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Suicidal Ideation and Its Correlates among Medical and Engineering Students: A Comparative Study

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Abstract: The current study aimed to investigate differences between medical and engineering students on suicidal ideation, anxiety, depression and life satisfaction and also investigated the relationship among these variables. A purposive sample of 200 students, including 100 medical students (50 male and 50 female) and 100 engineering students (50 male and 50 female), age 19 through 27 was drawn from students of medical and engineering colleges of Lahore. Satisfaction with Life Scale, GAQ-7 for anxiety, PHQ-7 for depression and SBQ-R for Suicidal Ideation were used to collect data from the participants. The results of t-test indicated that there was significant difference between medical and engineering students in terms of suicidal ideation and life satisfaction. The results of stepwise regression analysis indicated that depression and anxiety were significantly positive predictors of suicidal ideation, whereas life satisfaction was a significant negative predictor of suicidal ideation. The findings of this study can contribute in understanding suicidal ideation in medical and engineering students of Pakistan and is likely to contribute in further research on the topic.

Introduction

A lot of research has been done in an effort to pinpoint important risk and protective factors that foretell suicidal ideation. However, it can be difficult to clearly understand the suicide process, particularly suicide ideation (Wu & Bond, 2006). Suicidal ideations can be characterised as urges or thoughts to take your own life. Such thoughts are a result of feeling hopeless, depressed, or like one can no longer handle their current situation in life. Suicidal ideation can range greatly, from passing ideas to carefully planned suicides. Suicidal thoughts may arise for a wide range of reasons, including underlying conditions like depression, anxiety, or a lack of life satisfaction. An important contributing factor to the aetiology of suicidal behaviour has been identified as mental health (Cavanagh et al., 2003; Goldney, 2002).

The WHO (2008) estimates that in 2000, suicide claimed the lives of one million people, with depression and other psychological factors having a substantial impact. Major depression appeared to be the most common type of psychological distress, according to psychological autopsies from many different countries, which found that over 90% of suicides had an identifiable psychiatric illness at the time of their death (Tanney 2000). Depression appears to be one of the most significant indicators of suicidal ideation (May & Klonsky 2016). Suicide is the third largest cause of death for individuals aged between 15 to 24, as well as the second most common cause of death in college students. (Anderson & Smith, 2005). Although there are many theories to explain suicide, no single comprehensive theory adequately accounts for the heterogeneity of suicidal behaviour.

Coentre, R., & Góis, C. (2018) analyzed 17 studies more than 13000 students belonging to medical field and spreading across thirteen countries, which includes non-Western along with Western parts of world. Suicidal ideation prevalence varied considerably between the studies, ranging from 1.8% to 53.6%. One of the most prevalent factors associated with suicidal ideation among medical students included depression and related symptoms, prior diagnosis of a psychiatric disorder, lower socioeconomic status, financial difficulties, history of drug use, and feeling of neglect from parents. Another insight that literature provides us is that suicidal ideation and anxiety are commonly observed in adolescents (Biswas et al., 2019). According to a research investigation on suicidal ideation and life satisfaction, it was found that individuals who exhibited suicidal ideation or attempted suicide had a reduced level of life satisfaction. Furthermore, there was a significant predictive relationship between suicidal behavior and life satisfaction (You, Zhiqi et al., 2014).

Purpose of the Study

There haven't been many studies to compare medical and engineering students, particularly in Pakistani context and since engineering is a similarly difficult degree, there's a need to study suicidal ideation in both medical and engineering students to better understand the relationship between these two groups on the study variables. This study seeks to investigate the differences in life satisfaction, depression, and anxiety among medical and engineering students. It also seeks to determine whether life satisfaction, depression, and anxiety are possible correlates of suicidal ideation in medical and engineering students to play a role in reducing the gap in literature in this domain in Pakistani context.

Hypotheses

1. There would be significant relationship between depression, anxiety, suicidal

ideation and life satisfaction among medical and engineering students.

2. Medical students would differ significantly in depression, anxiety, suicidal ideation and life satisfaction as compared to engineering students.
3. Depression, Anxiety and Life Satisfaction would predict Suicidal Ideation among Medical and Engineering Students.

Method

Design and Participants

Correlational research method was used in the study to assess the relationship between the study variables. A purposive sample consisting of 200 medical and engineering students, including 100 from each group. The sample had an equal gender representation. The age range for medical students was 19 through 27 ($M=22.13$, $SD=1.433$) and for engineering students 19–25 ($M=21.25$, $SD=1.201$). The sample was drawn from UET Lahore and Continental Medical College Lahore. Data was collected from the students of UET Lahore and Continental Medical College Lahore respectively.

