



# Suicide Risk among Patients with Substance Use Disorders, A Cross Sectional Study

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## Abstract

Background: Substance Use Disorders are serious health issues that have been linked to numerous clinical correlations and mental health comorbidities. One of the most important health dangers linked to substance addiction was suicide. The current study aims to investigate the phenomena using a bio-psycho-social framework. The aim was to investigate the risk of suicide in a sample of substance use disorders patients. A case control comparison was performed between 190 substance abusers versus 30 controls. Addiction Severity Index, Beck Suicidal Ideation Scale, Arab Religiosity Scale, Socioeconomic Status Scale, as well as multiple historical variables, have been investigated. Results: Suicidality was prevalent among alcohol and opioids abusers, poly substance abusers, those with a family history of suicide, and those with a history of a previous attempt. Having a positive family history of suicide could predict an 8.3 point rise in Beck Suicidal Ideation Scale score, while having any previous attempt of suicide could predict 9.04 point rise in Beck Suicidal Ideation Scale score. Suicidality scores correlated with Addiction Severity Index scores, and indirectly with socioeconomic status and Religiosity. Combinations of drugs with other mental illness showed a significant predictive effect on suicidality score. Conclusion: Suicidality is expected among substance abusers, and is affected by multiple bio-psycho-social variables.

**KeyWords:** Suicide, Substance Use Disorders, Addiction.

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## BACKGROUND:

Suicide is the leading cause of premature death in adults. Worldwide, there is 16 completed suicides for every 100,000 people, according to World Health Organization figures, with over a million suicides per year. The number of suicide attempts is 5 to 20 times higher than completed suicide rate. [1]. Community surveys show that 5% of adults will attempt suicide at least once in their lifetime. [2].

Mental health problems are a very common and well-studied risk factor for suicidal ideation, suicide attempts, and successful suicide. Most suicide victims (about 90%) met diagnostic criteria for one or more mental disorders. People who abuse alcohol, drugs, or drug addicts are

about six times more likely to attempt suicide than those who do not. A male addict commits suicide (suicide) two to three times more often than a non-addict men. Women who use drugs are 6.5 to 7 times more likely to commit suicide than women who don't use drugs. [3].

Identifying individuals who are at a higher risk of suicidal behavior due to addiction-related issues is vital, as not all addicts necessarily experience suicidal thoughts or attempt to take their own life, despite the correlation between addiction-related illness and suicide. [4, 5].

The risk factors for suicide that are relevant to the general population are also applicable to drug addicts. One crucial aspect to consider is the type of drug used in the suicide attempt, as certain substances such as heroin and sedatives are more



commonly used in such attempts compared to other drugs. [6] Both the general population and drug addicts are at an increased risk of suicide behavior when experiencing affective disorders, including depression. Additionally, older individuals who use drugs have a higher likelihood of attempting suicide and dying by suicide compared to younger individuals. A significant predictor of future suicide attempts is a history of prior suicide attempts. Moreover, individuals who struggle with addiction and suicidal thoughts often face emotional and behavioral challenges that significantly impact their daily lives. [7].

As per a 2007 National Survey report, around 8.5% of the Egyptian population, which amounts to approximately six million people, are addicted to drugs. The majority of these addicts fall between the age group of 15 and 25. [8].

The main objectives of this study was to detect a group of risk factors that could explain the suicidality phenomenon among substance use disorders patients, and investigate protective factors as well.

## **METHODS**

### **Study design and setting**

This study was conducted in Faculty of Medicine Suez Canal University Hospital, Addiction Centers, and clinics of Suez Canal area.

### **Participants and sample**

This study was conducted on 190 treatment-seeking patients in comparison to 30 controls.

### **Sample Size:**

The sample size was calculated using the following formula:

[9].

### **Where:**

$n$  = sample size

$Z_{\alpha/2} = 1.96$  (The critical value that divides the central 95% of the Z distribution from the 5% in the tail)

$P_1$  = Prevalence/proportion of substance abuse in Egypt = 14.5% [10].

$E$  = Margin of error/Width of confidence interval = 10%

So, by calculation, the sample size is equal to 190 cases.

### **Control group size :**

Thirty healthy control subjects, were

recruited from Blood donors.

The following criteria were used during recruiting the participants:

### **Inclusion criteria:**

Patients aged from 18 to 55 years.

Patients with substance use disorders who were diagnosed according to the criteria of the International Classification of Diseases (ICD-10).

Patients in residential care after the detoxification period which is 15 days.

### **Exclusion Criteria:**

#### **Patients with intellectual disability.**

Patients with epilepsy, severe head trauma and neurological deficits.

Patients with sensory defect as hearing or visual defect.

Patients who are intoxicated or still have withdrawal symptom.

Patients with previous history of any psychotic disorder.

#### **Patients with dual diagnosis.**

### **Ethical Approval**

The study was done in accordance with the Declaration of Helsinki.

