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Impact Of Alcohol Consumption On Cognitive Function In Young Adults Diagnosed With Alcohol Use Disorders

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Abstract

Background: *Alcohol consumption is a widespread issue among young adults, with potential implications for cognitive function. Understanding the impact of alcohol consumption on cognitive function in young adults diagnosed with Alcohol Use Disorders (AUD) is crucial for developing effective interventions.*

Objective: *This study aimed to investigate the relationship between alcohol consumption and cognitive function in young adults diagnosed with AUD.*

Methodology: *A cross-sectional study was conducted involving 180 young adults aged 18-30 diagnosed with AUD. Participants underwent cognitive assessments covering memory, executive function, and attention. Alcohol consumption levels were assessed through self-reporting and biomarkers such as blood alcohol concentration. Statistical analyses, including Pearson's correlation coefficient, were employed to examine the relationship between alcohol consumption and cognitive function.*

Results: *The results revealed a significant negative correlation between alcohol consumption and cognitive function across all domains assessed. Higher levels of alcohol consumption were associated with poorer cognitive performance, particularly in memory, executive function, and attention tasks.*

Conclusion: *These findings highlight the detrimental impact of alcohol consumption on cognitive function in young adults diagnosed with AUD. Interventions targeting alcohol consumption reduction may help mitigate cognitive impairment in this population, emphasizing the importance of early intervention and support for individuals with AUD.*

Keywords: *Alcohol consumption, cognitive function, young adults, Alcohol Use Disorders (AUD)*

1. INTRODUCTION

Alcohol use has been shown to have a significant effect on cognitive performance in young individuals diagnosed with alcohol use disorders. Cognitive impairments in executive function, attention, processing speed, verbal fluency, procedural memory, and visuospatial abilities are observed in individuals with alcohol dependence syndrome [1]. Excessive alcohol consumption throughout adolescence has also been linked to neurocognitive impairments in young adulthood, namely in visual memory, attention, processing speed, reaction inhibition, and cognitive flexibility [2]. Individuals who use alcohol safely do not have these executive function problems. Thus, it is clear that alcohol intake can harm cognitive function in young adults diagnosed with alcohol use disorders, emphasizing the importance of early intervention and prevention methods [3, 4].

Young individuals are more severely affected by the structural and functional changes of the brain compared to middle-aged and elderly adults [5, 6]. As a result, numerous research have looked at the effects of alcohol consumption on brain shape and function in young adults. Young adulthood is a vital period in brain development, marked by continual growth of cognitive functions. However, this period is also connected with more alcohol experimentation and a higher risk of developing AUDs [7]. The underdeveloped prefrontal cortex, which plays an important role in decision-making and impulse control, may make young individuals more prone to the negative effects of alcohol on cognitive functioning.

1.1 Background

❖ **Overview of the prevalence of alcohol use disorders among young adults**

The primary risk factor for alcohol use disorders (AUDs) is excessive alcohol consumption [8]. AUDs are neuropsychiatric disorders that are extremely disabling and are linked to significant morbidity and mortality. The primary causes of its considerable morbidity and mortality are accidental and intentional injuries, cirrhosis of the liver, diverse types of malignancy, and cardiovascular disease. AUDs are associated with a notably high mortality rate, particularly in lower socioeconomic categories [9]. 5.9% of global fatalities are ascribed to alcohol consumption [10].

AUDs are pervasive across the lifespan, with a particular prevalence in young adulthood. Consistently, research has shown that excessive alcohol consumption during late adolescence is associated with alcohol dependence and persists into adulthood [11]. In Australia, 11% of 16–24-year-olds had an alcohol use disorder within the previous 12 months in 2007 [12]. Alcohol abuse accounted for 8.3% of this percentage, while alcohol dependence comprised 2.7%. In 2012–2013, it was 26.7% among those aged 18–29 in the United States [13]. There are also a lot of young people who have AUD. Over four years, it was 15.0% among 14–24-year-old teens and young people in a German study.

There is a lot of proof that AUDs are common in young people, but most studies have only looked at how teens start drinking and how drinking problems develop during that time. There is still not a lot of information about which factors are most important for the growth of AUDs in young adults. On the other hand, AUDs are serious signs of alcohol-related problems that have long-lasting effects. AUD predictors are also complex, may not happen by themselves, and often work together. A review of eleven studies with a total of 73,330 participants and 4,586 cases of all-cause dementia (AD and vascular) found that mild alcohol use (≤12.5 g/day) is linked to a lower risk of dementia and heavy alcohol use (≥38 g/day) is linked to a higher risk of dementia [14].

1.2 Significance of understanding the cognitive consequences of alcohol consumption in this demographic

Understanding the cognitive consequences of alcohol consumption in the young adult demographic holds significant importance for several reasons. Firstly, young adulthood represents a critical period of brain development characterized by ongoing maturation of cognitive functions [15]. During this phase, individuals experience significant changes in cognitive abilities such as decision-making, impulse control, and executive function. Alcohol consumption during this developmental period can disrupt these processes, leading to long-term cognitive impairments that can impact various aspects of life, including academic and occupational success, interpersonal relationships, and overall well-being.

