

Dr. Vipul Janardan

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30th August, 2024

To,

The Selection Committee

Sun Pharma Science Foundation

Subject: Submission of Signed Details for Sun Pharma Research Fellowship

Dear Members of the Selection Committee,

I am writing to submit the signed details of my research work for consideration for the Sun Pharma Research Fellowship. The attached document includes a comprehensive summary of my research contributions, complete with references and illustrations, as required by the application guidelines.

My research primarily focuses on "sexual dysfunction associated with substance use disorders," This work has been carried out with the utmost dedication to advancing knowledge in the field, and I believe it aligns well with the objectives of the Sun Pharma Science Foundation.

. All necessary references are included, and I have personally signed the document to confirm its authenticity.

Thank you for considering my application. I look forward to the opportunity to contribute further to the scientific community with the support of this fellowship.

Yours sincerely,



Dr. Vipul Janardan

Senior Resident, IHBAS

New Delhi, India

Comparative study of various substance use disorder and sexual dysfunction

Introduction

Sexual dysfunction, defined as any disruption in normal sexual activity, can affect any phase of the sexual response cycle, including physical pleasure, desire, preference, arousal, or orgasm^[1]. It is a common concern, with epidemiological studies showing that over 40% of women and 30% of men in the United States experience some form of sexual dysfunction^[2]. In European countries, these figures stand at 34% for women and 15% for men^[3]. Developing countries report even higher prevalence rates, especially regarding erectile dysfunction among men seeking primary care. For instance, Nigeria reported a 57.4% prevalence, Egypt 63.6%, and Pakistan 80.8%. A recent study in India showed that 14% of women and 21.2% of men suffer from sexual dysfunction^[4].

Several factors contribute to sexual dysfunction, including general health status, non-communicable diseases such as diabetes mellitus and cardiovascular diseases, psychiatric disorders, and chronic conditions^[5]. Substance use disorders have also been increasingly recognized as significant contributors to sexual dysfunction^[6]. Globally, substance use disorders are a major public health issue, contributing to substantial preventable morbidity and mortality. In 2015, the global prevalence of heavy episodic alcohol use among adults was 18.4%, with tobacco smoking at 15.2%, cannabis use at 3.8%, and opioid use at 0.37%^[7]. The disability-adjusted life-years (DALYs) associated with substance use are highest for tobacco smoking, followed by alcohol and illicit drug use.

In India, the prevalence of substance use disorders is 22.4%, with tobacco use disorders (20.89%) and alcohol use disorders (4.64%) being the most common, according to the National Mental Health Survey of India^[8].

Given the substantial impact of substance use on health, including sexual health, this study aims to explore the prevalence and nature of sexual dysfunction among male inpatients with alcohol dependence syndrome (ADS) and to compare sexual dysfunction across various substance use disorders. This research is particularly relevant as, despite the extensive literature on the physical and psychiatric complications of ADS, sexual dysfunction in this context has not been adequately explored. Most studies have focused on erectile dysfunction and premature ejaculation, with other domains of sexual dysfunction, such as sexual pleasure, desire, arousal, orgasmic function, and intercourse satisfaction, receiving little attention. Additionally, some studies have reported equivocal findings regarding the relationship between alcohol intake and sexual dysfunction, further complicating the understanding of this issue.

The Normal Sexual Cycle and Sexual Dysfunction

The human sexual response cycle is typically divided into four phases: excitement (which includes desire and arousal), plateau, orgasm, and resolution^[9]. The transition from one phase to another is triggered by an erotic stimulus and is influenced by a complex interplay of endocrine and nervous (both central and autonomic) systems. Sexual dysfunction can occur in any of these phases. Common sexual dysfunctions include hypoactive sexual desire disorder, erectile disorder, premature ejaculation, delayed ejaculation in men, and female sexual interest/arousal disorder, orgasmic disorder, and genito-pelvic pain/penetration disorder in women.

Substance/medication-induced sexual dysfunction, other specified sexual dysfunction, and unspecified sexual dysfunction constitute the remaining categories of sexual dysfunction^[10].

Use of Specific Substances and Related Sexual Dysfunction

Alcohol

Alcohol has long been used as an aphrodisiac due to its central nervous system depressant and disinhibitory effects. While alcohol may cause mild increases in sexual arousal at lower doses, higher doses lead to a decrease in sexual arousal, impaired erection, and difficulties with ejaculation. Chronic alcohol use affects almost all aspects of male sexual function, including the hypothalamo-pituitary-adrenal axis, which reduces gonadotropin release, resulting in hypogonadism^[11]. Alcohol also suppresses testosterone production, further contributing to erectile dysfunction. In women, chronic alcohol use can decrease vaginal lubrication, cause

dyspareunia, and make it difficult to achieve orgasm. Although some studies suggest that sexual function may improve with abstinence, this is not always the case.

Nicotine

Nicotine, primarily known for its strong vasoconstrictor effects, has a well-documented impact on male sexual function, leading to erectile dysfunction due to impaired initiation and maintenance of erections. The vascular effects of nicotine also reduce the availability of vasodilator substances like nitric oxide. While the effects of nicotine on female sexual function are less well-studied, some reports suggest decreased vaginal lubrication and delayed orgasm in women^[12].

Cannabis

Cannabis has been historically regarded as an aphrodisiac, but current evidence regarding its effects on sexual function is mixed. While some users report enhanced sexual pleasure and satisfaction, chronic cannabis use has been associated with decreased testosterone levels and erectile dysfunction. The inhibitory effects of cannabis on erectile function may be mediated through the central and peripheral cannabinoid receptors located in the hypothalamus and corpus cavernosum, respectively^[13].

Opioids

Opioids initially may enhance sexual function by delaying ejaculation in men and reducing vaginismus in women. However, chronic opioid use leads to hypogonadism by reducing the release of luteinizing hormone and decreasing testosterone and estradiol levels. This results in

reduced sexual desire, erectile dysfunction, and infertility. Long-term opioid substitution therapy, especially with methadone, also contributes to sexual dysfunction^[14].

Cocaine

Cocaine, a potent stimulant, initially enhances sexual arousal and erectile function. However, prolonged use decreases sexual desire and causes erectile dysfunction, delayed orgasm, and ejaculation. The effects are exacerbated when cocaine is used in combination with other substances, such as alcohol.

Amphetamines and MDMA

Amphetamines and MDMA are stimulants known for their aphrodisiac properties, especially in small doses. They increase sexual desire and delay orgasm by reducing inhibition, increasing confidence, and providing a heightened sense of energy. However, chronic use can lead to erectile dysfunction, decreased sexual desire, and anorgasmia^[15]. This condition, often referred to as "crystal dick," is characterized by a strong sexual drive paired with inadequate penile erections.

Nitrite Inhalants

Volatile nitrites, such as amyl and butyl nitrites, are used to enhance erectile function due to their smooth muscle relaxation and vasodilation effects. However, their role in causing erectile

dysfunction remains unclear. Despite this, nitrite abuse has been associated with high-risk sexual behavior and increased risk of HIV transmission^[16].

Conclusion.

Aim of the Study

The aim of this study is to compare various sexual dysfunctions in individuals with different substance use disorders.

Objectives of the Study

1. To assess the prevalence and nature of sexual dysfunction in male patients with substance use disorders.
2. To compare the different domains of sexual dysfunction across various substance use disorders, including alcohol, nicotine, cannabis, opioids, cocaine, amphetamines, and others.
3. To determine the relationship between substance use severity and the extent of sexual dysfunction.
4. To evaluate the impact of sexual dysfunction on the overall quality of life in patients with substance use disorders.

Methodology of the Study

- **Study Design:** Observational, descriptive, and cross-sectional study.
- **Study Population:** Male patients over the age of 18 with a diagnosed substance use disorder.
- **Inclusion Criteria:**
 - Male patients aged 18 years and above.

- All consecutive cases of substance use disorder admitted in the Drug and Alcohol Treatment and Rehabilitation Center (DATRC) ward under Section 85.
- Married or having a regular heterosexual partner.
- Willingness to provide informed consent.
- **Exclusion Criteria:**
 - Presence of comorbid psychiatric disorders.
 - History of primary sexual dysfunction.
 - Presence of other organic disorders.
 - Use of medications known to have sexual side effects.
- **Assessment Tools:**
 - **CSFQ (Changes in Sexual Functioning Questionnaire):**
 - Sexual desire/frequency score (8).
 - Sexual desire interest score (11).
 - Sexual pleasure score (4).
 - Sexual arousal/excitement score (13).
 - Sexual orgasm/completion score (13).
 - Painful orgasm score (13).
 - **IIEF (International Index of Erectile Function):**
 - Erectile dysfunction (scores less than 14).
 - Orgasmic function.
 - Sexual desire.
 - Intercourse satisfaction.
 - Overall satisfaction.

STATISTICAL METHODS

The statistical analysis for this study was conducted using software (Version 1.0, BDSS Corp, India). The primary outcome variables were the International Index of Erectile Function (IIEF) and the Changes in Sexual Functioning Questionnaire (CSFQ-F-C), which assessed various domains including pleasure, desire, interest, arousal, and orgasm. The primary explanatory variable was substance use. Additionally, demographic variables such as age, gender, occupation, and marital status were considered relevant to the study.

Descriptive statistics were utilized to summarize the data. Quantitative variables, such as age, were described using mean and standard deviation (SD), while categorical variables, like gender and marital status, were reported as frequencies and proportions. Data visualization was achieved through various graphical representations, including bar diagrams, pie charts, error bar charts, and cluster bar charts.

For quantitative parameters that followed a normal distribution, mean values were compared across different study groups using ANOVA (Analysis of Variance) when more than two groups were involved. The comparison of categorical outcomes across study groups was performed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant, indicating a meaningful difference between the groups being compared.

- **Result:**

A total of 150 subjects were included in the final analysis.

