Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/mjafi

Original Article

Prevalence and predictors of suicide ideation among undergraduate medical students from a medical college of Western India

Nimisha D. Desai [a], *Paragkumar Chavda* [b,*], *Sandeep Shah* [c]

[a] *Associate Professor (Psychiatry), GMERS Medical College, Gotri, Vadodara, Gujarat, India*
[b] *Assistant Professor (Community Medicine), GMERS Medical College, Gotri, Vadodara, Gujarat, India*
[c] *Professor (Psychiatry), GMERS Medical College, Gotri, Vadodara, Gujarat, India*

ARTICLE INFO

Article history:
Received 17 October 2020
Accepted 18 November 2020

Keywords:
Depression
Suicide ideation
Web-based survey
Academic stress
Medical students

ABSTRACT

Background: Looking at the background vulnerability and increasing incidence of suicides among medical students, more information on its burden and causes is needed.
Methods: A cross-sectional study was conducted at a medical college to assess prevalence of suicide ideation and associated factors among medical students. Data were collected through a web-based survey questionnaire using Patient Health Questionnaire-9 and items on suicide cognitions, suicide attempt history and risk factors. Bivariate and multivariate analyses were performed in SPSS.
Results: A total of 506 students (69.2%) responded to the survey questionnaire. The 2-week prevalence of depression and suicide ideation was 14% (73/506) and 9% (44/506). Proportion of participants reporting suicidal cognitions in preceding 1 month: life not worth living—13%; death wish—6%; suicidal ideas—4%; and suicide plan—1%. The significant predictors of suicide ideation were female gender (adjusted odds ratio [AOR] = 3.2, 95% confidence interval [CI] 1.6–49.1), alcohol use (AOR = 3.2, 95% CI 1.1–9.7), history of facing any type of abuse (AOR = 3.9, 95% CI 1.2–11.9), academic stress (AOR = 3.3, 95% CI 1–10.9), family-related stress (AOR = 5.6, 95% CI 1.8–17) and relationship-related stress (AOR = 3.5, 95% CI 1.1–10.8). Half of the students reported presence of academic stress as important life stressor. Three-fourth students preferred friends as their source of help in times of need. Web-based survey method for screening was acceptable to students.
Conclusion: The prevalence of suicide ideation is alarmingly high among medical students. Academic stress, previous experience of abuse, stress originating from family expectations and strained relationship with friends and peers were found to be risk factors or predictors for suicidal ideation.

* *Corresponding author.*
E-mail address: paragchavda@gmail.com (P. Chavda).
https://doi.org/10.1016/j.mjafi.2020.11.018

Introduction

Suicide ideation means thinking about considering or planning for suicide. Recognition of suicide ideation can help in early intervention and prevention of suicide.[1]

Suicide is among the top three causes of death among youth worldwide.[2] Earlier studies have reported that the youth in medical school are at a higher risk of depression.[3] Depression is associated with suicides. A suicide-behaviour model suggests that the medical training provides an acquired ability of converting ideation into attempt through habituation to suffering and availability of knowledge of ways of possible self-harm.[4]

A review of studies on suicide ideation among medical students from different countries has shown 11% pooled prevalence.[5] Such high prevalence of ideation calls for an enquiry. Studies on suicide ideation among medical students from developing countries are few.[6,7] The few studies from India reported a prevalence of suicide ideation in a range of 8–15%.[8,9] Systematic studies on the predictors of suicide ideation are needed. Furthermore, most of these studies have collected data in classrooms where students might not be comfortable revealing sensitive information. Hence, we tried to use web-based method of collecting information from students to know the prevalence of suicide ideation and its associated risk factors among students of our medical college.

Materials and methods

Ethics

Institutional Ethics Committee approval was obtained before start of the study. All information collected during study was kept confidential.

Study design and setting

This cross-sectional study was conducted at a medical college located in urban area of central Gujarat in November 2017. The yearly intake of this college is 150 and presently total nine batches of undergraduate students including interns are studying in this college.

Study questionnaire

The study instrument was a semi-structured questionnaire in English language self-administered by students in electronic form.

The questions on suicidality to be included in the survey questionnaire were decided by reviewing the available literature.[10,11] Study questionnaire was validated for content by two experts in psychiatry and an expert in research. The questionnaire was pilot tested on a group of 30 students to see feasibility in terms of acceptability and ease of understanding by the students. The responses of pilot testing phase were not included in the final data.

