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Study of Suicidal Thoughts and Its Demographic and Psychological Correlates in a Sample of Poly-Drug Users

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Abstract: **Patients suffering from suicidal behaviors among substance abusers are common, especially if substance abuse is comorbid with another psychiatric disorder. Although our knowledge of substance abuse and suicide behavior is increasing, we lack sufficient knowledge of suicidal thoughts among substance abusers. The aim of this study was to examine the prevalence of suicidal thoughts among poly-substance abusers and its correlative factors. This was a cross sectional case control study on 239 subjects. 122 Cases fulfilled the DSM- IV -TR criteria of substance abuse for two or more substances. Participants` were administered Beck Depression Inventory (BDI) in addition to semi-structured psychiatric interview and examination. Correlation between current suicidal thought and psycho-demographic factors was calculated using the Pearson's correlation coefficient. Statistically significant positive correlation with current suicidal thoughts in poly-substance abusers was found with Lifetime history of suicidal ideation or attempt, age, high altitude residence, lower educational level, presence of academic or occupational deterioration, history of legal troubles, amphetamine and volatile abuse, duration of substance abuse, presence of comorbid psychiatric disorder, disturbed home atmosphere, poor family support, family history of substance abuse or suicidal attempts, and Beck Depressive Inventory. While negative correlation was noticed with religiosity, Age of starting cigarette smoking and age of bereavement. This study demonstrated that associative psycho-demographic factors characterized by chaotic social life and living in high altitude in addition to comorbid psychiatric disorders may trigger suicidal thoughts in poly-substance abusers, and that religious upbringing is a helpful method for protection.**

Keywords: **Correlates, poly-drug users, psychological, suicidal thoughts.**

I. INTRODUCTION

The prevalence of actual substance abuse among youths has nearly doubled over the past decade. (1) Substance abuse is associated with suicidal ideation and suicide. This is attributed to the intoxicating and disinhibiting effects of many psychoactive substances. (2)

Suicide as a concept and as an act evokes very strong feelings in many people. However suicide rates usually increase throughout the world. (3) It occurs in every country in the world. (4) It accounts for nearly 1% of all deaths. (5) For example; Suicide rates are increasing from one year to another in Saudi Arabia. The main reasons, according to social workers in Jeddah, that lead to suicide are weak faith and a sense of overwhelming pressure where a person cannot cope and thus sinks into a deep depression that leads to suicide or attempted suicide. Suicide also stems from social, psychological and economic reasons and many drug addicts commit suicide. (6)

Beck (1986) defined suicidal ideation as the presence of thoughts or contemplation about suicide or a wish of an individual to terminate his or her life, but there is no self destructive action related to these thoughts. (5) The range of

suicidal ideation varies greatly from fleeting to detailed planning , role playing and unsuccessful attempts, which may be deliberately constructed to fail or be discovered, or may be fully intended to succeed. [7]

High rates of suicidal ideation were found by Cottler Linda et al in a research on a group of substance abuse patients. [8]

Suicidal thoughts and behaviors are a significant indicator of other co-occurring disorders; such as major depression, bipolar disorder, PTSD, schizophrenia, and some personality disorders in substance abusers. [9] So, psychiatric co-morbidity with substance use increases the risk for suicidal behavior. [10]

Prevention of suicide depends on the timely assessment of suicide risk. Shea says that timely assessment depends on clinicians' overcoming their own fixed ideas and basing their assessment on three pillars: analyzing the risk factors and predictors, uncovering and understanding suicidal ideation, and developing prevention strategies. [11]

The main objective of this study is to investigate the basic psycho-demographic characteristics of suicidal substance abusers and to understand the impact of dual diagnosis on suicidal thoughts. Assessment of these links is important to identify predictors for suicide in substance abusers to develop specific interventions for persons in substance abuse treatment.

II. MATERIALS AND METHODS

Study design:

A cross sectional case control descriptive study was carried out, to describe socio-demographic and other factors characterize participants.

Setting of the study:

This study was conducted between the periods from May 2011 to June 2012, in Al-Baha psychiatric hospital in south area in Saudi Arabia.

