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Short Communication

Sleep Disorders and Insomnia: Effects on a Young Population

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Abstract

Sleep and lifestyles interact to allow the appropriate development of cerebral structures, and prevention of many brain disorders like insomnia. But just a hand of articles identified an accurate relationship between these two major parameters above, and nobody makes a statement on who come first between sleeps disorders and insomnia. The aim of this study is to explore how insomnia is associated in simultaneous with sleep components, psychological stress, depression, anxiety, well-being, addiction and global health of participants; and if it is also influenced by the sociodemographic profile of each subject. The present study was led by the questionnaire Mental Health Profile of Etindele (MHPE) incorporating McNair test, and an incorporated score to evaluate insomnia, and nine other sections related to the clinical parameters cited above. Our results showed that the stress levels and well-being are comparable according to gender. Specifically, the results showed that lack of sleep combined with a low global score to MHPE is strongly correlated with insomnia, while score of memory and attention decreased. Insomnia is closely linked with sleep parameters and physical activity which decreased accordingly, and the family's history of medication.

Keywords: *Young Adults; Sleep; Brain Disorders; Insomnia; Physical Activity*

Introduction

Insomnia is a phenomenon which can appear at every stage of life, from youthness to elderly. Through the whole life, brain is particularly influenced by, social and psychological interplay between the body and his environment. This process strongly affects the development of both peripheral and central nervous system [1]. Of course, the majority of brain disorders are caused by a failure in one or many of the neuronal circuitry or normal neurobiology. As a consequence of these dysfunction, insomnia appears and become pathologic or persistent, even without any medication, or external factors like stress or mental illness [2-5]. A healthy lifestyle with physical activities may ensure a healthy brain, and an excellent shield against central nervous system failure and cognitive disabilities [6,7].

Epidemiologic data reported that, central nervous connections are modulated by the game of stimuli-response, play continuously by both nature and human [8], and these modulations increase the risk to develop neurodegenerative diseases as well as mood diseases, and also insomnia [9]. Young adults (between eighteen years old until thirty years old) are because of that, more expose to the risk to develop anxiety and psychiatric disorders [1,10]. Until now, no final therapy exists for mood disorders, but prevention of risk factors and promotions of good lifestyle are important because, insomnia and brain disorders are not easy to identify. Physical activity, non-usage of drugs and sleep quality may help to decrease insomnia for young adults' population (YA), compared with a midlife and elderly population [11,12]. Many other studies focused on risk factors like sociodemographic pattern of economic fluctuations, obesity, usage of drugs or family history of previous traumatic events in life; known to increase mental disorders and associated psychopathologies [9,13-15]. But

to our knowledge, just a hand of studies showed an accurate relation between combinations of non-psychological and non-environmental factors in insomnia for YA [5,16-19]. The current research seeks to exhibit incidence of insomnia of the complex combination of the following factors: sleep parameters, mood disorders parameters and general health status of our subjects.

Materials and Methods

Ethics committee

The current research was approved beforehand, by the ethic committee of research of the faculty of arts and science of the University of Montreal, Canada. All our subjects were volunteers and signed a consenting form.

Population's Criteria

Sociodemographic and clinical raw data of age, drugs associated with insomnia, gender, education, medical history of the participant's family, memory deficiency and cognitive complaints were collected with the MHPE questionnaire. This questionnaire was used in many previous studies, and it is really accurate and sensitive to detects each parameter it measured. Current and history of medications were classified as medications of musculoskeletal, neurological, respiratory or cardiovascular disease. Other treatments were grouped into antibiotics, anxiolytics, protein drinks, acupuncture, hypnosis, sleeping pills and anti-inflammatory. McNair scale was calculated using the short version of 15 items. Subjects aged more than 40 years old, enabled to complete experiments and speaking other languages than English and French were excluded from analysis. This proportion was around 32 participants.

Insomnia and Sleep Parameters

Sleep impairments and quality were authenticated with seven items; sleep duration, use of sleeping pills, history of medication, duration of medication, beginning of sleeping disorders, sleep quality ranged from 1 "very bad" to 5 "very well" and the difficulty of falling asleep from 1" None" to 4 "very difficult". 600 respondents were assessed in subjective insomnia using our questionnaire. The self-report for assessing insomnia included 20 items (scored from 0 "never or not applicable" to 4 "very often"). We determined then the insomnia over the global score ranging from 0 (no insomnia) to 60 (chronic insomnia). Scores between 25 and 45 points were considered indicative of normal/classic insomnia, and over 45 until 60 was categorized chronic insomnia.

