Association of sociodemographic factors with various domains of alcohol-induced sexual dysfunction – An Indian perspective

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ABSTRACT

Background: Sexual dysfunction is frequently seen in alcohol-use disorders. The available research on this topic has studied erectile dysfunction and premature ejaculation using nonvalidated scales. This study was undertaken to study the other major domains of sexual dysfunction, namely sexual desire, orgasmic dysfunction and satisfaction, and their association with sociodemographic factors. Materials and Methods: A cross-sectional descriptive study design was used and 78 male patients were recruited. The assessment was conducted using a specially designed intake pro forma, International Index of Erectile Function (IIEF-15) Scale, DSM-5 and International Classification of Disease, 10th revision, diagnostic criteria for research. A correlation between the amount of alcohol consumed and its effect on various domains of sexual dysfunction was also carried out using Pearson’s correlation coefficient. Results: The sociodemographic profile was studied in association with the overall (total) IIEF-15 subscale using analysis of variance (ANOVA). Statistically significant differences were observed among age groups, education subgroups, marital disharmony, years of alcohol use, and lifetime alcohol use. Further, since the values of ANOVA were significant, Tukey’s post hoc analysis was carried out which showed a statistically significant difference among the groups. Various domains of sexual dysfunction showed a strongly negative correlation for overall IIEF subscale followed by intercourse satisfaction, sexual desire, and orgasmic function with years of alcohol use and lifetime alcohol use. Conclusion: Sexual dysfunction in alcohol dependence patients was significantly associated with a family history of paternal alcohol abuse, lower educational background, increasing age, and marital disharmony. This study also found a strongly negative correlation between various domains of sexual functioning and years of alcohol use/lifetime alcohol use.

Keywords: Alcohol-induced sexual dysfunction, international index of erectile function-15, sociodemography

Satisfactory sexual functioning provides a sense of psychological, physical, and social well-being and is one of the very important determinants of quality of life.1 Although alcohol may promote the initiation of sexual activity by relieving inhibitions, regular and excessive use of alcohol leads to sexual dysfunction.2 Some of the predictors of sexual dysfunction are early age of onset of alcohol use, greater duration of alcohol dependence, concurrent tobacco use, greater quantity and frequency of drinking, and presence of liver disease.3

There is a complex interplay of biological, psychological, and sociocultural factors linking alcohol use to sexual dysfunction. Biological factors include age as an important risk factor independent of health Enzlin et al.4 The acquired conditions mainly include diabetes mellitus,5

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The prevalence of alcohol-induced sexual disorders have been reported ranging widely from 40% to 95.2%. This is probably due to underreporting by the patients and the topic often being overlooked by the clinicians. Rosen and Goldstein found a positive association between heavy alcohol consumption and erectile dysfunction, decreased sexual desire, and retarded ejaculation. Mirone et al. found significantly higher and fairly routine episodic erectile failure in men consuming more than three standard units of alcohol (12 g ethanol) daily. A prospective cohort study by Akre et al. in males aged 18–25 years showed that consumption of alcohol is a predictive factor for premature ejaculation (PE). Singh et al. in a community-based study population aged 18–60 years in rural northern India reported at least one sexual dysfunction prevalent in 81% of the males. However, few studies have contradicted the association between sexual dysfunction and alcohol by reporting nil or even protective association of alcohol with sexual functioning. Majority of the studies on the subject had limitations. Most conspicuously, it is the lack of validated scales for sexual dysfunction and advanced age of the patients studied, which in itself is an established cause. Furthermore, the available research on the topic has mainly studied erectile dysfunction, while other domains of sexual dysfunctions, namely sexual desire, orgasmic dysfunction, and satisfaction, have largely been disregarded, especially in an Indian setting.

This study was therefore undertaken in a younger population with comparatively homogeneous sociodemographic profiles with emphasis on studying all the domains of alcohol-induced sexual dysfunction using standardized measures.

**MATERIALS AND METHODS**

An observational, descriptive, noninterventional, and cross-sectional study was conducted in a general hospital psychiatric unit of a tertiary care center after clearance from the institutional ethical committee over a period of 18 months.