Study population:

Cases in this study were made up of male in-patients admitted to Al-Baha psychiatric hospital, aged 18 - 45 years, who met to the Diagnostic and Statistical Manual of Mental Disorders, Text Revision, fourth edition (DSM- IV -TR) for psychiatric diagnosis of substance abuse, and who were abusing two or more substances.

The controls are male subjects who never had the experience of taking illicit substances, and not suffering any current or past psychiatric disorders or any medical disease.

Controls were matched for age, residential environment and they were chosen from employees, workers in the hospital, and their relatives and friends.

Ethical considerations:

Written Informed consents were obtained from the patients after explaining to them the aim of the study and the importance of data they are going to offer, and that these Data are confidential.

Sampling technique and data collection:

The presumptive prevalence of substance abuse among this study population will be 7.8 % similar to study of (Amir, Taha, 2001)[12]. The calculated sample size per group was around 122 According to the following equation:

$n = (z/e)^2 (p) (1 - p)$

Where,

n: the sample size per group

p: the expected prevalence = 7.8%

z: the critical value which determine the area underlying the 95% of population on the normal distribution curve = 1.96

e: the margin of sample error tolerated = 0.05

$n = (1.96/0.05)^2 x (0.078) x (1- 0.078) = 111$

The expected drop-out was 10%, so the total sample size will be 122.

Participants in this study were 122 cases in addition to 117 controls. Five participants from the control group were considered as dropout because they did not fulfill the criteria.

Sample selected by systematic random sampling. There is about 225-273 cases suffer poly-substance abuse admitted to the hospital yearly, while our sample size is 122, so our interval = 273/122 = 2. Calculated as:

K=N/n

Where "K" is the interval, "n" is the sample size, and "N" is the population size.

The first case was chosen randomly then every 2nd case was selected to fulfill the sample size required which is 122 cases.

Participants were organized into two major groups, patients (poly-substance abusers) group (n=122), and control group (n=117). Then, patients were classified into suicidal and non-suicidal according to the presence of a lifetime history of suicidal ideation or attempt (Grohol 2012) [(13)]. The study was carried out for both groups:

Information from family members was gathered in some cases.

Participants were subjected to:

1. Psychiatric history and mental state examination. Patients were diagnosed according to Diagnostic and Statistical Manual of Mental Disorders, fourth edition, Text Revision (DSM- IV -TR).
2. Full physical and neurological examination, routine laboratory tests (CBC, blood chemistry, thyroid function, liver function and urine analysis) and ECG are done in order to exclude serious organic pathology. Urine and blood toxicology screen for substance abuse to detect (benzodiazepine, alcohol, amphetamine and amphetamine derivatives, opioids, cocaine, PCP, barbiturate, cannabis).
3. Modified Simi-structured Questionnaire for the drug intake and the assessment of socio-demographic data in which we used the original sheet constructed by (Soueif et al., 1986)[(14)] plus a suitable semi-constructed interview by using modified Ain Shams University case sheet (Magda Taha 1989) [(15)] .
4. Beck Depression Inventory Scale (BDI): It was constructed by Aaron Beck, (1961) to provide a quantitative assessment of the intensity of depression. The Arabic version was prepared and standardized by (Ahmed Abd El-Khaliq; Alexandria University, 1996) [(16)].

Screening for suicidal thoughts:

Suicidal ideation defined as thoughts about wishing to kill oneself, making plans of when, where and how to carry out the suicide, and thoughts about the impact of one`s suicide on others. [(17)] Fleeting thoughts of self-harm or threats in the context of a tantrum without any previous or subsequent ideation were not considered sufficient to meet the criteria.

Previous studies have paid close attention to item 9 on the BDI in examining current suicide risk, reliability and validity of using this item to assess suicidal ideation.

Therefore, in line with other research, we decided to focus on this item in the present study in order to assess current suicidal ideation.

The suicide item is:

1. (score 0) I do not have any thoughts of killing myself,"
2. (score 1) "I have thoughts of killing myself, but I would not carry them out,"
3. (score 2) "I would like to kill myself," and,
4. (score 3) "I would kill myself if I had the chance."