Inclusion Criteria

For a person to be selected for inclusion in the study sample, they had to be regular students of a medical or engineering college.

Measures

The following measures were used to collect data from the participants.

SBQ-R (Suicidal Behavior Questionnaire-Revised)

The Suicidal Behavior Questionnaire Revised (SBQ-R) is a self-report tool, freely available in the public domain, that was designed for use in clinical and non-clinical settings to assess suicidal ideation. The SBQ-R contains four items, each of which focuses on a different aspect of suicidal behavior. The first item examines lifetime suicidal ideation, while the second

assesses suicidal ideation intensity over the previous 12 months. The following item i.e 3rd aims to determine the chance of a suicide attempt by the participant, and the fourth evaluates the potential for suicidal behavior in the future. Due to its simplicity and concise language, the SBQ-R is useful for collecting data from the general population and clinical patients. By analyzing the responses, high-risk individuals can be identified, and their future behavior can be predicted. The cutoff score of this scale is ≥ 7 , with a specificity of 95% and a sensitivity of 93% for the general population, and a cutoff score of ≥ 8 , with a specificity of 91% and sensitivity of 80% for psychiatric inpatients. (Osman et al., 2001)

Generalized Anxiety Disorder 7 (GAD-7)

This is a self-reported survey used to detect and assess the severity of Generalized Anxiety Disorder (GAD). This survey questionnaire consists of seven items that can be answered by the individual themselves. The GAD-7 has been extensively used and has been translated into many languages, including Spanish. The Spanish version was validated on 212 patients being treated by family physicians and showed good internal consistency reliability with a value of $\alpha = 0.94$. Discriminative validity was also observed, with patients diagnosed with GAD having higher mean scores on the GAD-7 than those without a diagnosis. (Spitze et al., 2006).

Patient Health Questionnaire (PHQ-9)

The PHQ-9 is a self-administered instrument consisting of nine items that can be used to screen, diagnose, and assess the intensity of depression based on the DSM-IV criteria for depression. The questionnaire measures the frequency of depression symptoms and assigns a score based on the severity index. PHQ-9 has gained popularity in both practice and research settings over the years and is consistent with the latest diagnostic manual, DSM V. The psychometric properties of PHQ-9 are

considered excellent, and it has a sensitivity and specificity of 88% for screening major depressive disorders. Scores range from 0 to 27, with 5, 10, 15, and 20, which are indicative of mild, moderately severe, and severe depression, respectively. (Kroenke et al., 2001)

Satisfaction with life scale (SWLS)

The SWLS is a concise self-report tool consisting of five items, developed by Ed Diener and his colleagues to assess overall cognitive evaluations of life satisfaction. Due to its brevity and user-friendly nature, it only takes a few minutes to complete. The items on the SWLS use a 7-point scale, ranging from 1 to 7, which reflect the extent to which respondents agree with the statements. The SWLS has been utilized across various cultures and populations, with translations available in multiple languages, including Urdu. The SWLS appears to have positive psychometric properties, with coefficient alpha ranging from .79 to .89, suggesting that the instrument has a high degree of internal consistency. Test-retest correlations over a month interval were observed to be .84 and .80 for the SWLS. Furthermore, the SWLS demonstrates satisfactory convergent validity, meaning that it is related to, but still distinct from, other psychological factors such as depression, anxiety, self-esteem, negative and positive affect. (Diener et al., 1985)

Bio data form

The participants' demographic information was collected using a Bio data form, which included their ages, order of birth, father's education, mother's education, institution, year of study, and monthly income of the family

Procedure

The Board of Studies of Government College University Lahore approved the study based on all of the APA code of conduct considerations. The population sample was drawn from engineering and medical students at UET Lahore and Continental Medical College Lahore, respectively.

The purpose of the study was put in front of the participants and explained, and data confidentiality was guaranteed. From UET and Continental Medical College, an equal number of male and female participants were chosen.

Data Analysis

SPSS version 21 was used to analyse the data. The analyses of Pearson Product Moment Correlation, Independent Sample t Test, and Step Wise Regression were run to analyse data.

Results and Data Analysis

Table 1

Descriptive Statistics of Demographic Variables of the Population (N = 200).