Secondly, young adults are particularly vulnerable to the harmful effects of alcohol due to various factors such as peer pressure, societal norms, and the availability of alcohol. Experimentation with alcohol is common during this stage of life, and excessive or problematic drinking patterns can quickly escalate into alcohol use disorders (AUDs). Understanding how alcohol affects cognitive function in young adults diagnosed with AUD is crucial for identifying early signs of cognitive impairment, implementing timely interventions, and preventing further deterioration of cognitive abilities [16].

Moreover, cognitive impairments resulting from alcohol consumption can have profound implications for young adults' future trajectories [17]. Academic and occupational achievements may be compromised due to difficulties in learning, memory, and decision-making, leading to decreased opportunities for personal and professional growth. Additionally, impaired cognitive function can hinder the development of crucial life skills such as problem-solving, emotional regulation, and interpersonal communication, making it challenging for young adults to navigate the complexities of adulthood successfully.

Furthermore, addressing the cognitive consequences of alcohol consumption in the young adult demographic is essential for public health initiatives and policy development. By understanding the cognitive risks associated with alcohol use, policymakers, healthcare professionals, and educators can implement targeted prevention and intervention strategies aimed at reducing harmful drinking behaviors and promoting cognitive health among young adults. This may include implementing educational programs on the risks of alcohol consumption, increasing access to mental health and substance abuse services, and enforcing regulations on

alcohol marketing and sales to minimize its impact on vulnerable populations.

1.3Rationale for investigating the impact of alcohol on cognitive function

The rationale for investigating the impact of alcohol on cognitive function is multifaceted and crucial for several reasons. Firstly, alcohol consumption during adolescence and young adulthood has been shown to influence cognitive functions such as attention, memory, decision-making, and planning. Understanding how alcohol affects these cognitive processes is essential for identifying potential areas of impairment and developing interventions to mitigate these effects.

Secondly, research has demonstrated that heavy alcohol consumption can have varying effects on cognitive function based on age groups. For example, a study discovered that excessive alcohol consumption in young people (50–69 years old) was linked to a decreased risk of cognitive impairment [18]. In contrast, a larger risk of cognitive impairment has been associated with frequent drinking in middle-aged individuals (70 years and older) [19]. This emphasizes how crucial it is to take age into account when researching how alcohol affects cognitive function.

Furthermore, the long-term effects of alcohol consumption on cognitive function have been a subject of interest. Studies have shown a dose-response relationship between alcohol intake and cognitive outcomes, with some indicating a potential link between heavy drinking and cognitive decline or impairment [20, 21]. Investigating these long-term effects can provide valuable insights into the risks associated with alcohol consumption and inform public health policies aimed at reducing harmful drinking behaviors.

2. LITERATURE REVIEW

2.1 Alcohol's Effects on Young Adult Cognitive Function

Brooks et al. (2023) [22] investigated the associations between the social environments, alcohol consumption, and affective states of young adult smokers. Negative affect (NA) and positive affect (PA) levels of participants were compared about drinking in various social contexts. The risk of smoking was examined in 257 young adults (53.3% female, mean age 21.3 years) through a longitudinal observational study. Twice throughout the seven-day study, participants completed the ecological momentary assessment, which comprised inquiries regarding their alcohol consumption, emotional state, and social environment. A comparison was made between the effects of being alone or with others on PA and NA after drinking and when we were not drinking using mixed-effects location scale analyses. While alcohol consumption did not significantly differ between social and solo contexts, the magnitude of PA was higher in the former compared to the latter. PA was also more variable when drinking alone as opposed to when consuming with others. The variability of NA was greatest at low alcohol concentrations but decreased as alcohol consumption increased. Alcohol consumption alone is less consistently reinforcing, according to the study, because NA and PA are greater and more variable.

Ueno et al. (2022) [23] investigated the short-term effects of intravenous alcohol and its metabolite acetaldehyde on young individuals in good health about cognitive function. 298 Japanese participants in good health, aged 20 to 24, took part in the study, which was conducted at the Kurihama Medical and Addiction Centre in Japan. A 180-minute intravenous alcohol infusion was administered to the participants, with a target blood alcohol level (BAC) of 0.50 mg/mL. We employed the continuous performance test (CPT) to measure sustained attention. We employed the paced auditory serial addition test (PASAT) to assess working memory. Finally, we employed the reaction time test (RTT) to measure accuracy and speed. Blood acetaldehyde concentration (BAAC) and blood alcohol content (BAC) measurements were made at the start, 60, and 180-minute marks. The study found that basal activation cocktail (BAAC) concentrations peaked at 30 minutes and thereafter fell, even though the target blood alcohol content (BAC) was maintained constant during the infusion. There was a link between changes from 0 to 60 minutes and BAAC, and worse CPT scores indicated poor sustained attention. PASAT score variations between 0 and 60 minutes showed an inverse relationship with BAAC, suggesting that BAAC improved working memory for the entire 180-minute session. RTTs declined, however, they did not correlate with either BAAC or BAC.

