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Assessment of Sexual Functions among Male with Substance Use Disorders

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Background: Recent epidemiological and clinical studies confirmed the presence of a strong association between substance use disorders and sexual dysfunctions. Studies have demonstrated that prevalence of sexual dysfunctions among addict was about 30 %the most common problem among male substance abuse patients were Erectile Dysfunction (ED) and delayed ejaculation
Methods: This cohort comparative study was conducted on of 376 males aged between 18 – 50 years who were substance abusers including tramadol, cannabis and poly substance related and addictive disorders. All participants were subjected to psychiatric interview which was done using SCID-5-CV structured clinical interview for DSM-5 disorders. Psychometric, biochemical, medical and drug history evaluations were also performed.
Results: Our results show comparison between four groups (opiates-cannabis-poly substance abuse and control group according to severity of drug abuse, psychiatric evaluation and according to sexual functions. There were statistically significant differences between groups in sociodemographic data mainly in occupational and educational history. There also were statistically significant differences between groups in terms of drug use, psychiatric assessment, assessment of sexual activity, hormonal assessment of the studied population and quality of life assessment.

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Conclusions: Long term drug use has a statistically significant negative effect on all domains of male sexual functions. Also average daily dose and severity of addiction are significantly correlated to sexual dysfunctions in patients with tramadol abuse. This is done through an alteration in sex hormone and alters feedback regulations of the pituitary on the hypothalamus.

Keywords: Sexual functions; tramadol; opiates; cannabis.

1. INTRODUCTION

Substance use disorders (SUDs) are a global health problem which present in a variety of clinical settings. Substance use may complicate an underlying medical or psychiatric disorder and can also lead to medical or psychological morbidity in its own right [1].

In an Egyptian study by Kamel et al., 1995 cannabis was the most widely used drug followed by opioids and in a more recent study by El-Sawy and Abd Elhay it was found that adolescents (exposed to trauma) were more likely to use tramadol, followed by cannabis and benzodiazepines [2,3]. Psychosexual disorders are dysfunctions of the sexual response cycle that cause impaired sexual performance and distress to affected patients and their partners. These disorders can affect any phase of the sexual response cycle. The commonest sexual disorders seen in male patients are premature ejaculation and erectile dysfunction [4].

At the turn of the twenty-first century, the situation has changed dramatically. The recognition of a high prevalence of sexual disorders in the community, coupled with the rapid expansion of research on pharmacologic treatments for sexual dysfunctions, has resulted in the development of numerous new measures of sexual functioning [5].

In 2016, the United States Food & Drug Administration (FDA) issued a warning regarding severe safety issues associated with opioid pain medications as long-term use of opioids may be associated with decreased sex hormone levels and symptoms such as reduced interest in sex, impotence, or infertility [6].

Prevalence of sexual dysfunctions among addict was about 30% the most common problem among male substance abuse patients was ED and delayed ejaculation [7].

The aim of this study was to assess impact of various substance abuse on sexual functions.

2. PATIENTS AND METHODS

This cohort comparative study was conducted on of 376 males aged between 18 – 50 years who were substance abusers including tramadol, cannabis and poly substance related and addictive disorders. The study recruited participants who met the criteria of DSM- 5 for substance related disorders and attended either the outpatients and inpatient services of Neuropsychiatry Department and Center of Psychiatry, Neurology, and Neurosurgery hospital at Tanta University or Andrology unite of Urology department at Tanta University Hospital. After approval from Tanta University Institutional Review Board, a written informed consent was obtained from each participant.

Exclusion criteria were patients who had severe neurological disorders e.g. Parkinsonism, paraplegia as these conditions affect sexual function. Patients with history of medical conditions e.g., diabetes, hypertensive as these conditions may affect sexual performance. Patients who had severe psychiatric illness e.g., schizophrenia or bipolar disorders. Patients receiving psychiatric drugs which interfere with sexual functions such as psychotropic drugs SSRIS and antihypertensive.

The participants were allocated to one of four groups. Group 1: tramadol related addictive disorders (n= 94). Group 2: cannabis related addictive disorders (n= 94). Group 3: poly substance related addictive disorders (n= 94). Group 4: control group (n= 94).

2.1 Psychiatric Evaluation

All participants were subjected to psychiatric interview which was done using SCID-5-CV structured clinical interview for DSM-5 disorders, the clinical version for diagnosis of substance related disorders. Assessment of addiction severity was performed using Arabic version of addiction severity index. Collection of sociodemographic data of the studied populations which include age, occupation, residence, education, smoking and smoking

index. Complete evaluation of family characteristics among participants. Urine test for detection of the substance of use related disorders.

