

## IS THERE A RELATIONSHIP BETWEEN ALCOHOL/DRUG ABUSE AND LUTS/ED?

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### ABSTRACT

**Introduction:** The aim of the study was to assess the presence and severity of lower urinary tract symptoms (LUTS) and erectile dysfunction (ED) in the drug and alcohol addicted population.

**Materials and methods:** Alcohol and drug abuse groups constituted of male abusers who presented to a local Alcohol and Drug Abuse Research Center. Control groups were composed of age-matched healthy men who denied any drug/alcohol abuse. Each group was composed of 30 men. Beck Depression and Anxiety Scales, International Prostate Symptom Score (IPSS), Overactive Bladder Symptom Score (OAB-V8), International Index of Erectile Function (IIEF-5) and sexual satisfaction scale were the tools applied to the subjects and controls. Additionally, maximum (Qmax) and average urinary flow rates (Qave) were recorded for statistical assessment in all groups.

**Results:** The mean age, number of children, number of siblings, were comparable between the subjects and controls ( $p>0.05$ ). LUTS and ED were more prevalent in drug and alcohol abusers when compared with their controls. Higher mean depression and anxiety scores of the drug and alcohol abusers highlighted their worse psychological status. The quality of life and sexual satisfaction assessment of the drug abusers yielded significantly lower results when compared with their controls. Regarding the comparison between alcohol addicts and their controls; quality of life scores were significantly higher whereas sexual satisfaction assessment results were comparable. The Qave values were similar between drug abusers and their controls while mean Qave was significantly higher in the alcohol addicts than their controls.

**Conclusion:** ED and LUTS are more prevalent in alcohol and drug abusers when compared to healthy controls. It can be proposed that alcohol and drug addiction should be considered in the etiology of ED and LUTS especially in young adult population.

**Keywords:** Alcohol, drug addiction, dysfunction, sexual, urinary.

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### Introduction

Alcohol or illicit drug abuse is a global fact, with particular involvement among young people. In the United States approximately 50% of the adolescents aged between 12-17 years have consumed alcohol at least once in their lifetime and 25% identified themselves as regular alcohol consumers. In this context, it has been reported that worldwide alcohol consumption in 2010 was equal to 6.2 liters of pure alcohol consumed per person aged 15 years

or older, which translates into 13.5 grams of pure alcohol per day<sup>(1)</sup>. It is estimated that in the year 2010, between 153 - 300 million people aged between 15-64 years (3.4-6.6 % of the world's population in that age group) had used an illicit substance at least once in the previous year<sup>(2)</sup>.

People may use alcohol or illicit drugs in order to promote erection due to their potential performance anxiety reduction and vasodilatory effects. However on the long run, it has been shown that those who routinely consume alcohol or illicit drugs

might be at significant risk for developing some form of erectile dysfunction (ED). Indeed, the incidence of male sexual dysfunction in opioid addicts or those on maintenance treatment with various psychoactive drugs is significantly higher when compared to the general population<sup>(3)</sup>. Overall, 34-85% of heroin addicts, 14-81% of methadone, 36-83% of buprenorphine, and 90% of naltrexone maintenance receivers suffer some form of male sexual dysfunction. Regarding alcohol-addicted population, sexual dysfunction rates have been reported to be in the range of 40-95.2%, with a significant difference when compared to healthy controls or social drinkers<sup>(3)</sup>.

The lower urinary tract symptoms (LUTS) are particularly prevalent in older men and they have a negative impact on quality of life<sup>(4)</sup>. Non modifiable patient-related characteristics such as androgens, genetic predilection and age are considered as the main predisposing factors, but underlying pathophysiology may be multifactorial with the involvement of anatomic, functional, neurological and humoral disorders<sup>(5)</sup>. The negative influence of alcohol and drug abuse on lower urinary tract dynamics has been highlighted in the recent literature. The daily or heavy alcohol consumption has been shown to increase the risk of moderate to severe LUTS on long-term prospective studies (6,7). Moreover, the more widely used illicit drugs such as ketamine or cannabis can lead to LUTS by several mechanisms<sup>(8)</sup>.