The questionnaire was divided into three parts: background information of students, screening for depression and suicidality.

The first part collected demographic, family and personal attributes–related background information of the students. We identified the stressors to be included in the questionnaire from previous studies on similar topic.

For the second part of questionnaire which focused on measuring **depression,** we used self-administered nine-item patient health questionnaire (PHQ-9).[12] Each question on the PHQ-9 is scored on scale of 0 (not at all), 1 (several days), 2 (more than half the days) and 3 (nearly every day). The range of possible score on this questionnaire is 0–27, which is classified as follows: 0—none, 1–4—minimal, 5–9—mild, 10–14—moderate, 15–19—moderately severe and 20–27—severe depression.[12] As suggested by previous literature, we used cut-off score of 10 or above on PHQ-9 to define depression in this study.[12] The item 9 of the PHQ-9 pertains to suicidality. For measuring 2-week prevalence of suicidal ideation, we used the cut-off of score 1 or above on this item 9 on PHQ-9.

Part three included questions related to **suicidality**.[10,11] We collected information on suicidality during preceding 1 month, and suicidal attempt during lifetime.

The questions pertaining to preceding 1 month were as follows:

1. "Have you felt that life was not worth living?"
2. "Have you wished that you were dead-for instance that you would go to sleep and not wake up?"
3. "Have you thought of taking your life even if you would not really do it?"
4. "Have you seriously considered taking your life?"
5. "Have you attempted to take your life?"

The question on lifetime prevalence of suicide attempt was as follows:

"In your whole life, have you ever tried to kill yourself or made a suicide attempt?"

We measured each of these questions on a dichotomous (yes/no) response scale. For the questions on past 1-month ideation, the students were progressively exposed to the questions from death wish to active ideation; a student responding yes to a question was directed to the next question and a student responding no was directed to the question on lifetime suicide ideation. The question no. 3 on the above list of questions was kept as our operational definition of 'suicidal ideation' in the present study.

We also asked the students to rate their level of comfort while filling this questionnaire and a preferred source for help if needed.

The questionnaire thus prepared was converted to electronic form using Google forms.

Study population

A total of 731 undergraduate students studying from first professional year to internship in this medical college were eligible to participate in this survey.

Study procedure

Electronic survey helped in ensuring privacy of data collection as the students could fill up the form comfortably at the time and place of their convenience.

The first and second author recorded an audio-visual message providing information to the students on the importance of being aware of one's own mental status, the nature and purpose of survey and encouraging them to participate in the survey.

We used pre-existing nine WhatsApp groups of students to share information about this survey. We shared a link to the electronic version of questionnaire, the audio-visual message and a text message requesting students to participate in survey. The link to survey form was kept open for 10 days in the month of November 2017. Reminders were also sent at regular interval of 2 days via text messages.

The Google survey form was divided in four sections. The first section was participant information sheet that provided relevant information about the study to the student. Second section was a consent page. Only those students consenting to take part in the study were presented the third section, which was study questionnaire proper, rest were directed to the fourth section, which provided awareness information on depression and suicide through a link to resources from World Health Organization; contact details of investigators and local help centres from where students can avail counselling services. Later on, the students who approached for consultation were provided counselling and follow-up care.

Data management and statistical analysis

The data collected on Google survey was extracted in Microsoft Excel and analyzed using SPSS v.20. Descriptive statistics are presented using proportions and mean and standard deviation. Chi-square test was used in bivariate analysis. Binomial logistic regression model was applied for multivariate analysis.

Results

Of 731 eligible students, 30 participated in pilot testing. Hence, of the remaining 701 students, 507 filled the form and rest 194 did not fill the form. Among the 507 who filled the form, 1 did not give consent and rest 506 gave consent and completed the survey.

Demographic details of participants

Students from all professional years of study including internship participated in the survey. Most were girls (62%), Hindu (93%) and from urban background (85%). Other demographic details are in Table 1.

Table 1 – Sociodemographic profile of the medical students (n = 506).