Variables	f	%
Gender		
Female	100	50
Male	100	50
Education		
MBBS	100	50
Engineering	100	50
Mother's Education		
None	9	4.5
School	43	21.5
College	69	34.5
University	79	39.5
Father's Education		
None	3	1.5
School	40	20
College	51	25.5
University	120	60
Socio-Economic Status		
0-15,000	8	4
15,000-30,000	17	8.5
30,000-50,000	28	14
51000-100000	59	29.5
100000+	81	40.5

Table 2

Mean Scores, Standard Deviations and Alpha Coefficients of SBQ-R, GAD-7, PHQ-9 and Satisfaction with Life Scale (N=200).

Scale	M	SD	α	No. of Items
Suicidal Behaviour Questionnaire	6.38	3.82	.83	4
Patient Health Questionnaire 9	9.84	5.90	.84	9
Generalized Anxiety Disorder 7	8.39	5.19	.77	7
Satisfaction with Life Scale	21.24	6.71	.79	5

Note. M= Mean, SD= Standard Deviation

Suicidal Behavior Questionnaire, Patient Health Questionnaire 9 showed a high reliability of .82 and .84, GAD 7 and Satisfaction with Life Scale

showed moderately high reliability of .77 and .79 respectively.

Table 3

Correlation Matrix Between Suicidal Ideation, Anxiety, Life Satisfaction and Depression among medical students.(N = 100)

Variables	I	II	III	IV
I SBQ	-	.69**	-.47**	.85**
II GAD		-	-.48**	.75**
III LifeSat			-	-.58**
IV PHQ9				-

* $p < .05$; ** $p < .01$ Note: (SBQ) Suicidal Behavior Questionnaire, (GAD) Generalized Anxiety Disorder, (LifeSat) Life Satisfaction, (PHQ9) Patient Health Questionnaire 9.

The result of Pearson Product Moment Correlation indicate that suicidal ideation has a statistically significantly positive correlation with depression ($r = .85$, $p < .01$) and anxiety ($r = .69$, $p < .01$), and statistically significantly negative correlation with life satisfaction ($r = -.47$, $p < .01$) among medical students.

Table 4

Correlation Matrix Between Suicidal Ideation, Anxiety, Life Satisfaction and Depression among engineering students.(N = 100)

Variables	I	II	III	IV
I SBQ	-	.46**	-.61**	.55**
II GAD		-	-.22*	.57**
III LifeSat			-	-.37**
IV PHQ9				-

* $p < .05$; ** $p < .01$ Note: (SBQ) Suicidal Behavior Questionnaire, (GAD) Generalized Anxiety Disorder, (LifeSat) Life Satisfaction, (PHQ9) Patient Health Questionnaire 9.

The result of Pearson Product Moment Correlation indicate that suicidal ideation has a statistically significantly positive correlation with depression ($r = .55$, $p < .01$) and anxiety ($r = .46$,

$p < .01$), and statistically significantly negative correlation with life satisfaction ($r = -.61$, $p < .01$) among engineering students.

Table 5

Mean Based Comparison between MBBS and Engineering Students on Suicidal Ideation, Anxiety, Life Satisfaction and Depression (N=200)

Source	MBBS Students M(SD)	Engineering Students M (SD)	t	p	95% Confidence Interval of Difference LL UL		Cohen's d
Suicidal Ideation	6.99(3.8)	5.77(3.68)	2.28	.024	.165	2.27	.32

Anxiety	8.24(5.93)	8.55(4.36)	-.421	.67	-.17	1.14	.05
Life Satisfaction	23.02(7.00)	19.46(5.91)	3.88	.00	1.75	5.36	.54
Depression	9.92(6.66)	9.77(5.06)	.18	.85	-1.50	1.80	.02

$df=198$, * $p<.05$, ** $p<.01$

The findings of the independent sample t-test revealed a significant difference in suicidal ideation and life satisfaction between MBBS and Engineering students. Means showed that MBBS students ($M=6.99$, $SD=3.8$) have more suicidal ideation than engineering students ($M=5.77$,

$SD=3.68$), and that MBBS students ($M=23.02$, $SD=7.00$) have higher Life Satisfaction than engineering students ($M=19.46$, $SD=5.91$). Suicidal ideation was shown to have a small effect size among MBBS and Engineering students, while life satisfaction had a medium effect size.

Table 6

Analysis for Predictor Variables of Suicidal Ideation (N=200)

Model	B	SE	β	t	R^2	p
Step 1						
Constant	1.817	.368		4.93		.00
Depression	.46	.03	.71	14.44	.51	.00
Step 2						
Constant	4.16	.91		4.53		.00
Depression	.41	.03	.64	11.52		.00
Life Satisfaction	-.08	.03	-.15	-2.78	.53	.00
Step 3						
Constant	3.76	.92		4.07		.00
Depression	.34	.04	.53	7.59		.00
Life Satisfaction	-.08	.03	-.14	-2.66		.00
Anxiety	.11	.04	.15	2.37	.55	.01

* $p<.05$ ** $p<.001$.