The study was approved by the Research ethics committee of Faculty of Medicine, Suez Canal University and has issued the approval No.: 2019/10/28 - 3755 .

Data collection started on 2019-12-01 , An informed permission taken from the Medical Ethical Committee. Consent from the patient was taken at the beginning of the study based on information given about the nature of the study.

### **Instruments and data collection**

Full comprehensive psychiatric sheet including socio demographic data, (age, gender, residence, education, marital status, religion).

Clinical examination:

A. Complete physical and neurological examination to exclude neurological or organic co morbidities was done by physician.

B. Structured psychiatric interview using the Arabic version of The Mini-International Neuropsychiatric Interview v.5 (MINI), by Ghanem, et al. (2009) [8], the original test was created by Sheehan, et al. (2013) (11). The interview covers 19 commonly occurring psychiatric disorders, including two modules for personality disorders and one module for suicidality.



III- Urine toxicology screen before detoxification and just before interviewing.

### **Psychometric Assessment:**

Socioeconomic Status Scale (SES) [12]

Addiction Severity Index (ASI) [13]:

The ASI is a semi-structured interview that assesses a patient's current and lifetime status in seven different functional areas, including medical, employment, legal aspects, family/social, psychiatric, alcohol use, and other drug use. The ASI has an 85% sensitivity and 80% specificity. In this study, the Arabic version of the ASI (5th ed.) will be used. [14]. The Psychiatric Status domain is not used for diagnosing psychiatric disorders, but is used to assess the experience of various psychiatric symptoms unrelated to the effects of alcohol or drugs. [15] The average time required to complete the questionnaire was 40 minutes.

Beck's Suicidal Ideation Scale (BSI) [16]: The BSI, or Beck's Suicidal Ideation Scale, is a tool used by clinicians to evaluate and measure suicidal intent. It consists of a semi-structured interview format and has been found to have high internal consistency and a moderate correlation with other measures of self-harm and clinical ratings of suicidal risk. The BSI scale has an Alpha coefficient of 0.89 for internal consistency and an interrater reliability coefficient of 83%. The scale assesses various aspects of suicidal thoughts and intentions, including the patient's attitude towards them, the extent of their desire to die or attempt suicide, any plans they may have, internal deterrents, and their sense of control or courage in relation to a potential attempt. [16]. An Arabic version was used [17].

### **The Arabic Religiosity Scale (ARS) [18]:**

Is a reliable and valid tool used to assess religious beliefs, practices, and the importance of religion in the daily lives of adult psychiatric patients, including during difficult times. The scale comprises five sub-scores: Collective Activities, Individual Activities, Importance of Religion, Faith Helps, and Degree of Faith. In addition to these sub-scores, the scale also provides a total score. Overall, the ARS is a comprehensive measure of religiosity in Arabic-speaking populations, providing insight into the role of religion in mental health and well-being. [18].

### **Statistical Analysis:**

Data were analyzed using Statistical Package for

Social Sciences (SPSS) version 17 [19].

Correlation matrix was performed at the beginning to look for significant associations and/or difference.

Dependent variables were detected from the Beck suicidal ideation scale.

Independent variables were selected from correlation matrix based on their level of significance against the dependent variable.

Highly correlating independent variables were excluded.

Regression analysis was performed to seek for a best fit regression model to explain variance in dependent variable.

### **RESULTS:**

The majority of the recruited subjects in our study were married males. The mean age of the patients recruited in our cases group was ( $36 \pm 8$ ), compared to ( $44 \pm 7$ ), in the control group. As regards SES: shows that the majority of cases were from middle SES class ( $n=109$ , 49.5%), and similarly the majority of controls were also from middle SES class ( $n=22$ , 10%). Notably, no significant difference was found between the groups.

This current study found that Dysthymia symptoms had the highest prevalence (24.2%), followed by MDD and GAD symptoms (20.5% both). However in comparison with control group, this wouldn't reach level of statistical significance.

Regarding the distribution of specific substances among the substance use disorders group; cannabis had the highest prevalence (65.3%), followed by Benzodiazepines (43.7%).

The addiction severity index scores among substance use disorders group in comparison with control group. Alcohol and drugs problem had the highest mean severity, whereas medical and legal problems had the lowest severity.

Table (1), showed that the BSI score among MDD subjects was  $15 \pm 6$ , and that was significantly different from non MDD subjects which was  $4 \pm 2$ . Also, the BSI score among dysthymia subjects was  $17 \pm 6$ , and that was significantly different from non-dysthymia subjects ( $3 \pm 3$ ). Furthermore, BSI score among Mania hypomania subjects was  $15 \pm 5$  that was significantly different from non-manic subjects ( $5 \pm 7$ ). Moreover, BSI score among psychotic disorder subjects was  $14 \pm 12$  that was significantly different from non-psychotic disorder subjects ( $5 \pm 6$ ). Furthermore, BSI score among



GAD subjects was  $13 \pm 10$  that was significantly different from non-GAD subjects ( $4 \pm 6$ ). Overall, total Beck Suicidal Ideation scores among cases group was ( $7 \pm 4$ ), whereas total Beck Suicidal Ideation scores among controls group was ( $2 \pm 1$ ), with a significance level ( $p=0.043$ ) hence a statistical – and clinical – significance. . .