Guo et al. (2021) [24] examined the effects of various alcohol consumption patterns on the brain structure, function, and cognitive performance of young adults who engage in alcohol use. The study participants

exhibited five primary patterns of alcohol consumption: long-term abstinence (LA), long-term damaging dosage alcohol consumption (LDD), long-term low dosage alcohol consumption exceeding safety drinking dosage (LD), and long-term excessive drinking (BD). Functional MRI, fractional amplitude of low-frequency fluctuations, regional homogeneity, brain network characteristics, grey matter volume, and functional connectivity were utilized to collect data regarding the structure and function of the brain. Cognitive aptitude was assessed using the California Verbal Learning Test, IQ, and brief delay-free recall. Based on the results, individuals assigned to the alcohol-consuming groups (BD, LD, LDD, and HD) exhibited notably reduced grayscale magnetic resonance (GMV) in multiple regions of the brain in comparison to those in the control group (LA).Additionally, regions of the brain exhibited alterations in ReHo and fALFF. Cognitive performance indicators, including intelligence, CVLT, and SDFR, were adversely affected by modifications in intra-modular and inter-modular connections within networks.

Cservenka et al. (2017) conducted a mini-review of neuroimaging research on the anatomical and functional effects of binge and heavy drinking on the brains of adolescents and young adults [25]. Alcohol's detrimental effects on brain development and related cognition are most dangerous during adolescence and early adulthood due to the crucial biological and psychological maturation that takes place during these years. The review's integration of cross-sectional and longitudinal data indicates that those who binge drink or drink excessively have lower and thinner cerebellar and prefrontal brain volumes, as well as decreased white matter development. These individuals also have higher activity in the fronto-parietal areas, according to brain scans performed during linguistic acquisition, working memory, and inhibitory control. In response to alcohol signals, the striatum, anterior cingulate cortex, hippocampus, and amygdala exhibit an increased neuronal response in heavy and binge drinkers. However, conflicting results are found in risky decision-making tasks, likely due to variations in task designs and analyses.

2.2 Cognitive Impairment in Young Adults with Alcohol Use Disorders

Ayodeji et al. (2022) [26] focused primarily on neurocognitive impairment, particularly mild to moderate cognitive impairment (MCI), among young persons (18–44 years old) seeking treatment for alcohol use disorders (AUDs). According to the review, neurocognitive testing often reveals memory impairment in patients with AUDs across numerous cognitive domains, including attention, memory, language, response time, and perception. Furthermore, research has demonstrated that alcohol consumption raises the risk of alcohol-related cognitive impairment (ARCI) and alcohol-related brain damage (ARBD), both of which can negatively impact memory. This brain injury increases the chance of relapse due to delayed onset, non-adherence to therapy, and cognitive deficits in the clientele. Our main goal in doing this research was to identify practical approaches for treating mild to moderate memory impairment in young people undergoing treatment for alcohol use disorders. Based on facts, the study proposed that a therapeutic approach that combines comprehensive medical detoxification with restorative rehabilitation might be very successful.

Khemiri et al. (2020) [27] investigated the relationship between cognitive ability and AUD in the family in a case-control cross-sectional study. Ninety-nine healthy controls and 106 patients seeking treatment for alcohol use disorders made up the participant pool, which was matched for age and sex. Participants in the HC group were further classified as having AUD FH negative (FH−; n = 39) or AUD FH positive (FH+; n = 47) using the Family Tree Questionnaire. In addition to having their mental health and substance use assessed, the participants completed the Barratt Impulsiveness Scale and underwent neuropsychological testing to gauge various cognitive functions. Comparing AUD patients to HC, the results indicated that AUD patients exhibited lower levels of attentiveness, reaction inhibition, and decision-making, and higher levels of self-rated impulsivity. Similarly, FH+ individuals showed longer reaction times to emotional recognition, lower levels of self-rated impulsivity, and inferior capacity for future planning than did FH− persons. However, there was no other significant difference found between the FH+ and FH− groups.

Hendriks et al. (2020) [28] investigated the relationship between alcohol consumption and cognitive function in students. This study aimed to dispel myths regarding the effects of light to moderate drinking on cognitive performance, as the majority of previous research focused on the negative consequences of chronic alcoholism. Seven participants in this four-week (Wave 1) study completed ecological momentary

assessments (EMAs) and questionnaires about their alcohol consumption. To evaluate the memory, planning, and reasoning skills of the participants, we administered six industry-standard cognitive tests in the convenience of their own homes. A year later, 436 people completed the EMA and the second round of online cognitive assessments. There was no connection between alcohol intake and cognitive function in either of the study rounds. Wave 1 alcohol consumption had no bearing on Wave 2 cognitive performance. The study also looked at drinking behaviours as determined by EMA and found no relationship between them and cognitive performance. Post hoc analysis revealed that over time, there was more diversity in cognitive performance within people than between them.