Psychometric evaluation was done to evaluate presence of comorbidity of anxiety or depressive symptoms by hospital anxiety and depression scale Arabic version.

Medical and drug history of the patient were collected to exclude any other causes of sexual dysfunctions. The assessment of sexual functions was done using complete sexual history. Psychometric assessment including assessment for all stages of sexual cycle was done using Arizona sexual experience scale, Arabic version of international index of erectile dysfunction and men health questioner.

Biochemical evaluation was done through hormonal assessment. Urological evaluation was done using urological examination, Penile doppler to exclude any possible organic causes. Quality of Life Enjoyment and Satisfaction Questionnaire (short form) was used for the assessment of quality of life.

2.2 Statistical Analysis

Statistical analysis was performed using the Statistical Package for Social Sciences (SPSS). The Fisher exact test was used to compare categorical variables. The continuous variables were analyzed using the independent sample t test. All P values were 2-tailed, and statistical significance was set at $P > 0.05$.

3. RESULTS

3.1 The Results of the Current Study Included

The difference between the four groups was significant as regards their marital status and age of onset of substance use while no significant difference regarding to age Table 1.

Both tramadol and cannabis related disorders use these substances for sexual purposes more than the group of polysubstance related disorders (χ^2 =44.95, p=0.001). Previous treatment in opiates (tramadol) group show that 52 (55.3%) had previous treatment while in Cannabis group it show that 30 (31.9%) had previous treatment and in Poly substance group it show that 74 (78.7%) had previous treatment. There were statistically significant differences between groups Table 2.

There were a significantly higher comorbidity of anxiety and depression among poly substance abuse group compared to mono substance use groups Table 3.

There were statistically significant differences between groups according to the mean age of starting sex, ever had sex, source of sexual knowledge and sexual activity and masturbation during last three-months before marriage Table 4.

There were statistically significant differences between groups according to erectile functions, sexual satisfaction, orgasmic functions, sexual desire, general satisfaction and a total evaluation score Table 5.

There were statistically significant differences between groups according to total testosterone, FSH, LH, Prolactin and estrogen levels in addition to Quality of Life assessment score Table 6.

4. DISCUSSION

The systematic evaluation in this study shows substantial and symmetrical overlap between substance abuse and sexual dysfunctions which have a direct impact on all sexual function domains lead to impairment of quality of life and worsening of the prognosis.

Patient above 50 years were excluded in the current study, this helps avoiding as much as possible the effect of age on sexual functions.

Other studies put comparable age restrictions for the same purpose, El-Hadid & El-Gilani (2014) for example didn't state a maximum age for inclusion, however there was no subjects in their sample above 49 years [8].

Non workers percentage was higher among poly substance use group than mono substance group .This is because non-employment was one of the biggest indicators associated with substance abuse. That is why non-employment was more common among poly substance group than mono substance group [9].

Table 1. Age and marital status of the studied population

		Tramadol related group N=94	Cannabis related group N=94	Polysubstance related group N=94	Control group N=94	χ2	P
Age		36.56±7.355	34.85±4.056	38.83±4.701	34.28±8.420	31.499	0.138
Marital status	Single	15 (16%)	20 (21.3%)	7 (7.4%)	-	41.805	<0.001*
	divorced	16 (17%)	3 (3.2%)	17 (17%)	-		
	widow	3 (3.2%)	1 (1.1%)	2 (2.1%)	-		
	married	30 (31.9%)	45 (47.9%)	29 (30.9%)	-		
	Separated (troublesome)	30 (31.9%)	25 (26.6%)	39 (41.5%)	-		
Age of onset of substance use		27.87±8.108	17.38±2.878	29.61±2.334	-	155.206	<0.001*
TUKEY'S Test							
		Tramadol & Cannabis		Tramadol & Poly		Cannabis & Poly	
Age of Onset		<0.001*		0.056		<0.001*	

**Significant (P≤0.05)*

Table 2. Sexual and non-sexual motives for substance use and history of previous treatment trials among studied groups

		Tramadol related group N=94	Cannabis Related group N=94	Polysubstance related group N=94	χ2	p
Sexual motives	Yes	14 (14.8%)	21(22.3%)	54 (57.4)	44.95	0.001*
	No	80 (85.2%)	73 (77.7)	40 (42.6)		
History of previous treatment trials	Yes	42 (44.7%)	64 (68.1%)	20 (21.3%)	41.663	<0.001*
	No	52 (55.3%)	30 (31.9%)	74 (78.7%)		

