

学位論文の要旨

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学位論文名 Relationship Between Insomnia With Alcohol Drinking Before Sleep (Ne-Zake) or in the Morning (Mukae-Zake) Among Japanese Farmers

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論文内容の要旨

INTRODUCTION

Sleep is a restorative physiologic phenomenon that is essential for maintaining a healthy physical and mental condition; thus, impaired sleep could have a significant negative impact on health. Insomnia has been reported to increase the risk of not only physical diseases but also psychiatric disorders, leading to subsequent morbidity and mortality and a decline in the quality of life. Hence, insomnia is an important issue not only from a clinical perspective, but also in view of public health. It is well known that alcohol affects physiological functioning during sleep and daytime alertness, and has been associated with sleep disorders. Nonetheless, alcohol is often used as a self-treatment for sleeplessness in the general population as it is perceived to be a convenient, cost-effective, low-risk hypnotic. Previous studies have reported that the general population used alcohol as a self-treatment for sleeplessness widely. In Japan, alcohol is occasionally used before sleeping (Ne-Zake), for helping to fall asleep and sleep well, or in the morning (Mukae-Zake), for “calming down” or “curing hangovers”. Although many studies have investigated the association of alcohol consumption with sleep disorders, to the best of our knowledge, there has been no study to evaluate the effect of both Ne-Zake and Mukae-Zake on sleep disorders. The purpose of this study was to examine the relationship of insomnia with Ne-Zake and Mukae-Zake among healthy farmers in a prefecture in Japan, while adjusting for the influence of the quantity and frequency of alcohol consumption on the relationship.

MATERIALS AND METHODS

This cross-sectional study was conducted by agriculture workers aged 21 to 87 years who underwent the annual medical checkups and lifestyle questionnaires provided by the Health Promotion and Health Checkup Center, Japan Agriculture (JA) -Shimane, in Shimane prefecture, Japan, between June 2017 and March 2018. Insomnia was evaluated using the Japanese version of the Athens Insomnia Scale (AIS-J), which is a globally widely used, authorized, and validated questionnaire regarding insomnia and insomnia-related symptoms in the previous month. Alcohol consumption was evaluated by quantity and frequency from a self-reporting questionnaire in the Japanese specific health check-up, which was supplied by the Ministry of Health, Labor and Welfare, Japan. Ne-Zake is defined as alcohol consumption before sleep for helping to fall asleep and sleep well, and was detected by a question from the nationwide survey on smoking behavior and exposure to passive smoking among Japanese adults. Mukae-Zake is defined as alcohol consumption in the morning for “calming down” or “curing hangovers” and was detected by a question from the CAGE questionnaire, which is widely used to identify alcoholism. Multivariable logistic regression models were prepared to calculate the odds ratios (ORs) and 95% confidence intervals (95% CIs) of insomnia associated with Ne-Zake and Mukae-Zake, adjusted for age, sex, presence of sleep-related diseases, frequency of alcohol consumption, and quantity of alcohol consumed per one occasion. Statistical analyses were performed using STATA version 16.0 (StataCorp LP, College Station, Texas, United States). Two-tailed *p* values less than 0.05 were considered statistically significant. The study protocol was approved by the Ethics Committee of Shimane University.

RESULTS AND DISCUSSION

Among 1,072 agriculture workers, 986 agreed to participate in the survey (participation rate, 92.0%). After the exclusion of those who were not engaged in actual agriculture work (*n*=70), and those with incomplete or inappropriately filled questionnaires (*n*=170), a total of 746 participants were included in the analysis (mean age, 59.5 ± 14.4 years; women, 25.9%). We observed insomnia, Ne-Zake, and Mukae-Zake in 174 (23.3%), 140 (18.8%), and 37 (5.0%) participants, respectively. Compared to those without Ne-Zake, participants with Ne-Zake had a significantly higher prevalence of insomnia (OR 2.00, 95% CI 1.27-3.16, *p*<0.001), and Mukae-Zake also had a significantly higher prevalence of insomnia (OR 3.26, 95% CI 1.55-6.87, *p*<0.001) among male participants, compared to those without Mukae-Zake, adjusting for demographic and confounding factors. In the stratified analysis on Ne-Zake by sex, women had a trend to have more insomnia among those who did Ne-Zake; the OR for insomnia was greater among women (OR 4.26, 95% CI 1.07-16.8) than men (OR 1.88, 95% CI 1.14-3.09), but there was no sex difference for insomnia among those who did Ne-Zake, as the interaction *p* value for Ne-Zake and sex was not statistically significant (*p* for interaction=0.09). Among 746

participants, 114 did only Ne-Zake (15.3%), 11 did only Mukae-Zake (1.5%), and 26 did both Ne-Zake and Mukae-Zake (3.5%). The multivariable logistic regression models revealed that, compared with those with neither Ne-Zake nor Mukae-Zake, participants with both of them had a highly significant association with insomnia (OR 4.77, 95%CI 2.01-11.3, $p=0.001$), and the association of Mukae-Zake for insomnia was more pronounced than that of Ne-Zake (OR 4.09, 95% CI 1.14-14.7, $p=0.031$; and OR 1.81, 95% CI 1.08-3.06, $p=0.026$, respectively).

Our results of prevalence of Ne-Zake among Japanese middle-aged farmers, which was 18.8%, is consistent with that from a previous report in ten countries, which were Austria, Belgium, Brazil, China, Germany, Japan, Portugal, Slovakia, South Africa, and Spain (19.4%), but larger than several previous reports from the United States (10 to 13%). Hypnotic medicines are not as popular in Japan as in the United States, and more people generally are thought to believe that alcohol is an effective sleep aid. Compared with a previous study from Japan, the prevalence of alcohol use as a sleep aid in the present study was lower. The reason is thought to be that farmers generally start working earlier in the morning than office workers, so that they might not have Ne-Zake as frequently as the general population.

We found the association of Mukae-Zake with insomnia was stronger than that of Ne-Zake. The exact mechanism of the association between Mukae-Zake and insomnia remains unclear, but people who do Mukae-Zake are considered to have a high likelihood of developing alcohol dependence, and individuals with alcohol dependence more commonly experience sleep problems than those without. The mechanisms of the association of Ne-Zake with insomnia is thought that alcohol consumption before bedtime reduced the sleep onset latency, which makes it easier to fall asleep. In addition, gastric irritation, headache, and a full bladder may disturb sleep.

In the present study, women had a trend to have insomnia associated with Ne-Zake compared with men but there was statistically no sex difference. There are some previous reports which showed sex differences in alcohol effects but there are some which did not. Although this study supported the latter perspective, this issue needs further investigations and discussions.

CONCLUSION

To the best of our knowledge, this is the first report that indicates the association of insomnia with both Ne-Zake and Mukae-Zake independent of the quantity and frequency of alcohol consumption. People with insomnia are more likely to use alcohol as a sleep aid; however, as their sleep continuity gets worse over time, they might eventually develop alcohol dependence and mental diseases, which possibly make their insomnia much worse. This finding can be used for stratifying individuals with insomnia not only to improve sleep hygiene but also to prevent alcohol dependence by informing the general population that alcohol has a negative effect on sleep, contrary to popular beliefs.