Suicidal and self-injurious behavior among patients with alcohol and drug abuse

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Background: Self-injurious behavior, a major public health problem globally, is linked with alcohol and drug abuse. This cross-sectional study aimed to identify the prevalence and correlates of self-harming behavior in patients with alcohol or drug abuse problems.

Methods: This was a one-year study that recruited a convenience sample of 736 outpatients and inpatients identified with alcohol or drug abuse, and was conducted at Al-Amal mental health hospitals in three major cities. All consecutively selected patients were interviewed on five working days for data collection on a semistructured sociodemographic form using the Columbia Suicide Severity Rating Scale Risk Assessment version.

Results: In addition to the socioclinical profile revealed, 50.7% of respondents reported any suicidal ideation, while 6.9% reported self-injurious behavior without intent to die. Any suicidal and self-injurious behavior was reported by 13.1% of participants. A total of 71.3% of respondents reported any recent negative activating events. In addition to any treatment history, observed correlates were hopelessness (60.7%), perceived burden on family (29.5%), refusing a safety plan (26.1%), and sexual abuse (11%). Conversely, reasons for living (64.9%), fear of death or dying due to pain and suffering (64.3%), and spirituality (92%) were largely endorsed as protective factors. There were multiple significant odds ratios ($P \leq 0.01$) revealed when independent socioclinical variables were compared with dependent variables in terms of suspected risk and protective factors. In an adjusted logistic regression model, none of the independent variables contributed significantly to any suicidal and self-injurious behavior, any suicidal ideation, or protection from them ($P > 0.05$).

Conclusion: Our preliminary results suggest that there are some socioclinical correlates of any suicide ideation, suicidal and self-injurious behavior, and protection from risky behavior, but which of them contributes significantly to the risk and protective dimensions is yet to be elucidated in prospective community-based studies with larger and more diverse samples.

Keywords: self-injurious behavior, suicidal ideation, risk factors, protective factors, alcohol, drug, abuse

Introduction
Self-injurious behavior is classified as suicidal or nonsuicidal according to an individual’s intent to die or not to die. Self-injurious behavior can be further categorized into complete suicide, a suicide attempt, preparatory acts for imminent suicide behavior, suicide communication, and suicide ideation. The latter events can be further categorized into self-mutilation, parasuicide attempts, and other behavior with no deliberate self-harm. Along this spectrum of suicide events lie indeterminate behaviors broadly categorized into self-injurious behavior with suicidal intent unknown and with not enough information.1 Despite comprehensive exploratory probes and extensive...
research, many difficulties tend to cloak the issue of exact categorization of suicide and parasuicide behavior, including accidental events and their associated sociocultural and pathological functions in the light of automatic and social reinforcement.²

Mental disorders have a close relationship with self-injurious behavior, and 50% or more of all people who die by suicide have at least one mental illness, especially depression or substance abuse problems.¹ There are one million deaths by suicide each year, representing 1.8% of the total global burden of disease, and half of them have a history of suicide attempts attributed to multiple risk factors.⁴ About 20 million people self-harm nonfatally, and add substantial burden to the health care system. Notably, 10% of those with parasuicide attempts guided by psychological motives and meaningfulness compatible with a functionalist approach also eventually die from suicide.⁵,⁶ A large Western database has revealed multiple risk factors underlying self-injurious behavior and substance abuse, which among others, include coexisting mental and physical disorders, impulsivity, problem drinking, partner relationship problems, significant life stressors and events, previous suicide attempts, and lack of social and family support.⁷–²² Furthermore, level of acculturation, cultural conflicts, and stigma can also influence the likelihood of self-injurious behavior.²³ From the known risk factors for suicidal behavior, several investigators have developed 10 behavior patterns that need to be closely monitored, which are: talking or in any other way communicating a willingness to die or kill oneself; substance abuse; expressing a sense of purposelessness; showing signs of anxiety, including agitation and changes in sleep patterns; expressing feelings of being trapped in various personal situations; expressing feelings of hopelessness; withdrawing from social activities with friends and family; showing unusual signs of anger, engaging in reckless behavior; and exhibiting signs of mood changes.²⁴,²⁵ On the other hand, factors reported to be protective against self-injurious behavior include reasons for living, sense of responsibility to family or others, supportive family and social networks, fear of death or dying due to pain and suffering, spirituality, work engagement, and continuing treatment of underlying mental and physical disorders.²⁶–³¹