Variables	n	(%)
Year of study		
1st MBBS	108	(21)
2nd MBBS	144	(29)
3rd MBBS Part 1	104	(21)
3rd MBBS Part 2	85	(17)
Internship	65	(13)
Gender		
Female	313	(62)
Male	193	(38)
Religion		
Hindu	469	(93)
Muslim	30	(60)
Christian	7	(1)
Medium of school level instruction		
English	272	(54)
Gujarati	234	(46)
Residence of origin		
Urban India	430	(85)
Rural India	48	(10)
Tribal India	9	(2)
Outside India	19	(4)
Currently living		
With parents/local guardians	244	(49)
In hostel	262	(51)

Personal background of participants

A total of 162 students (32%) exercise regularly while 458 (91%) reported having a hobby other than studies. Fifty-three students (11%) gave a history of tobacco consumption and 14 students (2.7%) used tobacco once or more in a month. Eighty-eight (17%) reported having consumed alcohol and 12 students (2.3%) consumed alcohol once or more a month. Sixty students (12%) reported having taken medication for getting high, staying awake or going to sleep. The number of students reporting to have used such medication daily, weekly and monthly were 11 (2.2%), 11 (2.2%) and 10 (2%), respectively. Forty-three students (8.5%) reported a history of psychiatric illness. Among them, 33 (77%) received consultation from a psychiatrist or counsellor and 26 (60%) received pharmacotherapy. A total of 106 students (21%) gave a history of being victim of some form of abuse. Among them, 68 students (13%) reported a history of emotional abuse, 44 (9%) verbal abuse, 27 (5%) sexual abuse and 8 (2%) reported physical abuse. (Data not in table.)

Information on perceived life stressors

A total of 377 students (75%) reported having one or more difficulty in life that they were unable to deal with. The most common area where students felt such difficulty was related to academics (49%). (Table 2).

Family details

A total of 372 students (74%) belonged to nuclear family, 449 (89%) had a sibling, around 396 students (76%) had their fathers' education of graduate level or above and 326 students

Table 2 – Perceived life stressors by medical students (n = 506).

Variables	n	(%)
Presence of any stressor in life	377	(75)
No stressor	129	(26)
Area of stressor [a]		
Academic	248	(49)
Family related	70	(14)
Friend related	149	(29)
Health related	55	(11)
Major loss	17	(3)
Environment related	74	(15)
Self-esteem related	7	(1)
Availability of persons to share stress feelings (n = 377)		
Nobody	83	(22)
1	82	(22)
2	94	(25)
3 or more	118	(31)

[a] Multiple responses possible, numbers may not add up to 100%.

Table 3 – Prevalence of depression and suicide ideation among medical students (n = 506).

	n	(%)
Prevalence of depression in proceeding 2 weeks [a]	73	(14)
Severity wise break-up (n = 506)		
No depression	77	(15)
Minimal depression	206	(41)
Mild depression	150	(30)
Moderate depression	51	(10)
Moderately severe depression	15	(3)
Severe depression	7	(1)
Suicide ideation in proceeding 2 weeks		
Prevalence of suicide ideation	44	(9)
Suicidality in proceeding 1 month		
Felt that life is not worth living	66	(13)
Death wish—Wished that you were dead	32	(6)
Suicidal ideas—Thought of taking life even if you would not really do it	22	(4)
Suicidal plan—Seriously considered taking your life	5	(1)
Suicidal attempt—Attempted to take your life	2	(0)
Lifetime prevalence of attempt		
Ever tried to kill yourself or made an attempt	21	(4)
Preferred source for help		
Friend	388	(77)
Counsellor/Psychologist	53	(11)
Psychiatrist	40	(8)
Teacher	25	(5)

[a] Depression defined as PHQ-9 score ≥ 10.

(64%) had their mother's education of graduate level or above. A total of 129 students (25%) reported a family history of tobacco use and 87 (17%) reported a family history of alcohol use. Seventy-five students (15%) reported a family history of depression severe enough affecting daily life of affected family member, 46 students (9%) reported an attempted suicide within family or by someone they were close to and 31 students (6%) reported a history of completed suicide in family or by someone close. (Data not in table.)

Prevalence of depression and suicide ideation (Table 3)

Prevalence of depression defined as PHQ score≥10 among students in past 2 weeks was found to be 14% in this study. Although on item 10 of difficulty assessment due to all problems, 185 (37%) responded some difficulty, 21 (4%) reported very difficult life and 5 (1%) reported extremely difficult life.