- **Table 1: Descriptive analysis of age (years) in study population (N=150)**

Parameter	Mean \pm SD	Median	Minimum	Maximum	95% C. I	
					Lower	Upper
Age (years)	34.01 \pm 8.81	33.00	18.00	53.00	32.59	35.44

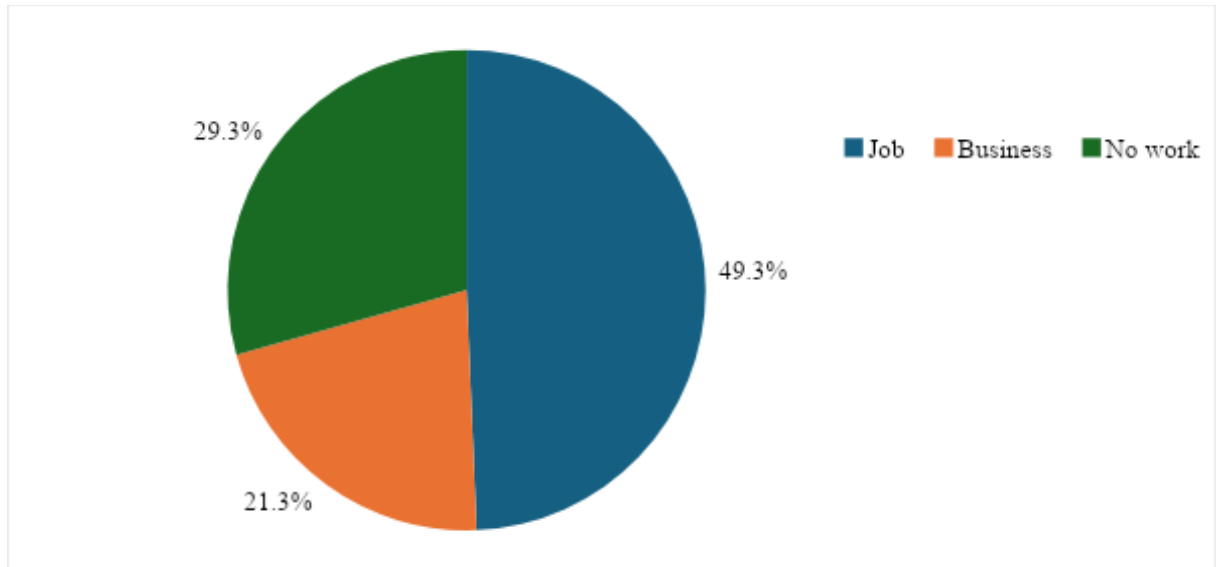
- The mean age was 34.01 \pm 8.81 years in the study population, minimum level was 18 and maximum level was 53 in the study population (95% CI 32.59 to 35.44). (Table 1)

- **Table 2: Descriptive analysis of occupation in the study population (N=150)**

Occupation	Frequency	Percentages
Job	74	49.33%
Business	32	21.33%
No work	44	29.33%

In the study population, 74 participants (49.33%) had jobs, and 32 (21.33%) were involved in business.

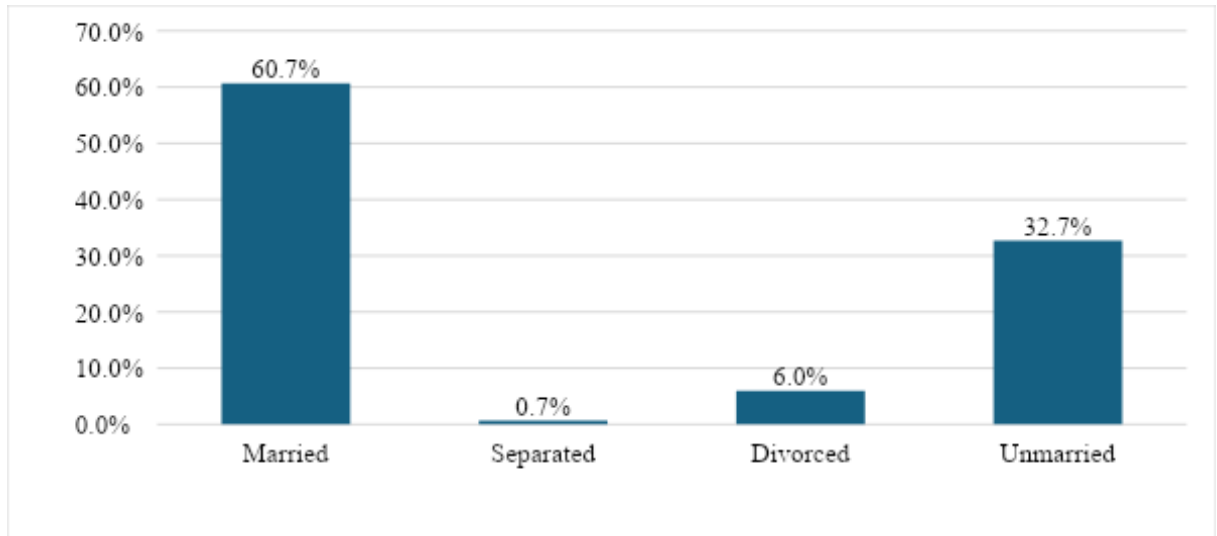
- **Figure 1: Pie chart of occupation in the study population (N=150)**



• **Table 3: Descriptive analysis of marital status in the study population (N=150)**

Marital Status	Frequency	Percentages
Married	91	60.67%
Separated	1	0.67%
Divorced	9	6.00%
Unmarried	49	32.67%

• **Figure 2: Bar chart of marital status in the study population (N=150)**

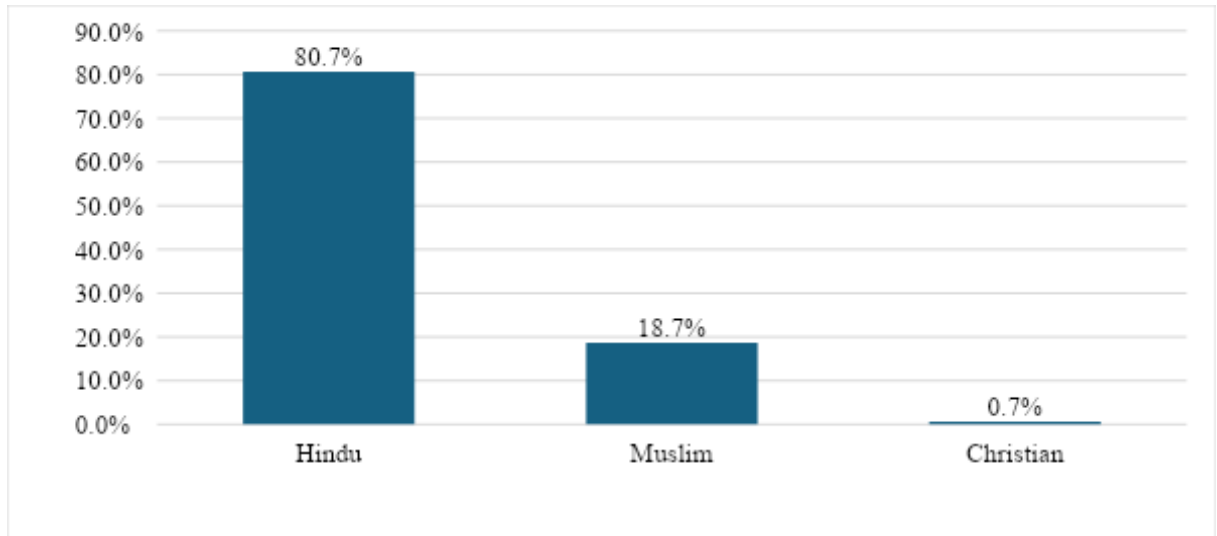


• **Table 4: Descriptive analysis of religion in the study population (N=150)**

Religion	Frequency	Percentages
Hindu	121	80.67%
Muslim	28	18.67%
Christian	1	0.67%

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- Among the study population, 121 (80.67%) participants were Hindu 28 (18.67%) were Muslim and 1 (0.67%) were Christian. (Table 4 & Figure 3)

• **Figure 3: Bar chart of religion in the study population (N=150)**



• **Table 5: Descriptive analysis of family history of substance abuse (N=150)**

Family History of Substance Abuse	Frequency	Percentages
Father	51	34.00%
Brother	2	1.33%
Father & Brother	4	2.67%
No drug history	93	62.00%

• **Figure 4: Bar chart of family history of substance abuse in the study population (N=150)**

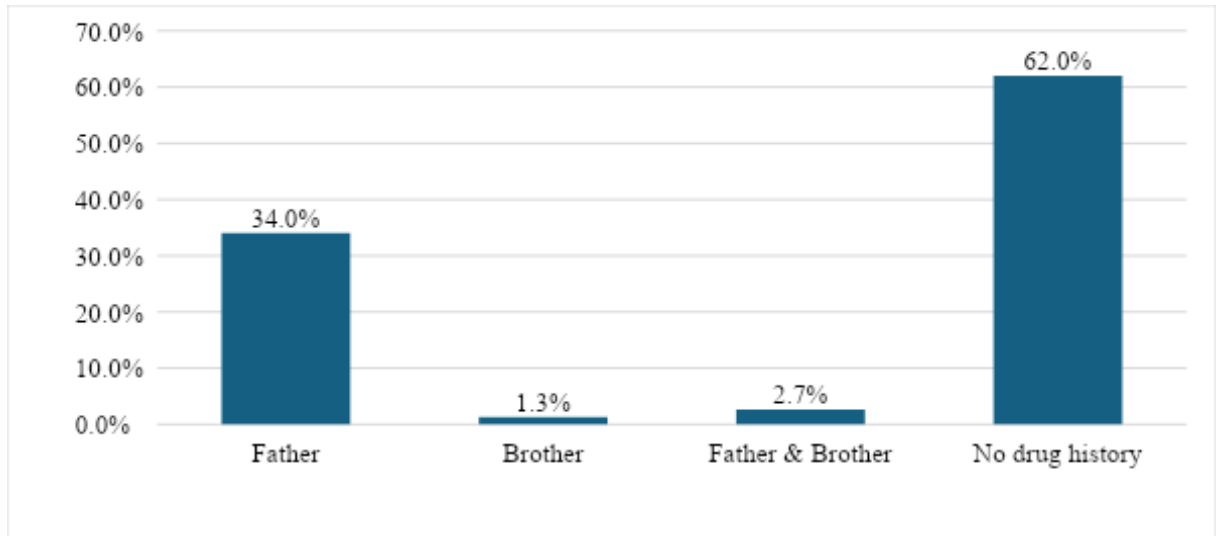


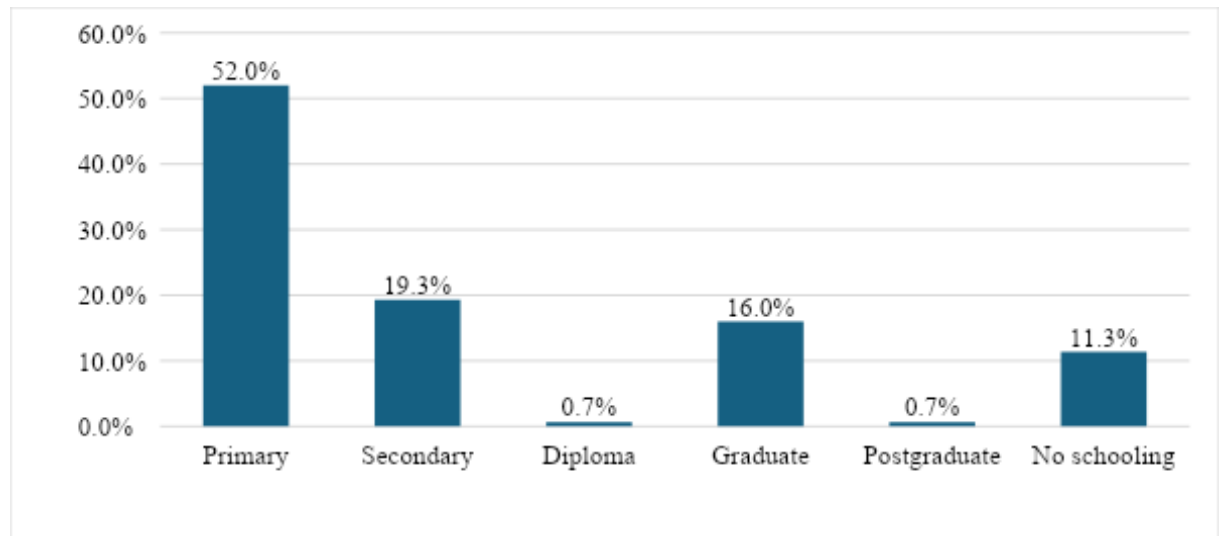
Table 6: Descriptive analysis of education in the study population (N=150)

Education	Frequency	Percentages
Primary	78	52.00%
Secondary	29	19.33%
Diploma	1	0.67%
Graduate	24	16.00%
Postgraduate	1	0.67%
No schooling	17	11.33%

- Among the study population, 78 participants (52.00%) had primary education, 29 (19.33%) had secondary education, only 1 (0.67%) had a diploma, 24 (16.00%) were graduates, 1 (0.67%) was a postgraduate, and 17 (11.33%) had no schooling.