In contrast, there is a meager database on self-injurious behavior in the Middle Eastern world. In a retrospective study of attempted suicides (n = 365) admitted to the National Guard Hospital, Riyadh, Saudi Arabia, it was shown that the two most important reasons for attempting suicide included family/marital problems and mood disorders among females and males, respectively.¹² Notably, alcohol and/or drug abuse is a major contributor to the morbidity and mortality of self-injurious behavior worldwide.

To our knowledge, there is no study that has estimated the prevalence or identified risk and protective factors for self-harm behavior among patients with alcohol or drug abuse problems in the Kingdom of Saudi Arabia. Therefore, this research aimed to assess the magnitude of suicide ideation, attempts, and parasuicidal behavior, and to explore possible risk and protective factors among patients diagnosed with alcohol or drug abuse. We hypothesized that the prevalence rate of self-harm behavior would be relatively low in Saudi culture, and attributable to a protective sociocultural belief system.

Materials and methods
A convenience sample of 736 patients with a diagnosis of alcohol or drug abuse was recruited proportional to the bed capacity of three settings, ie, the Al-Amal complex for mental health in Riyadh (n = 250), Dammam (n = 250), and Al-Amal, Jeddah (n = 236). We included patients aged ≥ 16 years and <60 years who were second or third consecutive outpatients and inpatients seen on all working days of the week who fulfilled the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV) criteria for substance use disorders with or without a history of suicidal or deliberate self-harm behavior. DSM-IV criteria are structured and research-oriented, but cross-sectional interviews conducted by qualified psychiatrists having in-depth knowledge of the DSM-IV were unstructured. DSM-IV describes a variety of “substance use disorders” and this research focuses on alcohol or drug abuse, because a patient with a substance use disorder has passed the stages of substance use to abuse, and the relevant literature suggests that these stages keep on shifting in both directions, ie, from use or abuse to addiction and vice versa in the patient’s life trajectory. Other inclusion criteria were: alcohol or drug abuse comorbid with other DSM-IV mental disorders; a history of repeated self-harm with and without intent to die; and patients with alcohol or drug abuse and coexisting medical problems not causing psychosis. Comorbid diagnosis of medical disorders was based on patient self-reporting. Patients with brain injury and those with psychoses caused by medical and neurological conditions were excluded from this study.

Following a detailed interview of all eligible patients together with a review of their medical files, sociodemographic and clinical variables were abstracted on a semistructured sheet. Primary and comorbid diagnoses were based on medical file reviews and interviews conducted
by assistant researchers. The respondents were arbitrarily categorized into four income groups, based on total annual income in Saudi Riyals (SR) whereby 1 USD is equivalent to 3.75SR (low $\leq$ 24,000SR, middle income 25,000–50,000 SR, high income $> 51,000–99,000SR, and wealthy income $> 100,000SR). The Columbia Suicide Severity Scale (CSSS) Risk Assessment version was used for assessing suicidal behavior. Low-income and middle-income groups were pooled for statistical purposes and considered as the low-income group. This scale has good reliability and validity, and assesses actual attempts, nonsuicidal self-injurious behavior, interrupted attempts, aborted attempts, preparatory acts or behaviors, absence of suicidal behavior, frequency of suicidal ideations over the last one week, and risk factors for and protective factors against suicide behavior. Bilingual interviewers with an MD/MS qualification read (often both in Arabic and English languages) the probes from this scale and definitions of each sub-item of six domains slowly and clearly to the respondents, and their responses were noted by the interviewers on scale templates. From an ethical perspective, the complete research proposal including informed consent was submitted to the General Administration for Medical Research, Ministry of Health. This department has both scientific and ethical committees for evaluating submitted research protocols. Finally, permission was obtained for conducting this research in the Ministry of Health setting. All participants were requested to sign the informed consent.