Most of the previous studies about the impact of illicit drugs or alcohol on sexual and lower urinary tract function adopted simple nonvalidated questions and lacked controls<sup>(9,10,11)</sup>. Furthermore, regional epidemiological data focusing on this relationship are also lacking. In this study, we aimed to investigate the relationship between alcohol/drug abuse and ED/LUTS via validated tools and compare the findings with relevant control groups.

## Materials and methods

Prior to the initiation of this study, local ethical committee approval has been obtained and all subjects have given written informed consent in order to participate in the study. Those who consented to join the study were asked to complete self-administered questionnaires anonymously. A psychiatrist monitored the whole course, made a brief introduction about the purpose of the study and assured them that the survey was only for acad-

emic interest, before the abusers started to answer the questionnaires.

Male patients who presented to a local Alcohol and Drug Abuse Research Center due to either alcohol (n=30) or drug abuse (n=30) related problems constituted the study population. On the other hand, control groups were composed of age-matched healthy men (30 subjects each corresponding to alcohol and drug abuse groups, respectively) who denied any history of alcohol or drug abuse. Being in the age range of 18-45 years, absence of a chronic systemic medical disorder, urethral stricture and absence of benign prostatic hyperplasia were the inclusion criteria of both groups. Those who had active urinary tract infection as documented by LUTS in the presence of significant bacteriuria and those who had undergone urogenital surgery were excluded from the study.

### *Relationship between alcohol/drug abuse and LUTS/ED*

Patients were asked to complete, validated versions of the following questionnaires; Beck Depression Scale, Beck Anxiety Scale, IPSS (International Prostate Symptom Score) and OAB-V8 (Overactive Bladder Symptom Score) in order to assess the presence and severity of depression, anxiety, LUTS and erectile functions, respectively. Additionally, uroflowmetric study of all patients were performed and maximum, mean urinary flow rates were recorded for statistical assessment.

### *Assessment tools*

#### • Beck Anxiety Scale

The Beck Anxiety Scale is a 21-question multiple-choice self-report inventory that is used for measuring the severity of anxiety in children and adults. Scores were interpreted as follows: 0-21: low anxiety, 22-35: moderate anxiety and 36-63: severe anxiety.

#### • Beck Depression Scale

The Beck Depression Scale is a 21-question multiple-choice self-report inventory that is used for measuring the severity of depression. Scores were interpreted as follows: 0-13: minimal depression, 14-19: mild depression, 20-28: moderate depression and 29-63: severe depression

#### • International Index of Erectile Function (IIEF)

The IIEF instrument contains 15 items that are divided into five domains: erectile function, intercourse satisfaction, orgasmic function, sexual

desire, and overall satisfaction. The presence and severity of ED was based on the IIEF erectile function domain (5 questions) score as 26-30 representing no ED; 22-25, mild ED; 17-21, mild to moderate ED; 11-16, moderate ED; and <11, severe ED.

- International Prostate Symptom Score (IPSS)

LUTS were assessed according to IPSS on a self-administered questionnaire. The overall symptom score was categorized as none to mild (0 -7 points), moderate (8-19 points), or severe (20- 35 points) symptoms.

- Overactive Bladder Validated 8 Question Screener

Overactive Bladder Validated Screen test consists of 8 questions which assess the presence and the bother associated with lower urinary tract symptoms that are suggestive of overactive bladder syndrome. A total score of 8 and higher was considered positive for OAB.

**Statistical analysis**

Kolmogorov-Smirnov test was used to evaluate whether the distribution of variables were normal. Accordingly, it was seen that all variables displayed a normal distribution. Two independent sample t test was used for the comparison of the continuous data between groups. The continuous variables were presented as the mean ± standard deviation. Categorical variables were compared by Chi-Square test. Categorical variables were presented as a count and percentage. A p-value of <0.05 was considered significant. Analyses were performed using commercial software (IBM SPSS Statistics, Version 23.0. Armonk, NY: IBM Corp.)

**Results**

The mean age of the patients was 40,67±10,84 years and 26,4 ±7,68 years in the alcohol and drug abuse groups, respectively. The most prevalent type of drug that has been abused was cannabis followed by heroin. A total of 9 patients in the drug abuse group were consuming more than one type illicit drug with cannabis being common in each combination. The duration of average alcohol and drug abuse were 19,53 years and 5,77 years, respectively.