. (Table 6)

- **Figure 5: Bar chart of education in the study population (N=150)**



- **Table 7: Descriptive analysis of substance use in the study population (N=124)**

Substance Use	Frequency	Percentages
Alcohol	81	65.32%
Opioid	28	22.58%
Alcohol + Nicotine	15	12.10%

- The majority of 81 (65.32%) participants had alcohol substance use, followed by Opioid, Alcohol + Nicotine had 28 (22.58%) and 15 (12.10%).

- **Table 8: Descriptive analysis of international index of erectile function (IIEF) in the study population (N=150)**

International Index of Erectile Function (IIEF)	Mean \pm SD	Median	Minimum	Maximum	95% C. I	
					Lower	Upper

Erectile Function (A)	21.2 ± 7.46	22.0	3.0	30.0	20.0	22.4
Orgasmic Function (B)	7.07 ± 2.75	8.0	0.0	10.0	6.6	7.5
Sexual Desire	7.13 ± 2.61	7.0	1.0	10.0	6.7	7.6
Intercourse Satisfaction (D)	10.84 ± 3.94	12.0	0.0	15.0	10.2	11.5
Overall Satisfaction	7.07 ± 2.24	7.0	2.0	10.0	6.7	7.4

- The mean Erectile Function (A) was 21.2 ± 7.46 in the study population. Ranged between 3.0 to 30.0 (95% CI 20.0 to 22.4).
- **Table 9: Descriptive analysis of CSFQ-F-C in the study population (N=150)**

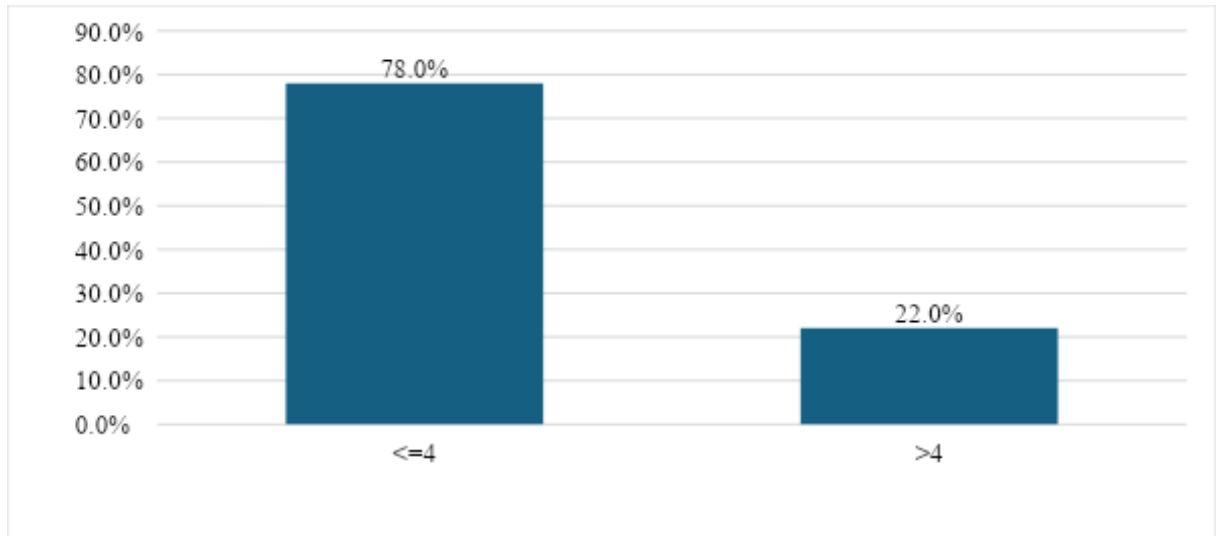
CSFQ-F-C	Mean ± SD	Median	Minimum	Maximum	95% C. I	
					Lower	Upper
Pleasure	3.38 ± 1.21	3.0	1.0	5.0	3.2	3.6
Desire	6.83 ± 2.18	7.0	2.0	10.0	6.5	7.2
Interest	8.61 ± 3.52	9.0	3.0	15.0	8.1	9.2
Arousal	9.67 ± 3.43	11.0	2.0	15.0	9.1	10.2
Orgasm	11.84 ± 3.19	13.0	3.0	15.0	11.3	12.4
Total	47.98 ± 11.55	49.5	20.0	66.0	46.1	49.8

- **Table 10: Descriptive analysis of CSFQ-F-C in the study population (N=150)**

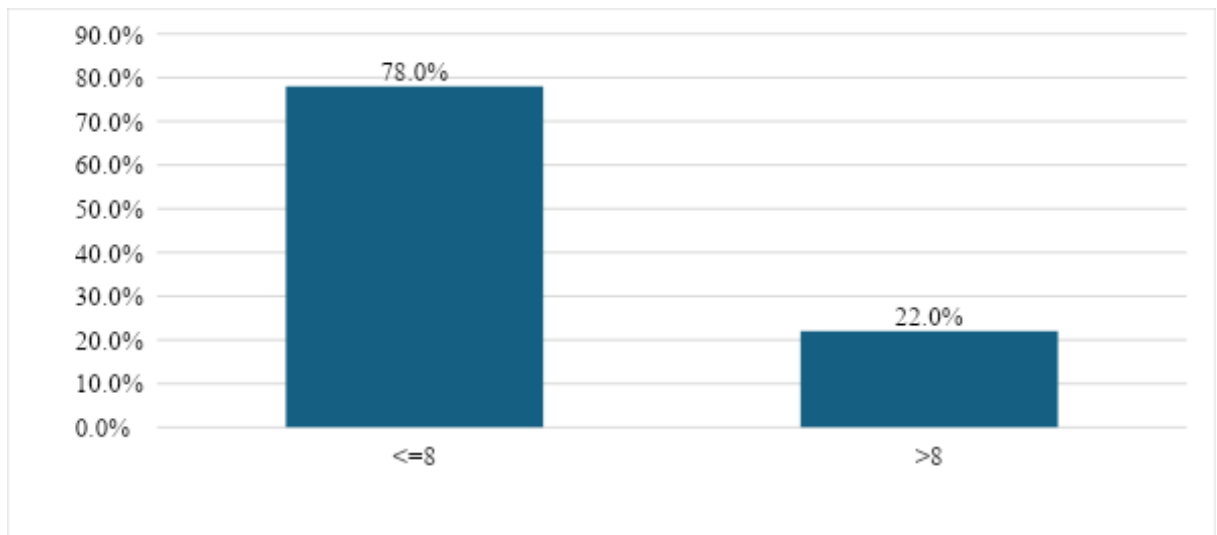
CSFQ-F-C	Frequency	Percentages
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Pleasure Score		
<=4	117	78.00%
>4	33	22.00%
Desire Score		
<=8	117	78.00%
>8	33	22.00%
Interest Score		
<=11	110	73.33%
>11	40	26.67%
Arousal Score		
<=13	132	88.00%
>13	18	12.00%
Orgasm Score		
<=13	96	64.00%
>13	54	36.00%
CSFC Total		
Yes (<=47)	67	44.67%
No (>47)	83	55.33%

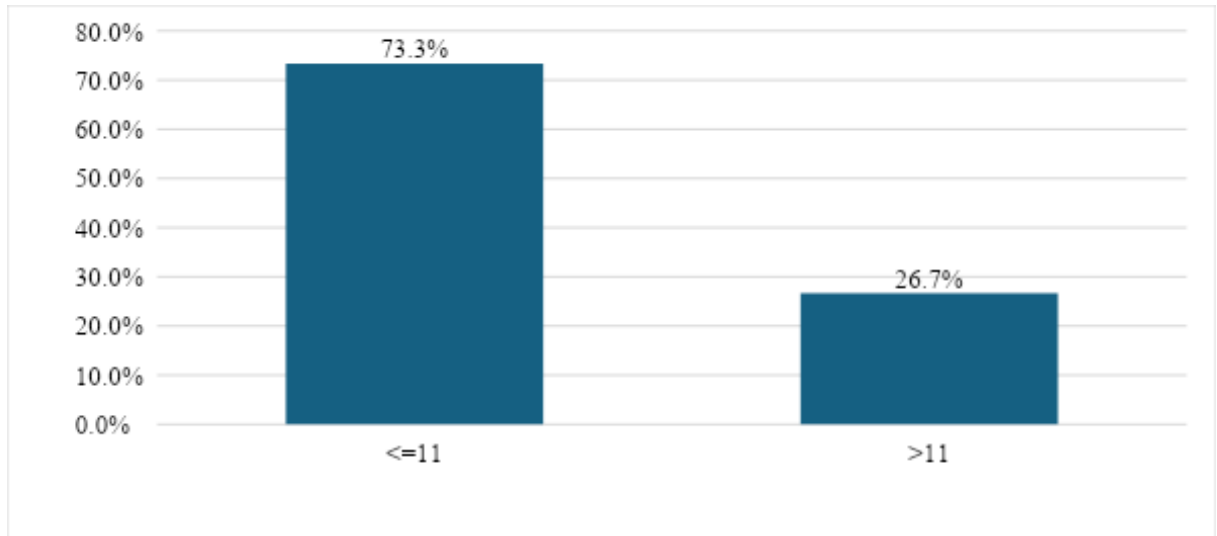
- **Figure 6: Bar chart of pleasure score in the study population (N=150)**



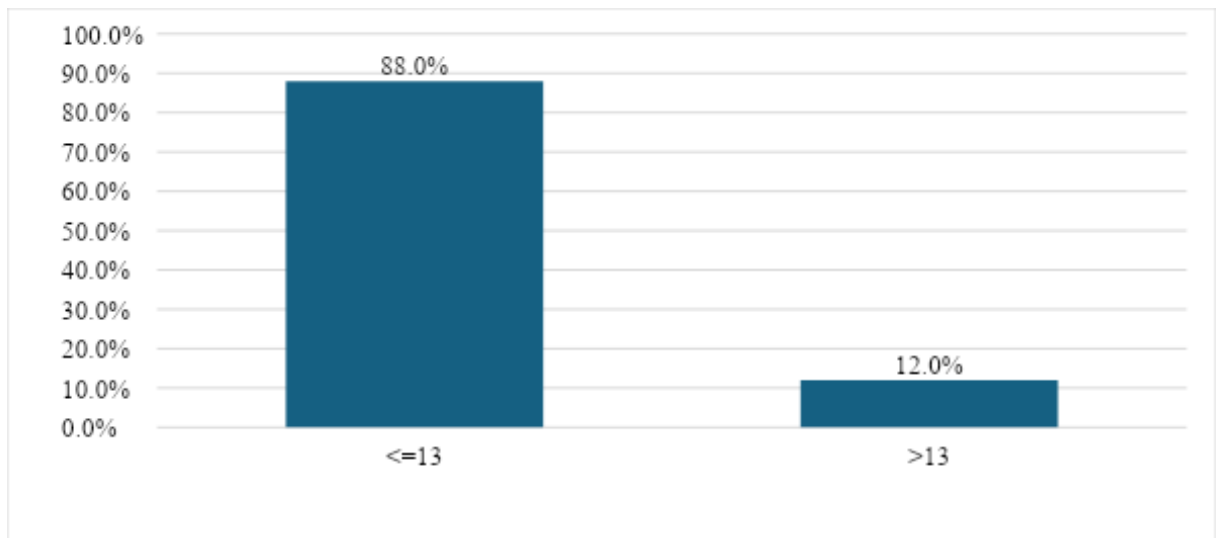
- **Figure 7: Bar chart of desire score in the study population (N=150)**



