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RESEARCH ARTICLE

TYPES OF SUBSTANCE USES AMONG SAUDI FEMALE USERS IN JEDDAH, KINGDOM OF SAUDI ARABIAFROM 2008 TO 2017: CASE - CONTROL STUDY

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Abstract

Background: Substance use is a major public health problem, necessitating further investigation in Saudi Arabia. This research was carried out to evaluate the patterns of substance use among Saudi women.

Method:This was a case-control studyconducted in Jeddah. Data was collected and analyzed using Chi-square tests.

Results: The mean age of the cases (mean± SD) was 29.9±10.9 years, while that of controls was 33.7±10.9 years. Most (71%) cases were smoking nicotine, (61.8%)using cannabis, and (47.3%) using amphetamine. Most of them were single (37%), separated (4.8%), or divorced (24.2%). More cases than controls were likely to have been in multiple marriages ($p<0.001$), have a lower education level ($p<0.001$), be unemployed ($p<0.001$), have a household income of less than 5000 SR ($p<0.001$), and live in families in conflicts ($p<0.001$).Tuberculosis ($p=0.012$), HIV ($p=0.036$), hepatitis C or B ($p=0.044$), and sickle cell disease ($p<0.001$)were more prevalent in cases than controls.Casesalso hada significantly higher prevalence of schizophrenia, depression, bipolar and personality disorders (all $p<0.001$) than controls.

Conclusion: These findings indicate the high prevalence of substance use in young Saudi females and the association with socio-economic, demographic, and mental health factors.

Introduction:-

Substance disorders, including substance abuse and dependence,areamong the top 20 risk factors well-known worldwide to hurt people's health, nations' economies, and overall social welfare[1].Substance use is considered a disease that can be prevented by implementing appropriate strategies leading to a decrease in its significant health burden[2–4]. According to the United NationsOffice of Drug Crime (UNODC) report in 2015, almost a quarter of a billion individuals aged 15–64 years were involved in substance use by consuming at least one drug. Moreover,

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among this quarter billion, almost 29.5 million of adults globally are suffering from substance use disorders issues[5]. Substance use disorder is a problematic pattern of substance use leading to clinically significant impairment or distress [6].

The terms "substance use, abuse, and dependence" are often used interchangeably to describe the behavior of using an illicit drug. However, substance dependence[7]is a cluster of physiological, behavioral, and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than other behaviors that once had greater value. Substance abuse is defined as a maladaptive pattern of use indicated by continued use despite knowledge of a persistent or recurrent social, occupational, psychological or physical problem caused or exacerbated by the use or recurrent use in situations in which it is physically hazardous[8].

History of substance use is linked to the use of psychoactive substances. These psychoactive substances are certain chemicals that influence human perception, mood, and behavior by altering brain functions. Substance use trends vary among different regions of the world;however, among the list of various substances and chemicals used for substance abuse, the most prominent ones are opioids, cannabis, cocaine, and alcohol[9].In 2015, UNODC estimated that 28 million years of healthy life were lost globally due to premature death and disability due to substance use, and almost 12 million Disability-Adjusted Life Years (DALYs) were attributable to opioids[5].

An increasing trend has been observed,particularly among youth of both genders leading to depressive disorders and anxiety syndromes[10,11], even though previous studies reported that the male population is more prone to substance use compared to female counterparts[12]. Recent studies show that the gender gap is narrowing, and both men and women are equally prone to substance use[13,14].

In Saudi Arabia, the illicit usage of drugs has also emerged as a significant concern and has also been on the rise, particularly among young people, which has led to an increase in drug-related crimes and health problems[15]. The Saudi Arabian government has taken steps to address the issue of drug abuse, including establishing drug treatment centers and implementing strict penalties for drug-related offenses[16]. However, despite these efforts, drug use remains a significant challenge in Saudi Arabia[15,16], and more needs to be done to prevent drug use and provide effective treatment for those struggling with addiction.

The most frequently abused substances in the Middle East are cannabis, amphetamine, and cocaine[17], while amphetamine, heroin, alcohol, and cannabis are the most abused in Saudi Arabia[18]. Overall, the use of amphetamine and cannabis escalated with a marked decline in the use of volatile substances and heroin[15]. In 2013, the Council of the European Union reported that the Kingdom of Saudi Arabia tops the list of Middle East nations as the largest consumer of stimulants accounting for up to 30% of global amphetamine seizures[19].