This table shows step-wise regression analysis for predictors of Suicidal Ideation. In step 1 depression appeared as a significant predictor of Suicidal Ideation among medical and Engineering Students, $F(1, 198)=208.6$, $p<.000$, the value of R^2 (.51) indicated that depression is likely to predict 51% of variance in suicidal ideation among medical and engineering students, value of beta for depression indicated that one standard deviation increase in depression is likely to predict .71 standard deviation increase in suicidal suicidal ideation. In step 2 Life Satisfaction appeared as a significant predictor of suicidal ideation as $F(2, 197)=111.74$, $p<.001$, the value of R^2 (.53) indicated that the combined effect of

depression and life satisfaction is likely to predict 53% variance in suicidal ideation. The value of beta for life satisfaction indicated that one standard deviation increase in life satisfaction is likely to predict .16 standard deviation decrease in suicidal suicidal ideation. In step 3 anxiety appeared as a significant predictor of suicidal ideation as $F(3, 196)=78.14$, $p<.05$, The value of R^2 (.55) indicated that the combined effect of anxiety depression, life satisfaction and anxiety is likely to predict 55% of variance in suicidal ideation, the value of beta for anxiety indicated that one standard deviation increase in anxiety is likely to predict .16 standard deviation increase in suicidal ideation.

Table 7*Gender Difference in Suicidal Ideation, Depression, Anxiety and Life Satisfaction (N=200).*

Source	Male M (SD) (n=100)	Female M (SD) (n=100)	t	p	95% Confidence Interval of Difference		Cohen's d
					LL	UL	
Suicidal Ideation	5.79(3.61)	6.97(3.97)	-2.20	.02	-2.23	-.12	.31
Depression	8.5(5.28)	10.84(6.33)	-2.41	.01	-3.61	-.36	.40
Anxiety	7.30(5.22)	9.49(4.95)	-3.40	.003	-3.61	-.76	.43
Life Satisfaction	21.86(6.52)	20.62(6.8)	1.30	.19	-.62	3.10	.18

df =148, * $p < .05$, ** $p < .01$.

The findings revealed that there are significant mean differences in suicidal ideation between men and women. $t(198) = -2.20$, $p < .05$, depression as $t(198) = -2.41$, $p < .05$ and anxiety $t(198) = -3.40$, $p < .05$. Means indicated that female students ($M = 6.97$, $SD = 3.97$) scored high in suicidal ideation as compare to male students ($M = 5.79$, $SD = 3.61$) whereas, male students ($M = 21.86$, $SD = 6.52$) scored high on life satisfaction than females ($M = 20.62$, $SD = 6.8$). Female students ($M = 10.84$, $SD = 6.33$) had higher levels of depression than male students ($M = 8.5$, $SD = 5.28$), while female students ($M = 9.49$, $SD = 4.95$) had higher levels of anxiety than male students ($M = 7.30$, $SD = 5.22$).

Discussion

The current research aimed to explore the differences among medical and engineering students on suicidal ideation, depression, anxiety and life satisfaction. The study also aimed to examine the relationship between depression, anxiety, life satisfaction and suicidal ideation among medical and engineering students. Therefore, SWSL, GAD-7, PHQ-9 and SBQ -R were the instruments used to measure the study variables among the population. To analyze the data different statistical techniques like t-test, correlation, regression are used. The sample of the study population included medical and engineering students.

According to the results of a stepwise regression analysis, depression, anxiety, and life

satisfaction were all significant predictors of suicide ideation. In both the engineering and medical students, there was a significantly positive relationship between suicidal ideation, anxiety, and depression, however a significantly negative relationship between life satisfaction and suicide ideation was observed among the study sample.

The first hypothesis i.e there would be a significant relationship between suicidal ideation, depression, anxiety and life satisfaction was thus proved.

These findings were consistent with the following previous findings, Kisch, Leino, and Silverman (2005) report that depressed mood was an indicator for detecting suicidal behavior and (Weber, Metha, & Nelsen, 1997; Garlow et al., 2008; Singh & Joshi, 2008) report that a significant relationship exists between depression and suicide ideation among college students, where high depression levels were associated with high levels of suicidal ideation, in another study it was revealed that poor mental and physical health during the previous one month, serious suicidal ideation over the last one year, planning for committing suicide over last one year and attempted suicide over last one year were significantly related to reduced life satisfaction. (Valois et al., 2004), it was observed in another study that among all participants who suffered from suicidal ideation at baseline, 52.4% of those participants suffered from at least 1 anxiety disorder. (Brian J. et al., 2005).