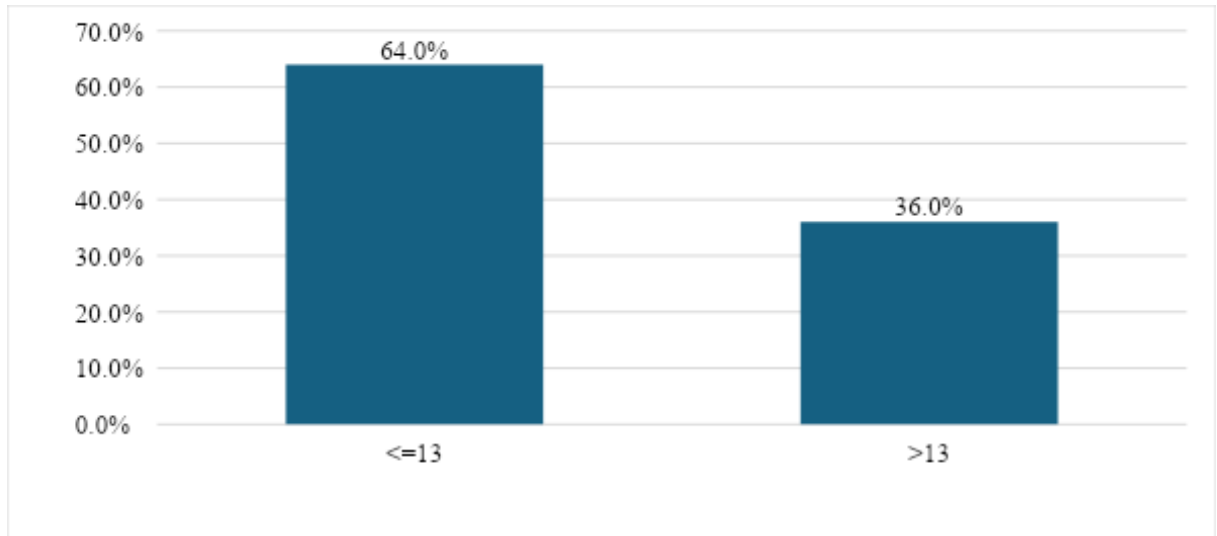
- **Figure 8: Bar chart of interest score in the study population (N=150)**



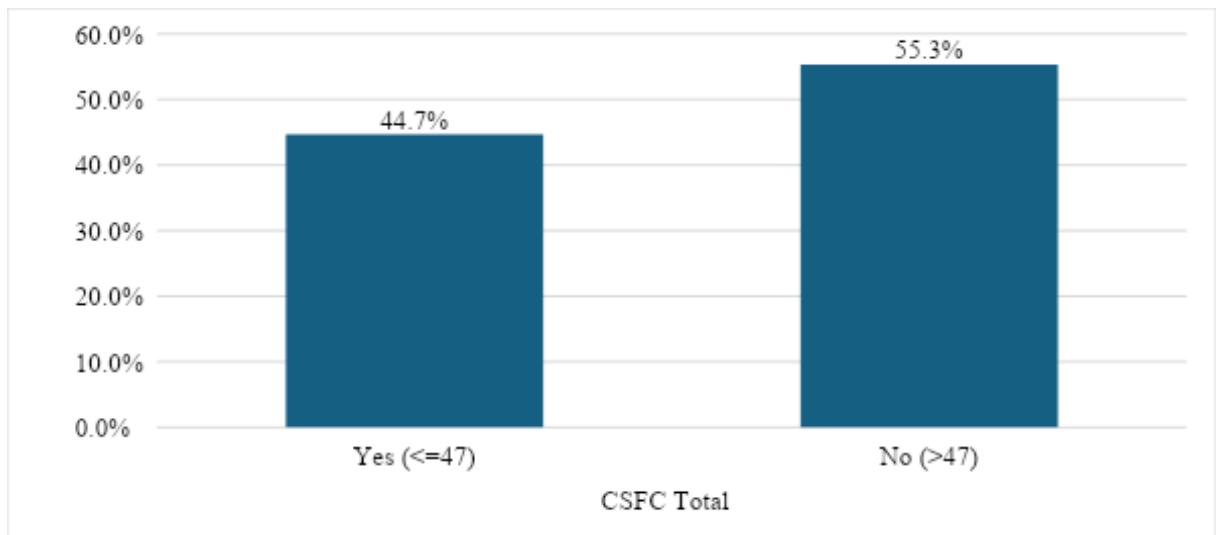
- **Figure 9: Bar chart of arousal score in the study population (N=150)**



- **Figure 10: Bar chart of orgasm score in the study population (N=150)**



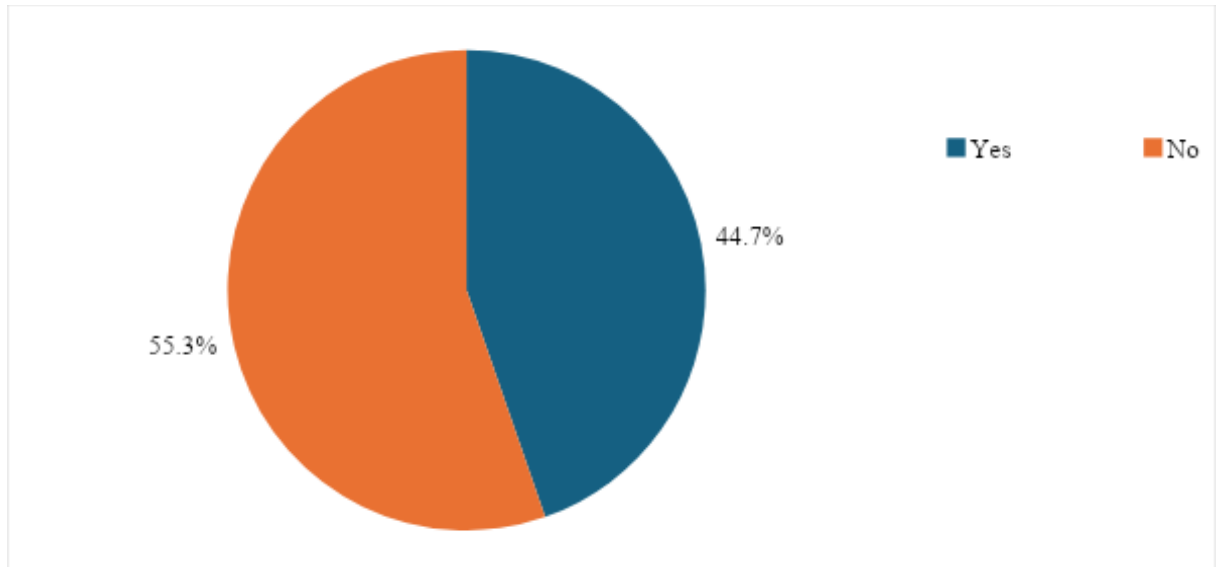
- **Figure 11: Bar chart of CSFC total in the study population (N=150)**



- **Table 11: Descriptive analysis of sexual dysfunction in the study population (N=150)**

Sexual dysfunction	Frequency	Percentages
Yes	67	44.67%
No	83	55.33%

- **Figure chart of sexual dysfunction in the study population (N=150)12: Bar**

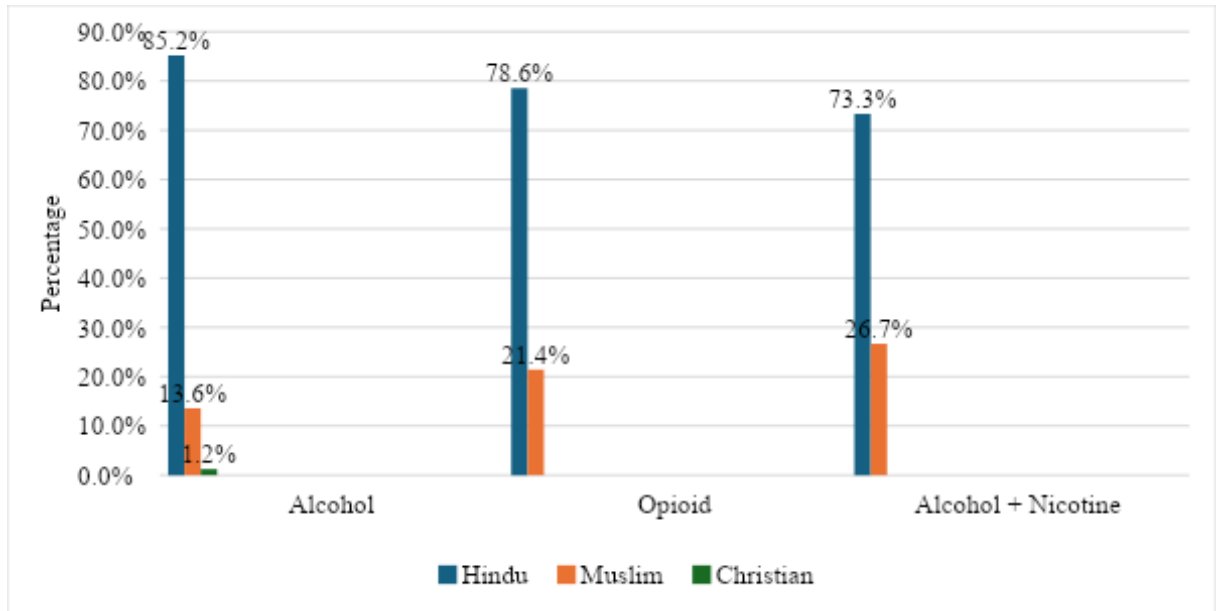


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• **Table 12: Comparison of religion across substance use (N=124)**

Religion	Substance Use		
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)
Hindu	69 (85.19%)	22 (78.57%)	11 (73.33%)
Muslim	11 (13.58%)	6 (21.43%)	4 (26.67%)
Christian	1 (1.23%)	0 (0.00%)	0 (0.00%)

