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ANXIETY AND SEXUAL DYSFUNCTIONS AMONG ALCOHOL-DEPENDENT MEN: AN EXPLORATORY CROSS-SECTIONAL STUDY

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Abstract

Background: Alcohol dependence (AD) is a broad term used for problematic alcohol use that results in mental or physical health consequences. Anxiety disorders are the most commonly occurring co-morbid conditions in individuals with AD. Alcohol also poses effects on sexual dysfunction as chronic and persistent alcohol use is known to cause sexual dysfunctions that also lead to marked distress and interpersonal difficulties.

Aim and objective: This study aims to assess the prevalence, severity, and interrelationship between anxiety and sexual dysfunctions in men diagnosed with AD.

Material and Methods: A cross-sectional study was conducted on 110 male participants with AD, recruited at psychiatry department of a tertiary care center. Participants were assessed using Hamilton scale for anxiety (HAM-A) for anxiety, and Arizona sexual experience rating scale (ASEX) for sexual dysfunctions.

Results: The results revealed that the mean age at onset of AD was 35.65 years, mean HAM-A score was 18.51. Half of the participants had moderate anxiety. Out of all, 85 participants i.e., 77.27% had sexual dysfunctions. A strong positive correlation was found between the severity of anxiety and the duration since last regular alcohol use. The duration since last regular alcohol use also correlated positively and statistically significantly with severity of sexual dysfunctions. There was positive but

statistically insignificant correlation between scores on HAM-A and ASEX. These findings show relationship between AD, anxiety, and sexual dysfunction.
Conclusions: This study highlights the importance of routine comprehensive clinical assessments in men with alcohol dependence with especial emphasis to assessment of anxiety disorder and sexual health.

Keywords: Alcohol, Alcohol dependence, Anxiety, Sexual dysfunction, Sexual health.

INTRODUCTION

Alcohol, generally known as ethyl alcohol and ethanol is one of the oldest and commonly used substance. It is a potent drug that causes both acute and chronic changes in almost all neurochemical systems. It is toxic to liver, the brain, and other organs over time. It also inhibits the central nervous system, impairing a person's coordination and judgment. Additionally, it may exacerbate psychological problems such as anxiety and depression, while chronic consumption of ethanol-based drinks can cause a person to develop debilitating alcohol addiction. According to WHO fact sheet 2024, the data on global alcohol consumption in 2019 shows that an estimated 400 million people aged 15 years and older live with alcohol use disorders, and an estimated 209 million live with alcohol dependence. [(1)]

Alcohol Dependence (AD) is a broad term used for problematic alcohol use that results in mental or physical health consequences. According to WHO report 2014, 30% of the total population consumed alcohol in a year, of which 50% fell under the category of hazardous drinking.[(2)] In 2019, 17% of people aged 15+ years and 38% of current drinkers engaged in heavy episodic drinking or "binge drinking" (consuming at least 60g of pure alcohol on one or more occasions in the last month), while continuous heavy drinking was highly prevalent (6.7%) among men.[(3)] The same study found that the prevalence of alcohol consumption among 15–19-year-olds was unacceptably high worldwide (22%) with very little gender differences and a tendency of increase from initially low levels in some regions. A recent report from the National Mental Health Survey (2015-16) in India showed that there was a high prevalence of substance use disorders (SUDs) of 22.4%, of which the prevalence of alcohol use disorder (dependence and harmful use) was 4.6% [(4)].

Long term alcohol use affects various spheres of an individual life like physical health, mental health, sexual health, social life, and financial aspects. The most commonly occurring co-morbid conditions in individuals with alcohol problems are mood and anxiety disorders, with the incidence of co-morbidity varying across studies. Overall co-morbidity had been reported at 37% [(5)], while 12-month prevalence for mood and anxiety problems has been reported as 19% and 17%, respectively.[(6)]

Anxiety disorders are the one of the most prevalent psychiatric disorders in the general population. Anxiety is a broad term that encompasses a variety of psychological and physiological symptoms. Anxiety manifests itself in a variety of ways, including cognitive, physical, and behavioral. Excessive fear, maladaptive anxiety signs, and associated behavioral abnormalities are all symptoms of anxiety disorders.[(7)] Co-occurring anxiety disorders and alcohol use disorders (AUDs) are of great interest to researchers and clinicians. Investigations into the unique connections between specific anxiety disorders and AUDs have shown that this association is multifaceted and complex, underscoring the importance of careful diagnostic scrutiny.