When Comparing BSI scores among specific substances; The BSI score among alcohol abusers subjects was ( $14 \pm 10$ ) that was significantly different from non-alcohol subjects ( $3 \pm 3$ ). Moreover, BSI score among dysthymia subjects was  $14 \pm 8$  that was significantly different from non dysthymia subjects ( $4 \pm 6$ ).

When studying the combined alcohol with depression group which were earned significantly higher, had significantly less religiosity score, showed worse Family and social relationship status score in ASI, showed higher total beck suicidality score, as well as all its subscores. Also, they did significantly higher number of previous attempts.

Furthermore, when comparing Opioids with MDD versus all other patients, were the patients in MDD group were found to have significantly worse scores in all ASI problems domain, significantly higher total beck score, and significantly higher number of previous attempts.

When comparing religiosity scores between cases and controls; the total religiosity score in group A ranged from 2 to 12, with a mean of  $8 \pm 3$ , whereas group B ranged from 8 to 14 with a mean of  $11 \pm 2$ . Notably, all scores showed significant differences between both groups at  $p$  value  $< 0.05$ .

Comparison of BSI scores between Mono Substance abusers ( $n=16$ ) and Poly substance abusers ( $n=174$ ), only the total score showed a significant difference between both groups at  $p$  value  $< 0.05$ , as the mono group ranged from 1 to 14 with a mean of  $2 \pm 3$ , whereas the poly group ranged from 1 to 35 with a mean of  $7 \pm 8$ .

In the comparison of BSI scores between those who had a positive family history of suicidality ( $n=17$ ) and those with negative family history ( $n=203$ ). The total score showed a significant difference between both groups at  $p$  value  $< 0.05$ , as the positive group ranged from 18 to 35 with a mean of  $25 \pm 7$ , whereas the poly group ranged from 0 to 18 with a mean of  $4 \pm 5$ . Furthermore, both groups did not differ significantly as regard number of past attempts. However, when

comparing cases versus controls as regards family history of suicidality, only the Beck total score showed a significant differences among the negative groups with a  $p$  value  $< 0.001$ , here Cases with negative family history ( $n=174$ ) showed a significantly higher mean beck score  $4 \pm 6$  when compared with control group ( $n=29$ ) with a mean beck score of  $2 \pm 3$ .

Table (2), shows that the total beck score has inversely moderate correlation with SES, religious collective and individual activities, degree of faith, and total religiosity score. Notably, collective religious activities, showed the highest inverse correlation with BSI, as opposed to individual religious activities which showed the weakest relationship.

Also, the total Beck score had a direct strong correlation with: ASI alcohol and drugs, ASI employment support, ASI legal status, ASI psychiatric status, number of previous attempts, the presence of a positive family history of suicide, sleeping difficulties, pain symptoms, History of sexual abuse, history of self-injurious behavior.

Total Beck score had a direct moderate correlation with history of sexual abuse, emotional abuse, experience of stressful life events, aggressive behavior, low self-esteem.

When studying historical variables; we found that 68.95% of substance abuse disorders group had sleeping difficulties. Compared to only 20% in the control group. Also, 8.42% of substance abuse disorders group had pain symptoms. Compared to only 3.33% in the control group. Aggressive behavior pattern was only seen in substance abuse disorders group in 19.47% of them. 16.32% of substance abuse disorders group reported being impulsive. Compared to only 6.67% in the control group.

Moreover, 27.37% of substance abuse disorders group had low self-esteem compared to 13.33% in the control group. There was a history of sexual abuse was only seen in the substance abuse disorders group in 13.68% of them. Furthermore, 25.79% of substance abuse disorders group had a history of physical abuse compared to only 20% in the control group.

Additionally, we found that 29.47% of the substance use disorders group had a history of emotional abuse compared to only 23.33% in the control group. Also, 38.42% of the substance use disorders group had a history of stressful life events compared to 13.33% in the control group.



Moreover, a history of self-injurious behavior was only seen in the substance use disorders group in 24.74 % of them.