Studies on gender differences in substance use and abuse showed that men aged 18 or older are almost twice more likely to have substance dependence than women[20,21]. Moreover, men are more likely than women to use cannabis and alcohol, while women are more likely to misuse prescribed drugs than their male counterparts[22].Though studies on substance use and abuse show gender-specific differences in substance use patterns and motivations for use [15,23], there is a lack of informationon the types of substances used among female users in Saudi Arabia[23]. Therefore, this study aimed to identify substance use patterns among female users at Al-Amal Hospital in Jeddah, Saudi Arabia, from 2008 to 2017.

Methodology:-

Study setting

This case-control study was carried out in Jeddah city, which is located in the western province of the Kingdom of Saudi Arabia and is considered the main seaport for the kingdom and the main entry port for the two holy mosques. The population of Jeddah was 4.082 million per the 2016 census.Thestudy was conducted atAl-Amal Hospital, the only specialized governmental hospital for treating and rehabilitating substance abuse in Jeddah.

Sampling technique

All Saudi female substance users who were cared for in Al-Amal hospital were included as cases. Sampling for controls was done through multistage cluster sampling. The Directorate of Public Health in Jeddah geographically divides Jeddah city into five main sectors, with each sector including 10 to 12 primary healthcare centers (PHCCs). A list for each sector was obtained from the directorate, and one PHCC was selected from each sector, using a random number generator in Excel. From each selected PHCC, 83 controls were selected by systematic sampling as

each third patient fulfilled the inclusion criteria, until the designated sample size was reached.

Data collection tool

A validated checklist by Al-Ghamdi and Ibrahim[24]was used among cases in reviewing patient files in Al-Amal Hospital.The checklist has been modified to a self-administered questionnaire for the controls, and the unrelated questions (e.g., substance use type and history) were removed. In addition, the self-administered questionnaire was translated into Arabic and validated for the controls in PHCCs. The modified self-administered questionnaire for the controls was translated to Arabic and tested for content and face validity to ensure appropriate clarity and fulfillment of the study objectives. Three experts (biostatistician, epidemiologist, and psychiatrist) reviewed the final version of the questionnaire. In addition, the questionnaire was tested for applicability and feasibility among a group of 90 women, including 30 non-Saudi female patients at Al-Amal Hospital and 60 women attending PHCCs, in a pilot study. The results were reviewed, and modifications were applied.

The questionnaire had three main parts. The first part was about demographic and social data, whichincludedage, residence, marital status, number of marriages, age of first marriage, educational level, occupation, family income, number of family members, and family status (single-parent, unmarried patterns, adoptive families, foster families, children raised by grandparents). The second part inquired about substance use history, which included the age of startingsubstance use, duration of substance use, family history of substance use, history of any kind of abuse, who was first introduced, and route of administration. The third part was about the participants' co-morbidities; 1) Physical co-morbidity includes a history of chronic diseases (Hypertension, Diabetes, Tuberculosis, HIV, hepatitis B, and C), and 2) Comorbid Psychiatric illness diagnosed by MINI (Mini International Neuropsychiatric Interview) which includes: Schizophrenia, Bipolar, Depression, Anxiety, Adjustment disorder, substance-induced mood disorders, and substance-induced psychosis; regular use of psychiatric medication, history of suicide attempts and number of mental hospital admissions[25].

During data collection, cases were collected by reviewing the medical records of the outpatients and inpatient Saudi females cared for in Al-Amal Hospital. For controls, an anonymous self-administered questionnaire was used to collect the information at the PHCCs.

Data management and statistical analysis

Data were collected, coded, and analyzed using Statistical Package for Social Science version 22.0 (SPSS program). Mean, and standard deviation were used to present the continuous normally distributed data, while median and interquartile range were used for non-normally distributed data. The categorical data are presented as frequency distribution. The Chi-square test was used to assess the association between two or more variables, and a P value less than 0.05 was considered a significance level.

Ethical consideration

The research was approved by the Saudi Board of Community Medicine Residency Program Scientific Committee. The research methods and data collection were approved by the organization and operating procedures of the Research and study Administration – Directorate of Health Affairs – Jeddah - Institutional Review Board (IRB) (KACST: H-02-J-002). The controls received detailed information regarding the study's purpose and nature and provided informed written consent before enrollment. The participants were informed about their right to withdraw from the study at any time. Participants gave informed consent to participate in the study and that was taken before filling outthe questionnaires. Confidentiality was ensured, and this study was conducted according to theDeclaration of Helsinki.