Alcohol exerts its harmful effects on different parts of the male reproductive system either directly or indirectly.[(8)] Chronic and persistent alcohol use was known to induce sexual dysfunction, which leads to marked distress and interpersonal difficulty.[(9)] This, in turn, is known to worsen the alcohol abuse. Alcohol poses various deleterious effects on the health of an individual leading to sexual dysfunctions. Sexual dysfunction may range from reduced sexual desire to difficulty achieving an erection, delayed orgasm, and premature ejaculation.[(10)] The spectrum of sexual dysfunction encompasses: decreased sexual desire, sexual aversion disorder, difficulty in erection—recurrent or persistent, partial or complete failure to attain or maintain an erection until the completion of the sex act; difficulty in achieving orgasm, premature ejaculation—persistent or recurrent ejaculation with minimal sexual

stimulation, before, on or shortly after penetration and before the person wishes it, which causes marked distress. [11] Interpersonal difficulties further worsen alcohol dependence.

Aim and objectives: The present study aimed to determine the prevalence and severity of anxiety, and sexual dysfunctions among men diagnosed with Alcohol Dependence. Primary objective was to assess severity of anxiety symptoms and prevalence of sexual dysfunctions. Secondary objective was to correlate above parameter with the associated clinical variables of the participants.

MATERIALS AND METHODS

- **Study design & site:** The present study was a cross sectional study conducted at department of psychiatry, Ananta institute of medical sciences and research center, Rajsamand, Rajasthan. The study received ethical approval from the Institutional Ethical Committee *(Ref no. AIMS/IEC/2023/120).*
- **Study duration:** The study duration was 18 months *(July 2023 to December 2024).*
- **Study population:** The study population included cases of alcohol dependence who consented to participate and fulfilled the inclusion and exclusion criteria. The included participants were married males of age 18 year and above, with a diagnosis of alcohol dependence as per ICD 11 diagnosed separately by two psychiatrists. Participants with diagnosed major psychiatric disorder, chronic medical diseases, those in active alcohol withdrawal state, consuming substance other than alcohol and nicotine, taking any medicine that could affect their sexual function, diagnosed cases of dementia, delirium and other organic disorders, mental retardation, not willing to provide consent were excluded.
- **Sample size:** Final sample size of the present study was 110 men with alcohol dependence.

Estimated true proportion - 0.65
Desired precision (+/-) - 0.05
Confidence level - 95% (z value = 1.96)
Population size (for finite populations) - 150 (for limited number of case and duration)
Sample size was calculated using the formula: n = (Z2 x P x (1 - P))/e2
Where- Z = value from standard normal distribution corresponding to desired confidence level (Z=1.96 for 95% CI)- P was expected true proportion- e was desired precision (half desired CI width).for small populations n can be adjusted so that n (adj) = (Nxn)/(N+n).
Adjustment for finite population size was described by Thrusfield M. [12]
Minimum sample size = 105
So after 5% of adjustment calculated final sample size was 110.

- **Study tools:**

o A semi structured proforma was designed that included **sociodemographic variables** (age, religion, domicile, education, type of family, socioeconomic status as calculated by modified Kuppuswami scale 2023, and employment status), and **Clinical variables** (duration since marriage, duration of living with spouse, age at first drink, age at last regular alcohol drinking, number of units of daily alcohol consumption, and presence of Nicotine use).

o The severity of alcohol dependence was assessed using **Severity of Alcohol Dependence Questionnaires** (SAD-Q). [13] SAD-Q have five aspects (each having four items) covering physical withdrawal, affective withdrawal, withdrawal relief drinking, alcohol consumption, and rapidity of reinstatement. A score of 31 or higher indicates "severe alcohol dependence", while a score of 16 -30 indicates "moderate dependence", and a score of below 16 indicates mild physical dependency.