The study's findings also revealed a significant difference between medical and engineering students in terms of suicidal ideation and life satisfaction. Means indicated that medical students had higher suicidal ideation and depression than engineering students, which is consistent with previous findings reporting a higher prevalence of depression among medical students, as well as high levels of psychological distress.(Dyrbye et al.,2006) however, engineering students reported higher levels of anxiety as compared to medical students and engineering students also experienced lower life satisfaction as compared to medical students. Keeping in view the above findings, the second hypothesis that medical students would differ significantly in suicidal ideation, depression, anxiety and life satisfaction as compared to engineering students was supported supported by the study.

The results also indicated that depression appeared as a significant predictor of Suicidal Ideation among medical and Engineering Students and depression is likely to predict 51% of variance in suicidal ideation among medical and engineering students. Life Satisfaction also appeared as a significant predictor of suicidal ideation and the combined effect of depression and life satisfaction is likely to predict 53% variance in suicidal ideation. Anxiety also appeared as a significant predictor of suicidal ideation, the combined effect of anxiety depression and life satisfaction is likely to predict 55% of variance in suicidal ideation. These findings were also in line with earlier findings. In earlier studies it was found that depression appears to be a strong predictor of suicidal ideation in young adults, depression in this population is frequently reported by the ones who have attempted to commit suicide (Bae, Ye, Chen, Rivers, & Singh, 2005; Garlow et al., 2008;Konick & Gutierrez, 2005; Spirito & Smythers, 2005; Westefeld et al.,2006). In a study conducted in Turkey, anxiety had the second highest contribution in prediction suicidal behavior in Medical students (Izadinia, 2010) and

another study also reported that students who display suicidal ideation or have attempted suicide had a lower level of life satisfaction and their suicidal behavior had a significant predictive relationship with life satisfaction. (You, Zhiqi et al., 2014).

The study further revealed that female students had higher mean scores on suicidal ideation, depression, anxiety and lower mean scores on life satisfaction, many previous studies have similarly validated these findings. For example, one study found that suicide thoughts and ideas were more prevalent in female adolescents than in male adolescents.. (Norhayati Ibrahim et al., 2017), another study conducted in Kuwait to explore gender differences in suicidal ideation among students reported that there were significant gender differences in suicidal ideation and that females scored higher on suicidal ideation than males on suicide Ideation (R. Alsalman, 2016). another study has also pointed towards to finding that women are more likely than men to suffer from serious depression.(Cyranowski at el.,2000), another study further revealed that females are more likely to present with internalizing disorders such as depression and anxiety (Marlena M. 2011). In another study from many countries it was reported that male report higher life satisfaction than females, further a higher level of life satisfaction in men was reported in a number of studies, (Goldbeck, 2007).

Limitations

This study focused on quantitative exploration of correlates of suicidal ideation and no attention was given to qualitative aspects of the problem.. Not enough indigenous literature was found on engineering students in terms of suicidal ideation. The finding of this study cannot be generalized due to small sample size and lack of diversity, a sample from different cities and both private and public institutions needs to be drawn for better results and students other than medical and engineering institutes need to be selected as

target population. As the literature has also pointed towards the role of hopelessness in suicidal ideation, there is a need to add that variable in further studies, which this study lacks.

Implications

Study will be of benefit to mental health professionals and campus counselors enabling them to understand the correlates of suicidal ideation among medical students which may help further understand the issue and formulate a way to address the issue of Suicidal Ideation. This study will play an important role in filling the indigenous research gap when it comes to engineering students. This study will also help future studies on the topic to go in more depth to address the issue of suicidal ideation and guide further studies that may play a vital role in providing the students with better mental health services and in formulating policies that may decrease the incidences of suicide among students and improve their overall life satisfaction.

Conclusion

The study concluded that suicidal ideation, anxiety, and depression have a significantly positive relationship in both medical and engineering students, and that all study variables are significant predictors of suicidal ideation in both medical and engineering students. In both medical and engineering students, life satisfaction had a significantly negative relationship with suicidal ideation. While medical students had higher depression and suicidal ideation as compared to engineering students, the engineering students faced higher levels of anxiety and lower levels of life satisfaction as compared to medical students. There were significant differences between male and female students in terms of suicidal ideation, depression, and anxiety, with females scoring high on these variables while having a lower score on life satisfaction.

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