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Original Article

Association between alcohol intake and subjective cognitive complaints in southwest Nigeria: a cross-sectional observational study ☆

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ABSTRACT

Background: Alcohol, a widely abused drug, is a general CNS depressant that is involved in an impaired neurological functioning in a dose-dependent manner and purportedly, in the development of adverse cognitive functions in humans.

Objective: To assess crosss-sectionally whether alcohol consumption is associated with the risk of subjective cognitive complaints (SCCs).

Material and Methods: A cross-sectional study of 1299 participants with diverse age groups, ethnicity and socioeconomic levels recruited from six public hospitals in three different states in the southwest Nigeria between March 2016 and April 2016 was done. Prevalence of subjective cognitive complaints by the level of alcohol intake was measured using standardized questionnaire. Factor analyses (explorative and confirmatory) were used to validate the cognitive complaint questionnaire while conditional multiple logistic regression analysis was used to investigate the association between alcohol intake and SCCs.

Results: After adjustment for age, marital status, level of education, ethnicity, smoking status and physical activity (basic adjustment), participants in the highest compared with the lowest quintile of alcohol intake had a significantly increased odds of SCCs (odds ratio [OR], 1.95; 95% confidence interval [CI], 1.39–2.74; *P* for trend <0.001). Additional adjustment for body mass index, depression, hypercholesterolemia, cardiovascular diseases, insomnia, stress and family histories of diabetes and hypertension (multivariable adjustment), did not substantially affect this relationship (OR, 2.02; 95% CI, 1.40–2.93; *P* for trend <0.001). When stratified by gender, results were similar and stronger for men in the basic (OR, 2.28; 95% CI, 1.34–3.88, *P* for trend <0.001) and multivariable (OR, 2.47; 95% CI, 1.37–4.47; *P* for trend <0.001) adjusted models but completely attenuated in the multivariable adjusted model for women (OR, 1.60; 95% CI, 0.94–2.69; *P* for trend = 0.08).

Conclusion: High intake of alcohol is associated with higher risk of SCCs in men. This relationship is independent of cardiovascular risk factors.

1. Introduction

Alcohol is not only a general CNS depressant affecting brain functions in a dose-dependent manner but also constitutes an agent for substance induced psychotic disorder.[1] Several studies have contributed toward understanding the dose and task-related ethanol's effect on the brain and their findings are valuable in disclosing the types of functions and the neural circuits underlying impairments due to ethanol's action.[2] Such studies revealed that the effects of alcohol, one of which may involve adverse cognitive functioning (i.e., mental activities that involve storing, retrieving and using information), are mediated through a number of target sites in the brain, principally $GABA_A$ and NMDA receptors.[3,4] However, proper cognitive functioning is essential for adequate and healthy performance in life.

SCCs are cognitively based errors that occur during the performance of a task that a person is normally successful in executing. Such complaints involve frequent forgetfulness, and difficulties in concentrating, making decision and thinking clearly, hence, depicting the experience of having problems with cognitive functioning. For instance, some individuals may experience such cognitive problems of having had to throw away something that they meant to keep and retaining those things they meant to throw out. Interestingly, these SCCs are common among not only the elderly people[5,6] but also the non-elderly adults.[7,8]

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The prior observations that mid-to-moderate drinking of alcohol can adversely affect various aspects of cognitive functioning[9] give reasons to expect that SCCs may be associated with alcohol intake. The focus of this present study therefore was to investigate the relationship between alcohol intake and subjective perceptions of cognitive symptoms. Thus, two independent self-report measures of (1) dietary intake that allows quantification of the amount of alcohol intake and (2) cognitive complaints that permit a quick and easily administered snapshot of cognitive concerns were used. It was predicted that a high- compared to a low level of alcohol intake would be associated with high SCCs.

2. Material and methods

2.1. Study population

In total 1299 people participated in the survey. The research participants consisted of 807 women and 492 men that were between 18 and 87 years of age. Participants were recruited from three different States of Lagos, Ogun and Oyo in the southwest of Nigeria and were selected across six public hospitals between March 2016 and April 2016. Letters were sent to the necessary units within these hospitals. An information sheet was sent out with the questionnaire. This included a description about the aims of the project. All participants were informed about the study, had the opportunity to ask questions and signed an informed consent before enrolling in the study. The following inclusion criteria were applied: (1) 18 years of age and older, (2) good health status. The exclusion criteria included (1) serious illness, severe hearing or visual impairment precluding a reliable assessment of cognitive complaints, (2) persistent impairment of consciousness, (3) a history of severe head trauma or neurosurgery, (4) previous prolong mental retardation. The study had approval by the Tai Solarin University of Education Institutional Review Board.