o Alcohol withdrawal state at the time of assessment of the participants was excluded using **Clinical Institute Withdrawal Assessment of Alcohol Scale, revised** (CIWA-Ar). [14] The CIWA-Ar scale can measure 10 symptoms. Three components (tremor, paroxysmal sweats, and agitation) of total 10 components are rated by observation alone. The other 7 components require discussion with the patient. Scores of less than seven was taken as exclusion of alcohol withdrawal in the present study as taken in past Indian study. [15]

o **Hamilton rating scale for anxiety** (**HAM-A**) [16]: HAM-A was used for screening of symptoms of anxiety. The scale consists of 14 items. Each item is scored on a scale of 0 (not present) to 4 (severe),

with a total score range of 0 to 56.A score of 8 to 14 denotes mild anxiety while the score range 15 to 23 denotes moderate anxiety, and score ≥ 24 denotes severe anxiety. Scores ≤ 7 were considered to represent no/minimal anxiety. In terms of its reliability and validity, the HAM-A scale had generally stood the test of time. It offers a consistent measurement across various contexts and over the repeated uses.

- **Arizona Sexual Experiences scale (ASEX)** [17]: Sexual dysfunctions were assessed using Arizona sexual experiences scale. The Arizona Sexual Experiences Scale is a five item self-reported inventory that uses a six-point Likert scale method (a score of 1 for "extremely strong", 2 for "very strong", 3 for "somewhat strong", 4 for "somewhat weak", 5 for "very weak", and 6 for "weakest"). ASEX is commonly used in clinical trials to assess sexual functioning. Each item of the scale measures one domain of sexual functions i.e., Desire, Arousal, Penile erection or vaginal lubrication, Ability of reach orgasm, and Satisfaction from orgasm. The total score obtained ranges from 5 to 30. Higher scores on ASEX reflect higher severity of sexual dysfunction. The ASEX global score >19, or score of 4 on three domains but global score <19, or score of 5 on any one domain but global score < 19 was taken as presence of sexual dysfunctions. ASEX have good convergent and discriminant validity along with internal consistency, test-retest reliability. It is been translated in many different languages including Hindi.[18]

- **Statistical Analysis:** Data was collected using the designed proforma and an excel sheet was prepared. Statistical analysis was performed with the help of software SPSS 22 (IBM crop 2011. IBM SPSS statistics for windows, version 20.0. Armok, NY: IBM crop). All quantitative variables were summarized by mean and standard deviation, while qualitative variables were summarized by frequencies and percentage. For assessing the correlation Pearson correlation coefficient was used. Results were considered statistically significant at the p value <0.05.

RESULTS

The participants of the current study were a total of 110 patients diagnosed as alcohol dependence and were fulfilling the inclusion criteria and exclusion criteria. Mean age of the participants was 35.65 years (SD 5.33).

Table 1: Distribution of sociodemographic variables of the participants

S. No.	Variables	Number	Percentage (%)
1.	Religion		
	Hindu	103	93.6 %
	Islam	5	4.5%
	Buddhism	2	1.81%
2.	Domicile		
	Rural	78	70.9
	Urban	32	29.1
3.	Education level		
	Illiterate	1	0.9
	Literate	3	2.7
	Primary	21	19.5
	Secondary	79	71.8
	Graduate	6	5.5
4.	Employment status		
	Never employed	6	5.45 %
	Presently unemployed	29	26.36 %
	Full time employed	4	3.63 %
	Part time employed	30	27.27 %
	Self employed	40	36.36 %
	Student	1	0.93 %
5.	Type of family		
	Joint	66	60
	Nuclear	25	20.7

	Extended nuclear	19	17.3
6.	Socioeconomic status Lower middle (11-15) Upper lower (5-10)	 19 91	 17.3 82.7

Table 1 shows that majority of the participants were following Hindu religion, belonging to rural background, educated up to secondary level, self-employed, living in joint family, and of upper lower socioeconomic status.

Table 2: Associated clinical variables

S. No.	Variable	Mean	Standard deviation (SD)
1.	Duration since marriage (years)	10.72	6.6
2.	Duration since living with spouse (years)	10.48	6.68
3.	Age at first drink (year)	24.80	3.32
4.	Age at last regular alcohol drinking (year)	26.08	3.15
5.	Alcohol consumption per day (number of units of alcohol)	18.03	3.88
6.	Duration of Nicotine use (years)	11.8	7.9

The table 2 shows the associated various clinical variables of the participants. Nicotine use was reported by 85.5% participants. The Family history of alcohol use was positive in 40 (36.4%) participants. The severity of alcohol dependence as per SAD Q score was mild in 3 (2.72%), moderate in 57 (51.82%) and severe dependence in 50 (45.46%) participants. SAD Q score for all the participants ranged from 15 to 43. The mean SAD Q score for the participants as a group was 28.88 (SD 5.92) that denoted the moderate alcohol dependence.