Prevalence of suicide ideation in past 2 weeks as per item-9 of PHQ-9 was found to be 9% in the present study. On assessment of suicidality in past 1 month, 66 students (13%) felt that life was not worth living, 32 (6%) had death wish, 22 (4%) thought of taking their life even if they would not really do it (suicide ideas), 5 students (1%) seriously considered taking their life (suicide plan) and two students had already attempted suicide in past 1 month. Apart from these two students, another 21 students (4%) had a history of suicide attempt in their life.

Of the students attending this survey, most preferred friends as source of help when needed. Among those students who had suicidal ideation, 12 (55%) chose friend as preferred source for help, 5 (22.5%) each chose a teacher or counsellor and none of them chose a psychiatrist. Four hundred thirty-nine (85%) students in the present study reported that they felt comfortable answering questions to this web-based survey. (Data not in table.) Six students reached out to psychiatry department for help soon after the survey.

Predictors

We checked demographic, family-related and personal attributes–related factors for their possible association with suicidal ideation in bivariate analysis. The outcome variable was past 1-month incidence of suicidal ideation measured on a dichotomous scale (ideation present or not) for this analysis (Table 4).

Selected variables were taken for multiple logistic regression analysis. Model fit was tested using Hosmer–Lemeshow test and Nagelkerke R^2 value was 0.378 (Table 5). Female gender, alcohol use, history of being victim of any form of abuse, academic stress, family-related stress and problems in relationships were found to be significantly associated with suicidal ideation in multivariate analysis.

Discussion

This study throws light on magnitude of the problem of suicide ideation and its associated factors among the vulnerable population of medical students.

The 2-week prevalence of depression and suicide ideation based on PHQ-9 was 14% and 9%, respectively. On assessment of suicidality in past 1 month, prevalence of suicidal ideation was found to be 4% and 1% students seriously considered taking their life. The variety of definitions and durations used by different researchers makes prevalence comparison across the studies difficult. Some studies have included passive ideation such as feeling of life not worth living in their definition, giving relatively high rates of prevalence of suicidal ideation.

Proportion of students reporting passive death wish was comparable in our study (6%) to the study by Patel et al. (6.3%) from Surat.[13] The prevalence of active ideation in form of

Table 4 – Bivariate analysis of factors associated with suicide ideation among the participating students (n = 506).

	Denominator	Students with suicide ideation		p value
		n	(%)	
Total participants	506	22	(4.3)	
Demographic variables				
Year of study				
1st MBBS	108	6	(5.6)	p = 0.76[b]
2nd MBBS	144	4	(2.8)	
3rd MBBS Part 1	104	4	(3.8)	
3rd MBBS Part 2	85	4	(4.7)	
Internship	65	4	(6.2)	
Gender[a]				
Female	313	20	(6.4)	p = 0.004[b]
Male	193	2	(1)	
Residence				
India Urban	430	19	(4.4)	p = 0.97[c]
India Rural & Tribal	57	2	(3.5)	
Outside India	19	1	(5.3)	
Currently living with				
With parents	244	9	(3.7)	p = 0.48[b]
In hostel	262	13	(5)	
Family-related variables				
Type of family				
Nuclear family	372	18	(4.8)	p = 0.36[b]
Joint family	134	4	(3)	
Presence of sibling				
Having a sibling	449	20	(4.5)	p = 0.98[c]
No sibling	57	2	(3.5)	
Mother's education				
Not literate	29	1	(3.4)	p = 0.82[c]
Literate	477	21	(4.4)	
Family history of attempted suicide				
Present	48	5	(10.4)	p = 0.07[c]
No such history	458	17	(3.7)	
Personal attributes				
Tobacco usage				
Tobacco using	53	2	(3.8)	p = 0.88[c]
Not using	453	20	(4.4)	
Alcohol usage[a]				
Alcohol using	88	9	(10.2)	p = 0.007[c]
Alcohol not using	418	13	(3.1)	
Drugs usage				
Drugs/Medication using	60	4	(6.7)	p = 0.54[c]
Drug not using	446	18	(4)	
History of facing abuse[a]				
Any abuse	106	15	(14.2)	p < 0.001[c]
No abuse	400	7	(1.8)	
History of psychiatric illness present[a]				
Psychiatric illness present	43	8	(18.6)	p < 0.001[c]
No psychiatric illness	463	14	(3)	
Presence of identified stressor				
Academic				
Academic stress present	248	15	(6)	p = 0.06[b]
No academic stress	258	7	(2.7)	
Family related[a]				
Family-related stress present	70	13	(18.6)	p < 0.001[c]
No family-related stress	436	9	(2.1)	
Friends related[a]				
Friends-related stress present	149	15	(10.1)	p < 0.001[b]
No friends-related stress	357	7	(2)	