**Data analysis**

The data collected were entered into a computer and cleaned before conducting the analysis. In addition to calculating the frequency distribution and statistics of the variables, odds ratios were estimated by comparing certain socioclinical and risk factors. Odds ratio estimates describe the strength of association or nonindependence between two binary variables. We have reported an odds ratio reflecting a significant association between two variables. A $P$ value $\leq 0.01$ was considered to be statistically significant. Adjusted regression analysis was also performed to elucidate the most significant protective factors and predictors of suicide and self-injurious behavior. The Statistical Package for Social Sciences version 10 (SPSS Inc, Chicago, IL) was used to analyze the data.

**Results**

**Sociodemographic variables**

All the respondents were male (substance abuse is uncommon among women in Saudi Arabia). The mean age of the respondents was $32.3 \pm 9.2$ (range 16–60) years. The majority were Saudis (97.4%), with 66.2% being unemployed and 25.3% being illiterate. Fifty-nine percent of the respondents were single, 58.2% were living in families, and 49.3% reported being on a middle income. The participants were drawn equally from urban and rural areas (Table 1).

**Clinical variables**

As shown in Table 2, the majority of the respondents (98.2%) were smokers, and 95.3% were chronic smokers (more than 6 months). The respondents were also chronic abusers of multiple addictive substances, including amphetamines (39.5%), alcohol (19.7%), heroin (17.4%), cannabis (16.3%),

| Table 1 Selected characteristics of patients with alcohol or drug abuse (n = 736) |
|-------------------------------|--------|--------|
| **Variable**                  | n      | %      |
| **Age, years**                |        |        |
| 15–24                         | 160    | 21.7   |
| 25–34                         | 313    | 42.6   |
| 35–44                         | 164    | 22.2   |
| 45–54                         | 92     | 12.5   |
| >55                           | 7      | 1.0    |
| **Gender**                    |        |        |
| Male                          | 736    | 100.0  |
| Nationality                   |        |        |
| Saudi                         | 717    | 97.4   |
| Not Saudi                     | 19     | 2.6    |
| **Education**                 |        |        |
| Primary                       | 107    | 14.5   |
| Secondary                     | 104    | 14.1   |
| Intermediate                  | 303    | 41.2   |
| College                       | 36     | 4.9    |
| Illiterate                    | 186    | 25.3   |
| **Employment**                |        |        |
| Employed                      | 249    | 33.8   |
| Unemployed                    | 487    | 66.2   |
| **Marriage status**           |        |        |
| Single                        | 437    | 59.4   |
| Married                       | 216    | 29.3   |
| Others                        | 83     | 11.3   |
| **Family types**              |        |        |
| Joint                         | 428    | 58.2   |
| Nuclear                       | 308    | 41.8   |
| **Income level**              |        |        |
| Low                           | 241    | 32.7   |
| Middle                        | 363    | 49.3   |
| High                          | 94     | 12.8   |
| Very wealthy                  | 38     | 5.2    |
| **Residence status**          |        |        |
| Rural                         | 370    | 50.3   |
| Urban                         | 355    | 48.2   |
| Nomads                        | 11     | 1.5    |
| **Religion**                  |        |        |
| Muslim (Islam)                | 733    | 99.6   |
| Non-Muslim (non-Islam)        | 3      | 0.4    |
Table 2 Subs...e drug abuse (n = 736)