Table 3: Distribution of participants according to Hamilton rating scale for anxiety (HAM-A) score

HAM-A Score	Number	Percentage
0-7 (no/ minimal)	0	0
8-14 (mild)	33	30
15-23 (moderate)	55	50
>24 (severe)	22	20

Table 3 shows the distribution of participants per the HAM-A scale. There are no/ minimal anxiety score in 0 participants, mild in 30%, moderate in 50% and severe in 20% of the study participants. HAM-A score for the all participants ranged from 9 to 31. The mean of HAM-A scoring of all participants as a whole group was 18.51 (SD 5.5) which denoted the moderate anxiety.

Table 4: Distribution of participants' sexual dysfunction as per Arizona sexual experience rating (ASEX) scale

Sr. No.	Domain of ASEX	Number (n=110)	Percentage
1.	Low sex drive	39	33.45
2.	Difficulty in sexual arousal	47	42.72
3.	Erection dysfunction	63	57.27
4.	Difficulty in reaching orgasm	61	55.45
5.	Dissatisfaction with orgasm	60	54.54

Table 4 shows the distributions of sexual dysfunction among participants who scored score 5 or 6 on individual domain of ASEX.

Table 5: Sexual dysfunction among participants on using ASEX criteria

Sr. No.	Variables	Participants with sexual dysfunction (N =85)	Percentage (%)
1.	ASEX global score >19	79	92.94 %
2.	ASEX score 4 on three domains but global score<19	3	3.53 %
3.	Score 5 on one domain but global score <19	3	3.53%

Table 5 shows that out of all 110 participants the total number of patients with sexual dysfunction on using ASEX scale criteria was 85 i.e., 77.27%.

Table 6: Correlation among various associated and clinical variables

Variables	Correlation coefficient (r value)	*p* value
Duration since last regular alcohol use Vs HAM-A score	0.24	**0.01**
Duration since last regular alcohol use Vs ASEX score	0.32	**0.001**
HAM-A score Vs ASEX score	0.17	0.07

Table 6 shows that the duration since last regular alcohol use correlated positively with the anxiety score that was statistically significant (*p* value 0.01), meaning as the duration since last regular alcohol use was increasing, the severity of the anxiety symptoms also increased significantly. The duration since last regular alcohol use also correlated positively with severity of sexual dysfunction (correlation coefficient 0.32) and it also was statistically significant (p-value 0.001) meaning that as the duration since last regular alcohol use increased, the severity of the sexual dysfunction also increased significantly. The table also shows positive but statistically insignificant (p = 0.07) correlation between scores on HAM-A and ASEX.

DISCUSSION

The findings of the present study revealed important insights into the relationships of Alcohol use disorder with anxiety and sexual dysfunction among the participants.

Sociodemographic Profile of Participants: In present study, the mean age of the participants was 35.65 years, with a standard deviation of 5.33 years. The age distribution suggested that the sample represents a mid-adulthood demographic, which was important as age can influence various aspects of health, including mental health and sexual function. This finding was comparable to previous studies. The mean age of the sample was 39.14 years in a study conducted by Prabhakaran et al [(19)] ,the mean age of the study participants was 35.62 years in Bhainsora et al [(20)], the mean age was 37 years in study by Arackal and Benegel [(21)]. In the present study, majority of the study participants were from Hindu religion (93.6%). This finding was in line with the earlier studies by Bhainsora et al, [(20)] Ghogare and Saboo [(22)] and Vaishnavi et al. [(23)] In present study the majority of participants were from the rural area of residence (70.9%) In Bhainsora et al **[(20)]** study, majority of the participants from the rural area of residence (61%). This was consistent with previous research by Suresh et al [(24)] that reported similar rural predominance among alcohol-dependent populations. Cultural practices and social norms in rural settings may influence drinking behaviours, with alcohol sometimes being more socially accepted or used as a coping mechanism for socioeconomic stressors.

