Seasonal affective disorder and alcohol abuse disorder in a population-based study

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ABSTRACT

Seasonal affective disorder (SAD) is a recurrent major depressive disorder with a seasonal pattern, which is characterized by sad mood, low energy, longer sleep duration and carbohydrate craving. Furthermore, seasonal changes in mood and behavior may be closely related to alcohol use disorder (AUD). Nevertheless, there is scarce research on the study of cognitive impairments in SAD and AUD. We aimed to examine the relationship between the prevalence between SAD and AUD patients, and how cognitive functioning might be related to these variables. To do this, a sample of 8135 Finnish subjects was invited to take part in the population-based Health 2011 Survey, of whom 5903 did participate and 4554 were interviewed for mental health status with the Munich version of Composite International Diagnostic Interview. They also completed the modified Seasonal Pattern Assessment Questionnaire, the Mini–Mental State Examination, the category (animals) verbal fluency test, and the Rey Auditory Verbal Learning Test. Our results reveal the existence of a strong link between SAD and AUD in a large sample of Finnish population, as well as association between SAD and short-term memory problems.

1. Introduction

Seasonal affective disorder (SAD) is a recurrent major depressive disorder with a seasonal pattern, usually beginning in fall and continuing into winter months. Symptoms center on sad mood, low energy, longer sleep duration and carbohydrate craving (Melrose, 2015). Nevertheless, SAD is not considered being a unique diagnostic entity. Rather, it is a type of recurrent major depression with a seasonal pattern. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM), the criteria for mood disorder with a seasonal pattern include a) having a major depressive episode that begins and ends during a particular period (season) every year, with full remission for the remaining period, for at least two years, and b) having more seasons of depression than seasons without depression over a lifetime (APA, 2013). Seasonal pattern disorders occur most frequently in winter although they can also occur in summer. Symptoms of winter seasonal pattern disorders center on sad mood and low energy. Information for the lay public identifies that people with SAD can feel sad, irritable, and may cry frequently. In addition to this, they feel tired and lethargic, have difficulty concentrating, sleep more than normal, are lack of energy, decrease their activity levels, withdraw from social situations, crave carbohydrates and sugars, and tend to gain weight due to overeating (Forneris et al., 2015). Interestingly, seasonal changes in

mood and behavior may be closely related to alcoholism, and certain environmental and social factors may contribute to the development of seasonality in patients with alcoholism (Sher, 2004a). Previous data suggest that some patients with alcoholism have a seasonal pattern associated to their alcohol-induced depression (Sher, 2002), and more specifically alcohol dependence has been found to consistently deteriorate during the fall and winter months in previous research (McGrath and Yahia, 1993). In addition, patients with alcoholism may be self-medicating and underlying depression with alcohol, especially given the carbohydrate craving associated with SAD. Nevertheless, other studies on healthy subjects suggest that annual seasonality in alcohol use excluding drinking behavior in December, is highest in the summer (Uitenbroek, 1996).

Alcohol use disorder (AUD) continues to be a concerning issue worldwide (Wackernah et al., 2014), and it can be described as a problematic pattern of using alcohol that results in impairment in daily life or noticeable distress. The DSM-5th edition (DSM-5) states that in order for a person to be diagnosed with a disorder due alcohol, they must display 2 of the following 11 symptoms within 12-months (APA, 2013): consuming more alcohol than originally planned; worrying about stopping or consistently failed efforts to control one's use; spending a large amount of time using alcohol, or doing whatever is needed to obtain them; use of the substance results in failure to "fulfill

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major role obligations" such as at home, work, or school; "craving" the substance (alcohol); continuing the use of a substance despite health problems caused or worsened by it; continuing the use of a substance despite its having negative effects in relationships with others; repeated use of the substance in a dangerous situation; giving up or reducing activities in a person's life because of the drug/alcohol use; building up a tolerance to the alcohol or drug; and/or experiencing withdrawal symptoms after stopping use.

Regarding SAD, few studies have assessed the relationship between daily variation in weather and human mood and cognition. Nevertheless, several findings about seasonal effect suggest that exposure to sunlight immediately affects mood and cognition (Kent et al., 2009). More specifically, there are findings suggesting that during northern spring the time that is spent outdoors increases the relationships of temperature and barometric pressure with mood, digit span, and openness to new information. Light has been shown to also affect brain blood flow. Cerebral blood flow has specifically been found to improve after phototherapy in pre-term infants (Dani et al., 2004) and SAD patients (Matthew et al., 1996) and has repeatedly been found to be associated with cognitive functions, such as memory. Therefore, both the time spent outdoors and the current season appear to moderate the effects of weather conditions on mood and cognition.

Regarding AUD, chronic excessive alcohol consumption induces cognitive impairments mainly affecting executive functions, episodic memory and visuospatial capacities related to multiple brain lesions (Bernardin et al., 2014). Therefore, cognitive impairments in patients with AUD may be a core issue when studying these patients.