| Variables                          | n   | %   |
|-----------------------------------|-----|-----|
| Cigarette smoking                 |     |     |
| Yes                               | 723 | 98.2|
| No                                | 13  | 1.8 |
| **Duration of cigarette smoking** |     |     |
|  <6 months                         | 21  | 2.9 |
|  >6 months                         | 702 | 95.3|
|  0 months                          | 13  | 1.8 |
| Pattern of drug abuse              |     |     |
| Alcohol                           | 145 | 19.7|
| Cannabis                          | 120 | 16.3|
| Heroin                            | 128 | 17.4|
| Amphetamines                      | 291 | 39.5|
| Cocaine                           | 13  | 1.8 |
| Volatile substances               | 8   | 1.1 |
| Others                            | 31  | 4.2 |
| **Duration of drug abuse**        |     |     |
|  <6 months                         | 9   | 1.2 |
|  >6 months                         | 727 | 98.8|
| Comorbid mental disorder          |     |     |
| Anxiety                           | 127 | 17.3|
| Depression                        | 419 | 56.9|
| Others                            | 44  | 6.0 |
| None                              | 146 | 19.8|
| **Duration of mental disorder**   |     |     |
|  <6 months                         | 22  | 3.0 |
|  >6 months                         | 568 | 77.2|
|  0 months                          | 146 | 19.8|
| Comorbid physical disorder        |     |     |
| Diabetes mellitus                 | 12  | 1.6 |
| Hypertension                      | 8   | 1.1 |
| Others                            | 62  | 8.4 |
| None                              | 654 | 88.9|
| **Duration of physical disorders**|     |     |
|  <6 months                         | 3   | 0.4 |
|  >6 months                         | 79  | 10.7|
|  0 months                          | 654 | 88.9|

Note: **Coexisting disorders.**

and others. Overall, 98.8% reported drug abuse for a period of more than 6 months. Depression was the most prevalent comorbid mental diagnosis (56.9%) in respondents, followed by anxiety disorders (17.3%). Approximately 11% of respondents had a coexisting physical disorder (eg, diabetes mellitus, hypertension).

CSSS Risk Assessment version

The CSSS Risk Assessment version includes six domains, ie, suicidal and self-injury behavior, suicide ideation, recent activating events, treatment history, recent clinical status, and recent protective factors. Several forms of suicidal behavior were reported by 6.2% of respondents, while 6.9% reported self-injurious behavior without suicide intent (Table 3). Suicidal ideation items were endorsed by 50.7% of participants; 71.3% of patients reported activating negative events; any treatment history items were endorsed by 93.3% of patients. Furthermore, patients’ reports on the clinical items included hopelessness (60.7%), highly

Table 3 Descriptive results from Columbia Suicide Severity Rating Scale Risk Assessment version among patients with alcohol or drug abuse (n = 736)

| Variables                          | n   | %   |
|-----------------------------------|-----|-----|
| **Suicidal and self-injury behavior** |     |     |
| Actual suicidal attempt – yes     | 20  | 2.7 |
| Interrupted attempt – yes         | 16  | 2.2 |
| Aborted attempt – yes             | 7   | 1.0 |
| Other preparatory acts to kill self – yes | 2  | 0.3 |
| Self-injury behavior without suicide intent – yes | 51  | 6.9 |
| Any suicidal and self-injury behavior | 96  | 13.1|
| **Suicide ideation**              |     |     |
| Wish to be dead – yes             | 273 | 37.1|
| Suicidal thoughts – yes           | 80  | 10.9|
| Suicidal thoughts with methods** – yes | 10 | 1.4 |
| Suicidal intent without specific plan – yes | 2 | 0.3 |
| Suicidal intent with specific plan – yes | 7 | 1.0 |
| Any suicide ideation              | 372 | 50.7|
| **Recent activating events**      |     |     |
| Recent loss or other significant negative event – yes | 247 | 33.6|
| Pending incarceration or homelessness – yes | 171 | 23.2|
| Current or pending isolation or feeling alone – yes | 254 | 34.5|
| Any recent activating events      | 672 | 71.3|
| **Treatment history**             |     |     |
| Previous psychiatric diagnosis and treatments – yes | 20  | 2.7 |
| Hopelessness or dissatisfied with treatment – yes | 365 | 49.6|
| Noncompliant with treatment – yes | 253 | 34.3|
| Not receiving treatment – yes     | 49  | 6.7 |
| Any treatment history             | 687 | 93.3|
| **Recent clinical status**        |     |     |
| Hopelessness – yes                | 447 | 60.7|
| Major depressive episode – yes    | 58  | 7.9 |
| Mixed affective episode – yes     | 3   | 0.4 |
| Command hallucinations to hurt self – yes | 2 | 0.3 |
| Highly impulsive behavior – yes   | 60  | 8.2 |
| Agitation or severe anxiety – yes | 40  | 5.4 |
| Perceived burden on family or others – yes | 217 | 29.5|
| Chronic physical pain/acute medical condition – yes | 32 | 4.3 |
| Homicidal ideation – yes          | 29  | 3.9 |
| Aggressive behavior towards others – yes | 44 | 6.0 |
| Method for suicide available – yes | 19 | 2.6 |
| Refuses or feels unable to agree to safety plan – yes | 192 | 26.1|
| Sexual abuse – yes                | 81  | 11.0|
| Family history of suicide – yes   | 2   | 0.3 |
| **Recent protective factors**     |     |     |
| Identifies reasons for living – yes | 478 | 64.9|
| Responsibility to family or others: living with family – yes | 153 | 20.8|
| Supportive social network or family – yes | 265 | 36.0|
| Fear of death or dying due to pain and suffering – yes | 473 | 64.3|
| Belief that suicide is immoral, highly spirituality – yes | 678 | 92.1|
| Engaged in work or school – yes   | 120 | 16.3|