A score of 2 or greater on this item should be considered a positive screen. [(18)] [(19)]

Statistical analysis:

The collected data were organized, tabulated and statistically analyzed using software statistical computer package (SPSS) version 16. For quantitative data, the mean and standard deviation were calculated. For qualitative data, comparison between two groups and more was done using Chi-square test (χ^2). For comparison between means of two groups of parametric data, student t-test was used. For comparison between more than two means, the F value of analysis of variance (ANOVA) was calculated, where (post-hoc) Tamhane`s T2 test was performed to compare between each two means if F value was significant. Correlation between variables was evaluated using Pearson's correlation coefficient (r).

III. RESULTS

The sample consisted of 122 cases (79 suicidal cases and 43 non suicidal cases) and 117 controls. It was found that: suicidal cases were highly present among poly-substance abusers 64.75%, and there were 22.13% of cases have history of at least one suicide attempt.

The present study shows that 36.07% (44/122) of cases experience current suicidal thoughts during assessment (i.e. scoring ≥2 on item 9 on the BDI) (not tabulated).

Table (1) lists socio-demographic characteristics of controls, non-suicidal cases and suicidal cases. Mean age was significantly higher in suicidal cases than in non-suicidal group. Mean number of cigarette smoked daily was significantly more in suicidal group and mean age of initiating smoking was significantly lower in the same group than control group. Significant differences between the three groups were noticed as regard residency, marital status, employment, religiosity, educational level, occupational and/or academic deterioration, history of legal troubles, bereavement from parents before age of 18, home atmosphere, family support, family history of substance abuse, family history of suicide and presence of comorbid psychiatric illness ($p<0.05$).

Table (1): socio-demographic data for cases and controls:

Variable	Controls (N=117)	cases (N=122)		χ^2	F	P
		Non-suicidal (N=43)	Suicidal (N=79)			
Age ,y mean (±SD)	31.66 (7.84)	28.47 (5.78)	32.92 (5.95)		5.84[a,c]	0.003
Residency *n(%)*						
High (on mountains)	93 (79.48)	14 (32.56)	66 (83.54)	42		0.000
Low	24 (20.51)	29 (67.44)	13 (16.46)			
Marital status *n(%)*						
Married	87 (74.36)	9 (20.93)	27 (34.18)	54.1		0.000
Single	26 (22.22)	24 (55.81)	33 (41.77)			
D/W/S	4 (3.42)	10 (23.26)	19 (24.05)			
Employment *n(%)*						
Professional	51 (43.59)	0 (0)	0 (0)	92.9		0.000
Tradesman	13 (11.11)	3 (6.97)	2 (2.53)			
Semi/unskilled	23 (19.66)	4 (9.3)	16 (20.25)			

Unemployed	30 (25.64)	36 (83.72)	61 (77.22)			
Religiosity *n(%)*						
Religious practicing	117 (100)	5 (11.63)	7 (8.86)	197		0.000
Believer not practicing	0 (0)	32 (74.42)	62 (78.48)			
Agnostic	0 (0)	4 (9.3)	5 (6.33)			
Doesn`t care	0 (0)	2 (4.65)	5 (6.33)			
Educational level *n(%)*						
Univ. graduated	22 (18.8)	0 (0)	10 (12.7)	73.9		0.000
College or institute graduated	25 (21.4)	4 (9.3)	4 (5.1)			
Secondary sch. graduated	34 (29.1)	19 (44.2)	15 (19)			
Univ. student	14 (12)	2 (4.7)	0 (0)			
Secondary sch. student	6 (5.1)	3 (7)	0 (0)			
Drop out	16 (13.7)	15 (34.9)	50 (63.3)			
Occupational or academic deterioration *n (%)*						
present	0 (0)	13 (30.2)	40 (50.6)	72		0.000
absent	117 (100)	30 (69.8)	39 (49.4)			
History of legal troubles *n(%)*						
present	1 (0.85)	8 (18.6)	53 (67.09)	109		0.000
absent	116 (99.15)	35 (81.4)	26 (32.91)			
Mean number of cigarette smoked daily. mean (±SD)	4.49 (5.35)	15.65 (10.49)	14.27 (8.09)		45.2[a,b]	0.000
Mean age of initiating smoking. mean (±SD)	19.77 (10.66)	15.44 (6.24)	11.38 (6.25)		7.07[a,b]	0.002
Bereavement from parents before 18. *n(%)*	8 (6.84)	7 (16.28)	25 (31.65)	20.8		0.000
Family size *mean (±SD)*	4.19 (3.01)	6.88 (3.47)	7.41 (4.22)		0.37	0.69
Home atmosphere *n(%)*						
Good	102 (87.18)	19 (44.19)	14 (17.72)	97.6		0.000
Average	11 (9.4)	11 (25.58)	36 (45.57)			
Disturbed	4 (3.42)	13 (30.23)	29 (36.71)			
Family support *n(%)*						
Good	105 (89.74)	16 (37.21)	17 (21.52)	111		0.000
Fair	12 (10.26)	13 (30.23)	19 (24.05)			