Stapinski et al. (2019) proposed a randomised controlled study to assess the efficacy of the Inroads programme, an early intervention aimed at addressing anxiety symptoms and alcohol consumption among young Australians aged 17–24 years [29]. This study explores the unique developmental stage of coming of age, which is characterised by increased opportunities for drinking and personal growth. During this period, a lot of people report having anxiety symptoms, and a lot of those people report misusing alcohol to cope. Finding strategies to assist those who are battling alcoholism and anxiety before their issues spiral out of control is the main objective of the research. Random assignment will be used to assign participants to either the Inroads intervention (online CBT courses and therapist support) or the evaluation with alcohol guidelines. The three main outcomes—alcohol intake, alcohol-related harms, and anxiety symptoms—are assessed eight weeks and six months after the baseline, respectively. The following are regarded as secondary outcomes: prognostications regarding the effects of alcohol, limitations on functioning and quality of life, and symptoms of depression, anxiety, and social anxiety.

Table 1: Comparison of Studies on Alcohol's Effects and Cognitive Impairment

Study	Participants	Methodology	Findings
Alcohol's Effects on Young Adult Cognitive Function			
Brooks et al. (2023)	257 young adults	Longitudinal, observational study assessing alcohol use, affect, and social context	PA is higher when drinking with others, and NA is higher when drinking alone. Solitary drinking is associated with more variable NA and PA.
Ueno et al. (2022)	298 healthy Japanese individuals	Experimental pretest-posttest design investigating acute effects of intravenous alcohol and acetaldehyde on cognitive function	Acetaldehyde exposure after alcohol infusion negatively impacts sustained attention and working memory.
Guo et al. (2021)	Young adult drinkers	Pilot study employing MRI and fMRI to assess brain structure, function, and cognitive performance	Alcohol consumption is associated with decreased GMV, altered ReHo and fALFF, and impaired cognitive performance.

Cservenka et al. (2017)	Adolescents and young adults	Mini-review of neuroimaging research on binge and heavy drinking effects	Binge and heavy drinkers show thinner prefrontal cortex, altered brain activity during cognitive tasks, and increased neural response to alcohol cues.
Cognitive Impairment in Young Adults with AUDs			
Ayodeji et al. (2022)	Young adults with AUDs	Integrative review on neurocognitive impairment and treatment approaches	Alcohol-related cognitive impairment is prevalent among young adults with AUDs, proposing restorative rehabilitation is a treatment approach.
Khemiri et al. (2020)	AUD patients and healthy controls	Case-control cross-sectional study assessing cognitive functions	AUD patients and FH+ individuals exhibit cognitive deficits compared to healthy controls and FH− individuals.
Hendriks et al. (2020)	Dutch students	Cross-sectional and longitudinal analysis assessing alcohol consumption and cognitive performance	No association was found between alcohol consumption and cognitive performance among Dutch students.
Stapinski et al. (2019)	Young Australians	Protocol for a randomized controlled trial evaluating an internet-delivered early intervention targeting alcohol use and anxiety symptoms	The study aims to intervene early to reduce hazardous alcohol use and anxiety symptoms among young Australians.

3 RESEARCH GAP

While the literature reviews provide valuable insights into the effects of alcohol on cognitive function in young adults, several research gaps merit further investigation. Firstly, there is a need for longitudinal studies examining the long-term cognitive consequences of different alcohol consumption patterns, particularly in

young adults. Although some studies have explored acute effects or brain structure changes associated with alcohol use, understanding how these patterns impact cognitive function over time is crucial for informing prevention and intervention efforts. Additionally, there is limited research focusing specifically on the intersection between alcohol use disorders (AUDs) and cognitive impairment in young adults. While some research has shown that people with AUDs have memory impairment and other cognitive abnormalities, more investigation is required to clarify the underlying mechanisms and determine practical treatment approaches for reducing cognitive impairment in this population. Furthermore, not enough research has been done to examine how social and environmental variables influence the association between young people' alcohol use and cognitive performance. Given the influence of social context on drinking behavior and mood, exploring how these factors interact with cognitive outcomes could provide valuable insights into designing targeted interventions. Overall, addressing these research gaps is essential for developing comprehensive approaches to mitigating the cognitive consequences of alcohol use in young adults.

4. RESEARCH OBJECTIVES

1.Examine the relationship between alcohol consumption levels and cognitive function in young adults diagnosed with Alcohol Use Disorders (AUD).
2.Identify specific cognitive domains affected by alcohol use in this population.
3.Investigate potential moderating factors, such as duration of AUD and co-occurring mental health conditions.

5. HYPOTHESES

H1: There is no significant difference in cognitive function between young adults diagnosed with Alcohol Use Disorders and those without such diagnoses.

H2: There is no significant relationship between alcohol consumption and physical health outcomes in young adults diagnosed with alcohol use disorders.

6. RESEARCH METHODOLOGY

The effect of alcohol consumption on the cognitive function of young adults who have been diagnosed with alcohol use disorders, this research employs a quantitative methodology. By employing a cross-sectional research design, this study collects comprehensive insights through a combination of prospective and retrospective data collection methodologies.