**Inclusion criteria**

i. Males between 20 and 50 years of age

ii. Married or having a regular heterosexual partner

iii. Willingness to consent for the study.

**Exclusion criteria**

i. Presence of comorbid major psychiatric disorders, namely schizophrenia, delusional disorder, anxiety disorders, and mood disorders including dysthymia

ii. Clinically assessed history of primary sexual dysfunction (prior to initiation of alcohol use)

iii. Comorbid physical disorders by history, examination, and investigations: diabetes mellitus, hypertension, signs and symptoms suggestive of alcoholic cirrhosis, a clinical diagnosis of endocrine disorders, other systemic illnesses, history of genitourinary surgery, and neurological or spinal cord lesions

iv. Substance use other than alcohol

v. Use of drugs affecting sexual function (antipsychotics, antidepressants, antihypertensives, steroids, and disulfiram).

**Sample size**

The sample size was calculated as follows:

Sample size $n = (\text{DEFF} \times Np [1 - p])/(d^2/Z_{1-\alpha/2}^2 \times [N - 1] + P \times [1 - p])$

Population size (for finite population correction factor or fpc) $N$: 5000

Prevalence: Hypothesized % frequency of outcome factor in the population based on previous studies ($\rho$): 71% ± 10

Confidence limits as % of 100 (absolute ± %) ($d$: 10% design effect (DEEF) (for cluster surveys-DEFF): 1

Substituting the values in the formula, a sample size of 78 was derived. The sample size of the present study was thus estimated to be 78 at a 95% confidence interval.

**Methodology**

All consecutive cases meeting the study criterion were admitted and recruited for the study with their documented written and informed consent. Of the 153 patients of alcohol-dependence syndrome (ADS), 68 were excluded as per the exclusion criteria (mainly physical comorbidities) and 7 were excluded as they had sexual dysfunction prior to developing alcohol dependence. Finally, 78 male patients were included in the study and were evaluated using specially designed pro forma and validated rating scales,
after the period of detoxification with benzodiazepine was over. The diagnosis of ADS was established as per the International Classification of Disease-10 Classification of Mental and Behavioural Disorders (Diagnostic criteria for research) by psychiatrist. Patients were then assessed for severity of alcohol dependence with Severity of Alcohol-dependence Questionnaire (SADQ-C).[21] Those with sexual dysfunction were diagnosed to have substance-induced sexual dysfunction using DSM-5 criteria. The severity of sexual dysfunction was then assessed using International Index of Erectile Function (IIEF-15) Scale.[22] PE was not assessed because there is a high level of subjectivity and unrealistic perception in men, which may itself lead to sexual disappointments and sexual dysfunctions.[23]

Approximate lifetime alcohol use in kilograms was calculated on the basis of alcohol consumption history given by the patient. Amount of alcohol was calculated as per the type of spirit namely 30 ml of rum/whiskey/vodka/brandy (volume/volume alcohol content of 42.7%) contains approximately 10 g of alcohol. None of the patients were consuming country liquor. Lifetime alcohol use was calculated by the number of years of alcohol use, amount, type, frequency of alcohol use, and period of abstinence. Marital disharmony and other sociodemographic variables, namely family history of paternal alcohol abuse, were ascertained from the history given by the patient, spouse, and other family members (telephonically) as informants.

A correlation was then analyzed between various domains of sexual dysfunction and years of alcohol use and lifetime alcohol use.

### Statistical analyses

The results on continuous variables were presented on mean ± standard deviation (SD) and results on categorical variables were presented in number (%). Student’s t-test (two tailed, unpaired) was used to find the significance of study parameters on continuous scale between two groups. Analysis of variance (ANOVA) was used to find the significance of study parameters between the groups (intergroup analysis). Further, post hoc analysis using Tukey’s post hoc analysis was carried out if the values of ANOVA test were significant. Pearson’s correlation coefficient was computed to measure correlation between different variables. The level of significance was fixed at $P = 0.05$ and any value less than or equal to 0.05 was considered to be statistically significant.

The statistical software IBM SPSS statistics 20.0 (IBM Corporation, Armonk, NY, USA) was used for the analyses of the data, and Microsoft Word and Excel were used to generate tables.