(continued on next page)

Table 4 – (*continued*)

	Denominator	Students with suicide ideation		p value
		n	(%)	
Health related				
Health-related stress present	55	4	(7.3)	p = 0.43[c]
No health-related stress	451	18	(4)	
Major loss in life[a]				
Stress related to major loss in life	17	3	(17.6)	p = 0.03[c]
No major loss related stress	489	19	(3.9)	
Environment related				
Environment-related stress	74	6	(8.1)	p = 0.15[c]
No environment-related stress	432	16	(3.7)	

[a] Statistically significant
[b] chi-square
[c] chi-square with Yate's correction.

thoughts of killing oneself in past month found in our study (4%) was similar to the study from Surat (4.2%) but low compared with a study from Taiwan (11.5%).[14] A prevalence of serious suicidal ideation (seriously considered taking like) was 1% in past month in our study compared to 2.7% in past 48 h in a study from Egypt.[15] The other studies have reported lifetime prevalence of a serious suicidal ideation from 3.6% to 13.9%.[6,8,15] The prevalence of lifetime history of suicide attempt reported in our study (4%) was similar to other studies from Delhi (2.6%) and Pakistan (4.8%).[6,8]

Among the Indian studies measuring suicidal ideation among medical students, ours is the first to use a web-based survey. Most students participating in our study felt comfortable responding to the web-based questionnaire. The availability and feasibility of such web-based survey tools is proven.[16] We also document that this method is acceptable to the students.

Several demographic, family-related and personal attributes were found to be significantly associated with suicidal ideation in the present study.

Among demographic variables, the female students were found nine times more likely to have ideation in the present study. Other studies among medical students[8,15] and among youth in India have also reported such higher prevalence among females.[17,18] Although other studies have reported a significantly higher rate of ideation among the first-year students, our study found a higher (statistically not-significant) rate among first-year students.[8,15] The adjustment to new environment and coping with new curriculum could be the reasons for higher stress and associated ideation among first-year students.

The suicidal ideation was found higher (statistically not significant) among students from nuclear families and those having a family history of attempted suicide in the present study. The odds of suicidal ideation were five times higher among the students facing family-related stress arising out of parental neglect or parental expectations in the present study. Other studies among medical students[6,7,9] as well as youth[19] have also reported association of parental neglect with suicidal ideation.

The odds of suicidal ideation were three times higher among alcohol users compared with non-users in the present study. A study by Osama et al. also reported similar finding.[6] Alcohol is known to be used as coping mechanism for stress management. Alcohol misuse is one of the predictors of suicide ideation and it increases the risk of suicide ideation, attempted suicide and completed suicide.[20]

In the present study, the odds of ideation were found almost four times higher among students who were victim of abuse. Other studies among medical students[6,7] and youth[17,19] have also reported similar findings. Earlier research has identified that sexual abuse has a direct link with ideation, whereas emotional and physical abuse has an indirect link with ideation, which is mediated through anxiety, depression and perceived social support.[21,22]

The odds of suicidal ideation were three times higher among students reporting the feeling of academic stress. Other studies among medical students have also reported similar finding.[7,9] A study among Indian and Malaysian students has found the mediating role of productive coping style and social support in reducing suicidal ideation.[23] Kosik et al. argue the possible role of medical curricula in making such a facilitating environment.[24] Vanderbilt University has developed such a model curriculum comprising three components: a mentoring program, students' organization and wellness curricula addressing interpersonal coping.[25]

The odds of suicidal ideation were three times higher among students reporting stressful relationship with friends and peers in the present study. Other studies among medical students have also reported similar findings.[6,9,26] The stressful relationship with friends or peers could be an independent origin of stress and it also leads to reduced social support, thereby affecting the coping capacity.

In our study, we could achieve a high participation rate of students. Advantage of web-based questionnaire used in the present study is that hesitation to reveal personal history is avoided.

The prevalence of depression and suicidal ideation is high at our medical college suggesting need to address this issue urgently. Academic stress, previous experience of abuse, stress originating from family expectations and strained relationship with friends and peers were important workable themes identified in the present study. To address all these issues, various programs at institute level should cover

Table 5 – Binomial logistic regression analysis for predictors of suicidal ideation (n = 506).