In present study, majority of participants (71.8%) were educated up to secondary school level. Prabhakaran et al [(19)] had conducted their study in Kerala state of India and observed that majority of the study participants (86.9%) were educated up to higher secondary school level. That study was conducted at Kerala state which have higher literacy rate. In contrast to our study, Bhainsora et al [(20)] found that in their study majority of the study participants were educated up to primary school level (35.4%) and secondary level (25%). This reflects that the level of education may have implications

for awareness, health-seeking behaviour, and understanding of mental health and sexual health issues. Lower educational attainment can be associated with limited access to health information, reduced health literacy, and increased vulnerability to risk behaviours, including alcohol use.

In present study majority of participants were self-employed (36.36%) while 27.27% were part time employed. Such employment types may lack job security, social benefits, and regular income, potentially contributing to stress, anxiety, and reduced access to healthcare. In the present study, majority of the study participants (60%) were from joint family. This finding was in line with studies done by Bhainsora et al **(20)** and Kumar & Rao 2019(25). In present study, majority of participants were belonging to upper lower category (82.7%) of socioeconomic status and followed by lower middle class (17.3%) that indicates a higher prevalence of alcohol dependence among individuals from economically disadvantaged backgrounds. This finding is in line with study by Reddy MP et al (26) who also found the majority of participants belonged to the upper lower class (70%) and middle (15%) socio-economic class. The socioeconomic profile of participants highlights the strong association between lower economic status and alcohol dependence. Individuals from economically disadvantaged backgrounds generally face higher levels of stress, limited access to education, unstable employment, and fewer healthcare resources.

Associated variable- In present study the mean duration since marriage of participants was 10.72 years (SD 6.6). The mean duration of participants living with their spouses was 10.48 year with SD 6.68. Comparable findings were reported by Bhainsora et al (20), where the mean duration of marriage was 11.4 years. Arackal and Benegal (21) also reported a mean marital duration of 9.8 years among alcohol-dependent males. The finding indicates that most participants were in long-term marriages, a stage often associated with increased family responsibilities and psychosocial stressors which is particularly relevant in the context of substance use, where relationship dynamics can both influence and get affected by substance use.

In the present study, the mean age of participants at their first drink was 24.80 years. Similar results were found in the study done by Chatterjee et al (27). On contrast, Prabhakaran et al (19) found the 80% of their participants started consuming alcohol during adolescence that could be because of the easy availability and higher curiosity during the adolescence. Our finding indicates that initiation of alcohol consumption at this stage of life may be influenced by factors such as increased social freedom, occupational stress, and peer influence both during early career development or higher education.

The mean age at regular alcohol drinking in our study was 26.08 years that was in line with the study done by Johnson et al (28) who found the mean age of onset of dependence was 27.8 years. These findings showed that because of peer pressure, work, family and financial related problems can play a role in for initiation of alcohol consumption. In our study the severity of alcohol dependence for the group as a whole was moderate dependence (mean SAD-Q score 28.88) which is comparable to the study by Khalid A et al (29) where the severity of dependence was moderate dependence. The mean number of units of the alcohol consumption per day in our study was 18.03 units (SD 3.88).

In the present study the more than one third (36.4 %) participants had positive family history of alcohol use. This finding was in line with study done by Hill EM et al (30) who found that 30 % of parents of the participants were using alcohol. It is established fact that genetics and environmental influences of family play an important role in the development of alcohol use disorder.

Alcohol use and Nicotine use- In the present study the co-morbid tobacco use was reported by 85.5% of the participants. Similar results were found in the study done by Pendharkar et al **(15)** in which 84.5% patients were dependent on tobacco. Prabhakaran et al (19) also showed that 73% of their patients had comorbid tobacco dependence. The mean duration of tobacco use in our study was 11.08 years. The positive comorbid history of tobacco use may implicate that these patients may have used nicotine with alcohol because of the social habits, or easy societal acceptance of the nicotine as smoke or chewing.