### RESULTS

#### Demographic characteristics

The mean age of the patients was 36.19 ± 5.924 years (range: 24–50 years) and majority had formal education up to or above 10th standard (92%). About 56.4% had a family history of alcohol consumption. All the patients were employed. Of 78 study subjects, 75 were married for a period of at least 1 year and 3 were unmarried, but all were in an active heterosexual relationship. Sixty percent of the married study subjects had marital disharmony. The mean year of alcohol use was 11.82 ± 4.245 (mean ± SD) years. The mean lifetime alcohol consumed was approximately 180.18 ± 45.297 kg. As per the SADQ scores, the percentage of subjects having mild, moderate, and severe alcohol dependence was 52.6%, 32.1%, and 15.4%, respectively [Table 1].

#### Association of severity of alcohol dependence with erectile dysfunction

Erectile dysfunction was quantified using IIEF. About 43.58% of alcohol-dependent males were found to have erectile dysfunction, of which 15.38% had mild, 14.1% had moderate, 10.3% moderate, and 3.8% had severe erectile dysfunction as per IIEF. The severity of sexual dysfunction was directly related to the severity of alcohol dependence ($P < 0.001$) [Table 2].

### Table 1: Sociodemographic characteristics of the study subjects

| Sociodemographic variables | Sub-groups | n (%) |
|----------------------------|------------|------|
| Age (years) (n=78), mean±SD: 36.19±5.924 | ≤30 | 16 (20.5) |
| | 31–40 | 44 (56.4) |
| | 41–50 | 18 (23.1) |
| Marital status (n=78) | Married | 75 (96.2) |
| | In relationship | 3 (3.8) |
| Marital disharmony (n=75) | Yes | 45 (60.0) |
| | No | 30 (40.0) |
| Education (n=78) | Below 10th standard | 6 (7.7) |
| | 10th standard | 32 (41.0) |
| | 11th standard | 6 (7.7) |
| | 12th standard | 26 (33.3) |
| | Graduate | 8 (10.3) |
| Family history of alcohol use | Yes | 44 (56.4) |
| | No | 34 (43.6) |
| Years of alcohol use (mean±SD)=11.82±4.245 | 1–10 | 34 (43.6) |
| | 11–20 | 39 (50.0) |
| | >20 | 5 (6.4) |
| Lifetime alcohol use (kg), mean±SD | 180.18±45.297 |
| SADQ | Mild (<15) | 41 (52.6) |
| | Moderate (16–30) | 25 (32.1) |
| | Severe (>30) | 12 (15.4) |

SADQ: Severity of Alcohol-dependence Questionnaire, SD: Standard deviation
Association of sociodemographic variables with sexual functioning (using international index of erectile function-15)

Age
Mean IIEF score (less the value, more is the dysfunction) was highest among <30 years age group while lowest in the older age group (41–50 years) of alcohol-dependent male patients, showing a decline in sexual functioning with the age (P < 0.001) [Table 3]. Further, using Tukey’s post hoc analysis, a statistically significant difference (P < 0.001) was observed in older age group (41–50 years); however, the difference between ≤30 and 31–40 years’ age group was not statistically significant (P = 0.114).

Marital disharmony
The association of overall (total) IIEF score (in terms of mean [SD]) with presence or absence of marital disharmony was analyzed using unpaired t-test. Sexual functioning was poorer in couples with marital disharmony (mean IIEF score 66.93 vs. 52.62) and this finding was highly significant (P < 0.001) [Table 3].

Education
Alcohol-dependent patients with better education were found to have better sexual functioning as per the mean IIEF scoring (P < 0.001). Further, post hoc analysis revealed a statistically significant difference in the group having education below 10th standard, but the difference was not

Table 2: Association of severity of alcohol dependence with erectile dysfunction

| Erectile dysfunction (IIEF subscale) | Mild (<15) | Mod (16-30) | Severe (>30) | Total | Percentage |
|------------------------------------|-----------|-------------|--------------|-------|------------|
| Normal                             | 38        | 05          | 01           | 44    | 56.4 (Normal) |
| Mild                               | 02        | 08          | 02           | 12    | 43.58 (Low) |
| Mild-moderate                      | 00        | 10          | 01           | 11    |             |
| Moderate                           | 01        | 02          | 05           | 08    |             |
| Severe                             | 00        | 00          | 03           | 03    |             |
| Total                              | 41        | 25          | 12           | 78    |             |

| P | <0.001 |

IIEF: International Index of Erectile Function, SADQ: Severity of Alcohol-dependence Questionnaire