**Significant (P≤0.05)*

Table 3. Depression and anxiety assessment by Hospital Anxiety and Depression scale

Variable	Tramadol related group N=94	Cannabis related group N=94	Polysubstance related group N=94	Control group N=94	P value
No	52 (55.3%)	61 (64.9%)	35 (37.2%)	84 (89.4%)	<0.001*
Yes	42 (44.7%)	33 (35.1%)	59 (62.8%)	10 (10.6%)	

**Significant (P≤0.05)*

Table 4. Comparison between studied groups according to characters of sexual behaviour (sexual history)

Variable	Opiates (tramadol) n=94		Cannabis n=94		Poly substance n=94		Control n=94		F χ2	P value
	No.	%	No.	%	No.	%	No.	%		
Mean age of starting sex	20.96±0.747		15.95±0.575		14.99±0.374		22.04±0.386		1082.075	<0.001*
Ever had sex										
No	28	29.8	41	43.6	13	13.8	27	28.7	20.297	<0.001*
Yes	66	70.2	53	56.4	81	86.2	67	71.3		
Source of sexual knowledge										
Porn movies	48	51.1	51	54.3	62	66.0	55	58.5	29.454	0.001*
Porn picture	26	27.7	27	28.7	20	21.3	14	14.9		
Sexual relationship	13	13.8	11	11.7	8	8.5	5	5.3		
Family information	7	7.4	5	5.3	4	4.3	20	21.3		
Sexual activity during last three month										
With wives	42	44.7	38	40.4	25	26.6	67	71.3	43.579	<0.001*
Masturbation	31	33.0	27	28.7	44	46.8	17	18.1		
Masturbation before marriage										
Once / week	39	41.5	43	45.7	33	35.1	51	54.3	28.652	0.001*
Daily	15	16.0	13	13.8	31	33.0	10	10.6		
More than one time/day	22	23.4	14	14.9	20	21.3	13	13.8		
Infrequent	18	19.1	24	25.5	10	10.6	20	21.3		
TUKEY'S Test										
	Tramadol & Cannabis		Tramadol & Poly		Tramadol & Control		Cannabis & Poly		Cannabis & Control	Poly & Control
Age of Starting sex	<0.001*		<0.001*		<0.001*		<0.001*		<0.001*	<0.001*

**Significant (P≤0.05)*

Table 5. Psychometric evaluation of sexual activity with international index of erectile function (IEEF)

Variable	Tramadol related group N=94	Cannabis related group N=94	Polysubstance related group N=94	Control group N=94	P value
Erectile function	9.00±0.207	16.02±0.463	5.99±0.647	26.99±0.740	<0.001*
Sexual satisfaction	3.46±0.501	7.88±0.323	2.77±0.426	9.88±0.323	<0.001*
Orgasmic function	3.05±0.226	6.87±0.335	2.93±0.421	10.31±0.529	<0.001*
Sexual desire	4.06±0.246	6.48±0.502	3.94±0.564	7.18±0.718	<0.001*
General satisfaction	3.80±0.649	7.13±0.335	3.62±0.893	8.18±0.816	<0.001*
Total score	23.37±0.892	44.38±0.940	19.23±1.402	62.54±1.373	<0.001*
TUKEY'S Test					
	Tramadol & Cannabis	Tramadol& Poly	Tramadol& Control	Cannabis & Poly	Cannabis & Control	Poly & Control
Erectile function	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Sexual Satisfaction	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Orgasmic function	<0.001*	0.119	<0.001*	<0.001*	<0.001*	<0.001*
Sexual Desire Score	<0.001*	0.360	<0.001*	<0.001*	<0.001*	<0.001*
General Satisfaction Score	<0.001*	0.297	<0.001*	<0.001*	<0.001*	<0.001*
Total Score	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

**Significant (P≤0.05)*

Table 6. Comparison between studied groups according to hormonal essay among male addict patients and quality of life assessment