Results:-

Socio-demographic characteristics

We included 207 cases from Al-Amal Hospital and 416 controls from PHCCs in Jeddah city. The age of the cases (mean± SD, 29.9±10.9 years) was slightly younger than controls (mean± SD, 33.7±10.9 years). **Table 1** shows that almost one-quarter of the cases (24.2%) were divorced compared to only (6.7%) of the controls, and (4.8%) were separated compared to (0.7%) of the controls. Among the married participants, a significantly higher percentage of the cases (25.4%) than controls (6.7%) were married twice ($p<0.05$), and a significantly higher percentage of cases than controls (43.1% vs 30.2%) had their first marriage before reaching 20 years old. Regarding educational level, controls had higher educational levels than cases, either for university qualifications (43.1% vs 27.4%) or postgraduate degrees (3.6% vs 0.0%), and a higher proportion of them (37.7%) had current jobs in comparison to cases (13%). Most of the cases (94.7%) had monthly income <5000 SR (Saudi Riyals) compared to (53.4%) of the

controls which is statistically significant p<0.05. While almost one-third of the cases (32.2%) expressed that they are living within united families with conflicts, (16.6%) within divorced families, and (20.1%) within separated families, significantly much lower percentages were recorded in the controls (8%, 5.1% and 2.4% respectively) p<0.05.

Table 1:- Socio-demographic characteristics of the study groups.

Substance abuse by relatives	**Cases N=207**		**Controls N=416**		**X^2**	**P**
	No	**%**	**No**	**%**		
Marital status:						
Single	77	37.2%	117	28.1%	73.051	<0.001*
Married	64	30.9%	254	61.1%		
Divorced	50	24.2%	28	6.7%		
Widowed	6	2.9%	14	3.4%		
Separated	10	4.8%	3	0.7%		
Number of marriages:						
Once	80	61.5%	239	79.9%	29.763	<0.001*
Twice	33	25.4%	20	6.7%		
>two times	17	13.1%	40	13.4%		
Age at first marriage:						
<20 years	56	43.1%	90	30.2%	6.676	0.010*
≥20 years	74	56.9%	208	69.8%		
Educational level:						
Illiterate	9	4.6%	10	2.4%	25.763	<0.001*
Read and write	4	2.0%	9	2.2%		
Primary	25	12.7%	34	8.2%		
Preparatory	32	16.2%	56	13.6%		
Secondary	73	37.1%	111	26.9%		
University	54	27.4%	178	43.1%		
Postgraduate	0	0.0%	15	3.6%		
Working status:						
Housewife	130	62.8%	197	47.9%	41.697	<0.001*
Has a job	27	13.0%	155	37.7%		
Student	50	24.2%	59	14.4%		
Family income:						
<5000 SR	196	94.7%	222	53.4%	106.896	<0.001*
5000-<10000 SR	5	2.4%	91	21.9%		
≥10000 SR	6	2.9%	103	24.8%		
Familial status:						
United Family	62	31.2%	347	84.4%	176.850	<0.001*
United families with conflict	64	32.2%	33	8.0%		
divorced	33	16.6%	21	5.1%		
separated	40	20.1%	10	2.4%		

* Statistically significant

The pattern of substances used among cases:

As shown in**Figure 1,**nicotine wasused by 147 (71%), cannabis by 128 (61.8%), amphetamine by 98 (47.3%), alcohol by 59 (28.5%), sedatives by 57 (27.5%) and tramadol by 29 (14%) participants, while the least used substance was Shammah, which is a traditional form of tobacco particularly in the Arabian Peninsula