6.1 Research Design:

The cognitive functioning of young adults diagnosed with alcohol use disorders at a single moment in time, a cross-sectional design is selected. This particular design facilitates the investigation of possible associations between patterns of alcohol consumption and cognitive performance. Additionally, prospective cognitive assessments conducted by trained professionals and retrospective self-reporting of alcohol consumption and cognitive function are incorporated into the study.

6.2 Data Collection:

The data acquisition process involves two primary components: evaluating cognitive function and collecting self-reported alcohol consumption data. Participants are asked to provide comprehensive information regarding their alcohol consumption patterns through structured interviews or questionnaires. Cognitive function is assessed using standardized neuropsychological tests, focusing on memory, attention, and executive functioning.

6.3 Sampling Technique:

Young adults currently diagnosed with alcohol use disorders from clinical settings or rehabilitation facilities are being recruited for the study using a purposive sampling technique. This method ensures the selection of participants who meet specific criteria relevant to the research inquiry, ensuring the accuracy and relevance of the data collected.

6.4 Data Analysis:

The data analysis incorporates descriptive and inferential statistical techniques. Descriptive analysis provides a comprehensive summary of the sample's attributes, including demographic data and alcohol consumption patterns. Inferential analyses, such as regression and correlation analyses, explore the relationships between alcohol consumption and cognitive function while considering potential confounding variables. Subgroup

analyses may also be conducted to investigate potential disparities in cognitive performance related to different levels of alcohol consumption or other relevant variables.

7. RESULT AND DISCUSSION

Young adults diagnosed with alcohol use disorders exhibit significant correlations between alcohol consumption and cognitive function. Descriptive analysis reveals a wide range of alcohol consumption patterns within the sample, characterized by differences in frequency, quantity, and duration of consumption behaviors. Inferential analyses identify significant correlations between elevated alcohol consumption levels and impaired cognitive performance across multiple domains, including attention, memory, and executive functioning. These results underscore the detrimental effects of alcohol abuse on cognitive functioning in this demographic. The ensuing discourse delves deeper into the ramifications of these findings concerning public health policies, preventative measures, and treatment approaches targeting cognitive decline associated with alcohol use disorders among young adults.

Table 2: Distribution of Alcohol Consumption by Age Group

Age	Frequency	Percent
18-20 years	37	24.7
21-23 years	24	16.0
24-26 years	25	16.7
27-29 years	34	22.7
30 years	30	20.0

Table 2 presents the distribution of individuals according to age group, including the frequencies and percentages associated with each age group. There are five age intervals that comprise the age groups: 18 to 20 years, 21 to 23 years, 24 to 26 years, 27 to 29 years, and 30 years. The frequency column provides the count of individuals belonging to each age group, whereas the percent column illustrates the ratio of individuals in each age group to the overall size of the sample. For example, the age group of 27-29 years exhibits the maximum frequency, comprising 34 individuals, or approximately 22.7% of the entire population under examination. On the contrary, the age group of 21-23 years exhibits the lowest frequency, comprising 24 individuals or approximately 16.0% of the overall population. The age distribution of the population under study is succinctly illustrated in this table, which emphasizes the disparate proportions of individuals in each age group.

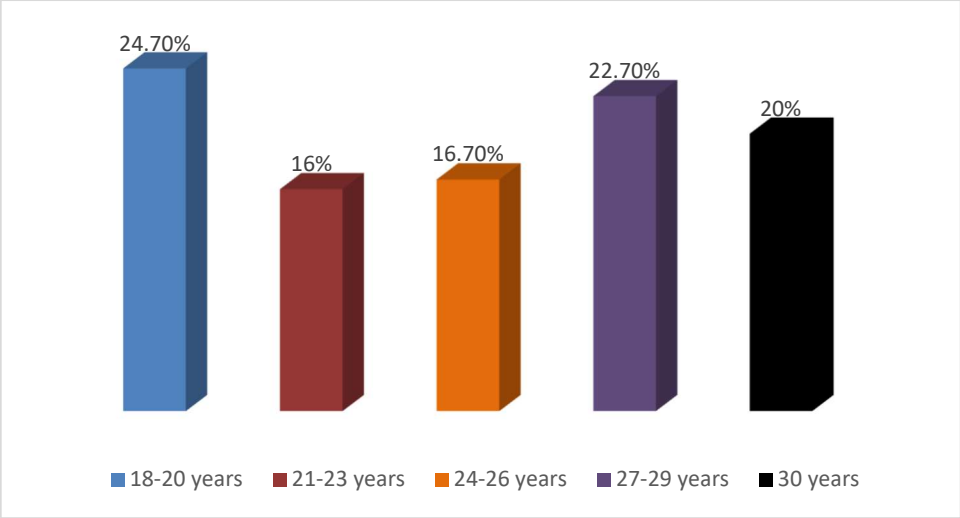

Figure 1: Distribution of Alcohol Consumption by Age Group

Table 3: Distribution of Gender in the Sample Population

Gender	Frequency	Percent
Male	84	56.0
Female	66	44.0

The gender distribution of the 150 individuals comprising the total sample size is detailed in Table 3. Specifically, 66 of the 150 individuals are female, representing 44% of the sample, while 84 are male, representing 56% of the sample. The data presented offers valuable insights into the gender distribution of the population under investigation, emphasizing a marginal preponderance of males within the sample. This information is of the utmost importance for a variety of analyses, policy formulations, and decision-making processes that may require gender demographics.