Regression Analysis : Taking the total BSI score as the dependent variable , we sought several models to detect any dependency effect among the study variables, Several regression models in our study showed clinical significance;

1-Model 1 : Effect of Sociodemographic data (Table 3): - Each 1 point increase in Collective religious activities score can predict 2.34 drop in BSI score. Indicating a protective effect. - Each 1 point increase in religiosity score can predict 2.04 drop in BSI score. Indicating another protective effect. - Each 1 rank worsening (increase) in the ASI Family and social relationship problems can predict 0.48 rise in BSI. - Each 1 rank worsening (increase) in the ASI legal status problems can predict 0.53 rise in BSI. - Having a positive family history of suicide can predict an 8.3 point rise in BSI score , indicating a strong risk factor. - Having a previous attempt of

suicide can predict an 9.04 point rise in BSI score , indicating the strongest predictor. - Having a history of sexual abuse can predict 2.1 points rise in BSI score. - Having a history of self injuriousbehaviour can predict 5.07 points rise in BSI score.

2-Model 2 : Effect of specific substances and related variables (Table 4): - Abusing synthetics predicts 1.8 points rise in BSI score. - Abusing alcohol predicts 2.05 rise in BSI score. However: - Abusing alcohol + MDD predicts 3.44 rise in BSI score. - Abusing alcohol + BAD predicts 5.02 rise in BSI score. - Abusing alcohol + dysthymia predicts 7.5 rise in BSI score

3-Model 3 : Effect of MINI symptoms on BSI score (Table 5): - Having dysthymia predicts 3.03 rise in BSI score. - Having mania , hypomania predicts 3.2 BSI score. - Having social phobia predicts 3.46 rise in BSI score. - Having psychotic disorder predicts 3.81 rise in BSI score

**Study Tables**

**Table 1:** Distribution of BSI Total Score among Specific MINI Symptoms Clusters:

|                 |           | Patients group A n=190 |         |                   | p Value | Control Group B n=30 |         | p value for cas vs contro |
|-----------------|-----------|------------------------|---------|-------------------|---------|----------------------|---------|---------------------------|
|                 |           | BSI within categories  |         | Total BSI Mean±SD |         | Total BSI            |         |                           |
|                 |           | Count                  | Mean±SD |                   |         | Count                | Mean±SD |                           |
| MINI MDD        | No        | 151                    | 4±2     | 0.039*            | 7±4     | 30                   | 2±1     | 0.043*                    |
|                 | MDD       | 39                     | 15±6    |                   |         |                      |         |                           |
| MINI Dysthymia  | No        | 144                    | 3±3     | 0.001**           |         |                      |         |                           |
|                 | Dysthymia | 46                     | 17±6    |                   |         |                      |         |                           |
| MINI Mania      | No        | 174                    | 5±7     | 0.033*            |         |                      |         |                           |
|                 | Mania     | 16                     | 15±5    |                   |         |                      |         |                           |
| MINI Panic      | No        | 186                    | 6±8     |                   |         |                      |         |                           |
|                 | Panic     | 4                      | 11±9    |                   |         |                      |         |                           |
| MINI Agoraphob  | No        | 168                    | 5±6     |                   |         |                      |         |                           |
|                 | Agoraphob | 22                     | 17±11   |                   |         |                      |         |                           |
| MINI Social     | No        | 180                    | 5±3     |                   |         |                      |         |                           |
|                 | Social    | 10                     | 22±7    |                   |         |                      |         |                           |
| MINI OCD        | No        | 172                    | 6±7     |                   |         |                      |         |                           |
|                 | OCD       | 18                     | 11±11   |                   |         |                      |         |                           |
| MINI PTSD       | No        | 185                    | 6±8     |                   |         |                      |         |                           |
|                 | PTSD      | 5                      | 12±8    |                   |         |                      |         |                           |
| MINI Alcohol    | No        | 134                    | 3±3     |                   |         |                      |         |                           |
|                 | Alcohol   | 56                     | 14±10   |                   |         |                      |         |                           |
| MINI Substance  | No        | 0                      | .       |                   |         |                      |         |                           |
|                 | Substance | 190                    | 6±8     |                   |         |                      |         |                           |
| MINI Psychotic  | No        | 167                    | 5±6     | 0.019*            |         |                      |         |                           |
|                 | Psychosis | 23                     | 14±12   |                   |         |                      |         |                           |
| MINI Anorexia   | No        | 190                    | 6±8     |                   |         |                      |         |                           |
|                 | Anorexia  | 0                      | .       |                   |         |                      |         |                           |
| MINI Bulemia    | No        | 188                    | 6±8     |                   |         |                      |         |                           |
|                 | Bulemia   | 2                      | 18      |                   |         |                      |         |                           |
| MINI Generalize | No        | 151                    | 4±6     | 0.017*            |         |                      |         |                           |
|                 | GAD       | 39                     | 13±10   |                   |         |                      |         |                           |
| MINI ASPD       | No        | 159                    | 5±7     |                   |         |                      |         |                           |
|                 | ASPD      | 31                     | 11±10   |                   |         |                      |         |                           |
|                 |           |                        |         |                   |         |                      |         |                           |
|                 |           |                        |         |                   | 7±4     |                      | 2±1     | 0.043*                    |