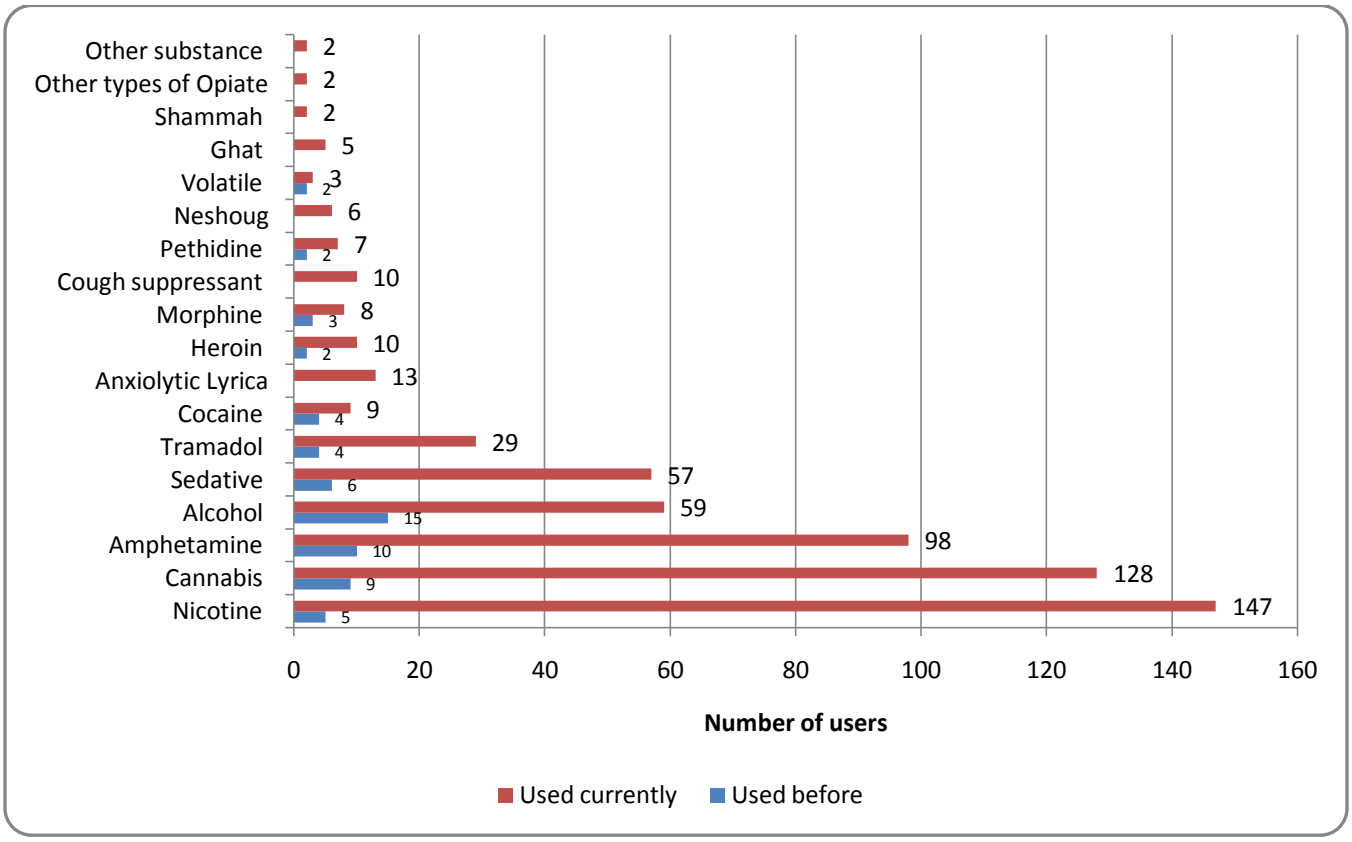

Figure 1:- Current and previous substance users.

As shown in **Figure 2**, ingestion was the commonest route of administration of the used substances 175 (84.5%), followed by smoking 154 (74.4%) and injection 20 (9.7%), while inhalation 4 (1.9%) and sniffing (6.8%) were the least reported routes of administration.

