

# Suicidal ideation, attempt, and determinants among medical students

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## Research article

**Keywords:** Suicidal Ideation, Attempt, Medical Students, Prevalence, Ethiopia

**Posted Date:** October 21st, 2019

**DOI:** <https://doi.org/10.21203/rs.2.14532/v2>

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# Abstract

**Background:** Suicidal ideation and attempts are highly prevalent among medical students compared to the general population and negatively impacts the quality of life, physical, and mental well being of students. However, research into suicidal ideation and attempts among medical students in low and middle-income countries are limited. Therefore, this study aimed to explore the suicidal ideation and attempts and associated factors among medical students in Ethiopia. **Methods :** An institution based cross-sectional study was conducted on 393 medical students from March to June 2019 at the University of Gondar in Ethiopia. A simple random sampling technique used to get study units by their identification card. Suicidal ideation and attempts were assessed by using World Health Organization Composite International Diagnostic Interview (CIDI) to assess lifetime suicidal ideation and attempt during medical school. Data were collected using self-administered questionnaires. Bi-variable and multivariable logistic regression analyses were used to identify associated factors between suicidal ideation and attempts with the explanatory variables at P-value <0.05 was considered statistically significant. **Results:** A total of 393 study participants were interviewed with a response rate of 92.9%. The prevalence of suicidal ideation and attempts among study participants were found to be 14% and 7.4% with 95% CI (10.9, 18.1) and (5.1, 10.2), respectively. In multivariate logistic regression; female sex (AOR: 5.21, 95% CI: 2.42, 11.20), depression (AOR: 10.12, 95% CI; 4.80, 21.52), current khat chewing (AOR: 4.46, 95% CI; 1.32, 15.02), and poor social support (AOR: 4.46, 95% CI: 1.43, 13.87) were factors significantly associated with suicidal ideation. Being female (AOR: 8.08, 95% CI: 3.04, 21.39), depression (AOR: 10.66, 95% CI; 4.01, 28.01 ), and history of mental illness (AOR: 5.53, 95% CI; 1.20, 25.50) were factors significantly associated with suicide attempts. **Conclusions :** In the current study, the prevalence of suicidal ideation among medical students was low compared to other studies, but the suicide attempt was high. Ethiopian medical students better to instate a screening program for every medical student for early detection and intervention of suicidal ideation and attempt. **Keywords:** Suicidal Ideation, Attempt, Medical Students, Prevalence, Ethiopia

## Background

Suicide is the act of deliberately causing one's own death (1). Suicidal ideation is thought of serving as the agent of one's own death while the suicide attempt is self-injurious behavior with a non-fatal outcome accompanied by implicit evidence that person's intended to die (2, 3).

Globally, the rate of suicide has increased by 60% in the past 45 years and about one million people die from suicide every year. It is the second leading cause of death among young people and it is higher in males than in females. And suicidal act results from social, cultural, psychological, biological, and environmental factors can interact to lead suicidal behavior (4, 5).

Suicidal ideation, attempt, and psychological distress are common in university students (6-10). The global prevalence of suicidal ideation and attempts from 36 college students were 23.3% and 3.2%, respectively (7). Physicians are one of the highest risk groups for suicide which seems that this problem

starting from medical school (2, 11-14). Mental distress among medical students are widespread (15) and it is highly affected in medical students compared with the general population (16, 17). Suicidal behavior is a mental health problem affecting a remarkable proportion of medical students (18). Most medical students experienced greater risk for suicidal ideation and thoughts of dropping out of medical school (19). The magnitude of suicidal ideation among medical students by including 13 Western and non-Western countries ranged from 1.8% to 53.6% (20). The prevalence of suicidal ideation and attempts among medical students in South Africa were 32.3% and 3.2%, respectively (21). In Ethiopia, the prevalence of suicidal ideation among the University students was 19.9%, but no study regarding suicidal attempts (13).