\* p Value < 0.05 Significant  
 \*\* p Value < 0.01 Highly Significant

**Table 2: Correlation Matrix between BSI Scores vs. Other Study Variables:**

|                                     | Beck Total Score | Active Domain | Preparation Domain | Passive Domain |
|-------------------------------------|------------------|---------------|--------------------|----------------|
| SES                                 | -.640**          | -.595**       | -.668**            | -.605**        |
| Collective Activities               | -.518**          | -.459**       | -.518**            | -.571**        |
| Individual Activities               | -.273**          | -.237**       | -.270**            | -.291**        |
| Importance                          | -.395**          | -.375**       | -.336**            | -.466**        |
| Does Faith Help                     | -.341**          | -.336**       | -.290**            | -.381**        |
| Degree of Faith                     | -.309**          | -.382**       | -.362**            | -.360**        |
| Religiosity Score                   | -.583**          | -.543**       | -.544**            | -.641**        |
| Alcohol_Drugs                       | .758**           | .718**        | .710**             | .786**         |
| Employment_Support                  | .776**           | .737**        | .752**             | .769**         |
| Family_Social_Relationships         | .743**           | .703**        | .719**             | .754**         |
| Medical_Status                      | .143*            | .158*         | .084               | .197**         |
| Legal_Status                        | .754**           | .717**        | .748**             | .722**         |
| Psychiatric_Status                  | .775**           | .740**        | .745**             | .771**         |
| Number of past attempts             | .928**           | .893**        | .916**             | .891**         |
| Family History of Suicide           | .764**           | .720**        | .746**             | .746**         |
| Suicidality preceded addiction      | .361**           | .383**        | .315**             | .326**         |
| Sleeping Difficulties               | .748**           | .723**        | .714**             | .729**         |
| Pain Symptoms                       | .786**           | .731**        | .759**             | .761**         |
| Aggressive Behaviour                | .352**           | .374**        | .324**             | .335**         |
| Impulsivity                         | .261**           | .283**        | .215**             | .226**         |
| Low self esteem                     | .454**           | .397**        | .448**             | .422**         |
| History of sexual abuse             | .814**           | .790**        | .786**             | .806**         |
| History of physical abuse           | .352**           | .361**        | .315**             | .327**         |
| History of emotional abuse          | .343**           | .359**        | .326**             | .338**         |
| Experience of stressful life events | .339**           | .349**        | .337**             | .341**         |
| Self injurious behaviour            | .917**           | .896**        | .905**             | .898**         |

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

**Regression Analysis :**

**Table 3 : Model 1 : Effect of model 1 on BSI total score:**



| Model                               | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------------------------|-----------------------------|------------|---------------------------|--------|------|
|                                     | B                           | Std. Error | Beta                      |        |      |
| (Constant)                          | -4.237                      | 3.549      |                           | -1.194 | .234 |
| Sex                                 | .826                        | .711       | .089                      | 1.161  | .247 |
| Recreative Activities               | -2.349                      | .456       | .040                      | -1.767 | .044 |
| Individual Activities               | -.069                       | .430       | -.007                     | -.161  | .872 |
| Importance                          | -.249                       | .514       | -.022                     | -.483  | .629 |
| Access to Faith Help                | 1.076                       | .633       | .066                      | 1.699  | .091 |
| Degree of Faith                     | -.171                       | .394       | -.023                     | -.434  | .665 |
| Religiosity Score                   | -2.042                      | .301       | -.110                     | -1.870 | .042 |
| U_Alcohol_Drugs                     | -.440                       | .352       | -.103                     | -1.249 | .213 |
| U_Employment_Support                | .437                        | .295       | .125                      | 1.483  | .140 |
| U_Family_Social_Relationships       | .481                        | .243       | .127                      | 1.980  | .049 |
| U_Medical_Status                    | -.131                       | .206       | -.020                     | -.636  | .526 |
| U_Legal_Status                      | .534                        | .238       | .173                      | 2.240  | .026 |
| U_Psychiatric_Status                | .199                        | .308       | .057                      | .647   | .519 |
| Family History of Suicide           | 8.375                       | 1.344      | .304                      | 6.234  | .000 |
| Mon vs Poly Substance Use           | .709                        | .930       | .025                      | .762   | .447 |
| History Previous Attempt            | 9.040                       | .957       | .473                      | 9.449  | .000 |
| Number of previous attempts         | 4.603                       | .863       | .367                      | 4.301  | .001 |
| Severity preceded                   | .719                        | .830       | .125                      | .752   | .437 |
| Attention                           |                             |            |                           |        |      |
| Learning Difficulties               | .608                        | .721       | .022                      | .832   | .346 |
| Attention Symptoms                  | .518                        | .834       | .321                      | .753   | .536 |
| Aggressive Behaviour                | .615                        | .826       | .626                      | .562   | .349 |
| Impulsivity                         | .812                        | .831       | .521                      | .531   | .597 |
| Low self esteem                     | .618                        | .821       | .195                      | .972   | .638 |
| History of sexual abuse             | 2.176                       | .933       | .166                      | 2.699  | .041 |
| History of physical abuse           | .619                        | .820       | .724                      | .612   | .525 |
| History of emotional abuse          | .918                        | .534       | .423                      | .663   | .143 |
| Experience of stressful life events | .799                        | .831       | .521                      | .661   | .546 |
| History of injurious behaviour      | 5.073                       | .936       | .486                      | 5.138  | .001 |