Variables and categories	Adjusted OR (95% CI)	p value
Gender		
Female	8.9 (1.6–49.1)	0.01[a]
Male		
Current living		
In hostel	2.4 (0.7–7.2)	0.12
With parents		
Family type		
Nuclear	1.1 (0.3–3.9)	0.85
Joint		
Self-harm in family		
Family history of self-harm present	0.7 (0.2–2.6)	0.5
No such family history		
Alcohol use		
Alcohol using	3.2 (1.1–9.7)	0.03[a]
Alcohol non-using		
Drugs use		
Drugs using	1.6 (0.4–6.7)	0.5
Drugs non-using		
History of facing abuse		
History of facing abuse present	3.9 (1.2–11.9)	0.01[a]
No history of facing abuse		
Previous psychiatric illness		
History of psychiatric illness present	1.7 (0.4–5.9)	0.40
No such history		
Academic stress		
Academic stress present	3.3 (1–10.9)	0.04[a]
No academic stress		
Family-related stress		
Family-related stress present	5.6 (1.8–17)	0.002[a]
No family-related stress		
Relationship-related stress		
Relationship-related stress present	3.5 (1.1–10.8)	0.03[a]
No relationship-related stress		
Health-related stress		
Health-related stress present	0.6 (0.1–2.9)	0.54
No health-related stress		
Major loss of life		
Stress related to major loss of life present	1 (0.1–6.8)	0.94
No such stress		
Environment-related stress		
Environment-related stress present	0.6 (0.1–2.8)	0.59
No such stress		

[a] Statistically significant.

Student Counselling Cell, gate keeper training at various levels for identifying warning signals of depression and suicide, proper referral mechanism including 24*7 helpline. There is also a need to develop an all-encompassing mentorship program, which can incorporate a holistic wellness concept. Although life skills are part of the school curriculum, they need to be re-enforced during the medical college study.

The new graduate medical education regulations by medical council of India have made provisions of elements of foundation course and professional development, which will provide necessary platform to integrate these aspects in curriculum.[27] We also identified the need for addressing the issue of parental expectations, which is an important stressor in Indian cultural set up. We identified the need of early screening and intervention for anxiety, depression and suicide ideation, especially among students with some risk factors during mentorship program.

There is a need for further such studies from other parts of India and using uniform definitions of suicide ideation to allow for comparisons. The future research should also focus on intervention studies on prevention programs addressing suicidal ideation.

Limitations

This being a single college study, generalizability of our results is limited. It was not possible to use a structured tool for measuring suicidality in our survey as we wanted to make it web-based. Although less likely due to web-based survey, there is still a possibility of social desirability bias in the students' responses.

Conclusion

The 1-month prevalence of suicidal ideation was 4% in our study sample. One percent students seriously considered taking their life in preceding 1 month. They mentioned friends as the preferred source of help. Suicide ideation was found associated with female gender, alcohol usage, history of facing any form of abuse and presence of stressors related to academics, friends and family. Web-based survey for screening of suicidal ideation was found acceptable by students.

Disclosure of competing interest

The authors have none to declare.

Acknowledgements

This research was carried out as a part of the faculty training program in biomedical research conducted by the central research unit of GMERS Medical College, Vadodara. The authors thank the faculty members who served as mentors and peers during this training program and contributed to improving the quality of this research study. They also thank the Dean and Medical Superintendent and Departmental colleagues for supporting this research project.

REFERENCES

1. World health organization. Preventing Suicide: A Global Imperative. Available from: http://www.who.int/mental_health/suicide-prevention/world_report_2014/en/.
2. World health organization. Suicide Rates Per 100,000 by Country Available from: http://www.who.int/gho/mental_health/suicide_rates_crude/en/.
3. Vankar J, Prabhakaran A, Sharma H. Depression and stigma in medical students at a private medical college. *Indian J Psychol Med*. 2014;36(3):246–254.