No support	0 (0)	14 (32.56)	43 (54.43)			
F.H. of S.A *n(%)*						
present	10 (8.5)	12 (27.9)	45 (57)	54.8		0.000
absent	107 (91.5)	31 (72.1)	34 (43)			
FH. Of suicide or attempt *n(%)*						
present	10 (8.5)	10 (23.3)	24 (30.4)	15.8		0.000
absent	107 (91.5)	33 (76.7)	55 (69.6)			
Comorbid psychiatric illness *n(%)*	-	31 (72.09)	70 (88.61)	5.33		0.021

According to post-hoc tests:

a= statistical significant difference between control and non-suicidal groups

b= statistical significant difference between control and suicidal groups

c= statistical significant difference between non-suicidal and suicidal groups

Comorbidity of substance abuse problem with another mental illness (Dual diagnosis) was well established in 101 cases (82.79%) diagnosed as (schizophrenia 16.39%, schizoaffective disorder 2.46%, bipolar I disorder 16.39% , major depressive disorder 18.03%, anxiety disorders 3.28% , adjustment disorders 2.46%, personality disorder 23.77%) (not tabulated).

Table (2): Types and condition of substance abused:

Variable	Non-suicidal (N=43)	Suicidal (N=79)	χ^2	T	p	Sig
Substance abused *n(%)*						
Amphetamine	33 (76.74)	74 (93.67)	7.40		0.007	High sig
Cannabis	27 (62.79)	59 (74.68)	1.89		0.169	N.S
Alcohol	8 (18.6)	38 (48.1)	10.3		0.001	High sig
Volatile substance	5 (11.63)	22 (27.85)	4.25		0.034	Signif
Minor tranquilizer	14 (32.56)	19 (24.05)	1.02		0.312	N.S
Age of onset of S.A						
≤ 18	11 (25.58)	28 (35.44)	1.25		0.264	N.S
>18	32 (74.42)	51 (64.56)				
Duration of S.A in years mean (±SD)	6.09 (3.84)	10.58 (7.05)		3.87	0.000	Very high sig

Amphetamine and cannabis dominated the list of substances abused in the present study. Amphetamine was the most commonly abused substance (87.7%) of all cases, followed by cannabis abuse (70.49%). Amphetamine, alcohol and volatile substances were found to have strong relation with suicidal thoughts or behaviors in our study.

It was found in this study that 39 patients (31.97%) started substance use before the age of eighteen. There was no significant relation of the age of beginning of substance abuse and suicidal thoughts or behaviors. But significant longer duration of substance intake was found to be (10.58 years) in the suicidal group.

Table (3): Beck Depressive Inventory for cases and controls:

BDI	Controls (117)		Substance abusers (122)			
			Non-suicidal (43)		Suicidal (79)	
	Mean	± SD	mean	± SD	Mean	± SD
	8.99	2.82	12.53	4.99	27.43	13.19

F= 125.85 p=0.000 p<0.001 (very highly signif)

Beck Depressive Inventory revealed significant higher results among suicidal group in relation to other two groups (Tamhane's T2, $P < 0.05$). Non-suicidal group showed also significant higher score than control group (Tamhane's T2, $P < 0.05$).

