EVALUATION OF SUICIDE RISK IN MEDICAL STUDENTS

Avaliação do risco de suicídio em acadêmicos de medicina

Edy Alyson Ribeiro[1] | Vinicius César Queiroz Bisetto[2] | Douglas Otomo Duarte[1] |

Maria José Caetano Ferreira Damaceno[2] | Lilian Dias dos Santos Alves[2]

[1] Medical student from Fundação Educacional do Município de Assis

[2] Professor of the medical course of Fundação Educacional do Município de Assis

Date of submission: 10/23/2019 | Date of approval: 07/26/2020

ABSTRACT

Objectives: Suicide is considered a serious public health problem and especially affects medical students, who present a high prevalence of suicidal ideation, of approximately 11.1%. The aim of this study is to evaluate the risk of suicide in medical students from a University in an inland city of the State of São Paulo, Brazil. **Methods:** This is a cross-sectional study carried out with 169 medical students from stages I, II, III and V of the medical course. Two questionnaires were employed: the module C of the Mini International Neuropsychiatric Interview (MINI), in which the risk of suicide was classified as "low" or "moderate/high"; and a survey with 23 questions about clinical and demographic factors potentially associated with suicide risk. A preliminary exploratory analysis was carried out to investigate this association and a subsequent logistic regression was employed to perform a multivariate analysis. **Results:** of the students who responded to the MINI questionnaire, 131 (77.5%) showed a low risk of suicide and 37 (21.9%), a moderate/high risk. The variables that were associated with suicide risk were: family history of suicide (RR= 5.90; p=0.001) and the diagnosis of mental disorders (RR=3.96; p= 0.004). Alcohol consumption was associated with suicide risk in the preliminary bivariate analysis (RR=4; p=0.046), but this association did not remain significant in the final model of the multivariate analysis (RR=3.54; p=0.059). **Conclusion:** The results showed that a family history of suicide and the diagnosis of mental disorders were associated with suicide risk and can be used to identify students at risk, as well as to guide preventive strategies for its prevention in Medical Schools.

Keywords: Medical Students; Suicide Attempt; Mental Health; Medical Education; Psychiatric Graduation Scales.

DOI: 10.5935/2763-602X.20210002

INTRODUCTION

Suicide is considered a public health problem by the Pan American Health Organization (PAHO/WHO)[1], with 800,000 cases every year, equivalent to 1.4% of the total deaths in the world[1]. In Brazil, 55,649 deaths from suicide were reported between 2011 and 2015, representing an average incidence of 5.5 cases per 100,000 inhabitants per year[2]. Between 2011 and 2016, 48,204 cases were reported, 69% in women and 31% in men, predominantly in the age group of 20 to 29 years (27.4%)[2].

In a meta-analysis carried out by Rotenstein *et al.*[3] in 2016, the overall average prevalence of suicidal ideation in medical students was 11.1%. In addition, stress, changes in the students' psychological and physical well-being and the prevalence of depressive and anxiety disorders, as well as of the consumption of alcohol, tobacco and other psychoactive substances increase during academic life[4-5].

According to a cross-sectional Brazilian study, composed of a sample of 4,840 medical students, 432 (8.94%) participants showed suicide ideation or attempt. Of these, 346 (80%) were women, 299 (69.2%) were heterosexual, 423 (97.9%) had no children, 193 had poor sleep (44.6%), 305 did not perform any physical activity (70.6 %), 130 (30%) reported a fair family relationship and 162 (37.5%) had good contact with friends[6].

The risk for suicide is associated with modifiable and non-modifiable factors such as: male gender, adult age, marital status, low income, homosexuality, family history of suicide, alcohol and tobacco consumption, diagnosis of mental disorders - such as mood disorders - in addition to other factors that are very common during student life, such as bullying and poor sleep quality[1,4,6-9].

These findings justify the importance of research on suicide among medical students, since many can be avoided. It is worth mentioning that the prevalence of suicidal ideation among medical students is higher than that of doctors and nurses[10].

Therefore, this study aims to assess the suicide risk among medical students and identify possible risk factors in this population, in order to better understand this issue and to promote measures to identify individuals at risk.

MATERIALS AND METHODS

This is a quantitative cross-sectional study carried out with medical students. Data collection took place between August and September 2018, at a University in an inland city of the state of São Paulo, Brazil, which had 193 enrolled medical students from the first to the fifth semester. The study included all male and female medical students 18 years or older who were enrolled in semesters I, II, III and V of the medical course, by the first semester of 2018, and who agreed to answer the questionnaires. Students not present at the time of the interview were excluded. As students are admitted to this Medical School biannualy, there is a class for each semester of the year. However, this did not apply to semester IV, which was not included in the sample, since new students were admitted only once that year.