Suicidal ideation and depression are strong predictors of attempted suicide in medical students (4, 17). The rate of suicidal ideation and attempts among female medical students were higher than male medical students (5, 15). Different factors could play a role in the development of suicidal behavior. These include depression, burnout, sleep disorders, family history of mental illnesses, previous psychiatric disorders, years of study, gender, substance use, poor social support, lived alone, feeling of neglect by parents, something valued lost, breaking of a steady love relationship, and poor physical health (13, 16, 18, 20-22). The impact of suicidal behavior among medical students includes substance use, unhealthy peer relationship, fixation with death or violence, poor academic performance, dropout, and suicide attempts (23-25).

Even though suicidal behavior has a high prevalence among medical students and most of available research evidence comes from developed countries, little attention is given in lower-middle-income and lower-income countries (26). To the best of our knowledge, there has been no published study on suicidal ideation, attempt, and associated factors among medical students in Ethiopia. This study, therefore, aimed to investigate the magnitude and determinants of suicidal ideation and attempts among medical students at the University of Gondar with a view of informing the development of interventions.

## Methods

**Study design and period:** An institution based cross-sectional study was conducted at the University of Gondar College of Medicine and Health Sciences, March 2019, Northwest Ethiopia.

**Study Setting:** The University of Gondar is one of the oldest Universities in Ethiopia. It was established in 1954 as the Public Health College and Training Center. It has 12 departments, including schools of medicine. The study was conducted on 1397 medical students. The University of Gondar, CHMS is located in Gondar town, which is 728 km far from the capital city Addis Ababa.

**Study population:** Undergraduate medical students at the University of Gondar College of Medicine and Health Sciences included in the sample.

**Sample size calculation and sampling procedures:** The sample size was calculated by using the single population proportion formula with a 95% CI, a 5% margin of error, and suicidal ideation, and attempts of

50% because of no published work in our country. Where,  $n$  = the required sample size.  $P$  = is the population proportion of suicidal behavior who had either ideation or attempts.  $d$  = is the margin of error (0.05), and  $Z_{\alpha/2} = Z$  value at ( $\alpha = 0.05$ ) = 1.96 corresponding to 95% confidence level.

Assuming a 10% non-response rate, 423 students were recruited randomly by using the simple random sampling technique. The number of medical students in the college with their identification number taken from the UoG CMHS registrar office; the required sample was selected through lottery methods. The lists of dormitory students took from the University of Gondar College of Medicine and Health Science student union dormitory affairs.

### **Data collection tools**

Data were collected using self-administered questionnaire which contained suicidal ideation and attempts as the dependent variable and several other explanatory variables that included socio-demographic factors, social support, clinical factors, and substance use factors. Ever use of substances defined as consuming any substance at least once in his or her lifetime while current substance use defined as consuming specific substance within the last three months.

Data on social support was assessed by Oslo social support scale (27). It has a three items social support scale (OSS-3) which provided a brief measure of social support and functioning and it is considered to be one of the best predictors of mental health. It covered different fields of social support by measuring the number of people the respondent feels close to the interest and concern shown by others, and the ease of obtaining practical help from others. Social support was collected by the Oslo 3-item social support scale which had a 3-item questionnaire commonly used to assess social support and used in several studies in Ethiopia(16, 27). The sum score scale ranges from 3 to 14, and had three broad categories: "poor support" 3-8, "moderate support" 9-11, and "strong support" 12-14(28).

Depression was assessed by using Patient Health Questionnaire (PHQ-9) and its score was greater or equal to 10; (5–9 mild depression, 10–14 moderate depression, 15–19 moderately severe depression, and 20–27 severe depression). PHQ-9 screening tool has nine items and was validated in Ethiopia with sensitivity of 86% and specificity of 67% (29).

Suicidal ideation, plan, and attempts were assessed using a questionnaire of dichotomous questions (yes/no). Suicide ideation, plan, and attempts were measured according to the WHO questionnaire. If the respondent provided a "Yes" answers to the question, ("During medical school, have you ever seriously thought about committing, plan or attempted suicide, respectively?" they were considered to have had suicidal ideation, plan, or attempt, respectively (30) and students were considered to have suicidal ideation, plan, and attempt intended to assess suicidality in medical students and previous study in Ethiopia(31) .