Table (4): Correlation and multiple linear regression analysis of independent variance and suicidal thoughts assessed by ninth item in Beck depressive scale for cases:

Items	Correlation (r)	Regression coefficient (B)
Lifetime of suicidal ideation or attempt	0.38**	-0.05
Age	0.420**	-0.37
Residence	0.447**	0.415***
Religiosity	-0.16	0.06
Educational level	0.27**	0.04
Employment	0.167	0.133
Deterioration of academic/ occupational functioning	0.27**	-0.004
Legal troubles	0.37**	-0.05
Age of starting cigarette smoking	-0.013	-0.05
Number of cigarette smoked/day	0.027	-0.001
Amphetamine abuse	0.154*	0.153*
Cannabis abuse	-0.045	-0.109
Alcohol abuse	0.138	0.029
Volatile abuse	0.270**	0.270**
Minor tranq. abuse	-0.018	0.036
Age of onset of substance abuse	0.035	0.3
Duration of substance abuse	0.393**	0.42*
Psychiatric disorders	0.28**	0.13*
Family size	0.067	0.06
Age when parents Sep/Die/Divorced	-0.28**	-0.06
Home atmosphere	0.32**	0.06

Family support	0.26**	-0.03
Family history of substance abuse	0.22*	0.004
Family history of suicide or suicidal attempt	0.325**	0.326**
BDI total	0.810**	2.63**
R		0.99
R square		0.98
F		52.62**

Correlation and regression are **highly significant ≤ 0.01 level.

Correlation and regression are *significant ≤ 0.05 level.

Relationship between presence of current suicidal thoughts and psycho-social parameters were examined for the cases by mean of correlation analysis. Significant high positive correlation were found between Lifetime history of suicidal ideation or attempt, age, high altitude residence, lower educational level, presence of academic or occupational deterioration, history of legal troubles, amphetamine and volatile abuse, duration of substance abuse, presence of comorbid psychiatric disorder, disturbed home atmosphere, poor family support, positive family history of substance abuse, positive family history of suicidal attempts, and Beck Depressive Inventory and higher ranks of current suicidal thought as a dependent variant. While significant negative correlation was noticed with age of bereavement, and non-significant negative correlation was noticed with religiosity and Age of starting cigarette smoking.

Risk factors for current suicidal thoughts:

To examine the combined effect of factors affecting current suicidal thoughts, multible regression analysis was performed for cases. Independent variables were selected based on results of correlation analysis performed on the cases and it was found that high altitude residence, amphetamine abuse, volatile abuse, duration of substance abuse, presence of comorbid psychiatric disorder, family history of suicide or suicidal attempt, and BDI were significant and independent risk factors for increased level of current suicidal thoughts. While many other items did not reach significance in the model, mainly due to the confounding effect of these items.

IV. DISCUSSION

The three groups that we studied were different with regard to abusing illicit substances and having a history of suicidal thought or attempt, The present study has shown that suicidal patients were highly present among poly-substance abusers as compared to the control group which contains none, and there were 22.13% of substance abusers with history of at least one suicide attempt. The results of this study agree with the findings of researches for Felts M. et.al. linking substance abuse to suicide. [20]

The present study also shows that 36.07% (44/122) of cases experience current suicidal thoughts during assessment. Slightly lower rates of Suicidal Ideation (31%) were found in male drug users group in other study by Linda B. Cottler. [8] While higher rates were found in a research by Al-Sharqi AM et.al. (2012) which was conducted at Al-Amal mental health hospitals in three major non-mountainous cities in Saudi Arabia on a group of patients with alcohol and substance abuse, to study suicidal and self-injurious behavior among them; clinical profile revealed, 50.7% of respondents reported any suicidal ideation [21].

This study showed that there were significant and positive correlations between lifetime history of suicidal ideation or attempt, older mean age, living in high altitude, educational drop-out, occupational and/or academic deterioration, history of legal troubles, amphetamine and volatile abuse, duration of substance abuse, presence of comorbid psychiatric disorder, chaotic home atmosphere, poor family support, presence of family history of substance abuse, presence of family history of suicidal attempt and Beck Depressive Inventory ($p<0.05$), and current suicidal thoughts. Of interest is the finding that negative correlation was noticed with religiosity however it was not significant.