The survey presented two self-administered questionnaires. The first instrument was the module C of the validated and structured Mini International Neuropsychiatric Interview (MINI), used to assess suicide risk, classifying it as "low" (score 1-5), "moderate" (score 6-9) and "high" (score $\geq$ 10)[11-12]. For data analysis, in this study, the scores were classified as absence of risk (equivalent to "low") and presence of risk (equivalent to "moderate" and "high" risk). Thus, the sum of six 6 or more points in the questionnaire represented a risk of suicide for the purposes of this study[11-12].

The second questionnaire was developed by the authors from a literature review and contained 23 questions about the following variables: sex/gender, age, marital status, race/ethnicity, religion, occupation, income, cohabitation, family structure, alcoholism, smoking, use of illicit drugs, diagnoses of mental illness, use of medications and history of suicide attempts by family members and friends[4,6-9,13]. Initially, a pilot questionnaire was applied to 34 students of Stage III of the medical course, who were included in the sample after the method fulfilled the expectations of the researchers, demonstrating its applicability in other students.

The study was approved by the Research Ethics Committee (protocol no. 2.746/18), according to Resolution 466/2012 of the Brazilian Health Council. Before the application of the questionnaires, all participants signed the Informed Consent form, which explained the nature and objectives of the research. The questionnaires were applied during curricular activities, at the institution's physical facilities, and lasted 15 minutes.

Initially, we employed the Chi-square test to perform a preliminary exploratory analysis, testing the association of the following categorical variables with the outcome (presence or absence of suicide risk): sex, family history of suicide, diagnosis of mental disorders, smoking, alcohol consumption, consumption of illicit drugs and religion, In this analysis, the significance level was set at 5%.

In a second moment, we employed a stepwise logistic regression to perform a multivariate analysis, using the forward method for variable selection. Therefore, each variable was introduced in the model one by one, starting from the variable that showed the strongest association with the outcome, in the bivariate analysis. Only statistically significant variables remained in the final model, at a significance level of 5%. The analyses were conducted using the SPSS statistical software in version 20.0 (IBM Corp, NY, United States of America).

RESULTS

Of the 193 enrolled medical students, the final sample was composed of 169 students (87.5%) that met the inclusion criteria. One student refused to answer the MINI, but answered the second questionnaire.

The students were predominantly female (120 or 71.0%), and all identified with their biological gender. A higher prevalence of white students was evidenced (154 or 91.1%); 103 students (60.9%) lived with someone and 161 (95.3%) were single. The mean age was 21.36 years (2.929 standard deviation).

Regarding the socioeconomic aspect, 65 (38.5%) had a family income of 5 to 10 Brazilian minimum wages. As for the declared religion, 135 (79.9%) stated that they have a religion, while 108 (63.9%) declared to be Catholics. As for the family environment, 143 (84.6%) students belonged to a traditional family, whose parents are not divorced, and 163 (96.4%) students did not have children. Regarding drug use: 136 (80.5%) drank alcoholic beverages, 20 (11.8%) smoked

TABLE 1 - Analysis of socioeconomic, demographic and clinical data of 169 medical students. Medical School of an inland city of the state of São Paulo, Brazil, 2018.

VARIABLE	MEAN	STANDARD DEVIATION
AGE	21,36	2,929
	FREQUENCY (N)	**PERCENTAGE (%)**
Sex	-	-
Female	120	71
Male	49	29
Race	-	-
White	154	91,1
Brown	8	4,7
Yellow	4	2,3
Black	3	1,7
Marital Status	-	-
Not Married	161	95,3
Married	8	4,7
Use of Alcohol	-	-
Yes	136	80,5
No	33	19,5
Smoking	-	-
Yes	20	11,8
No	149	88,1
Use of Illicit Drugs		
Yes	20	11,8
No	149	88,1
Religion	-	-
Yes	135	79,9
No	34	20,1
Type of Religion	-	-
Catholic	108	63,9
Protestant	20	11,8
Spiritist	3	1,7
Buddhist	2	1,1
Seicho-No-Ie	1	0,5
Umbanda	1	0,5
Does not have a religion	34	20,1
Family Structure	-	-
Integrated	143	84,6
Disintegrated	26	15,4
Income	-	-
0 to 1 minimum wages	0	0
2 to 4 minimum wages	5	2,9
5 to 10 minimum wages	65	38,5
10 to 20 minimum wages	44	26
More than 20	32	18.9
Not informed	23	13.6
Living with	-	-
Alone	66	39.1
Other people	103	60.9
Has Children?	-	-
No	163	96.4
Yes	6	3.5
Identifies with Biological Gender	-	-
Yes	169	100
No	0	0
Diagnosis of Mental Disorders	-	-
Yes	27	15.4
No	142	84
Main Disorders	-	-
Anxiety	16	9.4
Depression	7	4.1
Treatment	-	-
Yes	19	12.2
No	8	4.7