**Drug abuse and lower urinary tract symptoms / erectile dysfunction**

Statistically significant difference was not detected between the drug abuse group and its control group according to ages (p>0.05). Mean body

mass index of the control group was significantly higher than drug abuser group (p<0.001). Number of children, number of siblings and average monthly income were comparable between drug abusers and their controls. The clinical and demographic characteristics of the drug abuse group and its control group are summarized in table 1.

	Drug Control (n=30)	Drug Abuse (n=30)	p value
Cannabis	-	10 (33,3)	-
Heroin	-	7 (23,3)	
Synthetic Cannabinoid	-	1 (3,3)	
Ecstasy	-	3 (10)	
Cannabis+ Synthetic Cannabinoid	-	2 (6,7)	
Cannabis+ Synthetic Cannabinoid+ Ecstasy	-	1 (3,3)	
Heroin+Cannabis	-	4 (13,3)	
Cannabis+Ecstasy	-	2 (6,7)	
Age (years)	25,6±3,46	26,4±7,68	
Weight (kg)	79,9±11,17	66,43±8,59	<0,001
Height (cm)	177,47±5,51	171,73±5,49	<0,001
BMI (kg/m2)	25,35±3,22	22,49±2,46	<0,001
Number of children (n)	0,27±0,58	0,53±1,04	0,226
Number of siblings (n)	3,1±2,19	3,47±1,72	0,473
Average monthly income (Turkish liras)	2003,33±1293,08	1381,6±811,2	0,067
Duration of drug abuse (years)	-	5,77±4,9	-
<i>Data were shown as n (%) and mean ±standard deviation.</i>			

**Table 1:** Baseline demographic characteristics and abuse type of the drug abuse group and its corresponding control group.

BMI: Body mass index

Mean IIEF-5 score, mean IPSS and mean OAB score of the drug abusers were significantly different from their controls with the results being consistent with a more severe symptoms in those suffering drug addiction (p<0.05). Mean depression and anxiety scores of drug abusers were significantly higher than that recorded for their controls (p<0.05).

Quality of life and sexual satisfaction assessment of the drug abusers yielded significantly inferior results when compared with their controls. Despite a significant difference in IPSS, the difference between mean urinary flow rates did not exhibit statistical significance between drug abuse group and its control group (p<0.05).

Results of the tools that were applied to the drug abuse group and its control group are summarized in table 2.

	Drug Control (n=30)	Drug Abuse (n=30)	p value
Beck Depression Scale	7,13±6,33	13,63±10,76	<b>0,006</b>
Beck Anxiety Scale	7,57±10,19	16±12,39	<b>0,006</b>
Sexual Satisfaction Scale	50,97±6,7	43,63±15,21	<b>0,020</b>
IIEF-5	23,4±2,16	18,83±4,56	<b>&lt;0,001</b>
IPSS	3,57±4,16	10,47±7,82	<b>&lt;0,001</b>
Quality of life	0,8±0,89	1,7±1,34	<b>0,004</b>
OAB Score	5,43±5,19	9,47±7,12	<b>0,015</b>
Qmax (ml/sec)	21,63±6,36	25,8±15,98	0,192
Qave (ml/sec)	12,13±4,13	10,3±5,77	0,163
<i>Data were shown as and mean ±standard deviation.</i>			

**Table 2:** Results of the assessments done in the drug abuse group and its corresponding control group.

*BMI: IIEF-5; international index of erectile function, IPSS; international prostate symptom score, OAB; overactive bladder, Qmax; maximum urinary flow rate, Qave; average urinary flow rate.*

#### **Alcohol abuse and lower urinary tract symptoms / erectile dysfunction**

Mean patient BMI and age did not differ significantly between the alcohol abuse group and its control group ( $p>0.05$ ). Number of children and number of siblings were comparable between alcohol abusers and their controls.