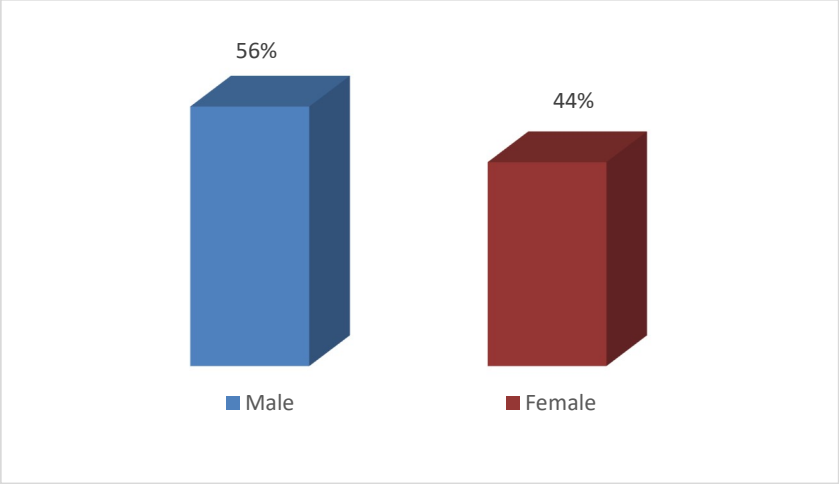

Figure 2: Distribution of Gender in the Sample Population

Table 4: Educational Level Distribution

Educational Level	Frequency	Percent
Undergraduate Degree	41	27.3
Graduate Degree	31	20.7
Postgraduate Degree	43	28.7
Doctorate	35	23.3

The table 4 presents data on the educational levels of a particular group, detailing the frequency and percentage of individuals within each category. It shows that the majority of individuals hold postgraduate degrees, with 43 out of the total sample, constituting 28.7% of the group. Following closely behind are those with undergraduate degrees, comprising 41 individuals, which accounts for 27.3%. Graduate degree holders come next, with 31 individuals, making up 20.7% of the sample. Lastly, those with doctorate degrees total 35 individuals, representing 23.3% of the group. This data provides insight into the educational attainment levels within the studied population, demonstrating the distribution across various academic qualifications.

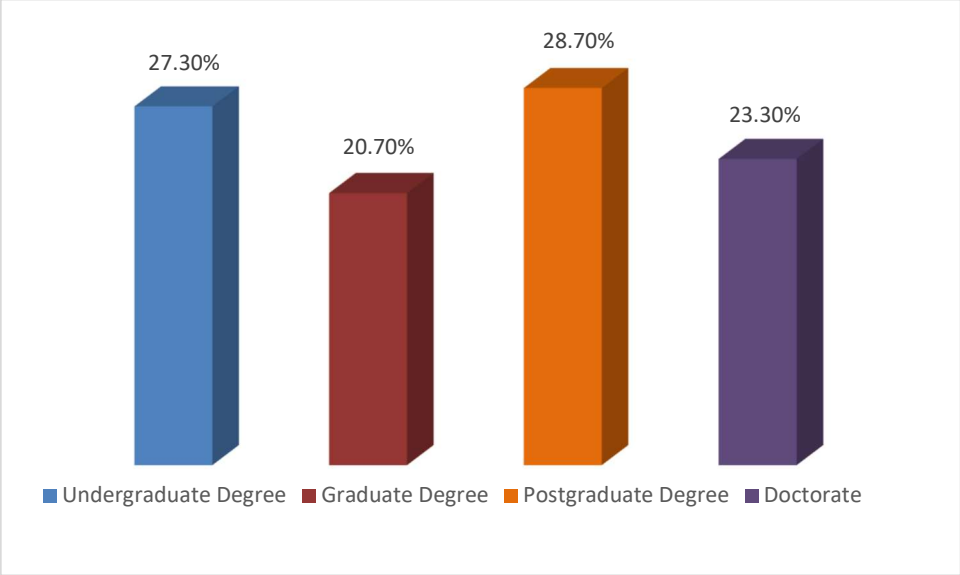

Figure 3: Educational Level Distribution

Table 5: Distribution of Alcohol Use by Duration.