**Table 4 : Model 2 : Effect of specific substances and related variables on suicide**

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| Model               |                   | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|---------------------|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                     |                   | B                           | Std. Error | Beta                      |        |      |
| 2                   | (Constant)        | 1.830                       | 1.452      |                           | 1.261  | .211 |
|                     | Cannabis          | .184                        | 1.047      | .009                      | .176   | .861 |
|                     | Synthetics        | 1.864                       | 1.027      | .207                      | 3.762  | .000 |
|                     | Alcohol           | 2.058                       | 1.653      | .003                      | .035   | .932 |
|                     | Opioids           | 1.475                       | 1.921      | .075                      | .768   | .445 |
|                     | Stimulants        | 2.418                       | 1.234      | .104                      | 1.960  | .053 |
|                     | BNZ               | .030                        | .955       | .002                      | .031   | .975 |
|                     | Hallucinogens     | 2.330                       | 1.243      | .104                      | 1.875  | .064 |
|                     | Inhalants         | .185                        | 5.029      | .002                      | .037   | .971 |
|                     | Medication        | -.246                       | 1.058      | -.013                     | -.233  | .816 |
|                     | Medical_Disorder  | -1.527                      | 1.380      | -.065                     | -1.107 | .272 |
|                     | Physical_Injuries | -.859                       | .997       | -.046                     | -.861  | .391 |
|                     | Alcohol + MDD     | 3.449                       | 2.452      | .167                      | 1.407  | .013 |
|                     | Alcohol + BAD     | 5.027                       | 1.720      | .124                      | 2.341  | .022 |
|                     | Opioids + MDD     | -2.795                      | 2.419      | -.125                     | -1.155 | .251 |
| Alcohol + Dysthymia | 7.593             | 2.711                       | .607       | 4.276                     | .000   |      |

**Table 5 : Model 3 : Effect of MINI symptoms on BSI score**



| Model |                                   | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|-----------------------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                                   | B                           | Std. Error | Beta                      |        |      |
| 3     | (Constant)                        | 1.982                       | .403       |                           | 4.923  | .000 |
|       | MINI_MDD                          | 2.982                       | 1.221      | .020                      | .313   | .045 |
|       | MINI_Dysthymia                    | 3.037                       | 1.253      | .438                      | 6.416  | .000 |
|       | MINI_Mania_Hypomania              | 3.200                       | 1.268      | .113                      | 2.524  | .013 |
|       | MINI_Panic                        | -2.786                      | 2.778      | -.051                     | -1.003 | .317 |
|       | MINI_Agoraphobia                  | 2.065                       | 1.365      | .084                      | 1.513  | .132 |
|       | MINI_Social_Phobia                | 3.467                       | 1.699      | .240                      | 4.983  | .000 |
|       | MINI_OCD                          | -1.907                      | 1.295      | -.071                     | -1.473 | .142 |
|       | MINI_PTSD                         | -1.228                      | 2.584      | -.025                     | -.475  | .635 |
|       | MINI_Psychotic_Disorder           | 3.819                       | 1.244      | .158                      | 3.070  | .002 |
|       | MINI_Bulimia_Nervosa              | 2.385                       | 3.616      | .031                      | .659   | .510 |
|       | MINI_Generalized_Anxiety_Disorder | 2.016                       | 1.110      | .104                      | 1.816  | .071 |
|       | MINI_ASPD                         | -1.343                      | 1.003      | -.063                     | -1.339 | .182 |
|       | BPD                               | -.303                       | 1.133      | -.013                     | -.267  | .790 |

**DISCUSSION:**

Suicidal behavior is a common dimension of life for patients requiring detoxification. Such life-threatening thoughts and actions necessitate studying so as to enable recognition of an individual’s suicidal risk and facilitate appropriate action to minimize consequences [20].

Gender: This study couldn’t show any correlation between genders in all comparisons; this might be due to the small sample size in this study. This coincides with findings of multiple previous studies (21 - 24). However, it is known that with respect to the gender effect, women in treatment for addictions more frequently reported suicidal ideation and suicide attempts than men, as seen in previous studies [25-27]. Other studies suggest that women are more likely to inform about their difficulties than men who may be more reluctant to seek help thus increasing the risk of under-diagnosis [28-31]. Nevertheless, some studies indicate the higher lethality in men [32-34]. In the United States, the rates of suicide were almost four times higher for men than for women (20.6 per 100,000 vs. 5.7 per 100,000) and were highest among Whites (14.9 per 100,000) (35).