Notes: **Mutually exclusive categories; **without specific plan or intent to act.
impulsive behavior (8.2%), a perceived burden on family (29.5%), refusal or feeling unable to agree to a safety plan (26.1%), and sexual abuse (11.0%). With regard to protective factors, the majority of respondents observed that there were reasons for living (64.9%), showed interest in family or others (20.8%), had supportive social networks or family ties (36.0%), had a fear of death or dying due to pain and suffering (64.3%), were engaged in work or school (16.3%), and held the belief that suicide is immoral (92.1%).

Associations between CSSS Risk Assessment version, demographics, and comorbidity

Table 4 summarizes associations (odds ratios) between the characteristics of the CSSS Risk Assessment version and demographic and comorbid variables. These odds ratios are unadjusted results. Because of multiple comparisons, variables with \( P < 0.01 \) are reported. Suicide ideation was reported three times more often by participants with high incomes who were from an urban background. Negative activating events were three times more commonly associated with low education, low income, rural background, and comorbid mental disorders. Furthermore, any treatment history was three times more likely to be associated with a low income and a rural background. A variety of clinical variables, in terms of hopelessness, depression, family burden, chronic physical diseases, homicidal ideation, and sexual abuse, were more frequently associated with age over 30 years, low income and education, rural background, and coming from a single family (a married couple living independently).

With regard to recently protective factors, identification of reasons for living was 1.5 times more common among adults (age \( \geq 30 \) years), and 2.5 and 4.0 times more common among those with no job and those from a rural background, respectively. Responsibility to family or others and living with family was twice as common among participants with no employment, while a supportive social network or family was about 1.5 times more common among those with no employment and no co-occurring medical illnesses, respectively. Furthermore, fear of death or dying with pain and suffering was about 3.0 and 2.0 times more common among participants in the rural and low-income groups, respectively. Being engaged in work or school was a strong protective factor against suicidal behavior.

We included several independent variables in an adjusted logistic regression model in terms of age, education, family type, residence status, nationality, income level, marital status, employment, religion, cigarette smoking, and comorbid mental and physical disorders. We also included recent protective factors as dependent variables. The computed average of each one of the three dependent variables (any suicidal and self-injurious behavior, any suicide ideation, and protective factors) were separately recoded into binary variables. Surprisingly, none of the independent variables regressed against binary dependent variables survived the logistic regression analysis (<0.05). The probable reasons for this are mentioned in the discussion.