	Control (n=30)	Alcohol Abuse (n=30)	p value
Age (years)	38,17±4,76	40,67±10,84	0,254
Weight (kg)	81,2±12	77,43±8,53	1,166
Height (cm)	173,27±6,18	171,1±6,16	0,179
BMI (kg/m <sup>2</sup> )	27,01±3,53	26,45±2,59	0,482
Number of children (n)	1,7±1,34	2,13±1,53	0,333
Number of siblings (n)	3,53±1,81	3,57±1,48	0,938
Average monthly income (Turkish liras)	2254±1002,29	1466,4±653,15	<b>0,001</b>
Duration of alcohol abuse (years)	-	19,53±7,91	-
<i>Data were shown as n (%) and mean ±standard deviation.</i>			

**Table 3:** Baseline demographic characteristics of the alcohol abuse group and its corresponding control group. *BMI: Body mass index*

Average monthly income was significantly lower in those patients who were routinely consuming alcohol when compared with their controls ( $p=0.001$ ). The clinical and demographic characteristics of the alcohol abuse group and its control group are summarized in table 3.

Mean IIEF-5 score, mean IPSS and mean OAB score of the alcohol abusers were significantly different from their controls ( $p<0.05$ ) with the results demonstrating higher prevalence of LUTS and ED in the alcohol addicted population. Mean depression and anxiety scores of alcohol abusers were significantly higher than their controls ( $p<0.001$ ).

Quality of life score of the alcohol addicts were significantly higher than their controls ( $p<0.001$ ). Despite lower mean IIEF-5 in the alcohol abuse group, sexual satisfaction assessment yielded comparable results between alcohol abusers and their controls. Mean urinary flow rates were higher in the controls when compared with the alcohol abusers with the difference being statistically significant only in the average flow rate ( $p=0.019$ ). Results of the tools that were applied to the alcohol abuse group and its control group are summarized in table 4.

	Control (n=30)	Alcohol Abuse (n=30)	p value
Beck Depression Scale	9,9±8,3	23,8±13,69	<b>&lt;0,001</b>
Beck Anxiety Scale	7,9±8,11	27,97±18,3	<b>&lt;0,001</b>
Sexual Satisfaction Scale	51,86±5,51	47,8±18,6	0,260
IIEF-5	22,43±2,8	17,13±3,99	<b>&lt;0,001</b>
IPSS	4,53±4,89	15,17±7,52	<b>&lt;0,001</b>
Quality of life	0,93±0,94	2,4±1,43	<b>&lt;0,001</b>
OAB Score	5,77±6,26	13,57±8,6	<b>&lt;0,001</b>
Qmax (ml/sec)	25,83±8,91	25,23±14,17	0,845
Qave (ml/sec)	13,63±5,15	9,97±6,5	<b>0,019</b>
<i>Data were shown as and mean ±standard deviation.</i>			

**Table 4:** Results of the assessments done in the alcohol abuse group and its corresponding control group.

*IIEF-5; international index of erectile function, IPSS; international prostate symptom score, OAB; overactive bladder, Qmax; maximum urinary flow rate, Qave; average urinary flow rate*

## **Discussion**

Erectile dysfunction is defined as the persistent inability to attain and maintain an erection suf-

ficient to permit satisfactory sexual performance<sup>(12)</sup>. Epidemiological data has shown a high prevalence and incidence of ED worldwide. The overall prevalence of ED in non-institutionalised men aged 40-70 years living in the Boston area was reported to be 52% according to the landmark study conducted by Feldman et al. with specific prevalence for minimal, moderate, and complete ED being 17.2%, 25.2%, and 9.6%, respectively<sup>(13)</sup>. The pathophysiology of ED may be vasculogenic, neurogenic, anatomical, hormonal, drug-induced and/or psychogenic. The well known etiologic factors for ED are testosterone deficiency, neurologic disease, atherosclerosis, diabetes mellitus, hypertension and drug usage.

In addition surgical intervention, radiotherapy, environmental factors, anxiety, depression, smoking and addiction may play a role in the pathogenesis of ED. In a meta-analysis of population based studies which assessed the association between alcohol intake and ED, it has been revealed that regular alcohol consumption was negatively associated with ED (odds ratio (OR) = 0.79; 99% confidence interval (CI), 0.67-0.92;  $p < 0.001$ )<sup>(14)</sup>. Regarding the chronic use or abuse of intoxicants such as cannabis and heroin, no solid conclusions could be drawn about the risk of ED and other forms of sexual dysfunction.