- **Due to zero cell value no test was applicable*
- In alcohol substance use, 69 (85.19%) participants were Hindu, 11 (13.58%) participants were Muslim and 1 (1.23%) participant was Christian. In opioid, 22 (78.57%) participants were Hindu and 6 (21.43%) participants were Muslim. In opioid, 11 (73.33%) participants were Hindu and 4 (26.67%) participants were Muslim.
- **Figure 13: Staked bar chart of comparison of religion across substance use (N=124)**



• **Table 13: Comparison of CSFQ-F-C across substance use (N=124)**

Parameter	Substance Use			Chi square value	P value
	Alcohol	Opioid	Alcohol + Nicotine		
	(N=81)	(N=28)	(N=15)		
Pleasure Score					
<=4	67 (82.72%)	18 (64.29%)	12 (80.00%)	4.18	0.1236*
>4	14 (17.28%)	10 (35.71%)	3 (20.00%)		
Desire Score					
<=8	66 (81.48%)	20 (71.43%)	11 (73.33%)	1.47	0.4785*
>8	15 (18.52%)	8 (28.57%)	4 (26.67%)		
Interest Score					
<=11	62 (76.54%)	17 (60.71%)	11 (73.33%)	2.62	0.2692*
>11	19 (23.46%)	11 (39.29%)	4 (26.67%)		

Parameter	Substance Use			Chi square value	P value
	Alcohol	Opioid	Alcohol + Nicotine		
	(N=81)	(N=28)	(N=15)		
Arousal Score					
<=13	72 (88.89%)	26 (92.86%)	15 (100.00%)	-	†
>13	9 (11.11%)	2 (7.14%)	0 (0.00%)		
Orgasm Score					
<=13	55 (67.90%)	14 (50.00%)	12 (80.00%)	4.57	0.1020*
>13	26 (32.10%)	14 (50.00%)	3 (20.00%)		
CSFC total					
Yes (<=47)	42 (51.85%)	9 (32.14%)	7 (46.67%)	3.25	0.1972*
No (>47)	39 (48.15%)	19 (67.86%)	8 (53.33%)		

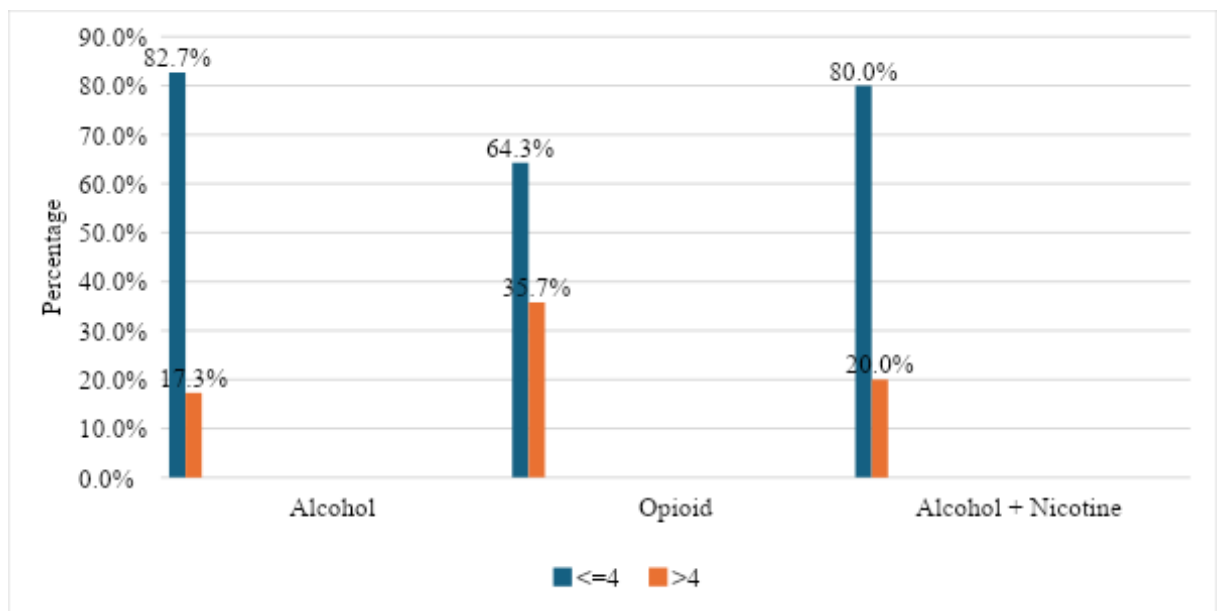
- * = Chi square test P value; † = No test was applicable due to zero cell value.

In the alcohol substance use group, 67 participants (82.72%) had a pleasure score of ≤4, while 14 participants (17.28%) had a pleasure score of >4. In the opioid group, 18 participants (64.29%) had a pleasure score of ≤4, and 10 participants (35.71%) had a pleasure score of >4. In the Alcohol + Nicotine group, 12 participants (80.00%) had a pleasure score of ≤4, and 3 participants (20.00%) had a pleasure score of >4. The difference in the proportion of pleasure scores

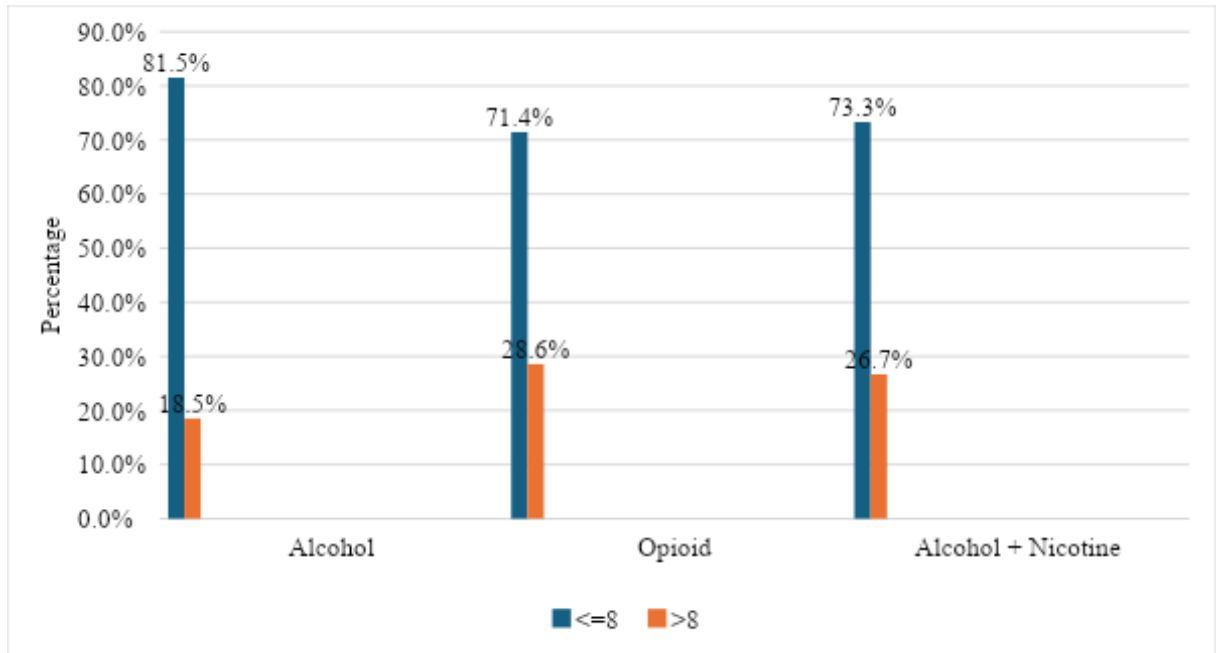
across substance use groups was not statistically significant (P value > 0.05).

The difference in the proportion of CSFQ total scores across substance use groups was also found to be insignificant, with a P-value of 0.1972. The majority of participants, 42 (51.85%), were in the alcohol substance use group.

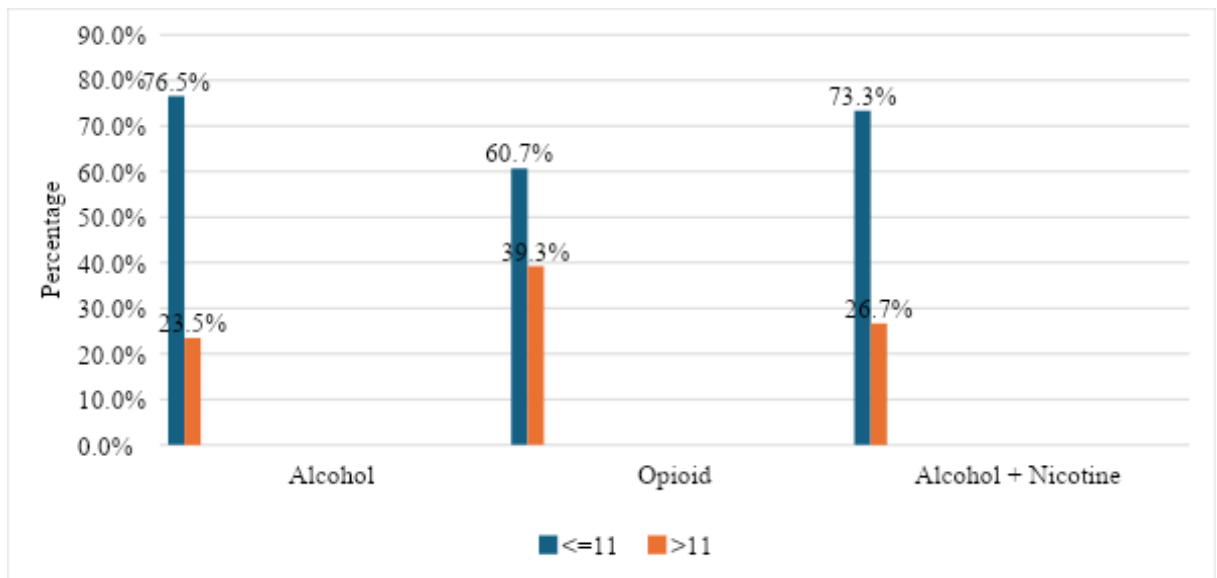
- **Figure 14: Staked bar chart of comparison of pleasure score across substance use**



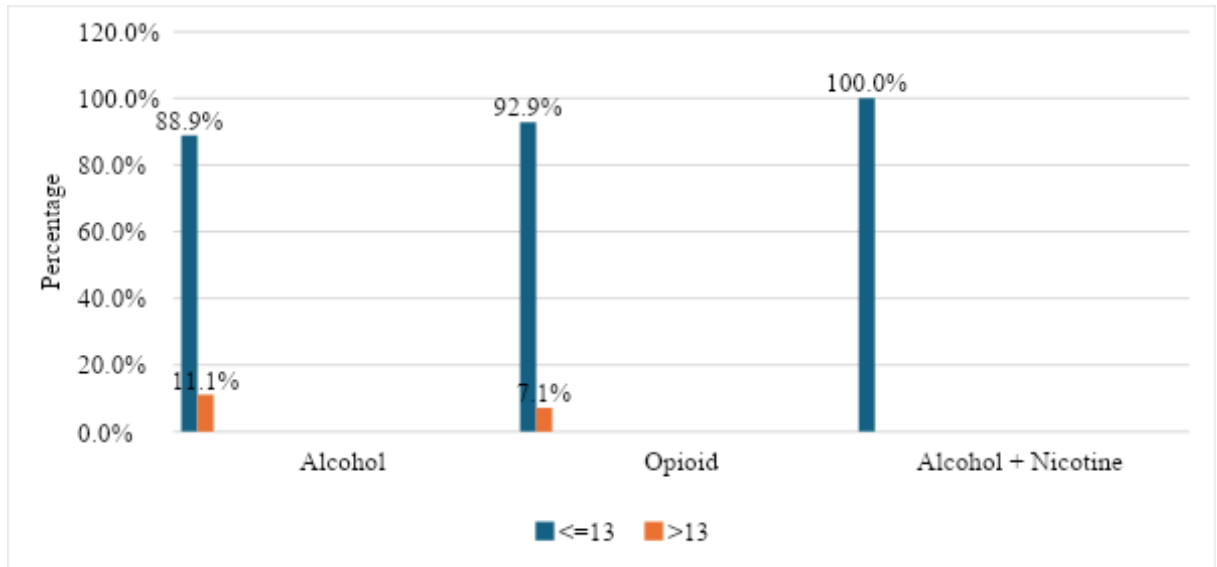
- **Figure 15: Staked bar chart of comparison of desire score across substance use**
(N=124)