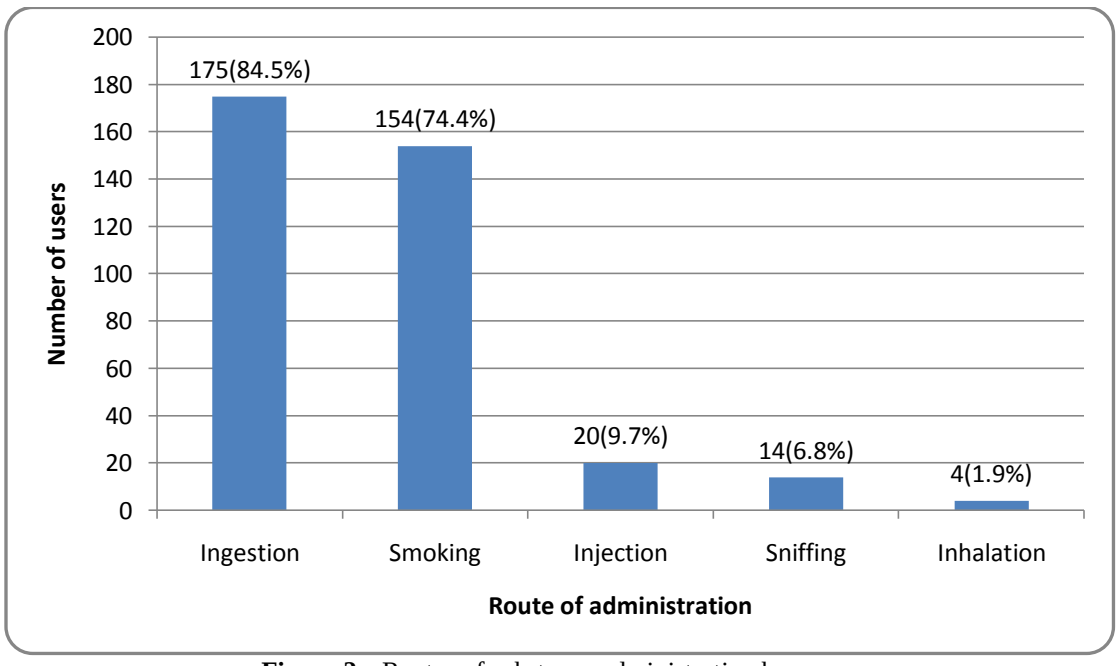

Figure 2:- Routes of substance administration by cases.

Table 2 demonstrates the starting age of substance use. Most users started between 18 and 25 years old (39.7%), some had started substance abuse as young as 7 years old, and a total of 8(3.9%) had started using it before reaching their 12thbirthday, in addition to (27.5%) who started to use it between 12 and <18 years old. The average duration of substance abuse was five years, with more than one-half of the users (57.1%) who were using it for five or more years.

The commonest introducers were peers, who represented the principal introducers for (50.7%) of the cases, followed by husbands (20.8%) and the least was the father(0.5%). Notably, 10 (4.87%) of the cases were introduced to substances through the course of treatment of sickle cell anemia, and 9 (4.4%) through psychiatric treatment, besides 7(3.4%) who were introduced through treatment from other medical conditions.

Table 2:- Age of starting, and duration of substance use and principal introducers.

Age, duration, and principal introducers of substance use	**No.**	**Percentage (%)**
Age of starting substance use(n=204):		
<12 years	8	3.9 %
12-<18 years	56	27.5 %
18-<25 years	81	39.7 %
≥25 years	59	28.9 %
Mean±SD	21.9±7.6 years	
Median	21 years	
Range	7-56 years	
Duration of substance use(n=193):		
<1 year	7	3.6 %
1-2 years	40	20.7 %
3-4 years	35	18.1 %
≥5 years	111	57.5 %
Mean±SD	7.8±7.4 years	
Median	5 years	
Range	<1-40 years	
Principal introducers (n=204):		
Peers	103	50.7 %
Husband	42	20.8 %
Mother	5	2.5 %
Sibling	7	3.4 %
Father	1	0.5 %
Others	45	22.1 %
Treatment for sickle cell anemia	10	4.87 %
Psychiatric treatment	9	4.4 %
Treatment for other medical conditions	7	3.4 %
Herself	7	3.4 %
Other relatives	9	4.4 %
Neighbor	4	2.1 %

Co-morbidities among the study group:

As seen in **Table 3,** cases were more likely to have tuberculosis(TB) (1.9%), HIV (1.4%), and hepatitis C or hepatitis B (2.8%) than the controls ($p<0.05$). A significantly higher proportion of the cases than controls (4.8% vs 0.2%) had sickle cell anemia ($p<0.05$), and mental disorders, such as schizophrenia (3.9% vs 0.0%), bipolar (4.8% vs 0.2%), depression (24.6% vs 3.4%), and personality disorder (2.4% vs 0.0%) ($p<0.05$). On the other hand, no significant difference was observed between the cases and controls regarding the prevalence of hypertension, diabetes mellitus, and anxiety $p>0.05$.

Table 3:- Co-morbidities among cases and controls.