4. Cornette M, DeRoon-Cassini T, Fosco G, et al. Application of an interpersonal-psychological model of suicidal behavior to physicians and medical trainees. *Arch Suicide Res*. 2009;13(1):1–14.
5. Rotenstein L, Ramos M, Torre M, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students. *J Am Med Assoc*. 2016;316(21):2214–2236.
6. Osama M, Islam M, Hussain S, et al. Suicidal ideation among medical students of Pakistan: a cross-sectional study. *J Forensic Leg Med*. 2014;27:65–68.
7. Menezes R, Subba S, Sathian B, et al. Suicidal ideation among students of a medical college in Western Nepal: a cross-sectional study. *Leg Med*. 2012;14(4):183–187.
8. Goyal A, Kishore J, Anand T, Rathi A. Suicidal ideation among medical students of Delhi. *J Mental Health Hum Behav*. 2012;17(1):60–70.
9. Jain A, Jain R, Menezes R, Subba S, Kotian M, Nagesh K. Suicide ideation among medical students: a cross sectional study from South India. *Inj Prev*. 2012;18(suppl 1). A166.2-A166.
10. Paykel ES, Myers JK, Lindenthal JJ, Tanner J. Suicidal feelings in the general population: a prevalence study. *Br J Psychiatry*. 1974;124:460–469.
11. KarN, Thirthalli J. A Survey of suicidality and views on suicide in an Indian sample of adults. *Indian J Soc Psychiatr*. 2015;31:100–106.
12. Kroenke K, Spitzer R, Williams J. The PHQ-9: validity of a brief depression severity measure. *J Gen Intern Med*. 2001;16:606–613.
13. Patel A, Mehta R, Chandra N, Chaudhary P, Shah R. Self-reported suicidality behavior and attitudes toward suicide among medical and paramedical students. *Ann Indian Psychiatr*. 2017;1:34–39.
14. Fan A, Kosik R, Mandell G, et al. Suicidal ideation in medical students: who is at risk? *Ann Acad Med Singapore*. 2012;41(9):377–382.
15. Ahmed S, Omar Q, Abo Elamaim A. Forensic analysis of suicidal ideation among medical students of Egypt: a crosssectional study. *J Forensic Leg Med*. 2016;44:1–4.
16. Williams A, Larocca R, Chang T, et al. Web-based depression screening and psychiatric consultation for college Students : a feasibility and acceptability study. *Int J Telemed Appl*. 2014;2014:1–9.
17. Pillai A, Andrews T, Patel V. Violence, psychological distress and the risk of suicidal behaviour in young people in India. *Int J Epidemiol*. 2009;38(2):459–469.
18. Nath Y, Paris J, Thombs B, Kirmayer L. Prevalence and social determinants of suicidal behaviours among college youth in India. *Int J Soc Psychiatr*. 2012;58(4):393–399.
19. Singh S, Manjula M, Philip M. Suicidal risk and childhood adversity: a study of Indian college students. *Asian J Psychiatr*. 2012;5(2):154–159.
20. Darvishi N, Farhadi M, Haghtalab T, Poorolajal J. Alcohol-related risk of suicidal ideation, suicide attempt, and completed suicide: a meta-analysis. *PloS One*. 2015;10(5):1–14.
21. Brown J, Cohen P, Johnson JG, Smailes EM. Childhood abuse and neglect: specificity of effects on adolescent and young adult depression and suicidality. *J Am Acad Child Adolesc Psychiatry*. 1999;38(12):1490–1496.
22. Bahk YC, Jang SK, Choi KH, Lee SH. The relationship between childhood trauma and suicidal ideation: role of maltreatment and potential mediators. *Psychiatr Investig*. 2017;14(1):37–43.
23. Khan A, Hamdan A, Ahmad R, Mustaffa M, Mahalle S. Problem solving coping and social support as mediators of academic stress and suicide ideation among Malaysian and Indian adolescents. *Community Ment Health J*. 2016;52:245–250.
24. Kosik RO, Nguyen T, Ko I, Fan AP. Short Communication Suicidal ideation in medical students. *Neuropsychiatry*. 2017;7(1):9–11.
25. Ngoc HH. The Vietnamese holistic mental well-being program in medical School : strategies of social support, express emotion and problem avoidance. *Glob J Pharm Pharmaceut Sci*. 2018;5(2), 555656:1-10.
26. Tan ST, Sherina MS, Rampal L, Normala I. Prevalence and predictors of suicidality among medical students in a public university. *Med J Malaysia*. 2015;70(1):1–5.
27. Medical Council of India. *Curriculum Implementation Support Program of Competency Based Undergraduate Medical Education Curriculum. New Delhi*. 2019.