### **Data processing and analysis**

Data were entered into Epi-info version 7 software after checking for completeness and exported to SPSS version 20 for analysis. Bi-variable analysis was done to see the association of each independent variable with the dependent variable. Those variables a P-value less than 0.2 were entered into the multivariate logistic regression model to identify the effect of each independent variable with the outcome variables. The strength of the association presented by the adjusted odds ratio with a 95% Confidence interval, and a P-value less than 0.05 was considered statistically significant.

## Results

### Socio-demographic characteristics

A total of 393 participants was included in the study with a response rate of 92.9%. The mean age of the respondents was 22.16 ( $\pm 1.86$ ) years. Out of the participants, 241 (61.3%) were male; 254 (64.6%) were the age of greater than 25 years, and 304 (77.4%) were coming from the urban residence. Nearly three-fourth (72%) of the participants were Orthodox Christian; and more than half (55.5%) their cumulative grade was between 2.76 to 3.5. The median monthly income of the participants was 1000 Birr and ranges from 50 to 6036 Ethiopian Birr (table 1).

### Clinical and social characteristics

Of the participants, 50 (12.7%) had a family history of mental illness, 13 (3.3%) had a history of mental illness, 33 (8.4%) had a family history of suicidal attempt, and 122 (31%) had depression. Regarding social factors, 104 (26.5%), and 202 (51.4%) of the respondents had poor and moderate social supports. Out of the participants, 29 (7.4%) had a suicidal plan (table 2).

### Substance use characteristics

At the movement, 168 (42.7%) were drinking alcohol, 51 (13%) were chewing chat, and 37 (9.4%) were taking tobacco. Of the participants, 205 (52.5%) were drinking alcohol, 66 (16.8%) were chewing chat, and 45 (11.5%) had been taking tobacco ever use, respectively (table3).

### The prevalence of suicidal ideation and attempt

This study showed that the prevalence of suicidal ideation and attempts of the participants were 14% and 7.4%, with a 95% CI (10.9, 18.1) and (5.1, 10.2), respectively (table 4 &5).

### Factors associated with suicidal ideation and attempt

Among all covariates, Female sex, depression, current and ever chewing khat, current drinking alcohol, and smoking cigarettes, history of mental illness, family history of mental illness, and social support had less than 0.2 P-values in the bi-variable logistic regression and considered as the multivariable logistic regression model. The multivariate analysis suggested that the female sex was more than five times (95%; CI: 2.42, 11.20) more likely to have suicidal ideation compared with the male sex. Depression was

ten times (95%; CI: 4.80, 21.52) more risky to develop suicidal ideation compared to counterparts. At the moment, chewing khat was 4.46 times (95%; CI: 1.32, 15.02) more risky for suicidal ideation compared to students who did not chew khat and having poor social support more than four times (95%; CI: 1.43, 13.87) to develop suicidal ideation compared to good social support (table 4). On the other hand, female sex was more than eight times (95%; CI: 3.04, 21.39) to develop suicide attempts compared with counterparts and depression also has 10.66 times (95%; CI: 4.01, 28.01) higher risk to develop suicide attempts compared to students who did not have depression. Finally, having a history of mental illness was about 5.53 times (95%; CI: 1.20, 25.50) more likely to increase suicide attempts compared to counterparts (table 5).

## Discussion

In the current study, the magnitude of suicidal ideation, attempt, and their possible association with various factors were assessed among medical students in Ethiopia for the first time. The prevalence of lifetime suicidal ideation and attempts were found to be 14% and 7.4%, respectively. Regarding prevalence of suicide ideation, our result is consistent with those of reported magnitude other studies carried out among medical students in Taiwan, China, Australia, and Turkey, in the prevalence estimated at 11.5%, 17.7%, 11.3%, 12%, respectively (22, 32, 33).