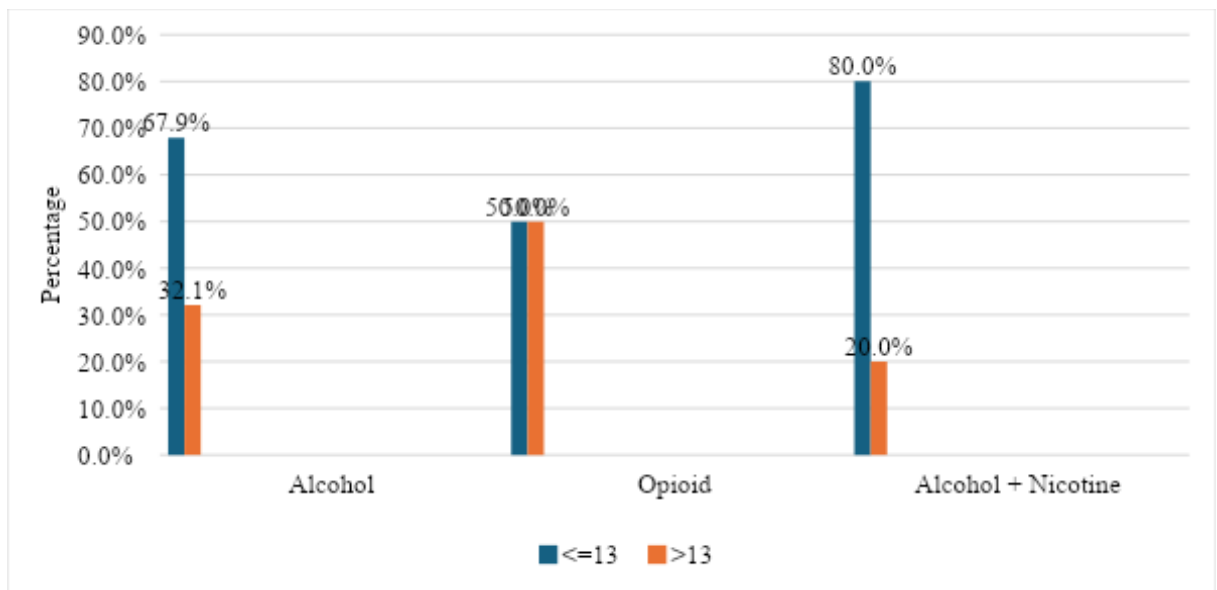
• **Figure 16: Stacked bar chart of comparison of interest score across substance use (N=124)**



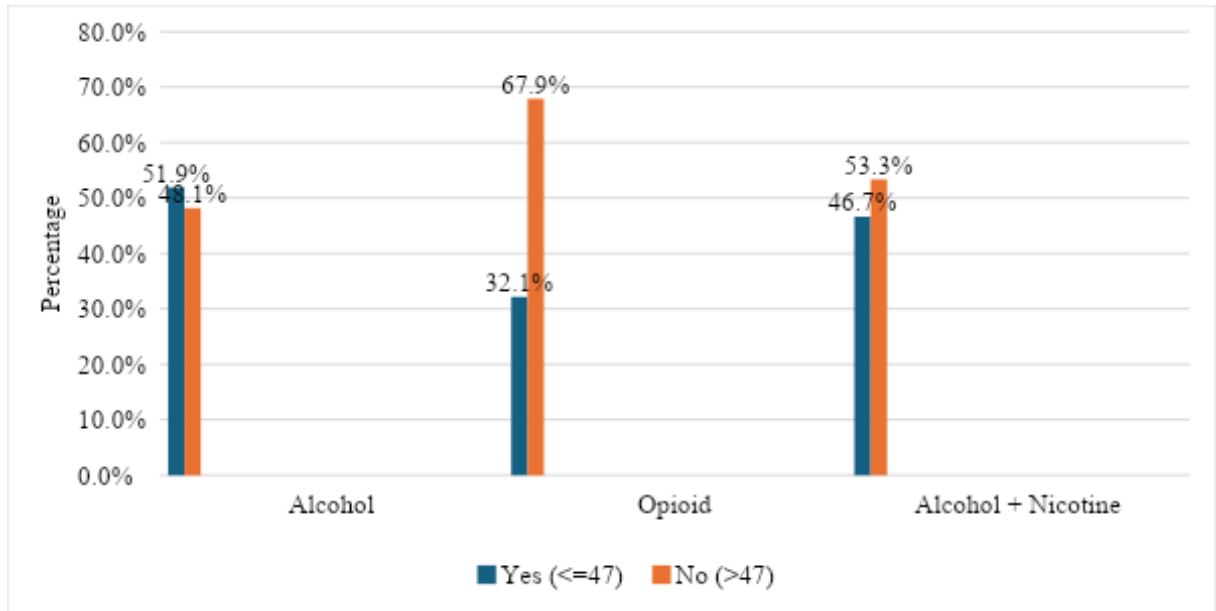
• **Figure 17: Stacked bar chart of comparison of arousal score across substance use (N=124)**



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- **Figure 18: Stacked bar chart of comparison of orgasm score across substance use (N=124)**



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- **Figure 19: Stacked bar chart of comparison of CFSC total across substance use (N=124)**



- **Table 14: Comparison of international index of erectile function (IIEF) with substance use (N=124)**

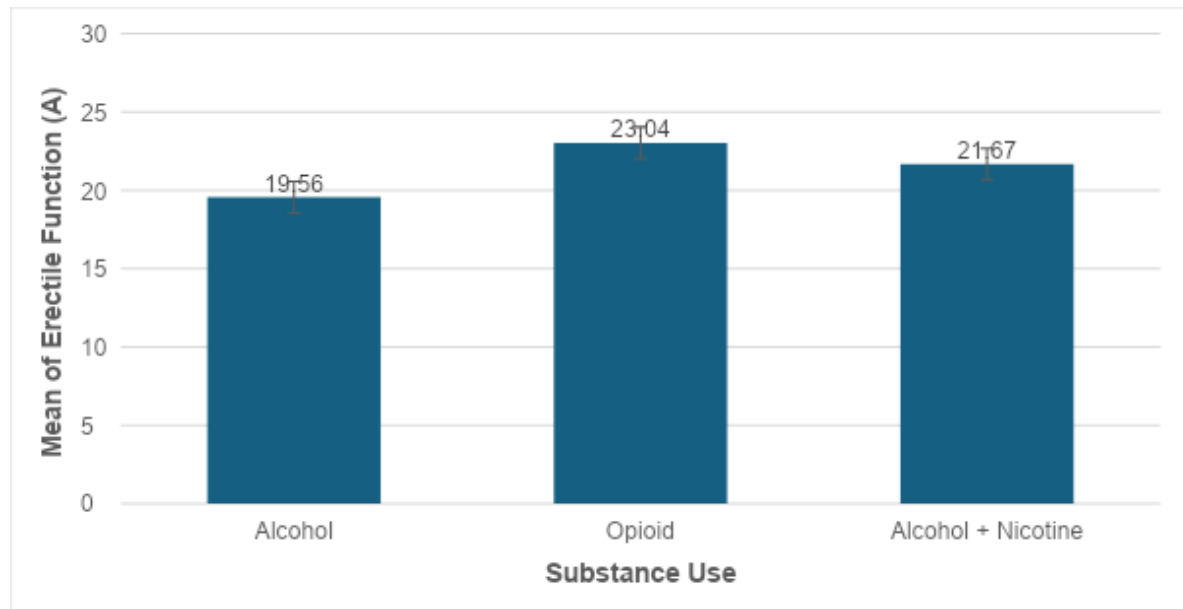
Parameter	Substance Use			P Value (ANOVA)
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)	
	Mean \pm SD	Mean \pm SD	Mean \pm SD	
Erectile Function (A)	19.56 \pm 8.29	23.04 \pm 7.24	21.67 \pm 4.88	0.1079
Orgasmic Function (B)	6.68 \pm 3.05	7.61 \pm 2.22	6.73 \pm 2.66	0.3233
Sexual Desire	6.84 \pm 2.63	7.54 \pm 2.49	7.20 \pm 2.46	0.4555
Intercourse Satisfaction	10.36 \pm 4.06	11.89 \pm 3.50	9.73 \pm 4.18	0.1397
Overall Satisfaction	6.68 \pm 2.44	7.43 \pm 2.13	7.27 \pm 1.53	0.2728

- The mean erectile function (A) with in alcohol substance use was 19.56 \pm 8.29, it was 23.04 \pm 7.24 in opioid and it was 21.67 \pm 4.88 in Alcohol + Nicotine. The mean

difference of erectile function (A) in substance use was statistically not significant with P value 0.1079.