Statistical Analysis

The distribution of insomnia measures was normal, and tested with the Kolmogorov-Smirnov's test. To analyse McNair test answers, scores were converted to a dichotomous variable, individuals with a score fewer than 15 were scored "No cognitive complaints "vs whose score is more than or equal to 15 were scored "Presence of cognitive complaints". Spearman rank was employed to analyse the relationship between the continuous variables general health, stress, dependency, well-being and McNair score. Mann-Whitney's non-parametric test for independent samples was used to compare McNair score as a continuous variable between two groups. Kruskal Wallis test was used for comparing McNair score for more than two groups. Logistic regression was applied to study the relationships between insomnia scale as a dependent variable, and all the other parameters as independent variables. Statistical tests used an alpha of 0.05 as a level of significance. Odds ratios were calculated for sleep parameters. Test-retest and internal consistency analyses were performed to identify the reliability of the questionnaire MHPE. Cronbach alpha value was considered excellent for above 0.80. Intraclass Correlation Coefficient (ICC) (95% confidence interval) was used for test-retest value and Cronbach alpha was used for internal consistency measure, ICC value 0.70 and above were accepted as a high level of correlation. Construct validity of the MHPE was assessed by factor analysis and convergent validity of the questionnaire was determined to use the Pearson correlation coefficient method after total scores obtained from McNair scale, Hopital Anxiety and Depression Scale (HADS), and Columbia Suicide Severity Rating (C-SSRS). For the Pearson correlation coefficient, 0.87 to 1.00, 0.81 to 1.00, 0.41 to 0.60, 0.21 to 0.40, and 0.10 to 0.20 were considered to be respectively: excellent, very good, good, poor, and no correlation. Data analysis was performed using PRISM (GraphPad Prism, version 7.0.0.159, graph pad software) and the statistic software R.

Results

600 subjects were used in the study. The response to the questionnaire was maximum. 78% of the sample was aged between 18 and 24 years, a significant proportion. One of the properties of the present research is, compared to many previous papers, a good representative population was recruited to study the impact of clinical and lifestyle factors in insomnia between adults, mainly younger adults. Women represented 57% of the sample. Majority of the respondents were undergraduate students (68%).

Insomnia and Clinical Parameters

Looking deeply the family history's disease, 23% (n = 138) suffered from cardiovascular disease and 12% (n = 72) suffered from neurologic disease. 64% (n = 384) of them, have family members with insomnia and 35% (n = 541) suffered from Alzheimer. 8% (n = 48) of respondents were treated from cardiovascular disease, 18% (n = 108) suffered from musculoskeletal disease, 15% (n = 90) used medication for neurologic disease and 3% (n = 18) has a lung impairment. All clinical parameters were associated with insomnia ($p < 0.0001$, Kruskal Wallis test) except for the usage of drugs or memory impairment ($p = 0.735$, U Mann-Whitney's test). The analysis of depression and anxiety showed that 69% (n = 414) of the participants has a depression but 16% (n = 96) has an anxiety. The average well-being score was 19 ± 0.8 (SD) with a good correlation with McNair score ($p < 0.0001$, spearman rank). The mean dependency score was 17.45 ± 0.58 (SD), based on Spearman rank it's associated with McNair score ($p = 0.00089$). However, as shown by the Figure 1, there was no correlation between general health score, stress score and McNair score ($p = 0.362$, $p = 0.382$ respectively with Spearman rank test).

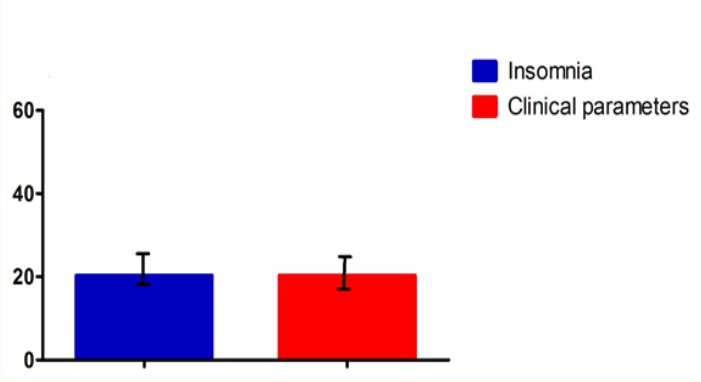

Figure 1: *Insomnia and Clinical Parameters.*

Association between Insomnia and Sleep Parameters

Figure 2 shows a strong correlation between insomnia and sleep parameters except for the beginning of sleep disturbances ($p = 0,386$, U Mann Whitney test). Figure 2 showed that this association would persist even when we considered all sleep parameters as independent variables and McNair score as dependent variable. The logistic regression was employed on uncorrelated variables to identify the best indicators for insomnia score. Multicollinearity was detected between the parameters: sleeping pills, medication, and beginning of sleep disturbances. Four variables were included: sleep duration, duration of medication, sleep quality and difficulty falling asleep. Logistic regression analysis revealed that 44.8% of the variance in insomnia was explained by sleep duration, duration of medication, sleep quality and difficulty falling asleep. The model was significant ($p < 0.0054$). The variable sleep quality was the less significant factor in the model (Wald statistic = 29.06) and duration of medication the most significant (Wald statistic = 108). Sleep time (Wald statistic = 74.56, p-value < 0.00021), duration of medication of one month or between one month and six months (p-value < 0.00087 vs 6 months-1 year, $p = 0.0928$), no difficulty of falling asleep (Wald statistic = 84, p-value = 0.00051) or have a difficulty to fall asleep (p-value < 0.000 33 vs a