2.2. Assessments

2.2.1. Alcohol intake

This was measured using items from a standard food frequency questionnaire with ratings involving a 10 point scale from – Never to – Everyday. The questionnaire is similar to a fairly recent validated food frequency questionnaire (FFQ).[10] The FFQ was analysed using feta software.[10]

2.2.2. SCCs

This study measures SCCs by using Cognitive Failures Questionnaire (CFQ) scores.[11] The CFQ is a 25-item self-report measure of failures in attention, perception, memory, and action. Participants were asked to indicate on a 5-point scale how often they have experienced each failure in the past months, from 0 (*never*) to 4 (*very often*). Examples of CFQ items include #2, "Do you forget why you went from one part of the house to the other?" and #19, "Do you daydream when you ought to be listening to something?" The total score of the measure ranged from 0 to 100 and the median score was put at 50.0.

2.3. Medical history, anthropometric data and lifestyle factors

Anthropometric data, lifestyle factors and medical history were obtained as part of the standard FFQ. Body mass index was calculated as weight in kilogrammes divided by the square of height in metres. Physical activity was expressed as metabolic equivalent task (MET)-hours based on self-reported types and durations of activities per week. One MET-hour is equivalent to energy expenditure while sitting quietly for 1 h. Smoking status was obtained and depicted as current, former and never. Medical history of chronic diseases involving diabetes, hypertension, depression, cardiovascular diseases, insomnia, hypercholesterolemia and stress were defined through questions asking whether doctor informed them with having the condition in the past year, and were dichotomized to either yes or no.

2.4. Demographics

Data from items referring to age, gender, education, ethnicity and marital status included in the demographic section of the standard FFQ were obtained for this analysis. Gender was self-reported as either male or female. Age was treated as continuous measure. Education level was treated based on four levels — No formal education, primary education, secondary education, college education and university education. Ethnicity consisted of four subgroups — Yoruba, Hausa, Ibo, and others. There were five categories of marital status — married, single, widowed, divorced and separated.

2.5. Statistical analyses

The CFQ as a measure of SCCs was assessed for internal consistency using Cronbach's alpha reliability coefficient. We validated the construct on Nigerian sample using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

Continuous variables are presented as means and standard deviations or medians and interquartile ranges and were compared among quintiles of alcohol separately for men and women using One-way ANOVA or the Kruskal-Wallis H test. Proportions were compared using the X^2 test.

Alcohol intake of participants were categorised into quintiles. Conditional logistic regression was used to investigate the association between alcohol intake and SCCs. To test for linear trends across categories, we used log-transformed alcohol levels. In the basic model, we adjusted for demographic and lifestyle factors involving age (continuous), marital status (single, married, divorced or separated), level of education (non-formal, primary, secondary, college or university), ethnicity (Yoruba, Hausa, Ibo or others), smoking status (never, past or current) and physical activity (quintiles). In our multivariable model, we further adjusted for body mass index (continuous) and history of diabetes (yes/no), hypertension (yes/no), depression (yes/no), cardiovascular diseases (yes/no), insomnia (yes/no), hypercholesterolemia (yes/no) and stress (yes/no).

We next examined the impact of a doubling in alcohol intake on subjective cognitive complaints by estimating the odds ratios (ORs) associated with an increase of (continuous) log-transformed alcohol intake by units on a log scale, which corresponds to a doubling in alcohol intake on the original scale. These analyses were carried out for crude, basic and multivariable models as indicated above.

We repeated all the analyses above separately for men and women using the crude, basic and multivariable models and estimated their individuals ORs. We assessed the goodness of fit of the models using the method described by Hosmer and Lemeshow.[12] All *P*-values are two-tailed, and $P < 0.05$ was considered statistically significant. All analyses were performed using SAS software, version 9.2.1 (SAS Institute Inc., Cary, NC, USA).

3. Results

3.1. Validation of the CFQ: A measure of SCCs

The data from CFQ had a Gaussian distribution and a reliability with high internal consistency (Cronbach's α was 0.93). A scree plot graphing the eigen values revealed a sharp break in the curve