Discussion

According to this hospital-based study, the majority of patients with drug abuse, suicidal ideation, and suicidal and self-harm behavior were young adults with minimal education. Just over half of the patients were single, unemployed, and were from joint families (a married couple living with his/or her parents). Furthermore, half of the patients were from a rural background and about one third had a low income. Because we had only one local study available on this subject, we compared our results with those of studies in alcohol/drug abuse/addiction populations from the Western world. The researchers feel that such comparisons are limited in many ways, and especially from the cultural perspective. Our sociodemographic profile of an addictive population with suicidal and self-injurious behavior is consistent with that reported in other studies. A similar demographic trend was also found in our previous addiction research that did not assess suicide behavior. An important implication of this study is that alcohol and drug abuse coupled with self-injurious behavior has already spread to rural communities. In addition to residential status and family composition, other sociodemographic variables, ie, young age, single marital status, unemployment, and low income, have been identified as possible risk factors for suicidal communication, ideation, and self-injurious behavior, consistent with other research.

In our study, the majority of patients were chronic smokers, stimulant abusers, and had comorbid anxiety disorders and depression, but less physical diseases and this clinical trend is mostly consistent with other studies. In our two studies of psychiatric patients with trihexiphenidyl abuse, a similar pattern of smoking was also found.

Any suicide ideation and any suicidal and self-injurious behavior without intent to die were reported by about 50.7% and 13.1% of respondents, respectively. These prevalence rates, as revealed by the CSSRS Risk Assessment version in psychiatric outpatients and inpatients with a history of drug abuse, are presumably at variance with the findings of studies of community samples from other cultures. In a Chinese study, Cheng et al found that 17.4% of students
| Characteristics                      | Demographic and comorbid variables | OR     | 95% CI       |
|--------------------------------------|------------------------------------|--------|-------------|
| **Suicidal ideation**                |                                    |        |             |
| Wish to be dead                      | Income                             | Low    |             |
| Yes, n (%)*                          | High                               | Low    | 3.347      |
| Yes, n (%)*                          | 354 (48.09)                        | 250 (33.97) | 2.075–5.398 |
| Suicidal thoughts                    | Residence                           | Urban  | 12.89      |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 8.72–19.077 |
| Residency                            | Educational level                  |        |             |
| Wish to be dead                      | Intermediate and higher            | Secondary or less | 18.64 |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 10.33–33.63 |
| Suicidal thoughts                    | Current or pending isolation or feeling alone | Income | 1.67–3.108 |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 1.167–3.108 |
| **Activating events**                |                                    |        |             |
| Recent loss or other significant negative event | High | Low | 12.89      |
| Yes, n (%)*                          | 354 (48.09)                        | 250 (33.97) | 8.72–19.077 |
| Current or pending isolation or feeling alone | Income | Low | 11.12–2.062 |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 10.33–33.63 |
| Pending incarceration or homelessness | Residence                           | Urban  | 18.64      |
| Yes, n (%)*                          | 13 (1.77)                          | 158 (21.47) | 10.33–33.63 |
| Current or pending isolation or feeling alone | Income | Low | 1.67–3.108 |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 1.167–3.108 |
| **Comorbid mental disorder**         |                                    |        |             |
| Pending incarceration or homelessness | Current or pending isolation or feeling alone | Income | 1.67–3.108 |
| Yes, n (%)*                          | 22 (2.99)                          | 149 (20.24) | 1.167–3.108 |
| Treatment history                    |                                    |        |             |
| Hopeless or dissatisfied with treatment | High | Low | 2.500–5.898 |
| Yes, n (%)*                          | 35 (4.76)                          | 218 (29.62) | 1.288–2.384 |
| Current or pending isolation or feeling alone | Income | Low | 1.67–3.108 |
| Yes, n (%)*                          | 328 (44.57)                        | 234 (31.79) | 1.167–3.108 |
| Hopeless or dissatisfied with treatment | Residence                           | Urban  | 1.67–3.108 |
| Yes, n (%)*                          | 117 (15.90)                        | 248 (33.70) | 1.67–3.108 |
| Not receiving treatment              | Clinical status (recent)            | Income | 1.67–3.108 |
| Yes, n (%)*                          | 11 (1.49)                          | 154 (20.92) | 1.167–3.108 |
| Hopelessness                         |                                    |        |             |
| Yes, n (%)*                          | 47 (6.39)                          | 400 (54.35) | 1.67–3.108 |
| Current or pending isolation or feeling alone | Income | Low | 1.67–3.108 |
| Yes, n (%)*                          | 160 (21.74)                        | 267 (36.28) | 1.67–3.108 |
| Comorbid physical illness            |                                    |        |             |
| Yes, n (%)*                          | 5 (0.68)                           | 27 (3.67) | 23.6–172.02 |
| Chronic physical pain or other acute medical problem | Income | Low | 1.67–3.108 |
| Yes, n (%)*                          | 3 (0.36)                           | 26 (3.53) | 28.65 |
| Homicidal ideation                   |                                    |        |             |
| Yes, n (%)*                          | 3 (0.36)                           | 26 (3.53) | 28.65 |
| Sexual abuse (lifetime)              |                                    |        |             |
| Yes, n (%)*                          | 14 (1.90)                          | 67 (9.10) | 5.294      |
| Joint family                         |                                    |        |             |
| Yes, n (%)*                          | 14 (1.90)                          | 67 (9.10) | 5.294      |
| Sexual abuse (lifetime)              |                                    |        |             |
| Yes, n (%)*                          | 14 (1.90)                          | 67 (9.10) | 5.294      |
| Protective factors (recent)          |                                    |        |             |
| Yes, n (%)*                          | 218 (29.62)                        | 260 (35.33) | 1.415      |
| Identifies reasons for living        |                                    |        |             |
| Yes, n (%)*                          | 218 (29.62)                        | 260 (35.33) | 1.415      |
Table 4 (Continued)