Table 3: Association of sociodemographic variables with overall (total) International Index of Erectile Function Scale Score

|                  | n  | Mean score | Std. deviation (SD) | F     | P       |
|------------------|----|------------|---------------------|-------|---------|
| Age              |    |            |                     |       |         |
| ≤30              | 16 | 67.75      | 7.810               | 18.312| <0.001**|
| 31–40            | 44 | 61.07      | 10.977              | 10.777| <0.001**|
| 41–50            | 18 | 45.50      | 14.374              | 14.374| <0.001**|
| Total            | 78 | 58.85      | 13.628              | 13.628|         |
| Marital disharmony|    |            |                     |       |         |
| Present          | 45 | 52.62      | 23.712              | 5.161 (t) | <0.001**|
| Absent           | 30 | 66.93      | 7.943               |       |         |
| Education        |    |            |                     |       |         |
| Below 10th       | 6  | 40.33      | 16.046              | 5.790 | <0.001**|
| 10th             | 32 | 56.56      | 13.868              |       |         |
| 11th             | 6  | 64.67      | 10.857              |       |         |
| 12th             | 26 | 61.42      | 10.786              |       |         |
| Graduate         | 8  | 69.13      | 3.944               |       |         |
| Total            | 78 | 58.85      | 13.628              |       |         |
| Years of alcohol use |    |            |                     |       |         |
| 1-10             | 34 | 68.59      | 4.587               | 35.057| <0.001**|
| 11-20            | 39 | 53.18      | 13.012              |       |         |
| >20              | 5  | 36.80      | 8.106               |       |         |
| Total            | 78 | 58.85      | 13.628              |       |         |
| Family history of alcohol use |    |            |                     |       |         |
| Present          | 44 | 54.43      | 14.618              | 3.482 (t) | <0.001**|
| Absent           | 34 | 64.56      | 9.761               |       |         |

*P<0.05 - Significant, **P<0.001 - Highly significant
Years of alcohol use
Sexual dysfunction was directly proportional to the number of years of alcohol use (\(P < 0.001\)) [Table 3]. *Post hoc* analysis also revealed a statistically significant difference among all the groups.

Family history of alcohol use
Patients with a family history of alcohol abuse in their father had lower mean sexual functioning scores (54.43) as compared to the group with no family history of alcohol use (64.56) and the difference was statistically significant [Table 3].

Correlation of various domains of sexual functioning with years of alcohol use and lifetime alcohol use (using international index of erectile function-15)

Years of alcohol use
The years of alcohol use by the patients showed a statistically significant negative correlation with different domains of sexual functioning (\(P < 0.001\)). The negative correlation was greatest for IIEF overall score followed by intercourse satisfaction, overall satisfaction, orgasmic desire, and orgasmic function in descending order [Table 4].

Lifetime alcohol use
The lifetime alcohol use by the patients showed a statistically significant negative correlation with different domains of sexual functioning (\(P < 0.001\)). The negative correlation was greatest for IIEF overall score followed by intercourse satisfaction, overall satisfaction, orgasmic function, and sexual desire in descending order [Table 5].

TABLE 4: Correlation between years of alcohol use and different domains of sexual functioning

| Domains of sexual functioning (IIEF subscale) | Years of alcohol use | \(r\) (correlation coefficient) | \(P\) |
|--------------------------------------------|---------------------|--------------------------------|------|
| Orgasmic function                          | -0.595              | <0.001**                       |
| Sexual desire                              | -0.619              | <0.001**                       |
| Intercourse satisfaction                   | -0.746              | <0.001**                       |
| Overall satisfaction                       | -0.727              | <0.001**                       |
| IIEF overall (total) score                 | -0.792              | <0.001**                       |