On the other hand, this finding is higher than a study done in China, the magnitude reported at 7.5% (17). The variation may be because of instrumental, for instance, in China, suicidal ideation among medical students was assessed item nine of patient health questionnaire the scale using the phrase “thoughts that would be better off dead or hurting yourself.” However, the prevalence of suicidal ideation in the current study is lower than the study done in South Africa among medical students were asked surrounding suicidal ideation, from the standardized Paykel’s instrument, which has been used to assess suicidal ideation was 32.3% (21), in India, by using do you have thought suicide/ death? was 53.6% (34), in Turkey and Austria, students were asked five questions with dichotomous(yes/no) response format related to ever suicidal behavior were 27.3% and 37.8%, respectively (33) and in the USA, the impact of medical school on student mental health by using three suicide questions from the inventory developed by Meehan was 29.9% (35). The variation may be due to distinctions study designs, sample size, and the socio-cultural variations between Ethiopia, and the other countries. In addition to the above, the difference was suicidal ideation and reactions to suicide among medical students were cultural factors of the countries (31).

Regarding factors associated with suicidal ideation, female sex had five times more risk of suicidal ideation compared with male medical students. This was supported by those of other studies carried out a meta-analysis among the university students in China female students had higher suicidal thoughts than male students(10), in Pakistan female medical students a greater risk of suicidal ideation than male students(5), and another meta-analysis was done among medical students and medical professionals, psychological distress was higher for female physicians and medical students compared with males (15). Female physicians have a greater risk of suicide than other women (2).

In this study, medical students with depression were strongly associated with suicidal ideation. The odds of suicidal ideation were ten times higher who had depression than those without depression. Our results are consistent with findings reported in other studies that have shown medical students' depression was the most common predictor of suicidal ideation (11, 14).

In this study, current khat chewing was 4.46 times more risky for the development of suicidal ideation compared to students who had no suicidal ideation. Which was supported by other studies done among the university students of Ethiopia, Current khat chewing was nearly two times increased suicide (13), having drug misuse among medical students were a strong predictor of suicidal thoughts (20). Suicide risks among those who abuse substances were high in different studies (2).

Poor social support increased more than four times among medical students compared to their counterparts in this study. This is in line with a study done in Ethiopia (13). Lack of social support was two times risk of suicidal ideation among the University students in Ethiopia compared to students had moderate or good social support. Suicidal ideation was highly prevalence among people who had less social support from their family, friends, and other relatives(36).

On the other hand, our result of suicide attempts was in line with those of other studies conducted among medical students. For example, a study in South Africa medical students reported magnitude was 6.2% (21) and a cross cultural investigation among similar study participants in Turkey the prevalence of suicide attempts estimated at 6.4% (33). Similarly, the prevalence of suicide attempts among study participants was higher than those of other studies conducted in United Arab Emirates 1.8% (32), Germany, suicide attempts among medical students and young doctors was assessed by using one question from patient health questionnaire nine was 1.4% (32), in Delhi, 2.6% had attempted to commit suicide at least once in their life (33), China pooled prevalence of suicide attempts was 2.7% (9).

Our study revealed that the female sex was eight folds of attempts suicide among medical students compared to their counterparts. This is supported by a study done in Nepal, girls were nearly two folds of more likely to attempt suicide compared to boys (37). There were different studies documented in Uganda, South Africa, and Iran, females were more risky to have suicide attempt compared to males (38-40). Women attempt suicide or suicidal thoughts three folds as often as males (2).

In this study, depression and other history of mental illness were strong predictors for suicide attempts. Depression is more than ten times risky for suicide attempts compared with those who had no depression and history of mental disorders was more than fifth folds of suicide attempts compared to students who had no history of mental illness. These were agreed from the previous studies done in South Africa (21), and (18). Previous diagnosis of depression or psychiatric disorders had strong correlations with suicide attempts (21) and suicidal behavior or attempt was higher in medical students who had depression (12). Depression disorders accounts for 80% of suicide attempts while previous psychiatric disorders risk for suicide is three to twelve times that of non-psychiatric patients, but the degree of risk varies depending on sex, age, diagnosis, and treatment (2). Since the questionnaire is self administered the participants may not give genuine response. A cross-sectional study design cannot permit conclusions for some variables,

for example, to decide whether social anxiety symptoms are risks for or consequence. This study also was not included sixth year medical students so this is not representative all medical students. This finding is likely only to hint at the complex interactions between suicidal ideation and attempt with explanatory variables (risk factors). Moreover, this study was on self-reported data, which might reduce objectivity and introduced the possibility of reporting bias. This study, conducted in one university in Ethiopia, which confines generalized to other settings and finally, the use of retrospective items in the questionnaire may have incurred recall bias.