Variable	Tramadol related group N=94	Cannabis related group N=94	Polysubstance related group N=94	Control n=94	F	P value
Total Testosterone	2.47±0.850	3.49±0.629	1.19±0.494	4.52±1.834	161.187	<0.001*
F S H	3.84±1.030	5.52±0.701	1.69±0.503	7.22±3.228	171.985	<0.001*
L H	4.08±0.845	4.99±0.814	1.80±0.616	5.21±2.291	130.303	<0.001*
Prolactin	15.12±1.671	11.22±1.903	26.76±3.681	9.40±3.319	738.115	<0.001*
Estrogen	44.37±5.753	34.20±2.758	52.62±4.866	29.80±5.278	429.038	<0.001*
Quality of life score	34.26±5.584	44.79±5.611	25.20±3.198	57.87±4.537	795.364	<0.001*
TUKEY'S Test						
	Tramadol & Cannabis	Tramadol & Poly	Tramadol & Control	Cannabis & Poly	Cannabis & Control	Poly & Control
Testosterone	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
FSH	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
LH	<0.001*	<0.001*	<0.001*	<0.001*	0.637	<0.001*
Prolactin	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Estrogen	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*
Quality of life score	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*	<0.001*

**Significant (P≤0.05)*

Also no obvious difference between substance abuse due to difference in places although some scholars believe that addiction is the result of urban development, [10]. Also another scholars believe that public participation plays an important role in reducing this problem [11,12].

Drug addictions can affect a marriage in different ways ,time spent away from the marriage, as an addict dedicates more and more time to procuring and consuming their substance of choice this lead to increased emotional distance between partners and higher levels of stress in the relationship [13].

There are numerous factors associated with the support from patients wives such as occupation and education .there are positive correlation between the level of wife education and occupation with her attitude to her husband problem and sharing in supply the required support for her husband .

It was concluded that wife attitude to treatment and her husband was negative among poly substance than mono substance use group .this is attributed to level of wife education and occupation .this reflected on compliance of treatment.

In the current study, age of cannabis use was early than other groups. This in agreement with other studies. Rotermann, reported that one in five Canadian youth between the ages of 15–19 report having used cannabis in the last year [14]. In the Egyptian culture Cannabis is easy accessible and is the most common substance of abuse among adolescents.

Studies on sex-related drinking motives suggest that individuals abuse drugs for various sex-related reasons, including enhancement of sex, to increase sexual risk-taking, and to decrease anxiety about sexual activity.

Banks & Zapolski, ; Celio et al.,; Messman-Moore et al. and Nash et al., reporting more sex-related abuse motives have greater levels of heavy and problem abuse [15-18]. Drugs are also often used in conjunction with sex (sometimes termed “Chem Sex”) [19].

There is great difficulty in management of substance abuse as our findings suggest that substance abuse treatment services require more integrated, individualized, comprehensive, and longer-term approaches to care. Specifically limited housing and treatment options. Because housing is considered critical for sober living, inadequate housing resources impact lengths of stay [20].

Research also documents a reverse gateway effect, whereby those who smoke marijuana in early young adulthood are more likely to initiate tobacco use and to have a greater likelihood of developing nicotine dependence than their non-smoking peers [21-23].

Those who go on to have problems with the use of illicit drugs, including but not limited to marijuana, are more likely to be heavy smokers, to be nicotine dependent, and to experience greater difficulty with quitting smoking [24].

There is great comorbidity between substance abuse and psychiatric disorders especially anxiety and depressive symptoms which worsen their sexual performance which lead to more depressive and anxiety symptoms which has a direct impact on quality of life.

Several studies have demonstrated that, of the various negative effects, prolonged use of drugs leads to impairment of sexual function and, with time, may lead to onset of sexual disorders [25].

According to La Pera *et al.*, 34.8% declared that a sexual disorder had influenced their decision to start taking illegal drugs. This percentage is statistically higher in those presenting a sexual disorder prior to first drug use .Furthermore, this percentage tends to increase with the increase in sexual disorders [25].

Indeed, of the subjects presenting only one sexual disorder, this percentage is 33.3%, while in those with two sexual disorders, that is, PE(premature ejaculation) and ED(erectile dysfunctions), this percentage reaches 43%. On the other hand, when three sexual disorders are present, that is, PE and ED, LSD(lack of sexual desire) this percentage rises to 75% [25].

In this study, the use of opioids is associated with some high-risk sexual behaviours and a reported early age of sexual initiation in Egyptian adult drug users. Participants in the study reported high rates of sexual activity over the previous 3 months, exchange of sex for drugs or money, rates of risky sexual behaviours were observed, particularly in poly substance users. The data reported by the study sample are consistent with those obtained in previous research. These high

rates of sexual behaviours may be due to impulsivity and lack of self-control which was associated with substance use disorders [26,27].

However, the age of sexual initiation in our sample is earlier when compared with that of the normal Egyptian population (16 years) and of street children (15 years) [28,29].