IIEF: International Index of Erectile Function

TABLE 5: Correlation between lifetime alcohol use and different domains of sexual functioning

| Domains of sexual functioning (IIEF subscales) | Lifetime alcohol use (kg) | \(r\) (correlation coefficient) | \(P\) |
|-----------------------------------------------|---------------------------|--------------------------------|------|
| Orgasmic function                            | -0.595                    | <0.001**                       |
| Sexual desire                                | -0.619                    | <0.001**                       |
| Intercourse satisfaction                     | -0.759                    | <0.001**                       |
| Overall satisfaction                         | -0.746                    | <0.001**                       |
| IIEF overall score                           | -0.790                    | <0.001**                       |

IIEF: International Index of Erectile Function

DISCUSSION

We attempted to study the deleterious effects of alcohol on sexual dysfunction by recruiting married and relatively younger (75% were <40 years) sociodemographically homogeneous population without any comorbid physical/psychiatric/substance use disorder.

The mean age of the study subjects was 36.19 ± 5.924 years [Table 1] and a significant decrease in sexual functioning with increasing age was found in concurrence with other studies[4,11] [Table 3]. However, the study population in the current study was relatively younger, thus minimizing the confounding effects of advanced age on sexual dysfunction.

Marital disharmony was present in 60% of the study subjects, which was in agreement with previous studies that indicated that alcohol dependence and erectile dysfunction can lead to decreased sexual satisfaction and deterioration of relations between partners[24] Fugl-Meyer *et al.* [Table 3]. The prevalence rate of marital disharmony (60%) in our study was high as compared to 21.2% found by Boddi *et al.*[25] and could have influenced the incidence of sexual dysfunction. However, a precise cause and effect could not be established as marital disharmony could be due to alcohol use leading to decreased sexual functioning or vice versa. This finding has clinical consequences, especially in a de-addiction setting in which the relationship between substance use, marital discord, and sexual dysfunction must be thoroughly evaluated and managed to obtain an effective outcome.

Level of education can be a risk factor for male sexual problems, as seen in our study [Table 3] which showed significantly worse sexual functioning in patients with education below 10th standard which corroborates with other studies.[11,26] This could possibly be due to myths and cultural beliefs about sex being more strongly believed by less educated people.

About 43.58% of alcohol-dependent males had erectile dysfunction [Table 2] as per IIEF. This was higher than 16% and reported by Vijayasenan[27] and 33.3% reported by Arackal and Benegal[28] (assessment tool used was sexual dysfunction checklist) and could possibly be due to the use of standardized scales having higher sensitivity in the current study.

Mean years of alcohol use and lifetime alcohol use were found to be 11.82 years (±4.245 SD) and 180.18 kg
(±45.297 SD), respectively, suggesting heavy alcohol use over prolonged periods. The current study found a strongly negative correlation between different domains of sexual functioning and years of alcohol use/lifetime alcohol use [Tables 4 and 5]. This finding is in consonance with the available literature;\(^\text{26}\) however, a clear negative correlation with all the domains of sexual functioning as brought out in the current study is generally lacking, especially in Indian studies.

The findings of statistically significant negative correlation between lifetime alcohol use (approximately in kilograms) and different domains of sexual functioning in our study are unique as none of the previous research studied this relation to the best of our knowledge [Table 5].

This study assessed sexual dysfunction comprehensively across multiple domains in alcohol-dependence patients using standardized scales. The study subjects were relatively homogeneous as important confounders such as old age, unemployment, illiteracy, comorbid medical/psychiatric, and other substance abuses were excluded. Major limitations were that dyadic assessment was not done, i.e., spouses were not assessed for any sexual dysfunction which could itself worsen the alcohol use and sexual dysfunction in male counterparts. Secondly, being a cross-sectional study in a hospital setting limits its generalizability to the community.

**CONCLUSION**

Sexual dysfunction in alcohol-dependence patients was found to be significantly associated with a family history of paternal alcohol abuse, lower educational background, increasing age, and marital disharmony. This study also found a strongly negative correlation between various domains of sexual functioning and years of alcohol use/lifetime alcohol use. It is recommended that during evaluation of patients with ADS, the treating psychiatrists should routinely screen for all domains of sexual functioning wherein an unidentified sexual dysfunction may be perpetuating alcohol dependence with poor response to deadication therapy.

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**Conflicts of interest**

There are no conflicts of interest.

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