Co-morbidities	Cases N=207		Controls N=416		X^2	P
	No	%	No	%		
Hypertension:						
Yes	11	5.3%	38	9.1%		
No	196	94.7%	378	90.9%	2.784	0.095
Diabetes mellitus:						
Yes	11	5.3%	36	8.7%		
No	196	94.7%	380	91.3%	2.210	0.137
TB:						
Yes	4	1.9%	0	0.0%		
No	203	98.1%	416	100.0%	Fisher	0.012*
HIV:						
Yes	3	1.4%	0	0.0%		
No	203	98.6%	416	100.0%	Fisher	0.036*
Hepatitis B or C:						
Yes	6	2.8%	1	0.2%	Fisher	0.044*
No	201	97.2%	415	99.8%		
Sickle cell anemia:						
Yes	10	4.8%	1	0.2%		
No	197	95.2%	415	99.8%	Fisher	<0.001*
Schizophrenia:						
Yes	8	3.9%	0	0.0%		
No	199	96.1%	416	100.0%	Fisher	<0.001*
Bipolar:						
Yes	10	4.8%	1	0.2%		
No	197	95.2%	415	99.8%	Fisher	<0.001*
Depression:						
Yes	51	24.6%	14	3.4%		
No	156	75.4%	402	96.6%	66.932	<0.001*
Anxiety:						
Yes	7	3.4%	16	3.8%		
No	200	96.6%	400	96.2%	0.084	0.772
Personality disorder:						
Yes	5	2.4%	0	0.0%		
No	202	97.6%	416	100.0%	Fisher	0.004*

* Statistically significant

Discussion:-

Substance use disorder, including abuse and dependence, is a major public health problem worldwide and a main contributor to global disease burdens, including morbidity and mortality[1,26]. Over the last few decades, a notable increase was noted in the incidence and prevalence of substance use disorders in different countries, including Saudi Arabia[27]. Recent figures from some Middle East countries showed that over one million citizens are suffering from substance use disorder by one substance at least[28]. Due to the scarcity of local studies concerning substance abuse among women, this research was conducted to explore the patterns of substance use among women in Jeddah City, Saudi Arabia.

Substance abuse can be affected by not only gender-specific factors but also social, familial, and economic factors[29]. We found that divorce, multiple marriages, low education levels, low income, unemployment, and family separation and conflicts significantly correlated with more substance use ($p<0.05$). Studies exploring factors associated with substance use have reported similar findings, including family problems and low income [30]. Previous studies also indicated that unemployment, low income, and lack of education can contribute to substance abuse [31]. It was established that young adults who spent their childhood and adolescence in lower socio-economic households are more prone to unemployment and substance use [31,32].

Secondary/high school level was associated with more substance use, which might be attributed to the young age and adolescence of secondary school students as more substance users were young and in their teenage years. Research has found a positive association between adolescence and drug abuse due to peer pressure and the influence of media portrayal [33,34].

Most recruited women used nicotine and cannabis, with figures hovering around 70% and 60%, respectively. Next was amphetamine, with a value reaching up to half of the cases. Alcohol was used by almost a third of females. Sedatives were reported to be used by a quarter of the recruited patients, and only 2 cases used Shammah. These findings seemed to be different from those previously reported by a review article published in 2016 exploring the profile of substance abuse in Saudi Arabia during the last decade, which reported that the most commonly abused substances among Saudi patients in addiction treatment settings were amphetamine, heroin, alcohol, and cannabis [15]. This might be attributed to the gender preference differences as the review article focused on males. Though alcohol is not classified as an illegal substance in many countries, it is disregarded by most Middle East countries and even entirely banned in some nations that practice Islamic law, such as Saudi Arabia, the United Arab Emirates (UAE), Iraq, Iran, Bahrain, and Afghanistan [35].

Our findings are also different from reports in Westerncountries. While alcohol was at the top of the list of abused substances in Western countries[36], the Middle East region has a greater prevalence of illicit drug use[37], which might be due to the relative inaccessibility of alcohol in Muslim countries. Reports from a study assessing mental health in Egypt reported that females abused substances less than males except for tranquilizers and hypnotics, where the prevalence was similar, and men used cannabis, nicotine, alcohol, stimulants, heroin, and cocaine more than females[38,39]. Being prohibited in the Islamic religion, Alcohol does not come to the top of the list in most Middle Eastern countries, which are majority Muslim. However, cannabis is used by the majority of substance users in Middle East countries[17], aligning with this study.