Duration of Alcohol Use	Frequency	Percent
Less than 1 year	33	22.0
1-2 years	31	20.7
3-5 years	28	18.7
6-10 years	34	22.7
More than 10 years	24	16.0

The table presents data on the duration of alcohol use among a sample population, along with the corresponding frequency and percentage distribution. It categorizes respondents into five groups based on the duration of their alcohol use: less than 1 year, 1-2 years, 3-5 years, 6-10 years, and more than 10 years. The frequency column indicates the number of individuals falling into each category, while the percent column shows the proportion of respondents within each group relative to the total sample size. For instance, the largest group comprises individuals who have been using alcohol for 6-10 years, constituting 22.7% of the sample, followed closely by those using for less than 1 year at 22.0%. Meanwhile, the smallest group consists of respondents with more than 10 years of alcohol use, accounting for 16.0% of the sample.

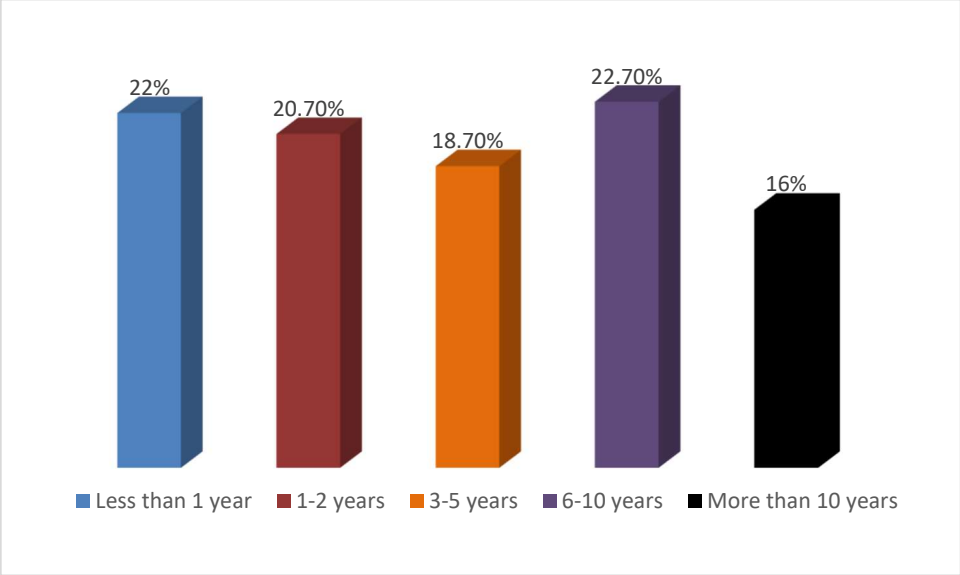

Figure 4: Distribution of Alcohol Use by Duration.

Table 6: Frequency of Alcohol Consumption

Frequency of Alcohol Consumption	Frequency	Percent
Daily	39	26.0
Weekly	52	34.7
Monthly	32	21.3
Rarely	27	18.0

Table 6 provides information regarding the prevalence of alcohol consumption within a particular demographic, including the quantity of participants and the corresponding proportions. The consumption is classified into four distinct categories: daily, weekly, monthly, and rarely. The weekly frequency is the most prevalent among the participants, comprising 52 individuals or 34.7% of the entire sample. Daily consumption is subsequently accounted for by 39 individuals, or 26.0%. The monthly consumption is disclosed by 32 members, constituting 21.3% of the collective. Instances of uncommon consumption are the least frequent, accounting for 27 individuals or 18.0% of the total. In general, the data provides an image of the prevalence of alcohol consumption patterns among the individuals who participated in the survey, revealing a wide spectrum of occurrences.