## Conclusions

The prevalence of suicidal ideation among medical students was low compared to other studies, but the suicide attempt was high. Female sex, depression, current khat chewing, and poor social support were factors significantly associated with suicidal ideation while female sex, depression, and history of mental illness were factors significantly associated with suicide attempts. This finding showed that suicidal ideation and attempt in medical students remains a significant concern. The ministry of health better to instate the screening program for every medical student for early detection and intervention of suicidal ideation and attempt. Future researchers should focus on preventive and treatment programs targeting the identified factors associated with suicidal ideation and attempt in medical students should be conducted to strengthen and broaden these findings.

## List Of Abbreviations

CI	Confidence Interval
CMHS	College of Medicine and Health Science
Epi-info	Epidemiological Information
QOL	Quality of Life
OR	Odds Ratio
SPSS	Statistical Package for Social Sciences
UAE	United Arab Emirates
UOG	University of Gondar
USA	United States of America

## Declarations

### Ethical approval and consent to participate

Ethical approval was obtained from the Institutional Review Board (IRB) of the University of Gondar Department of Psychiatry. The objectives and demands of the study were explained carefully.

Participants who agreed to participate gave written consent. Confidentiality and anonymity were assured to the participants. The respondents did not write their name at the time of responding the questions. Selected participants for the study were informed of the general purpose, possible risks, and benefits. Participants were participated voluntarily and had the right not to answer any of the questions. To ensure confidentiality, participants' data were linked to a code number and registered.

### **Consent for publication**

Not applicable

### **Availability of data and materials**

The dataset during and/or analyzed during the current study available from the corresponding author on reasonable requests

### **Competing interests**

The authors declare that they have no competing interests.

### **Funding**

The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors. The funder has no role in collection, analysis and interpretation of data and in writing the manuscript

### **Authors' contributions**

Getachew, T conceived the study and was involved in the study design, reviewed the article, analysis, report writing, and drafted the manuscript. MW, SD, and AA were involved in the study design, analysis and drafted the manuscript. Both authors read and approved the final manuscript.

### **Acknowledgments**

First of all, we would like to thank the University of Gondar, College of Medicine and Health Sciences, Department of Psychiatry for organizing this research program. Secondly, our heartfelt thanks also extend to the University of Gondar, College of Medicine and Health Sciences, registrar office for their assistance to get the data of students to determine sample size and their help during a data collection time. Finally, we would like to thank our study participants for their cooperation in providing the information.

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## Tables

Table 1 Socio demographic characteristics of respondents among medical students at University of Gondar, northwest Ethiopia, 2019(n=393).

Variables	Categories	Frequency	Percent
Sex	Male	241	61.3
	Female	152	38.7
Age	19-24	139	35.4
	≥25	254	64.6
Religion	Orthodox	283	72.0
	Muslim	41	10.4
	Protestant	54	13.7
	Other*	15	3.8
Marital status	Married	25	6.4
	Single	368	93.6
Ethnicity	Amhara	205	52.1
	Oromo	91	23.3
	Tigrie	56	14.2
	Other**	41	10.4
Residency	Urban	304	77.4
	Rural	89	22.6
Year of study	1 <sup>st</sup>	28	7.1
	2 <sup>nd</sup>	73	18.6
	3 <sup>rd</sup>	107	27.2
	4 <sup>th</sup>	106	27.0
	5 <sup>th</sup>	79	20.1
CGPA*	2.00-2.75	59	15.0
	2.76-3.5	218	55.5
	>3.5	116	29.5
Monthly income	50-1800	323	82.2
	>1800	70	17.8

Note: others\*: Catholic, Waqefeta, Atheist

Others\*\*: Gurage, Somali, Afar

CGPA\*: Cumulative Grade Points Average

Table 2. Clinical and social characteristics of respondents among medical students at University of Gondar, northwest Ethiopia 2019(n=393)

Variables	Categories	Frequency	Percent
Family history of mental illness	Yes	50	12.7
	No	343	87.3
History of mental illness	Yes	13	3.3
	No	380	96.7
History of chronic illness	Yes	25	6.4
	No	368	93.6
Family history of Suicide attempt	Yes	33	8.4
	No	360	91.6
Depression	No	271	69
	Yes	122	31
Social support	Poor	104	26.5
	Medium	202	51.4
	Good	87	22.1
Suicidal plan	Yes	29	7.4%
	No	364	92.6%

Table 3. Substance use characteristics of respondents among medical students at University of Gondar, northwest, Ethiopia 2019 (n=393).

