BACKGROUND

- The demands of a 24-hour service and globalized society have led to an increase in long working hours. This trend has been accompanied by a corresponding rise in sleep disorders.\(^1\)\(^,\)\(^2\) Subsequently, sedative-tquirants have been reported as the third most misused drug class in the U.S.\(^2\)
- Also, it is common practice to use medications, including prescribed and controlled medicines, for their side effects, such as sedating effects, and for recreational purposes.\(^3\)\(^,\)\(^4\) Hence, the use of medications with secondary sedating side effects, such as pain medications, anti-histaminic drugs, and anti-depressants, has increased.\(^5\) There has been a significant increase in benzodiazepine-related overdose mortality by over 400\% between 1999 and 2013.\(^6\)
- The prevalence of long working hours in the U.S. working population is expected to lead to a continuous increase in the use of sleep aid medications in this population with other associated substance abuse to aid sleep.
- However, despite the availability of studies highlighting the relationship between long working hours and the consumption of alcohol,\(^6,\)\(^7\) the relationship between long working hours and the use of sleep aid medications has rarely been examined.

OBJECTIVES

- The key objective of this study was to characterize the relationship between working hours on the use of sleep aids and medications with sedative properties.

METHODS

- We utilized the 2010-2019 Medical Expenditure Panel Survey (MEPS) data from the University of Minnesota's Integrated Public Use Microdata Series (IPUMS)\(^8\) to the Anderson healthcare utilization model for conceptualizing our research questions.\(^9\)
- Sleep aids and medications with sedation as a side effect were identified. Also, medications with sedation as a side effect were identified using Wolters Kluwer’s Facts and Comparison.\(^10\)
- We used exploratory, descriptive statistics to examine the distribution of independent variables. We examined the frequency distributions of our study’s participant categorical variables. The continuous variables’ means, standard deviation, median, and interquartile ranges were also assessed. This was followed by examining the distribution of the participant characteristics across both dependent variables (use of sleep aids and use of medications with sedative properties) using the Chi-square test.
- Furthermore, we employed different regression models ranging from multivariable linear regression, Tobit regression, Heckman regression, and multivariable logistic regression to ensure consistency, robustness, and reliability of associations between working hours and the use of medications.

RESULTS

<table>
<thead>
<tr>
<th>Variables</th>
<th>Linear Regression</th>
<th>Tobit Marginal Effect</th>
<th>Adjusted Logit Odds Ratio</th>
<th>Logit Marginal Effect</th>
<th>Linear Regression Among Medication Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work hours/week – Use of Prescription Sleep Aids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 56 h/week</td>
<td>0.046***</td>
<td>0.065*</td>
<td>1.126*</td>
<td>0.007*</td>
<td>0.370**</td>
</tr>
<tr>
<td></td>
<td>(0.021, 0.070)</td>
<td>(0.015, 0.114)</td>
<td>(1.008, 1.258)</td>
<td>(0.000, 0.014)</td>
<td>(0.128, 0.611)</td>
</tr>
<tr>
<td>Work hours/week – Use of Prescription Medications with Sedative Properties</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 56 h/week</td>
<td>0.186***</td>
<td>0.114***</td>
<td>1.094**</td>
<td>0.020**</td>
<td>0.347***</td>
</tr>
<tr>
<td></td>
<td>(0.119, 0.253)</td>
<td>(0.065, 0.163)</td>
<td>(1.032, 1.160)</td>
<td>(0.007, 0.033)</td>
<td>(0.187, 0.506)</td>
</tr>
</tbody>
</table>

CONCLUSION

- Working 56 hours or more per week was significantly associated (p < 0.05) with an increased odds of using sleep aids and medications with sedative properties by 13% (Adjusted Odds Ratio, aOR = 1.13, 95% Confidence Interval, CI=1.01:1.26) and 9% (aOR=1.09, 95% CI=1.03:1.16), respectively more than that among those who worked fewer hours.
- This is similar to the risk of the onset of risky alcohol use for persons working 55 hours or more per week at 12%.\(^6\)
- Compared to males, females were 11% (aOR=1.11, 95% CI=1.05:1.19) more likely to use prescription sleep aids.
- Professional services had the highest likelihood (aOR=3.13, 95% CI=1.14:1.50) of using sleep medications.
- Sleep medications have been linked with increased mortality.\(^11,\)\(^12\)
- The chronic use of sleep aids increases the risk of cognitive and psychomotor impairments, car and workplace accidents, and addiction.\(^13,\)\(^14\)
- Also, the residual effects of sleep medications and their resultant effects present safety risks to the workers that use them and the public.

REFERENCES

- Demetra Antimisiaris, PharmD, FASCP
- Emmanuel Ezekekwu, BPharm, MHA, PhD(c)
- Christopher Johnson, PhD
- Seyed Karimi, PhD
- Demetra Antimisiaris, PharmD, FASCP
- Doug Lorenz, PhD

School of Public Health
University of Louisville