TABLE 2 - Suicide risk among 169 medical students assessed by the MINI. Medical School of an inland city of the state of São Paulo, Brazil, 2018.

M.I.N.I	FREQUENCY (N)	PERCENTAGE (%)
Low	131	77,5
Moderate	22	13,0
High	15	8,9
Did not respond	1	0,6
Total	169	100,0

TABLE 3 - Bivariate analysis of conditions related to suicide risk in medical students at a medical school of an inland city of the state of São Paulo, Brazil, 2018.

		BIVARIATE ANALYSIS *		MULTIVARIATE ANALYSIS	
VARIABLE	**N**	**RR****	**P**	**RR****	**P**
Sex	-	-	-	-	-
Female	119	1,307	0,253	-	-
Family history of suicide	14	10,57	0,014	5,9	0,001
Diagnosis of mental disorders	27	9,83	0,002	3,96	0,004
Smoking	20	0,652	0,419	-	-
Alcohol consumption	136	4	0,046	3,54	0,059
Consumption of illicit drugs	20	0,841	0,359	-	-
Religion	135	0,458	0,498	-	-

* Chi-square test; **Relative Risk

and 20 (11.8%) used other types of drugs.

According to the answers, 14 (8.3%) students had a history of suicide in the family and 27 (15.4%) mentioned having a diagnosis of mental disorders. Of these students, 16 (9.4% of the total sample) had Generalized Anxiety Disorder (GAD). Of the students who had a diagnosis, only 19 (70.3%) underwent treatment, including psychotherapy and/or pharmacological treatment. Table 1 represents the clinical and demographic data of the sample.

In the results obtained after the application of the MINI, we identified 15 (8.9%) students with high suicide risk, considering that 1 (0.6%) student did not respond to this questionnaire. Table 2 presents the results of the MINI questionnaire.

In the bivariate analysis, an association was observed between "suicide risk"/"diagnosis of mental disorders" (p= 0.002); "family history of suicide" (p= 0.014)/"alcohol use" (p= 0.046). In the multivariate analysis, an association was identified between "suicide risk"/"diagnosis of mental disorders" (p= 0.004); "risk of suicide/family history of suicide" (p= 0.001) (see Table 3).

DISCUSSION

The present study showed that 37 (21.9%) students had a moderate/high risk of suicide, according to module C of the MINI questionnaire, a value that exceeds the one found in the systematic review by Rotenstein *et al.*[3], of 11.1%. This fact can be justified by the use of different instruments for data collection and by the difference of sample size between the studies, which was considerably larger in the systematic review[14].

In our study, the following factors showed a significant association with suicide risk: family history of suicide (RR= 5.90; p= 0.001) and the diagnosis of mental disorders (RR= 3.96; p= 0.004). These findings corroborate the international literature[15], and the main explanations are the cognitive distortion seen in mental disorders[16-17] and associated genetic factors[16-18]. Accordingly, Bachmann *et al.*[13] reported that mental disorders, observed in 15.4% of our sample, are present in 60-98% of suicide cases. In addition, the presence of these diagnoses increases the risk of suicide by 10% in the general population[13].

In the present study, 14 (8.3%) students reported a positive history of suicide in the family, which had a statistically significant association with suicide risk in the sample (RR= 5.90; p= 0.001). This result is in line with a cross-sectional study carried out with 637 students, whi-

ch reported a history of suicide attempts of family members as a factor associated with increased risk of suicidal ideation[19]. These findings are compatible with the results of a longitudinal study by Oppenheimer *et al.*[18], which showed a complex and still poorly understood mechanism of transmission of suicide risk from parents to their children. This study suggests that children, in addition to inheriting neurocognitive alterations, problems of emotional regulation and other neurobiological deficits from their parents, may be exposed to a stressful family environment, due to high levels of conflict between family members. Therefore, their vulnerability to suicidal behaviors increases[18].