Variables	Categories	Ever use		Current use	
		Frequency	Percent	Frequency	Percent
Alcohol	No	188	47.8	225	57.3
	Yes	205	52.5	168	42.7
Chat	No	327	83.2	342	87
	Yes	66	16.8	51	13
Cigarette	No	348	88.5	356	90.6
	Yes	45	11.5	37	9.4s
Others*	No	387	98.5	386	98.2
	Yes	6	1.5	7	1.8

NB: Other\*: Cannabis and Shisha

Table 4 Bi-variable and multivariate analysis of suicidal ideation among medical students at the University of Gondar, Northwest Ethiopia, 2019 (N=393).

Variables	Categories	Suicidal ideation		COR (95%, CI)	AOR (95%, CI)	P-value
		Yes	No			
Sex	Male	26	215	1	1	0.001
	Female	29	123	1.95(1.10,3.46)	5.21(2.42,11.20)	
Family history of mental illness	Yes	14	36	2.86(1.42,5.76)	1.88(0.80,4.41)	0.149
	No	41	302	1	1	
History of mental illness	Yes	4	9	2.87(0.85,9.66)	2.40(0.57,10.15)	0.23
	No	51	329	1	1	
Depression	Yes	40	82	8.32(4.38,15.84)	10.12(4.80, 21.52)	0.001
	No	15	256	1	1	
Current alcohol	Yes	32	136	2.07(1.16,3.68)	1.57(0.76,3.24)	0.39
	No	23	202	1	1	
Current khat	Yes	16	35	3.55(1.80,7.00)	4.46(1.32, 15.02)	0.01
	No	39	303	1	1	
Current cigarette	Yes	10	27	2.56(1.16,5.64)	0.53(0.13, 2.19)	0.39
	No	45	311	1	1	
Social support	Poor	25	79	5.20(1.89,14.23)	4.46(1.43, 13.87)	0.01
	Moderate	25	177	2.31(0.86,6.27)	1.95(0.67, 5.81)	0.22
	Good	5	82	1	1	

Table 5 Bi-variable and multivariate analysis of suicide attempts among medical students at University of Gondar, Northwest Ethiopia, 2019(n=393).

Variables	Categories	Suicide attempts		COR(95%, CI)	AOR(95%, CI)	P-value
		Yes	No			
Sex	Male	10	231	1	1	0.001
	Female	19	133	3.30(1.49,7.30)	8.08(3.04,21.39)	
Family history of mental illness	Yes	7	43	2.38(0.96,5.89)	1.58(0.54,4.61)	0.40
	No	22	321	1	1	
History of mental illness	Yes	4	9	6.31(1.81,21.93)	5.53(1.20,25.50)	0.02
	No	25	355	1	1	
Depression	Yes	21	101	6.83(2.93,15.92)	10.66(4.01, 28.01)	0.001
	No	8	263	1	1	
Ever alcohol use	Yes	20	185	2.15(0.95,4.84)	0.89(0.16, 4.96)	0.89
	No	9	179	1	1	
Ever Chat use	Yes	9	57	2.42(1.05,5.60)	0.68(0.03,12.91)	0.80
	No	20	307	1	1	
Ever cigarette use	Yes	7	38	2.73(1.09,6.81)	1.37(0.07,25.86)	0.83
	No	22	326	1	1	
Current alcohol use	Yes	18	150	2.33(1.07,5.09)	2.39(0.42, 13.35)	0.32
	No	11	214	1	1	
Current khat use	Yes	8	43	2.84(1.19,6.81)	2.20(0.09,51.70)	0.84
	No	21	321	1	1	
Current cigarette use	Yes	6	31	2.80(1.06,7.40)	1.45(.06,36.00)	0.82
	No	23	333	1	1	