| Characteristics                          | Demographic and comorbid variables | OR        | 95% CI       |
|------------------------------------------|------------------------------------|-----------|--------------|
| Identifies reasons for living            | Employed                           | 196 (26.63) | 282 (38.32)  | 2.688 | 1.889–3.825 |
| Responsibility to family or others; living with family | Unemployed                        | 82 (11.14)  | 71 (9.65)    | 2.877 | 1.997–4.144 |
| Supportive social network or family      | Urban                              | 107 (14.54) | 158 (21.47)  | 1.569 | 1.146–2.149 |
| Engaged in work or school                | Rural                              | 109 (14.81) | 11 (1.49)    | 33.69 | 17.62–64.41 |
| Identifies reasons for living            | High                               | 175 (23.78) | 303 (41.17)  | 3.996 | 2.889–5.527 |
| Fear of death or dying due to pain and suffering | Low                                | 184 (25.0)  | 289 (39.27)  | 2.919 | 2.133–3.955 |
| Income                                   | No                                 | 59 (8.02)   | 414 (56.25)  | 2.696 | 1.837–3.957 |
| Fear of death or dying due to pain and suffering | Yes                               | 226 (30.70) | 39 (5.30)    | 1.718 | 1.082–2.727 |

Notes: 30 years as cutoff point was based on arbitration. *Subsequent sociodemographic and comorbid variables with responses yes, number (%).

Abbreviations: CI, confidence interval; OR, odds ratio.

had seriously considered attempting suicide, and 8.1% had made a specific plan for suicide during the 12 months preceding the survey. In a Turkish study, 23% of students (aged 13–18 years) reported having had thoughts of killing themselves during the previous 12 months or during their lifetime. The reported rate of suicidal and self-injurious behavior would presumably be much less if such study was conducted in the general population, as was found in recent US surveys of youth. In a drug abuse population, reported rates of lifetime suicide attempts have been much higher at 47%, and this figure was higher in polysubstance abusers (58%) than in alcoholics (38%). In another study of 80 opiate addicts, the lifetime prevalence rate of self-injurious behavior was 49%. Notably, the prevalence of suicidal and self-injurious behavior is highly variable, which is attributable to a variety of factors, including sample characteristics, measurement tools, and study design. The epidemiological trend of variable suicidal and self-injurious behavior in the present study might be attributed to sociocultural factors.