Finally, few studies have attempted to study the relationship between alcohol abuse and seasonal affective disorders and its effect on cognitive functioning. Previous research found that cognitive dysfunction in alcohol dependence is not more pronounced in those with a comorbid affective disorder (Lee et al., 2015). Nevertheless, further studies should focus on the effects that alcohol abuse and SAD may exert on cognition. In addition to this, other interfering variables such as age, gender, civil status, education or region might influence cognitive performance in these specific patients. To sum up, SAD and AUD are conditions that could be highly correlated to each other, and in addition to this, many other variables might be interfering in these comorbid disorders.

The aim of this study was to examine the relationship between SAD and AUD patients' prevalence, and how cognitive functioning might be related to these variables.

2. Methods

2.1. Participants

The Health 2011 Survey was conducted by the National Institute for Health and Welfare (THL) in Finland in the years of 2011–2012. The invitation to take part in the Health 2011 Survey was sent to all persons who had been included in the Health 2000 Survey. The Health 2000 Survey (http://www.terveys2000.fi/) was conducted in the years of 2000–2001 as a representative study of the Finnish population based on a sample of 9922 adults (Heistaro, 2008), consisting of a personal interview, self-report questionnaires, a diagnostic interview for mental disorders, and a clinical examination on physical health status. The Health 2011 Survey (http://www.terveys2011.info) was a follow-up study using the same methods than the Health 2000 Survey (Lundqvist and Mäki-Opas, 2016). All the 8135 members of the original Health 2000 Survey sample who were living in Finland and who had not refused to participate (as of July 6, 2011) were invited to take part. The participation rate was 73% (n=5903), and 4554 (56%) participants aged 18–97 years completed the diagnostic interview for mental disorders and were included in the analyses of this current study.

2.2. Instruments

The World Health Organization Composite International Diagnostic Interview (Robins et al., 1988), the Munich version (M-CIDI; Wittchen et al., 1998) is a comprehensive, fully-structured and computerized interview designed to be used by trained interviewers for the assessment of mental disorders according to the definitions and criteria of the International Classification of Diseases (ICD-10) and DSM-IV. It is intended for use in epidemiological and cross-cultural studies as well as for clinical and research purposes. For this study, we only focused on the variables related to alcohol use (i.e., alcohol abuse during lifetime, alcohol dependence disorder (ADD) during lifetime, AUD during lifetime, alcohol abuse during past 12 months, ADD during past 12 months and AUD during past 12 months). This alcohol section of the M-CIDI allows the assessment of lifetime and current use of alcohol along with information about the presence and absence of each DSM-IV and ICD-10 abuse and dependence criteria, diagnosis and course over time. More specifically, it provides scores for a positive diagnosis for alcohol dependence, alcohol abuse, and alcohol withdrawal (dichotomous scales: 0=absence, 1=presence). It also gives a count of total alcohol symptoms in the lifetime, clustering of symptoms in a single 12-month period, age at first problem related to alcohol, age at recovery, current drinking level, heaviest drinking level ever, impairment due to drinking, and comorbid mental disorders.

The Seasonal Pattern Assessment Questionnaire (SPAQ) is a brief, self-administered screening tool for SAD (Rosenthal et al., 1984; Magnusson, 1996). The global seasonality score (GSS, that is composed of six behavior ratings) is used to determine the potential presence of SAD. A score of 11 or higher on this scale, along with an endorsement of at least moderate difficulties with seasonal change, indicates that further assessment should be conducted to confirm whether a diagnosis of SAD is warranted. The SPAQ is widely used in adult clinical and community samples as a screening tool for SAD. For this study, we used two sections in the SPAQ: (1) degree of seasonal change in mood and behavior ('change items'); and (2) whether (and, if so, to what extent) seasonal changes constitute a problem.

The mini–mental state examination (MMSE) or Folstein test (Folstein et al., 1975) is a 30-point questionnaire that is used extensively in clinical and research settings to measure cognitive impairment. It is commonly used in medicine and allied health to screen for dementia. It is also used to estimate the severity and progression of cognitive impairment and to follow the course of cognitive changes in an individual over time. Administration of the test takes between 5–10 min and examines functions including registration, attention and calculation, recall, language, ability to follow simple commands and orientation.

Category verbal fluency test – animals (Lezak et al., 2012): the verbal fluency test is a short test of verbal functioning. It typically consists of two tasks: category fluency and letter fluency (sometimes called phonemic fluency). In the standard versions of the tasks, participants are given 1 min to produce as many unique words as possible within a semantic category (category fluency) or starting with a given letter (letter fluency). The participant's score in each task is the number of unique correct words. For this study, we only used the category verbal fluency test, and more specifically the animal version, where participants had to say in 1 min time as many animals-words as possible.

Rey Auditory Verbal Learning Test (RAVLT) (Schmidt, 1996): this test evaluates a wide diversity of functions: short-term auditory-verbal memory, rate of learning, learning strategies, retroactive, and proactive interference, presence of confabulation of confusion in memory processes, retention of information, and differences between learning and retrieval. Participants are given a list of 15 unrelated words repeated over five different trials and are asked to repeat. Another list of 15 unrelated words are given and the client must again repeat the original list of 15 words and then again after 30 min. For this study, we only focused on the short-term verbal recall part.