, WA, St. Luke's Hospital, Chesterfield, MO, and the VA-Boston Healthcare System, Boston, MA. There is a tight linkage between changes in weight and severity of obstructive sleep apnea. Evidence suggests that increase in weight leads to worsening or development of sleep apnea, whereas reductions in weight can lead to significant improvement or remission of the disease. Moreover, there is also evidence that obstructive sleep apnea by itself can facilitate weight gain. If this is true, treatment of obstructive sleep apnea should result in weight reduction. Whether, in fact this occurs is unclear. Some studies indicate that treatment of obstructive sleep apnea with CPAP leads to a reduction in weight while other studies indicate that weight reduction does not occur or weight even increases. However, there have been few randomized, controlled trials trying to assess whether treatment of obstructive sleep apnea with CPAP does, in fact, lead to changes in weight. This study is a secondary analysis of data from the "Apnea Positive Pressure Long-Term Efficacy Study," otherwise known as APPLES. APPLES is a randomized, controlled clinical trial of active CPAP versus sham for six months to determine whether CPAP has any impact in neurocognitive outcomes in obstructive sleep apnea. As part of this study, participants were weighed at every clinic visit. Therefore, this study offers the possibility to determine whether individuals treated with CPAP have any change in weight in comparison to their sham counterparts. There were 1,105 participants from the five participating centers who were initially randomized to active or sham CPAP. However, a number of participants were excluded from this analysis because of missing measurements of body weight either during the baseline examination or after six months. Therefore, there were 812 participants that were analyzable. 387 had been randomized to sham CPAP and 425 to active CPAP. There were no differences in baseline weight,

height, gender, race, apnea-hypopnea index or Epworth Sleepiness Scale between the groups. The participants generally were middle-aged, Caucasian, male and overweight or obese. They had moderate to severe obstructive sleep apnea, with an apnea-hypopnea index in both the sham and active groups of 40.5 events per hour. The results of the study showed that the mean change in weight for those who used CPAP for six months was 0.35 kg weight gain in comparison to those who were randomized to sham CPAP who lost 0.71 kg. Thus, the participants who received CPAP gained weight over the course of the study and those who received sham actually lost weight. When participants were stratified as to whether they used CPAP or sham for more than four hours per night on at least 70% of nights, those who received CPAP gained on average 1 kg of weight over six months. In contrast, those who received sham CPAP or were non-compliant to CPAP did not have any significant weight changes, or actually lost a slight amount of weight. In a regression analysis, each hour of CPAP use per night was associated with an average 0.42 kg increase in weight over six months. Therefore, it appears that contrary to perhaps popular belief, treatment with CPAP of patients with obstructive sleep apnea facilitates weight gain and not weight loss. The reason for this finding is not entirely clear. However, one possible explanation relates to changes in the energy cost of breathing at night in those who received CPAP. It is possible that when individuals have significant obstructive sleep apnea, the energy cost of breathing at night is quite high. After treatment with CPAP, these energy costs decrease but their caloric consumption may not change. If this was to occur and there was no commensurate increase in physical activity, a weight increase would result. Therefore, irrespective of the mechanism that is producing the weight increase, patients who receive CPAP for treatment of their obstructive sleep apnea should not be counseled that weight reduction will automatically occur without definitive measures to also reduce caloric consumption or increase physical activity.

In an accompanying editorial, Dr. Barbara Phillips and Dr. Nitin Dahon emphasize that if weight reduction is chosen as a treatment option for individuals with obstructive sleep apnea, a defined plan for weight reduction needs to be outlined for the patient, including specific referrals, target weight goals and careful follow up.

The next paper to be discussed in this podcast is entitled, "Mortality of Patients with Obstructive Sleep Apnea in Korea," by Dr. Ji-Eun Lee and colleagues from the Departments of Otolaryngology, Chosun University Hospital, Gwang-Ju,

Seoul National University, Bundang Hospital, Seongnam, Seoul National University College of Medicine, Seoul, Department of Psychiatry, Seoul National University Bundang Hospital, Seongnam, Korea. A number of longitudinal cohort studies have indicated that obstructive sleep apnea is a risk factor for premature mortality. However, most of these studies have been performed in either North America or Western European countries. Few of the cohorts have contained any significant number of Asians. This is important because risk factors for Asians related to obstructive sleep apnea are different than in Caucasians. Thus, this observational cohort study was performed to determine whether obstructive sleep apnea is a risk factor for premature mortality in an Asian population recruited from a sleep clinic in Korea. The results of the study showed that there were 2,240 subjects, of whom 1,669 were men and 571 were women. 735 were treated with CPAP, a mandibular advancement device or surgery. The others were not treated. After adjustment for age, sex, body-mass index, diabetes, hypertension, pre-existing cardiovascular disease and previous history of stroke, increasing severity of obstructive sleep apnea was significantly associated with increased mortality. The adjusted hazard ratio for severe OSA defined as an apnea-hypopnea greater than 30, versus no OSA was 2.47 and the adjusted hazard ratio for cardiovascular mortality was 4.66. After adjusting for whether individuals were treated or not, the all-cause and cardiovascular mortalities were attenuated to 2.14 and 4.19, which were of borderline statistical significance. These data indicate that severe obstructive sleep apnea is a risk factor for all-cause and cardiovascular mortality in an Asian population. Furthermore, they also suggest treatment of obstructive sleep apnea may confer survival benefits. These data add to the increasing evidence that obstructive sleep apnea is a significant risk factor for both all-cause and cardiovascular mortality.

The final study to be discussed in this podcast is entitled, "The Association between Sleep Duration and Self-Rated Health in the Korean General Population," by Dr. Jae-Hyun Kim

and colleagues from the Department of Public Health, Yonsei University College of Medicine, Institute of Health Services Research, Yonsei University, Department of Psychiatry, Yonsei University College of Medicine, and the Department of Preventative Medicine, Yonsei University College of Medicine, Seoul, Korea. Short and long sleep duration are increasingly implicated as risk factors for a variety of chronic diseases, such as hypertension, diabetes and heart disease. However, there is relatively little data examining the relationship between sleep duration and self-rated health in the general population, especially amongst Asians. This study utilized data from 15,252 participants in the Korea National Health and Nutrition Examination Survey Four between 2007 and 2009. All participants were aged 19 years or older. Self-reported sleep duration was categorized as less than five, six, seven, eight, or greater than nine hours per night. As part of this survey, participants self-rated their health status. The investigators found that both short, less than five hours, and long, greater than nine hours of sleep, was associated with poor self-rated health, which was independent of socio-demographic, health risk and health status variables. In comparison to seven hours of sleep duration, a multivariate analysis showed that short sleep duration was associated with a 1.358 times higher risk of self-reported poor health and that long sleep duration was associated with a 1.322 times higher risk of reporting poor health. These findings were generally consistent across sub-groups of gender, age and body-mass index. These data add to the increasing evidence that extremes of sleep duration are associated with adverse health outcomes. Whether or not sleep duration is the primary cause of these adverse health outcomes or serves as a surrogate for another factor that is producing poor health or increasing risk for chronic diseases is unclear. Further research in this area is needed.

This concludes the regular podcast of the *Journal of Clinical Sleep Medicine*. The listener is encouraged to read the contents of the *Journal* for additional information regarding each of the articles summarized in this podcast, as well as other papers published in this issue of the *Journal*.