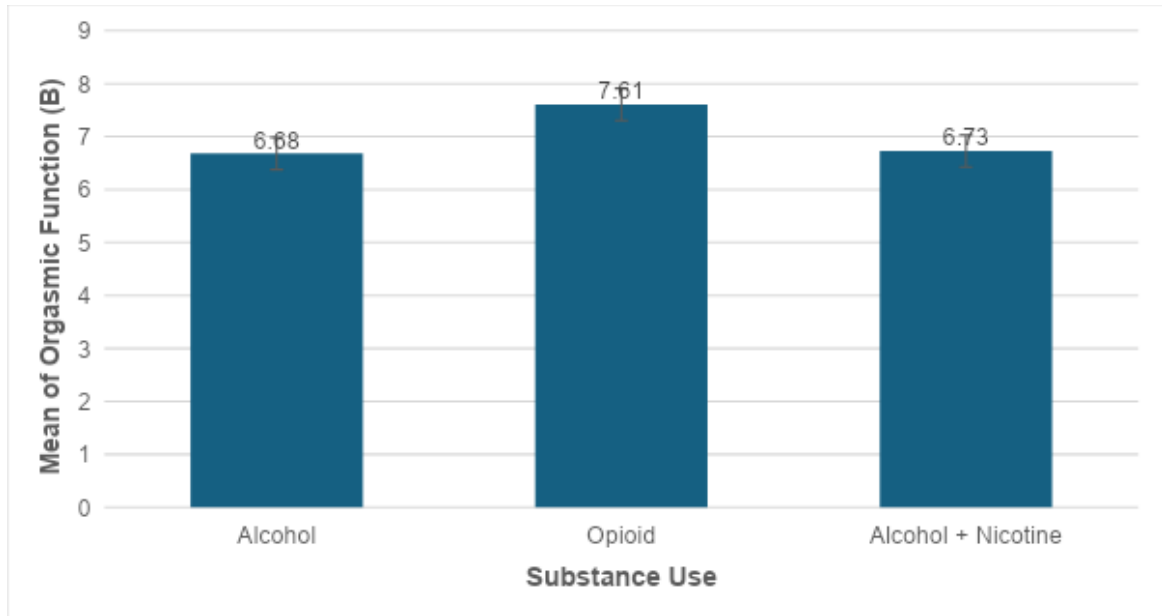
- **Figure 20: Error bar chart of comparison of erectile function (A) across substance use (N=124)**

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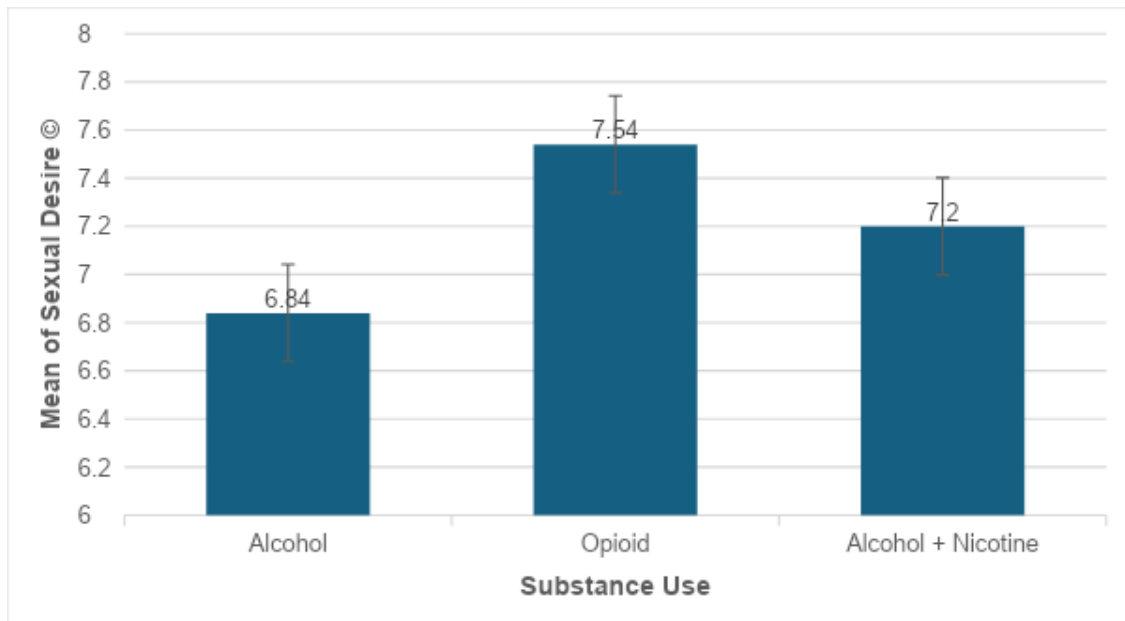


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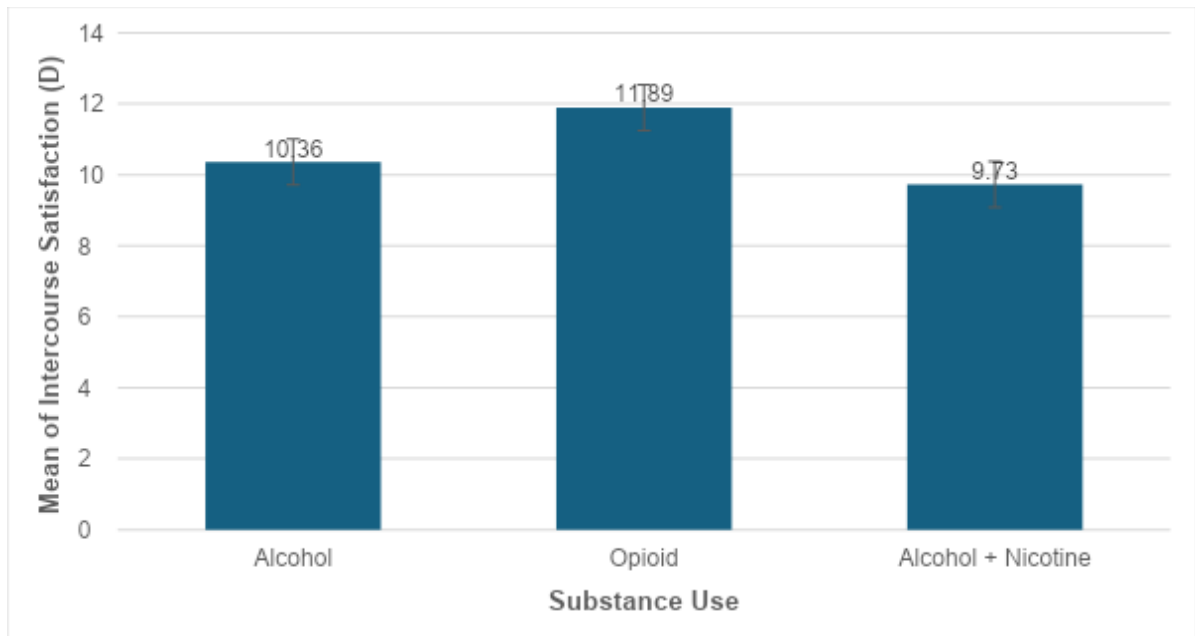
- **Figure 21: Error bar chart of comparison of orgasmic function (B) across substance use (N=124)**



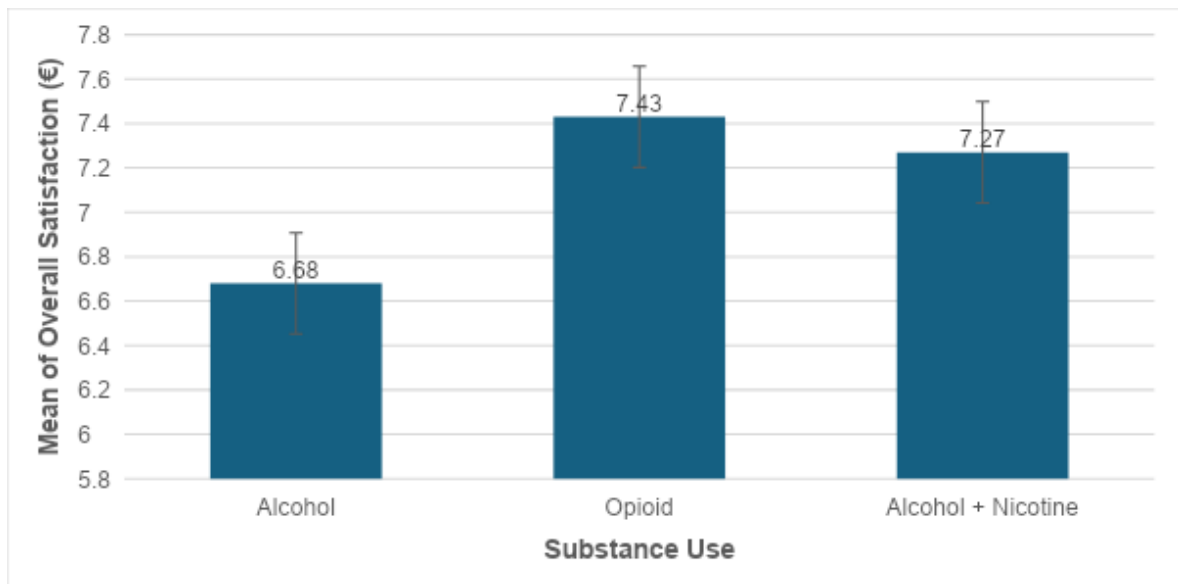
- **Figure 22: Error bar chart of comparison of sexual desire © across substance use (N=124)**



- **Figure 23: Error bar chart of comparison of intercourse satisfaction (D) across substance use (N=124)**



- **Figure 24: Error bar chart of comparison of overall satisfaction (€) across substance use (N=124)**

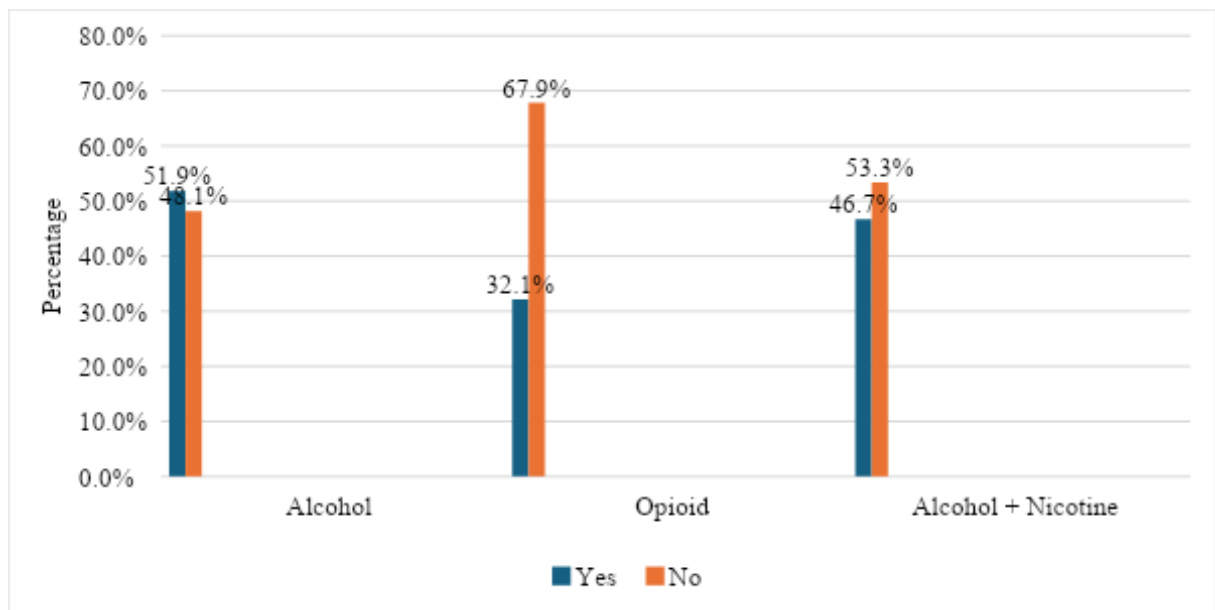


- **Table 15: Comparison of Sexual dysfunction with substance use (N=124)**

Sexual Dysfunction	Substance Use	Chi square	

	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)		P value
Yes	42 (51.85%)	9 (32.14%)	7 (46.67%)	3.25	0.1927
No	39 (48.15%)	19 (67.86%)	8 (53.33%)		