Male addicts involve in frequent masturbation before marriage even after it with pleasurable seeking activities patients seek for [30].

Effect of opiates (tramadol) on sexual functions is due to its effect on sex hormones, Oxidative stress has been proposed to be related to erectile dysfunction (ED),serotonergic activity and its negative effect on opioid receptors [31].

According to orgasmic function There was a statistically significant difference between the three groups as orgasmic function in opiates (tramadol) group was with a mean value of 3.05±0.226 while in Cannabis group it was with a mean value of 6.87±0.335 and in Poly substance group it was with a mean value of 2.93±0.421 finally in control group it was with a mean value of 10.31±0.529. This in agreement with other previous studies (Zhang et al. and Abdelazim et al.,) [32,33].

Our study found a statistically significant negative correlation between daily dose of tramadol and both erectile function and sexual desire. This is in consistent with Cushman (1973) who found a significant inverse correlation between opiates dose and serum testosterone level and hence sexual functions [34].

However, the results of this study is in contrast with Al-Gommer et al., and Abd El-Qader who failed to demonstrate any significant relationship between dose of heroin or tramadol and any of sexual functions or sex hormone levels. This can be explained by the relatively smaller number of subjects and lower average of daily dose of tramadol in their study than ours [35,36].

The research of Palha and Esteves; Babakhanian, [37,38], who studied sexual dysfunction among 101 heroin addicts, found that 60% of them had problems achieving orgasm. They also found that 75% of men in their study complained of low libido, 71% reported altered sexual arousal, and 72% had reduced sexual satisfaction.

Abel [39] reported that a small amount of cannabis can enhance sexual activity but larger quantities can suppress sexual motivation. Similar dose-dependent effects were confirmed by some other clinical studies Koff; Chopra [40] and Jandu [41], however, in a recent study, no association was found between frequency of cannabis use and sexual desire [42].

Thereafter, in a clinical study, erectile dysfunction was found twice more common in daily cannabis users than the control group. This finding was supported by another study which showed that cannabis consumption can be the cause of erectile dysfunction through its effect on endothelial function [43].

Similarly, Smith et al. reported that there is not an association between the frequency of cannabis use and erectile dysfunction in a computer-assisted telephone survey, this is may be due to lack of psychometric evaluation for every sexual domain instead of global evaluation.

Regarding the orgasmic function, the first prominent study of the literature was conducted. They reported that 68% of male cannabis users expressed that cannabis use increased the quality of orgasm but did not have a positive effect on quantity of orgasm [44].

Meanwhile, Kumsar et al. reported that there was not a significant difference between cannabis users and healthy controls in terms of sexual intercourse and overall satisfaction.

Another parameter taken into consideration during the evaluation of sexual function was sexual satisfaction. There were only limited number of studies providing data about the association of cannabis use and sexual satisfaction [45].

After abstinence from substances the hormonal levels of the three groups significantly changed, testosterone, FSH and LH became significantly higher than the basic levels and both prolactin and estrogen lowered in all groups.

Mikhail study has shown a direct interference of tramadol consumption with pituitary release of LH and FSH which could interfere with the menstrual cycle in women by blunting of the normal pulsatile release of LH and direct negative effects on the testes of males resulting in testosterone decrease and a reduction in testicular interstitial fluids which lead to decrease

in sexual drive as well as sustenance of erection [46].

In general, it is believed that marijuana consumption decreases LH levels [47,48].

Cannabinoid receptors are closely related to neurons in the hypothalamus and GnRH release has been shown to be inhibited in males through interaction with GABA and other systems [49].

There were statistically significant differences between groups as quality of life affected with prolonged and multiple substance abuse with disastrous effect on sexual functions and comorbidity with anxiety and depression [50].

5. CONCLUSIONS

Long term drug abuse has a statistically significant negative effect on all domains of male sexual functions. Also, average daily dose and severity of addiction are significantly correlated to sexual dysfunctions in patients with tramadol abuse. This is done through an alteration in sex hormone and alters feedback regulations of the pituitary on the hypothalamus.

CONSENT AND ETHICAL APPROVAL

The study recruited participants who met the criteria of DSM- 5 for substance related disorders and attended either the outpatients and inpatient services of Neuropsychiatry Department and Center of Psychiatry, Neurology, and Neurosurgery hospital at Tanta University or Andrology unite of Urology department at Tanta University Hospital. After ethical approval from Tanta University Institutional Review Board, a written informed consent was obtained from each participant.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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