little difficulty to fall asleep, p-value = 0.0095), mild subjective sleep satisfaction (p-value < 0.00012) were associated with insomnia. The odds ratios were ranged from 42 for the duration of medication (less than one month) to 0,008 for sleep time (5 hours).

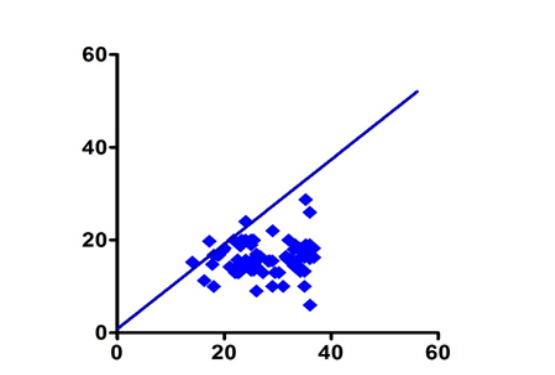

Figure 2: *Insomnia and Sleep Parameters.*

Discussion

Effect of this complex combination was not followed continuously, and one goal of the current research is to provide a tool or a path to identify cognitive disabilities, on a young population. Many previous studies were focused on environmental factors and lifestyle, which could negatively increase the rate of nervous system disorders [12,15,20,21]. But to our knowledge, there are fewer proofs of links between simultaneous actions of the clinical parameters calculated above, on the incidence of insomnia in particular [22-24]. It has been established in the last decade physical activity is a way to reduce stress and cognitive decline process [25,26], while a good quality of sleep and an appropriate duration of sleep perfectly ensures brain maturation and good mental health [27-32]. Recent studies showed the impact of what is known now as complex combination, on the brain disorders [33,34]. And the same literature linked many components of the complex combination of a progressive and quantitative decrease of cognitive functions as well as sleep and mood disorders [33]. Issue is adequate data for young adults' insomnia are not precise until now, and our findings suggest the idea of a positive interplay of lifestyle and sleep in general; on insomnia. People with less than eight hours of study and at least a moderate anxiety, has a bad global score on McNair tests and all his dimensions. This result is also the same, in items related to insomnia. This longitudinal research confirms the hypothesis that during learning process; neuronal memory is more configured by the environment. It is may be possible that insomnia is a consequence of a silent damage of the brain structure, or a symptom indicating the necessity to evaluate the mental health of people. We are able to predict the insomnia with our protocol, even with people without a medical diagnostic. According to our observations, a regular evaluation of insomnia while controlling sleep parameters (duration and quality) and clinical parameters are an innovative and strategic manner to complete mental survey, for both healthy or sick population. These findings are coherent with previous studies, stating that, monitoring the mental state of YA will decrease considerably memory complaints [33,34] and prevent the onset of brain disorders.

Considering the present results, it was not possible to follow regularly the participants, and record continuously evolution of insomnia, during the following weeks. In a following study which is running actually, three appointments are books with participants (equally spaced of one month). The MHPE will be using three times to compare the changes in the clinical parameters or the general state of the participants. Each of the independent variables has been already studied alone or in association, to see their impact on insomnia aetiology, psychiatric disorders and/or neurodegenerative diseases [35-38]. But compared to previous studies above with the same design; our questionnaire evaluated more accurately correlation between insomnia and the multiple variables composing the complex combination.

Conclusion

A healthy mental function and appropriate quality of sleep including an efficient duration, contribute both to a better prevention of insomnia tendency for young adults until midlife. Young adults and midlife samples for both men and women have almost the same level of stress but, insomnia parameters of men are more affected by this combination compared to women. Age is also a main factor because the majority of our sample was aged between eighteen and thirty, and the best score for cognitive subsection and even insomnia test; was obtained by people over thirty years old. These findings suggest that, monitoring the cognitive function, sleep and clinical parameters of young adults, can prevent strongly insomnia. More research should be made in this way, to investigate this relation.

Conflict of Interests

Author mentioned above, has no conflicts of interests, financial or otherwise with the present study.

Author Contributorship

Faustin Armel Etindele Sosso work in conception and design of research, completed experiments and analysis, drafted and revised final version of Manuscript.

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