Notably, several significant odds ratios were found for socioclinical variables and risk and protection factors when sociodemographic variables and risk/protective factors were compared, and overall revealed significant results which are mostly consistent with the world literature on risk and protective factors concerning suicidal behavior. 7-22,44,45 Certain trends in suicide ideation and self-injurious behavior were identified in this study, and are summarized because of their sociocultural significance; respondents had a three-fold lower risk of suicidal behavior if they had families and a history of sexual or physical abuse. The coupling of sexual abuse and minimal suicide behavior is surprising and needs investigation in larger groups of patients with a history of drug and sexual abuse. We also found that participants were 18 times more at risk of suicidal behavior when they were awaiting imprisonment or were from rural areas. A combination of drug abuse, crime, a rural background, and suicidal communication is apparently emerging in our culture; participants were six times more vulnerable to suicidal behavior if they were younger and had a family history of violence; they were four times more at risk of suicide and self-injurious behavior if they were single and had a family history of violence; were 2–4 times more at risk for suicidal behavior if they had a low income, were unmarried, lived in joint families, came from a rural background, or suffered from depression; were 64 times more at risk of suicidal behavior when they suffered from chronic pain or comorbid medical illness than those without medical disorders.

Factors identified to be protective against suicidal behavior need emphasis. Family connectedness, as found in joint families, has been reported to be a protective factor against suicidal behavior among adolescents with a history of sexual abuse. In another study of the role of psychological buffers in the development of hopelessness and suicidal ideation, the authors found that life satisfaction, self-esteem, perception of family cohesion, and social support were mitigating factors against hopelessness and suicidal ideation, respectively. Multiple aches and pains commonly reported by the population in the Eastern world, also found in this study, have sociocultural explanatory models. Although there is a huge amount of research data on risk factors for suicide and self-injurious behavior, relatively little is said about protective factors against suicidal behavior. According to this study,
multiple possible factors protective against suicide behaviors were consistent with those identified in other studies.\textsuperscript{41,45,48} In addition, several studies have found other protective factors against suicide and self-injurious behavior.\textsuperscript{40,49} In our study, these protective factors were apparently ineffective in about 50\% of cases as far as suicide ideation and communication were concerned, but were very effective against carrying out thoughts about suicide and parasuicide attempts. How risk factors for and protective mechanisms against suicide behavior interact to manifest in either of the possible outcomes, ie, suicidal or no suicidal behavior, is challenging to investigate and limited information is available.\textsuperscript{50} Moreover, whether both protective factors against and risk factors for suicide and self-injurious behavior are the same or different is debatable and challenging to investigate.\textsuperscript{5,51,52}

This is the first cross-sectional study in a hospital-based population that has attempted to estimate the prevalence of suicidal and self-injurious behavior and associated risk and protective factors. However, its tentative preliminary results cannot be generalized to a larger population and need to be interpreted cautiously. The study has some limitations. Sample selection was not randomized and there was no determination of an adequate sample size, with recruitment being merely proportional to the bed capacity at each setting. Further, there was no consideration of inter-rater differences, although all coinvestigators were MD/MS graduates with considerable clinical experience, and were intensively briefed by the principal investigators about the rating scale in two mini-workshops. This scale has good reliability and validity and has been used extensively worldwide, although no attempt was made to assess its statistical properties in relation to the Saudi setting. Furthermore, our results are descriptive only and require confirmation in a larger and more diverse sample to understand suicidal behavior better. The results are useful as preliminary data for informing further research or generating hypotheses for further testing, but they do not reflect definite “risk or protective factors” because they are descriptive only. Surprisingly, the adjusted logistic regression analysis did not yield significant results. Our negative results might be attributed to measurement error, our small hospital-based sample, and/or more negative responses on any suicide ideation and suicidal and self-injurious behavior and more positive responses on protective items in the rating scale, and others.

In summary, rates of any suicide ideation or suicidal and self-injurious behavior are relatively low in this study. The protective factors identified might possibly act against translating suicidal ideation into suicide attempts and self-injurious behavior. Prospective community-based studies are needed to elucidate the most significant protective factors and predictors of suicide ideation, or suicidal and self-injurious behavior in the future.

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