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Employees' Sleep Duration and Body Mass Index: Potential Pathways and Confounders

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Objective: Productivity losses are associated with both employees' sleep and weight problems. Addressing these issues independently may be complicated by a potential link between sleep duration and weight. The mixed results of prior studies, both supporting and refuting an association between sleep duration and weight, may have been subject to missing variable bias. To clarify future strategies for workplace health promotion, possible confounders to the relationship between employees' sleep duration and weight were investigated.

Method: Cross-sectional data from the 2007 EADS/Augsburg (Germany) cohort follow-up study (n=1,163) was used in the analysis. Weight and height were measured onsite by trained staff. Sleep duration was self-reported for workday and non-workday sleep. Multivariate models were used to explore the relationship between self-reported average sleep duration, operationalized over the whole week, and body mass index (BMI) by sequentially adding blocks of demographic (age, gender, marital status), health behavior (alcohol consumption, smoking, physical activity), work status (shift work status, work position), physical health (self-rated health, hypertension, diabetes mellitus), snoring, and emotional status (stress index, HADS depression scale) variables.

Results: The relationship between average sleep duration and BMI was significant ($\beta_{st}=-0.058$, $p=0.041$) when demographic, health behavior, and work status variables were included. When physical health and emotional status variables were added, the significant relationship between sleep duration and BMI did not persist. In the final multivariate regression model, being male ($\beta_{st}=-0.186$, $p<0.001$), being married ($\beta_{st}=0.140$, $p<0.001$), less frequent alcohol consumption ($\beta_{st}=-0.091$, $p=0.001$), greater snoring ($\beta_{st}=0.215$, $p<0.001$), medically treated hypertension ($\beta_{st}=0.123$, $p<0.001$) and lower self-rated health ($\beta_{st}=0.072$, $p=0.012$), were significantly associated with higher BMI. Among the work status variables, process owners were significantly associated with lower BMI ($\beta_{st}=-0.114$, $p=0.010$). Including emotional status variables did not add significantly to the explanatory power of the multivariate model.

Conclusion: Our results emphasize the role of socioeconomic status, general health status and snoring as confounders to the relationship between sleep duration and body weight. Snoring may be an indicator for weight-related obstructive sleep apnea, an underdiagnosed condition in Germany. Some of the identified confounders have been overlooked in previous research investigating the link between sleep and weight. The relationship between employees' sleep duration and weight, if present, may involve several pathways and potential confounders that should be taken into account when designing workplace health promotion programs.