Our results showed that 136 (80.5%) students consumed alcoholic beverages at least once during the medical course. This value is similar to results reported in previous studies[20]. In particular, of the students who had a moderate/high risk of suicide (37), 34 (91.8%) drank alcohol at least once a month. A meta-analysis suggested that the use of high doses of alcohol is associated with an increased risk of suicide attempts and with decompensations of underlying mental disorders[20]. However, although the bivariate analysis showed an association of alcohol consumption and suicide risk, this finding did not remain statistically significant when the interaction of other variables was considered in the final model, after multivariate analysis (p= 0.059). This finding, which goes against the literature[19], may be explained by the fact that we did not control, in our sample, factors such as differences in doses and patterns of alcohol consumption, which may vary between participants, as well as compared to the samples of other studies[19-21]. For instance, a cross-sectional study reported that students with alcohol abuse and/or dependence had twice the risk of suicidal ideation when compared to those who consume alcohol moderately[19].

Moreover, we observed in this study that, of the 27 (15.4%) students who presented a mental disorder, 16 (59.2%) declared to have GAD. A meta-analysis showed that stress and anxiety are associated with the competitiveness of medical school and with the onset of depression and suicidal ideation[6]. Corroborating this fact, a Brazilian study showed that the prevalence of anxiety and depression in medical students is associated with a high number of study hours, a high course load, feeling insecure regarding one's professional life, being too hard on oneself and the close contact with several diseases[22].

According to Bailey *et al.*[23], among medical students, women had a higher rate of suicide ideation and attempt when compared to men. In our study, we found a great number of women (120, 71%) with these symptoms, but there was no significant association between females and a higher risk of suicide (RR= 1.307; p= 0.253). Regarding the relationship between suicide and religion, we observed that 135 (79.9%) students claimed to have some religion, but the association of religiousness with the risk of suicide was not statistically significant (RR= 0.458; p= 0.498) in this sample. However, in an international systematic review, religious affiliation is a protective factor against attempted and completed suicides, but it does not interfere with suicidal ideation[24].

Only 20 (11.8%) students reported tobacco use, similarly to the values found in the literature[25]. In this context, a cross-sectional observational study pointed out that, although 48.4% of the participating students had ever smoked, only 12% consumed tobacco frequentely[25]. Although tobacco is a risk factor for suicide according to some studies in the literature[9,25], there was no association between suicide risk and smoking in our sample (RR= 0.652; p= 0.419).

This study has some limitations, such as its cross-sectional design, which does not make it possible to identify causal factors. Another limitation is the difficult generalization of the results, as it was carried out in a private Medical located in the interior of the state of São Paulo and has a small sample of individuals evaluated, as it was a course that started a few years ago. There was also no verification of family history of mental disorders among medical students, which could be associated with the risk of suicide.

Despite these limitations, the findings we report are relevant and need to be further investigated and considered by other medical schools, as it deepens the knowledge on the factors related to the risk of suicide. Moreover, the findings of this study can contribute to the improvement of mental health indicators among medical students, by guiding awareness campaigns of the community and programs to support and educate students regarding mental health implemented by the Medical School and associated healthcare services. When designing these preventive programs and interventions, it is important to identify students most likely to present an increased risk of suicide in a timely manner. This can be done by screening risk factors, by providing proper psychiatric and psychological care and by performing a close follow-up of these students, aiming to fully address their needs[13,26].

CONCLUSION

This study analyzed the relationship between demographic and clinical factors and suicide risk among medical students. In this study, suicide risk, according to the score obtained after the application of the MINI questionnaire, presented an association with the diagnosis of mental disorders and with a family history of suicide. No association was found between suicide risk and religion, use of tobacco, alcohol and illicit drugs. Thus, a family history of suicide and the diagnosis of mental disorders can guide prevention strategies in Medical Schools. We suggest that universities and government agencies responsible for medical education implement measures aiming to promote the quality of life of students. We advise the competent authorities to identify family history of suicide, as well as to prioritize the diagnosis and early treatment of mental disorders, among medical students, in order to reduce the suicide risk of this population.

ACKNOWLEDGEMENTS

The authors would like to thank the Fundação Educacional do Município de Assis for the Scientific Initiation Project scholarship that resulted in this article.

DISCLOSURES

There is no conflict of interests to declare.

FINANCIAL SUPPORT

This research was funded by FEMA/IMESA scientific initiation program.

INFORMATION ABOUT THE ARTICLE

Fundação Educacional do Município de Assis

Mailing address:
Avenida Getúlio Vargas, 1200
CEP: 19807-130 – Assis, SP, Brasil

Corresponding author:
Dra. Lilian Dias dos Santos Alves
lili_soprano@hotmail.com

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