In a study conducted by Lynch et al. [36], the risk of suicide among men and women with Substance Use Disorders (SUDs) was estimated. The study involved a general population sample receiving care from eight large integrated healthcare systems across the United States, covering a diverse range of regions. The results indicated that SUDs were significantly associated

with an increased risk of suicide, even after adjusting for other factors known to increase the risk of suicide, such as psychiatric conditions or physical health comorbidity. The study also looked at the association between SUDs and suicide risk for males and females separately, and found that all categories of SUD were associated with a significantly increased risk of suicide for both genders.

Age: In the current study, there was no statistical difference between both groups regarding the age of the participants, a result that is consistent with findings of Shahin, et al. [37] and Aly et al. [38]. However, Kwon et al. [39] found that younger age was associated with suicidal ideation at borderline statistical significance. Furthermore they found that the comparison of the characteristics of substance users with and without suicidal ideation, 41.1% planned suicide with suicidal ideation. Their mean age was 42, and 93.5% of them were male.

Education: In the current study, control subjects had matching education years (10 years) and substance use disorders (8 years). Lower education years among substance abusers may reflect socio economic status differences, truancy or delinquency. This coincided with the findings by Mehrez, et al. [40]. However, Shahin, et al. [37] could not find a significant difference between both groups.

Religiosity: In our Study, collective religious activities, showed the highest inverse correlation with BSI, as opposed to individual religious activities which showed the weakest relationship. This may reflect the influence of social bonding,





belonging, identity, and affiliation.

**Socio Economic Status:** In this study, the majority of cases were from middle SES class (n=109, 49.5%), and similarly the majority of controls were also from middle SES class (n=22, 10%). Notably, no significant difference was found between the groups.

**Beck Suicidal Ideation (BSI):** Several studies attempted to study the relationship between suicide and substance abuse, however most studies used suicidality as a set of dichotomous variables, e.g.: suicidal ideation, suicidal attempt, previous attempt, family history. Hence, aiming at improving the study power, we preferred using a detailed scale to quantify several aspects of the phenomenon, this scale represented our main dependent variable. The current study found that the cases group showed (7±4), that was statistically significant from control group (2±1), this wide gap between means is also clinically significant, indicating the magnitude of the problem. Kwon, et al. [39] found that the suicidal ideation of the subjects was shown to have been associated with their dissatisfaction with their domestic environment, which had an odds ratio (OR) of 0.50. Other reviews have determined the characteristics of drug users who had suicidal behaviors or completed suicide, namely; family dysfunction (childhood neglect or abuse), social isolation, social dysfunction (prison, unemployment, poor education) [41-45], less spare time experiences with others (OR, 0.37), dissatisfaction with their spare time experiences (OR, 0.54), experiences of emotional abuse (OR, 1.87), experiences of serious depression (OR, 2.01), and trouble with controlling violent behavior (OR, 2.59). [46, 47]

**Addiction Severity Index (ASI):** In this study, addiction severity index scores among substance use disorders group; Alcohol and drugs problem had the highest mean severity, whereas medical and legal problems had the lowest severity. We found that total beck score had a direct strong correlation with: ASI alcohol and drugs, ASI employment support, ASI legal status, ASI psychiatric status.

According to Kwon et al. [39], a statistically significant difference in detoxification treatment experience was observed between groups with and without suicidal ideation, based on items in the ASI. The group with suicidal ideation had a higher frequency of detoxification treatments,

accounting for 39 (18.2%) of the cases, than the group without suicidal ideation. In the Social Information domain, statistically significant differences were found between groups based on several factors, such as marital status, satisfaction with family environment, spare time experiences with others, satisfaction with spare time experiences, serious family problems, experiences of emotional, physical, and sexual abuse, conflicts with family members, human relations problems, and recognition of the need for treatment.

The analyses with the items of the alcohol and drug use scales allow a better understanding of the link between addiction and suicidal behaviors. The components of addiction severity associated with suicidal ideation are mostly items related to consumption frequency (number of days of use, number of days with alcohol and/or drug problem), findings which were already reported in the literature [48-50]. Age of onset of drinking [51] and number of overdoses in the lifetime [52] have also been reported.

**Alcohol:** In our study, alcohol was abused by 56 persons (29.5%). Furthermore, these alcoholics showed mean BSI total score (14 ± 10), as compared to nonalcoholic (3 ± 3). This difference was significant at p value < 0.05. Previous researches identified the characteristics of alcoholic persons who attempted or completed suicide; these characteristics were psychiatric comorbidity (especially major depressive episodes), stressful life events (particularly interpersonal difficulties or unemployment), poor social support, high aggressiveness or impulsivity, hopelessness, childhood physical and sexual abuse, serious medical illness, severe alcoholism, and comorbid substance abuse [53].