Being easy, non-painful, and accessible, ingestion was the most commonly used route of administration among females recruited for this study, consistent with another previous study[40].

The mean age females started using substances was 21.9±7.6 years. Adolescents and young adults seemed to be the most vulnerable age group for substance use initiation. This indicates thattrends did not seem to change significantly over time, as the mean age at the start of substance use reported from the al-Amal study between 2002-2006 was close to what we found (19.0±5.2)[24].

Regarding substance abuse duration, over one-half of patients studied used substances for more than 5 years. Less than (3.6%) could stop substance use after less than a year of use. This is a poor indicator of the psychological will of patients to stop using substances. It may also reflect lacking discipline that provides effective therapeutic and secondary preventive measures for substance use disorder[41].In agreement with this study, a study exploring the age at onset of substance abuse published in 2017 reported that (74%) of studied patients started substance use at the age of 17 or younger, one third (34.1%) began between 15-17 years, and (29.7%) started between 12-24 years[42]. Studies reported that the age at the onset of presentation is significantly associated with the psychological outcome as well as the degree of dependence among patients[43,44].

Infections, HBV, HCV, HIV, and TB were significantly more prevalent among cases than controls. This is similar to previous studies, indicating the high prevalence of infections among substance users[45,46]. The National Institute of drug abuse indicated that 1 in every 3 persons with HIV in the United States during the years 2005 – 2009 was a current drug user or binged on alcohol[47,48]. Because of the routes of administration of a substance, which carry considerable risk for infection transmission, as well as the immune-compromised state of most substance users, it is expected to encounter a higher prevalence of infection among those patients[49]. The frustration associated with these illnesses as well as the medications used for their treatment, especially opioid painkillers, which might be addictive in some cases like sickle cell anemia, may be responsible for the significant association between substance abuse and these diseases. Researchhas foundan association between sickle cell disease and substance abuse, aligning with our study,which did not find any association between substance use and chronic medical illnesses except sickle cell anemia ($p<0.001$). Though the reason is not well understood, some scholars attributed this association to the chronic use of addictive drugs to manage sickle cell complications. Others hypothesized that there might be another elusive mechanism for substance abuse, even in the absence of complications necessitating the use of addictive drugs[50,51].

Psychiatric illnesses, namely schizophrenia, depression, bipolar disorders, and personality disorders, were significantly higher among cases than controls, similar to previous studies documenting such associations between psychiatric illnesses and substance use[36]. The most common psychiatric disorders encountered in substance abuse patients were depression, substance-induced psychosis, and substance-induced mood disorders. While our study did not find an association between anxiety disorder and substance use, previous research found that anxiety disorders and mood disorders were more prevalent in patients with a history of substance abuse[52,53].

The economic development and social changes in Saudi Arabia led to increased migration as Saudi economic success attracts more migrant workers, which might lead to increased substance use. Migration itself can bring about challenges and stressors that may contribute to substance use as a coping mechanism[54]. Factors such as acculturation difficulties, discrimination, social isolation, and limited access to support networks and resources lead to substance use among this population[55]. Therefore, gender-specific, cultural, social factors, mental health, and treatment availability, are all essential to consider when addressing substance abuse in Saudi Arabia for successful treatment completion and help individuals overcome addiction.

Limitationsof the study

Some important variables, such as treatments and rates of prescribing medications among cases, could not be measured accurately for both inpatients and outpatients since the hospital's treatment guidelines do not recommend substance use agonist therapies such as buprenorphine andsuboxone for medical maintenance in the management of substance use disorder[56]. They are used in detoxification only. Due to the hospital policy forbidding contact with the patients, the researcher couldnot interview them to fill the gap inthe missing information.

Conclusions:-

Nicotine and cannabis were the main substances used by Saudi females, followed by amphetamine, alcohol, sedative, and tramadol, respectively. Infectious diseases such as hepatitis B and C, HIV, tuberculosis, and psychiatric illnesses were more prevalent among substance users. Family conflicts, marriage problems, low income, and low education levels were associated with a high prevalence of substance use.

Developing preventive programs and enabling community participation at the level of planning are recommended to target and manage the established risk factors for substance use disorder**.** Raising awareness about substance use disorder is essential. Coordination between schools, the Ministry of Interior, and Non-Governmental Organizations to plan and produce short movies through the media showing the adverse health impacts of substance use and its unfavorable consequences are also recommended.

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