Alcohol use and Anxiety- In present study the mean of anxiety symptoms for the group (assessed by using the HAM-A scale) was 18.51 that shows the group was in moderate anxiety category, and majority (50%) of the participants were having moderate anxiety symptoms. Our findings are in line with study done by Boschloo I et al (31) which showed the mean of anxiety symptoms was 16.7 that

indicated moderate anxiety in the study participants. Our finding was also in line with study done by Mathur P et al [32] which showed the mean of HAM-A score was 18.6 and majority of participants had moderate anxiety. The high prevalence of moderate anxiety may be attributed to factors such as chronic substance use, unstable interpersonal relationships, low socioeconomic status, or limited access to mental health services. In particular, co-occurring alcohol use and anxiety symptoms may create a bidirectional relationship where each condition exacerbates the other. In contrast to our study, Study by Malkarjun Bole et al [33] found, 57.45% of alcohol dependent participant had mild or no anxiety, 26.24% had moderate anxiety and 16.31% had the severe anxiety. The difference between these findings can justified by the fact that these study participants had last intake of alcohol 3 months ago and they were on treatment since last three months.

Alcohol use among participants and Sexual Dysfunction- In present study more than two third of the participants (77.27%) had sexual dysfunction. This finding was in line with a study done by Fahrner et al [34] who found that 75% participants with alcohol dependence had sexual dysfunction. Our study found that the majority of participants were suffering from the erectile dysfunctions (57.27%) that was followed by difficulty to reach orgasm (55.45%), dissatisfaction with orgasm (54.54%), difficulty in reaching sexual arousal (42.72%), and one third participants reported low sex drive. This prevalence demands assessment of sexual functions in all patients that present with alcohol dependence as chronic use of alcohol alters the hormones and neurochemicals governing the sexual functioning of an individual. Our findings are comparable to study done by Acharya RK et al [35] found 62% of sexual dysfunction in the male patients with the alcohol dependence. A study done by Pendhakar et al [15] found sexual dysfunction was seen in 58.4% patients in the Alcohol dependence group and the highest frequency was seen for dysfunction for arousal (57.4%), followed by problems in desire (54.4%), erection (36.6%), satisfaction with orgasm (34.6%) and ability to reach orgasm was least affected (12.87%). The relation of alcohol dependence and sexual dysfunction may also have underlying marital or interpersonal problems warranting further evaluation by the health care professionals.

Correlation among various associated and clinical variables: In our study the duration since last regular alcohol use correlated positively with the severity of anxiety score (*correlation coefficient 0.24*) that was statistically significant (*p value 0.01*). As the duration of regular alcohol intake increased, the severity of anxiety symptoms also increased significantly. Our findings were in line with study done by Malkarjun Bole R et al [33] and Ravikant T et al [36]. In our study the duration of last regular alcohol use correlated positively with severity of sexual dysfunction *(correlation coefficient 0.32)* that was statistically highly signification *(p-value 0.001).* This was in line with study done by Prabhakaran et al [15]**,** Acharya RK et al [35] and Bhainsora et al [20]. In current study, HAM-A scores showed a weak positive but statisticallysignificant *(p = 0.07)* correlation with the ASEX scores. Previous study by Montejo et al [37] who had consistently reported a significant association between anxiety symptoms and sexual dysfunction. They found that individuals with higher anxiety scores had significantly more sexual difficulties.

Conclusions- The distribution suggested that the study sample mainly represents individuals in mid-adulthood identified as Hindu residing in rural areas and living in joint family and belonging to upper lower and lower middle class. More than three fourth participants had a history of tobacco use while more than one fourth of participants had a positive family history of alcohol use. Majority of participants had moderate and severe alcohol dependence and moderate anxiety. More than three fourth of participants had sexual dysfunction. Longer duration since last regular alcohol use was statistically significantly associated with higher score for the anxiety and sexual dysfunctions.

Overall Strengths of the Study: The present study addresses interrelated psychological and sexual health domains, offering a holistic view of the psychological burden of alcohol dependence. Despite their significant impact on quality of life. sexual dysfunctions are often under-reported and under-researched in alcohol dependent populations. Male specific data is valuable , as gender differences exist in alcohol use patterns and related consequences. This allows tailored interventions for male patients. Few studies assess all these variables together in a single population. This integrated approach may yield new correlation or causal patterns.

Limitations and future directions: The findings of present may not be large enough to fully generalize to the broader population as it was a cross sectional study with limited sample size of one sex only. The reliance on self-reported data for measures of sexual dysfunction, and sociodemographic variables can introduce biases, where participants may either overreport or underreport sensitive information. This could affect the validity of the findings, as self-reported data may not always align with clinical assessments.

Conflict of Interest: None declared.

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