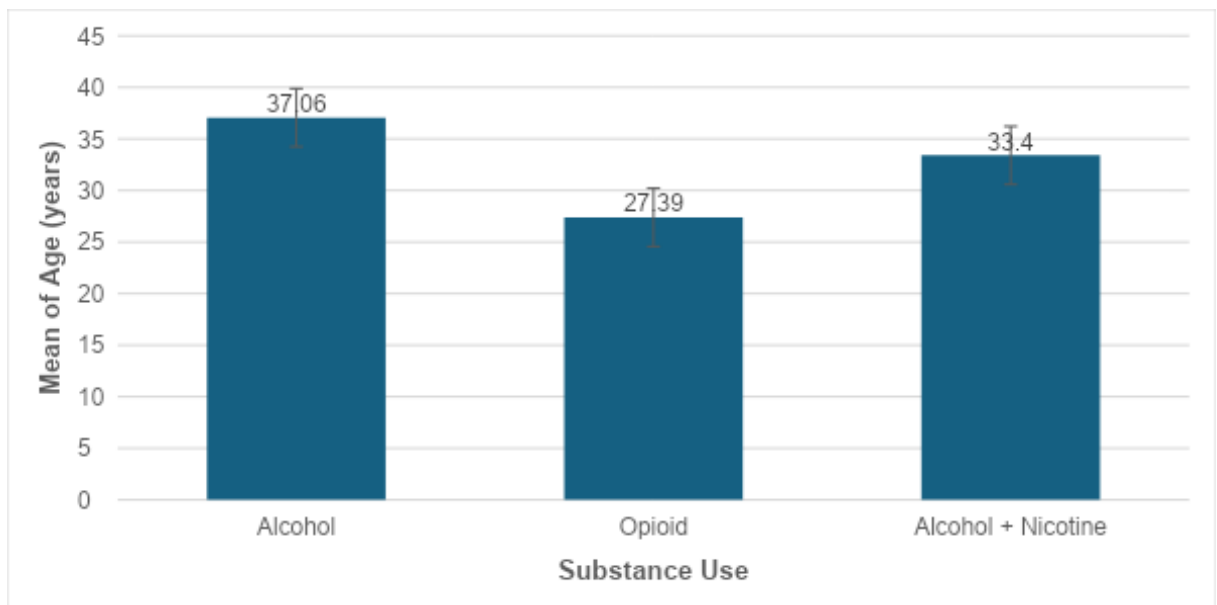
-
- **Figure 25: Staked bar chart of comparison of sexual dysfunction across substance use (N=124)**



- **Optional Tables**
- **Table : Comparison of age (years) with substance use N=124)**

Parameter	Substance Use			P Value (ANOVA)
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)	
	Mean \pm SD	Mean \pm SD	Mean \pm SD	
Age (years)	37.06 \pm 7.81	27.39 \pm 5.65	33.40 \pm 9.54	<0.001

-
- The mean age (years) with in alcohol substance use was 37.06 \pm 7.81, it was 27.39 \pm 5.65 in opioid and it was 33.40 \pm 9.54 in alcohol + nicotine. The mean difference of age (years) in substance was statistically significant with P value <0.001.
- **Figure 26: Error bar chart of comparison of age (years) across substance use (N=124)**



-
- **Table : Comparison of demographic parameters with substance use N=124)**

Demographic parameters	Substance Use			Chi square value	P value
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)		
Occupation					
Job	49 (60.49%)	11 (39.29%)	5 (33.33%)	8.29	0.0815
Business	15 (18.52%)	5 (17.86%)	5 (33.33%)		
No work	17 (20.99%)	12 (42.86%)	5 (33.33%)		
Marital Status					
Married	61 (75.31%)	12 (42.86%)	7 (46.67%)	-	†
Separated	0 (0.00%)	0 (0.00%)	1 (6.67%)		
Divorced	5 (6.17%)	0 (0.00%)	1 (6.67%)		
Unmarried	15 (18.52%)	16 (57.14%)	6 (40.00%)		
Family History of Substance Abuse					
Father	23 (28.40%)	9 (32.14%)	6 (40.00%)	-	†
Brother	1 (1.23%)	0 (0.00%)	1 (6.67%)		

Demographic parameters	Substance Use			Chi square value	P value
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)		
Father & Brother	3 (3.70%)	0 (0.00%)	1 (6.67%)		
No drug history	54 (66.67%)	19 (67.86%)	7 (46.67%)		

- **=Chi square test P value; †= No test was applicable due to zero cell value.*

- **Table : Comparison of education with substance use N=124)**

Education	Substance Use		
	Alcohol (N=81)	Opioid (N=28)	Alcohol + Nicotine (N=15)
Primary	46 (56.79%)	13 (46.43%)	8 (53.33%)
Secondary	12 (14.81%)	9 (32.14%)	2 (13.33%)
Diploma	1 (1.23%)	0 (0.00%)	0 (0.00%)
Graduate	11 (13.58%)	6 (21.43%)	3 (20.00%)
Postgraduate	1 (1.23%)	0 (0.00%)	0 (0.00%)
No schooling	10 (12.35%)	0 (0.00%)	2 (13.33%)

- **No test was applicable due to zero cell value.*

Conclusion

-

The study examined the demographic characteristics, substance use patterns, and sexual functioning among a population of 150 participants. The mean age of the study

population was 34.01 ± 8.81 years. The majority of participants were Hindu (80.67%), followed by Muslim (18.67%) and Christian (0.67%). In terms of education, 52.00% had primary education, while a small proportion (0.67%) had postgraduate qualifications.

Substance use patterns revealed that 65.32% of participants primarily used alcohol, followed by 22.58% who used a combination of alcohol and nicotine, and 12.10% who used opioids. The study found that erectile function, measured using the International Index of Erectile Function (IIEF), varied across substance use groups, with a mean score of 21.2 for the entire study population. Although there was a variation in mean erectile function scores across substance use groups, these differences were not statistically significant (P value = 0.1079).

Regarding sexual pleasure, measured by the Changes in Sexual Functioning Questionnaire (CSFQ), the majority of participants across all substance use groups had a pleasure score of ≤ 4 , indicating a lower level of sexual satisfaction. The differences in CSFQ total scores across substance use groups were also not statistically significant (P value = 0.1972).

In conclusion, while there were observable trends in sexual functioning related to different substance use patterns, these differences were not statistically significant. This suggests that while substance use may affect sexual functioning, the specific impact may vary and requires further research to establish more definitive correlations.

Discussion

This study aimed to assess the prevalence and type of sexual dysfunction among patients with various substance use disorders, specifically focusing on alcohol, opioid, and alcohol + nicotine dependence. The findings were analyzed in relation to demographic factors, such as age and education, and compared with results from previous studies.

Age Distribution

The mean age of the participants in this study was 34.01 ± 8.81 years, with a majority being over 30 years old. This is consistent with findings from similar studies. For instance, Kishor et al. (2013) reported a mean age of 39 ± 7 years among alcohol-dependent individuals^[17]. Similarly, Pandey et al. found a mean age of 37.5 years in their sample, while Benegal et al. (2005) reported a slightly higher mean age of 42.6 years in an Indian population with alcohol use^[18]. The age range in our study aligns well with these findings, suggesting that individuals in their 30s and 40s are particularly vulnerable to substance use disorders, including alcohol, opioids, and alcohol + nicotine.

Educational Background

Education level has been shown to significantly influence the likelihood of developing substance use disorders. In our study, over half of the participants (52%) had only primary education. This aligns with research by Fothergill et al. (2008), who found that individuals with less than a high school education were three to four times more likely to develop substance use disorders^[19]. Furthermore, Crum et al. demonstrated an inverse correlation between years of formal education and the prevalence of alcohol use disorders^[20].

Our findings extend these observations to include not just alcohol, but also opioid and alcohol + nicotine users, reinforcing the idea that lower educational attainment may increase the risk of developing various substance use disorders. The relationship between education and substance use likely reflects broader socioeconomic factors, such as limited access to education, lower socioeconomic status, and reduced opportunities, all of which contribute to the likelihood of substance dependence.

Sexual Dysfunction and Substance Use

Sexual dysfunction was a prevalent issue among the participants in our study, across all substance use groups. The mean erectile function score (IIEF) and the pleasure scores (CSFQ) were generally lower among those who used alcohol, opioids, and alcohol + nicotine. However, the differences in sexual dysfunction across these substance use groups were not statistically significant.

This lack of statistical significance might be due to the sample size or the complexity of sexual dysfunction as a multifaceted issue, potentially influenced by factors such as the duration and intensity of substance use, comorbid mental health conditions, and individual variations in response to substances. Nevertheless, the trends observed in this study are consistent with the broader literature, which often reports sexual dysfunction as a common consequence of chronic use of substances like alcohol and opioids. The inclusion of alcohol + nicotine in this analysis highlights the compounded effects of polysubstance use on sexual health, an area that warrants further research.

Limitations

This study, while insightful, has some limitations that should be acknowledged. Firstly, the sample size was relatively small, which may limit the generalizability of the findings to the broader population of individuals with substance use disorders. A larger sample size would enhance the statistical power and allow for more robust conclusions.

Another limitation is the inability to accurately calculate the duration of substance use among participants. The amount of time an individual has been using a substance can significantly impact the severity of sexual dysfunction and other health outcomes. Without this information, it is challenging to fully understand the relationship between substance use duration and sexual dysfunction.

Furthermore, the study did not account for potential confounding factors such as the presence of comorbid mental health disorders, the use of medications, or the impact of psychosocial stressors, all of which could influence the results. Future studies should aim to control for these variables to better isolate the effects of substance use on sexual dysfunction.

Strengths

Despite the limitations, this study has several strengths. It provides valuable insight into the prevalence of sexual dysfunction across different types of substance use, including alcohol, opioids, and alcohol + nicotine, which is a relatively underexplored area. By examining multiple substances, the study offers a more comprehensive understanding of the impact of substance use on sexual health.

The study also contributes to the growing body of literature on the sociodemographic profiles of individuals with substance use disorders, reinforcing the link between lower educational attainment and increased risk of substance dependence. This information is crucial for developing targeted interventions aimed at preventing and treating substance use disorders.

Moreover, the use of validated tools like the International Index of Erectile Function (IIEF) and the Changes in Sexual Functioning Questionnaire (CSFQ) adds credibility to the findings, ensuring that the assessment of sexual dysfunction is based on reliable and widely recognized measures.

Recommendations

Based on the findings and limitations of this study, several recommendations can be made for future research and clinical practice.

Firstly, future studies should aim to include a larger and more diverse sample size to increase the generalizability of the results. Additionally, efforts should be made to accurately measure the duration of substance use among participants, as this variable is likely to play a significant role in the development of sexual dysfunction.

Researchers should also consider controlling for confounding variables such as comorbid mental health conditions, medication use, and psychosocial stressors to better understand the direct effects of substance use on sexual health.

Clinically, these findings underscore the importance of routinely assessing sexual dysfunction in patients with substance use disorders, regardless of the type of substance used. Healthcare providers should be aware of the high prevalence of sexual dysfunction in this population and consider integrating sexual health evaluations into standard care protocols for individuals with substance use disorders.

Finally, targeted educational and prevention programs should be developed to address the specific needs of individuals with lower educational attainment, who may be at greater risk for substance use and its associated complications, including sexual dysfunction.

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