**Opioids:** In our study, opioids were abused by 47 persons (24.7%). Furthermore, opioids abusers showed significantly higher mean BSI total score = 14 ± 8, as compared to non-opioids abusers 4 ± 6, at p < 0.05. Recent research suggests that a suicidal element may play a significant role in opioid overdose deaths. [54] People who use opioids are 14 times more likely to die by suicide compared to the general population, [55] perhaps the highest odds of all substances. Indeed, estimates of lifetime suicide attempt rates among individuals with OUD are gravely elevated, ranging between 17% and 48% (56-58). Co-use of alcohol and opioids can significantly increase the risk of death from overdoses due to respiratory depression [59], and in fact, many OUD-related deaths involve alcohol



use [60].

In our study, we found that Synthetics abuse predicted a 1.86 rise in BSI scores, however, almost all substance use disorders are associated with an increase in suicide risk. Research shows that the suicide hazard ratio is 1.35 for cocaine use, 2.10 for psycho-stimulant use, 3.83 for benzodiazepine use, 3.89 for cannabis use, and 11.36 for sedative use [61]. Additionally, marijuana use, cocaine use, alcohol use, and cigarette smoking were all found to be independently related to suicide, even after controls for socio-demographic factors [62]. Tobacco use and smoking appear to contribute to deaths by suicide [63]. Current smokers are at the highest risk of suicidal ideation, plans, and attempts, followed by past smokers, with nonsmokers carrying the lowest risk. Genetic vulnerabilities in the serotonergic system may predispose a smoker to suicide, although the exact mechanisms have yet to be elucidated [64].

**Limitations:** There were several limitations to our study. First, we were unable to achieve a balanced gender ratio among the substance users in our sample. Second, due to the variety of substances used by the subjects, it was not possible to isolate the effects of each drug. Future research should consider analyzing the data based on gender and substance type. We attempted to address limitations related to self-reporting by obtaining additional information from family and healthcare professionals, which is a more accurate method.

Additionally, we lacked comparable data on substance misuse prevalence in the general population of our catchment area, and we were unable to examine the clinical correlates of individual drugs due to the high prevalence of concurrent use of cannabis and alcohol.

Further study may be needed to further investigate the influence of social bonding, belonging, identity, and affiliation. Those may be inherent aspects of religious practice.

Despite these limitations, the study had several strengths, including a focus on an area of research that has received little attention (suicide, addiction, and religiosity), the use of a more objective and reliable measure of suicidality (the Beck Suicide Ideation Scale), and the investigation of the protective role of religious belief against suicide among substance abusers. The study also revealed a significant link between addiction severity and suicidality. This

study tried to analyse the complex interactions of a Bio-Psycho-Social model through a comprehensive regression analysis, in an attempt to explore a causal pathway.

### **CONCLUSIONS:**

From the current study it was concluded that the substance use disorders are a major health problem accompanied by multiple comorbidity as well as suicidality. Also, suicidality was mostly evident among alcohol and opioids abusers. Suicidality was also more evident among poly substance abusers, those with a family history of suicide, and those with a history of a previous attempt. Certain Combinations of drugs with other mental illness showed a significant predictive effect on suicidality score, notably: Alcohol + MDD, Alcohol + BAD, Alcohol + Dysthymia. Furthermore, certain mental disorders showed a significant predictive effect on suicidality scores, notably: MDD, Dysthymia, Mania, Social Phobia, and Psychotic Disorders.

### **DECLARATIONS:**

Ethics approval and consent to participate

The study was approved by the Research ethics committee of Faculty of Medicine, Suez Canal University and has issued the approval No.: 2019/10/28 - 3755

An informed permission taken from the Medical Ethical Committee.

### **Consent for publication**

Written Consent from every subject was taken at the beginning of the study based on information given about the nature of the study, Every subject had to sign the written consent.

Availability of data and material

The authors confirm that the data supporting the findings of this study are available upon request.

### **Competing interests**

The authors declare that they have no conflict of interest.

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The current study received no funding.

### **Authors' contributions**

All authors provided critical feedback and helped shape the research, analysis and manuscript. M D wrote the manuscript, he also collected and statistically analyzed and interpreted the patient data. A T was the main supervisor of the study and contributed to the method and discussion, K A was a supervisor and contributed to the method. H S



contributed to the review of literature, H B contributed to the review of literature. O I was a supervisor of the study and contributed to the review of literature as well as the manuscript.

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### LIST OF ABBREVIATIONS:

- ARS = Arab Religiosity Scale  
ASI = Addiction Severity Index  
BAD = Bipolar affective Disorder  
BSI = Beck's Suicidal Ideation Scale  
CDC = Center For Disease Control And Prevention  
ICD-10=The International Classification of Diseases-10  
MDD = Major Depressive Disorder  
SES = Socioeconomic Scale  
SUD = Substance Use Disorders  
WHO= World Health Organization

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