Our results are consistent with previous reports of Haws et.al. about increased suicide rates among high altitude residents. [22] and many researchers reported that employment and spirituality was protective against suicidal ideation. [8] [21] Our results were also relevant to what was found in other areas in Saudi Arabia. In a research by Al-Sharqi AM et.al. (2012), They observed that spirituality was largely endorsed as protective factors against suicidal and self-injurious behavior among alcohol and substance abuse. [21]

A study by Wines et.al 2004 found that correlates of lifetime suicidal behavior in drug user group included: younger age, greater depressive symptoms, sedative or alcohol use, and past suicidal behavior. [23]

Our result was inconsistent with previous study which reported that older age was protective against suicidal ideation. [22] This difference in our study can be explained by the fact that older age individuals may have longer duration of drug use, more physical illness and more accumulated social and financial troubles that can contribute in provocation of suicidal thoughts among them.

Primary, intermediate and secondary educations are parts of the official education ladder in Saudi Arabia. We considered participants who did not reach the intermediate education certificate as drop out. The findings in this research are also consistent with previous studies which found that suicide rates are inversely related to level of education, and that higher levels of academic and school performance are significantly predicted lower levels of suicidal behavior. [24] [25]

Inconsistent with our results; other study by Linda B Cottler for many factors among drug users; unexpectedly found that there was a trend for men with an arrest history to be protected from reporting suicidal ideation. [8]

Others found that adults who were children when their parents divorced are more likely to seriously consider suicide than adults who grew up in intact families, according to a new study in University of Toronto, 2011. [26] It was recorded by Yoshiko Okasaka 2006 that suicidal subjects who abuse drugs, scored lower on both the parental and maternal care scores of the Parental Bonding Instrument (PBI). [27]Another study mentioned that persons with an alcohol or drug problems who die by suicide have often little social support. [28]

Another researchers recorded that children raised by alcoholic parents are likely to exhibit a spectrum of maladaptive coping responses, including suicidal ideation and suicidal behaviors. Thus, both alcohol abuse and suicidal behavior may be used as means of escaping from serious interpersonal problems. However, genetic factor seems to link alcoholism and suicide, the linkage is probably indirect. This relationship is most likely mediated through the physiological basis of depression. Low levels of serotonin have been found to play a role in depression, suicide, and alcoholism. Thus, neurophysiological factors may provide a link between suicide and a family history of substance abuse. [29]

Matching with our study; Alec Roy`s research on drug users found that Significantly most of the patients who had attempted suicide had a family history of suicide. [30]

Our study showed that comorbid psychiatric disorders were had high significant relation with suicidality. These findings were supported by Lukasiewicz et.al. 2009 who recorded that Dual Diagnosis showed strong association with suicide risk among sample of French prisoners. And that the majorities of them associate a substance use disorders with a mood disorder.[31] and personality disorders. [32]

Significant and positive correlation with current suicidal thoughts was found with amphetamine and volatile substances, and mean duration of using illicit substances which is consistent with previous studies.[33][34] It was consistent with previous study which found that the use of stimulant was more closely associated with a self-reported incidence of attempted suicide than was use of alcohol, marijuana, or needle drugs. [35] McGarvey et al. (1999) reported that adolescents with past inhalant use were more hopeless and depressed than those with no inhalant use history. In a study of youths on probation, inhalant users reported significantly more lifetime thoughts of suicide and suicide attempts. [36] [20] However; Alec Roy recorded that significantly more of the patients who had attempted suicide had a lifetime history of alcoholism. [30] In addition that Long-term consumption of alcohol leads to depression, which in turn increases the probability of suicide, according to Murphy's study.[35]

In order to know the risk factors for current suicidal thoughts among participants, multiple regression analysis was used and revealed that they are: high altitude residence, amphetamine abuse, volatile abuse, duration of substance abuse, presence of comorbid psychiatric disorder, family history of suicide or suicidal attempt, and BDI in our study.

Given these findings, we suggest that the management of suicidal behavior among substance abusers should focus on prevention of these previously mentioned risk factors, treating underlying depression, and bio-psycho-social management with help of spiritual therapy may have great benefit.

Conclusion: This study demonstrated that associative psycho-demographic factors characterized by chaotic social life and living in high altitude in addition to comorbid psychiatric disorders especially with disturbed-mood element may trigger suicidal thoughts in poly-substance abusers, and that religious upbringing is a helpful method for protection.

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