However, according to a recent study, mean IIEF score in each domain of the subjects who were abusing heroin, amphetamine and ecstasy were significantly lower than that recorded for controls. In our cohort alcohol and drug abusers' mean IIEF-5 scores were significantly lower than their respective control groups ( $p < 0.001$ ). In literature the relationship between chronic diseases and ED has been clearly reported in numerous studies. Higher depression and anxiety level of the alcohol and drug abusers, as reflected by their Beck scores when compared with that of the controls, might partly be explanatory for this significant difference.

On the contrary, the more recent literature, concentrating on the association between chronic alcohol consumption and the risk of ED, is against this assumption, such that consumption of 8 or more drinks/week has been shown to reduce the risk of ED significantly while the consumption of less alcohol (1-7 drinks/week) did not have a similar reduction effect<sup>(14)</sup>. These conflicting results may be related with the duration of the addiction and demographic characteristics of the subjects.

The LUTS are defined according to ICS definitions and have storage, voiding, post-micturition components. EpiLUTS study, which assessed the prevalence and associated bother of LUTS in the USA, UK and Sweden, has shown that the prevalence of at least one LUTS at least "sometimes" was 72.35 for men and 76.3% for women<sup>(15)</sup>. Besides being prevalent, LUTS can be a major cause of bother and reason for quality of life impairment such that most LUTS were described as at least "somewhat" bothersome by at least half of the participants who experienced them<sup>(15)</sup>.

LUTS have traditionally been related to bladder outlet obstruction due to benign prostatic hyperplasia. However, LUTS can affect both sexes and are often unrelated to prostate pathology<sup>(16)</sup>. Lower urinary system can be negatively affected by several factors including obesity, anxiety, depression, multiple sclerosis etc. Many drugs can alter the functions of the lower urinary tract, as well. Lower urinary tract dysfunction which might be the result of drug and/or alcohol abuse can also lead to LUTS. Overall, putting the relatively strong and well-defined relationship between ketamine abuse and the development of lower urinary tract related problems aside there is contradictory data in the literature about the association between the abuse of alcohol and/or illicit drugs and the risk of developing LUTS with some of them drawing attention to a possible positive correlation while some failing to demonstrate any association<sup>(17)</sup>.

In present study, which lacks ketamine abusers, we have demonstrated that the mean OAB and IPSS scores of the alcohol and drug abuse groups were significantly higher than their controls ( $p < 0.001$ ). Accordingly, quality of life results were significantly better in the control group. Interestingly, symptoms differences could not be supplemented with a similar trend in uroflowmetric parameters. The nonsignificant differences between the urinary flow rates of the control group and abuse groups can be attributed to the relatively young age (< 40 years) of the overall study population and the fact that the majority of the LUTS that has been reported by the addicts and controls were related with the filling phase of bladder cycling.

However, some studies that were conducted primarily among middle-aged women have ended up with conflicting results: among non-care seeking ladies and those living in certain geographic areas (Southern Sweden) overactive bladder was not found to be associated with alcohol consumption<sup>(18,19)</sup>.

In our study, we have focused primarily on erectile problems regarding sexual dysfunction while other aspects of sexual function, such as sexual desire, ejaculation and orgasm, were not assessed. However, it has been shown that illicit male drug users in particular, were prone to have ED together with decreased sexual desire and increased ejaculation latency. Increased ejaculatory latency was seen in all type of abusers while ED and decreased sexual desire were most commonly seen after heroin exposure followed by amphetamine and ecstasy<sup>(20)</sup>.

## Conclusions

Erectile dysfunction and lower urinary tract symptoms are more commonly seen in alcohol or drug abusers when compared to healthy controls. Psychological disturbances, which are also more prevalent in the addicted population, may be the predisposing factor for the end result of worse sexual and urinary functioning in these individuals. Urinary flow rates do not seem to be affected significantly by the abuse of alcohol or drugs. However more comprehensive clinical and experimental studies are necessary to confirm of these results.

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