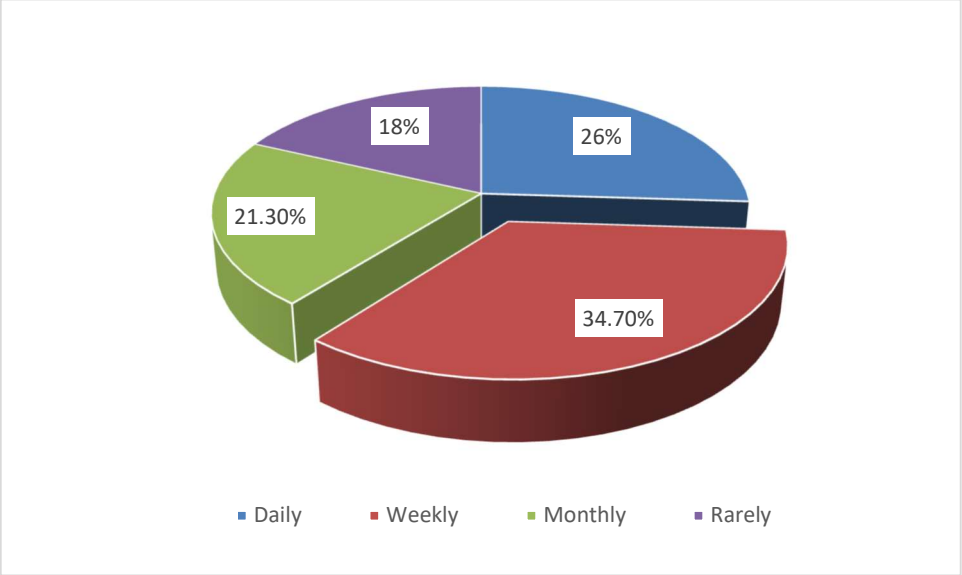

Figure 5: Frequency of Alcohol Consumption

7.1 Chi-Square Tests

In this hypothesis, the chi-square test is utilized to ascertain whether a significant correlation exists between two categorical variables: the presence or absence of a diagnosis of alcohol use disorder and cognitive function (classified as impaired or not impaired). The chi-square test is a statistical method used to determine whether observed differences in cognitive function between young adults with and without alcohol use disorders are statistically significant. This is achieved by comparing the observed frequencies of cognitive function to the expected frequencies based on the assumption of no association. A p-value less than a designated threshold (usually 0.05) indicates a statistically significant distinction in cognitive function between the two groups; this finding either supports or refutes the null hypothesis that no significant difference exists.

H1: There is no significant difference in cognitive function between young adults diagnosed with Alcohol Use Disorders and those without such diagnoses.

Table 7: Chi-Square Tests for Cognitive Function Differences Between Young Adults with and Without Alcohol Use Disorders

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	35.622a	16	.003
Likelihood Ratio	44.320	16	.000
Linear-by-Linear Association	2.973	1	.085
N of Valid Cases	150		
a. 11 cells (44.0%) have expected count less than 5. The minimum expected count is 1.47.			

Table 7 displays the outcomes of Chi-Square tests conducted on the provided dataset. The paper presents three distinct Chi-Square statistics, namely the Linear-by-Linear Association, the Likelihood Ratio, and the Pearson Chi-Square. With a significance level (p-value) of 0.003 and a Pearson Chi-Square value of 35.622 (df), there is a statistically significant relationship between the variables under investigation. With 16 degrees of freedom and an even smaller p-value of 0.000, the Likelihood Ratio test demonstrates a value of 44.320,

which provides further support for the existence of a significant association. In contrast, the Linear-by-Linear Association test yields a p-value of 0.085 and a value of 2.973 for a single degree of freedom. These results fail to meet the conventional significance level of 0.05. Furthermore, it is observed that eleven cells (44.0 percent of the overall cells) possess an expected count below 5, with a minimum expected count of 1.47. This implies that certain anticipated frequencies are notably low, potentially compromising the dependability of the Chi-Square test outcomes. In the analysis, 150 legitimate cases were considered.

7.2 Linear Regression

It is appropriate to employ a linear regression test in order to evaluate the null hypothesis H2, which posits that there is no statistically significant correlation between alcohol consumption and physical health outcomes among young adults who have been diagnosed with alcohol use disorders. By permitting the examination of the relationship between two continuous variables, linear regression is applicable in this context to the analysis of the potential association between alcohol consumption (independent variable) and physical health outcomes (dependent variable). Researchers can obtain significant insights into the effects of alcohol consumption on the physical health of young adults with alcohol use disorders by employing linear regression to quantitatively evaluate the strength and direction of any observed relationship.

H2: There is no significant relationship between alcohol consumption and physical health outcomes in young adults diagnosed with alcohol use disorders.

Table 8: ANOVA Table for the Relationship Between Alcohol Consumption and Physical Health Outcomes in Young Adults with Alcohol Use Disorders.

ANOVAa						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	74.114	1	74.114	12.110	.001 b
	Residual	905.779	148	6.120		
	Total	979.893	149			
a. Dependent Variable: PhysicalandHealth_Impact						
b. Predictors: (Constant), GeneralAlcoholConsumption						

The outcomes of an analysis of variance (ANOVA) conducted on a regression model are displayed in Table 8. The dependent variable under consideration is "Impact on Physical and Health." The regression model effectively explains a substantial proportion of the variability observed in the dependent variable, as evidenced by the model's high F-statistic (12.110) and the correspondingly small p-value (.001). The regression model's significance level, sum of squares, degrees of freedom (df), and mean square are displayed in the "Regression" row. "General Alcohol Consumption," the predictor variable, exerts a substantial influence on the dependent variable. Furthermore, the "Residual" row presents the unexplained variance that remains subsequent to the inclusion of the regression model. The model demonstrates a significant ability to account for the entirety of the variance, as indicated by the high F-value and the relatively small residual sum of squares in relation to the total sum of squares.

CONCLUSION

In conclusion, the proposed research design employs a cross-sectional approach with multiple groups based on alcohol consumption levels to examine the influence of alcohol on cognitive function in young adults diagnosed with Alcohol Use Disorders (AUD). By utilizing standardized cognitive tests and fMRI, this study aims to elucidate the relationship between alcohol consumption and cognitive domains such as memory, executive function, attention, and processing speed. Anticipated contributions include providing insights into how varying levels of alcohol intake affect cognitive abilities in this demographic, potentially uncovering specific cognitive domains more susceptible to impairment due to alcohol, and highlighting the importance of early intervention strategies. Future implications may involve refining AUD interventions tailored to cognitive deficits and exploring longitudinal studies to assess cognitive changes over time in response to alcohol consumption and interventions.

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