

Prevalence and Predictors of Suicidality Among Medical Students in A Public University

Tan Siew Tin, MSc*, Sherina Mohd Sidik, PhD*, Lekhraj Rampal, PhD**, Normala Ibrahim, PhD*

*Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia, **Department of Community Health, Faculty of Medicine and Health Science, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia

SUMMARY

Background: Undergraduate medical students have been the most distressed group among the student population. Depression and anxiety have been found to be more prevalent in this group of students compared to others.

Objective: This study was conducted to determine the prevalence and predictors of suicidality among undergraduate medical students in a public university.

Methods: This was an analytical cross-sectional study, conducted in a public university in Selangor, Malaysia. Data were collected using self-administered questionnaires from January to February 2013, and analysed using the Statistical Package for Social Sciences Software (version 21).

Results: Out of 625 undergraduate medical students, 537 (85.9%) participated in the study. The prevalence of the suicidality among undergraduate medical students was 7.0%. The significant predictors of suicidality based on multiple logistic regression were the respondent's lifetime suicide attempts (Adjusted Odds Ratio, AOR 10.4, 95% CI 2.7 to 40.9); depression (AOR 5.9, 95% CI 1.5 to 23.0); breaking off a steady love relationship (AOR 5.4, 95% CI 1.3 to 22.4); hopelessness (AOR 4.9, 95% CI 1.1 to 21.6); and something valued being lost or stolen (AOR 4.4, 95% CI 1.2 to 15.9).

Conclusion: These findings indicate that mental health care services should be strengthened at university level. The results show a need for an intervention programme to reduce suicidality among the undergraduate medical students.

KEY WORDS:

Suicidality, prevalence, predictors, medical students, public university, Malaysia

INTRODUCTION

Suicide is the act of deliberately killing oneself;¹ whereas suicidality is a term which encompasses suicidal thoughts, suicidal ideation, suicidal plans, suicide attempts, and completed suicides.² According to World Health Organization, approximately one million people die by committing suicide, every year.³ This represents about one

death every 40 seconds or 16 suicide deaths per 100,000 population. Suicide is one of the three leading causes of fatalities among those aged 15-44 years. In Malaysia, the National Suicide Registry Malaysia (NSRM) found that there were 328 cases of suicide deaths reported in 2009; which was a suicide rate of 1.18/ 100,000 population.⁴ The age range of the victims was 14 to 94 years, with a mean of 39.8 years. There were more men than women; the gender ratio was 3:1 (males: females). The Malaysian National Health and Morbidity Survey, 2011 indicated that among the age groups, 16 to 24 years old was found to have the highest prevalence of suicidal ideation (1.7%), suicide plan (0.9%) and suicide attempt (0.5%).⁵

This study on the prevalence and predictors of suicidality was conducted among undergraduate medical students. This group was selected as the study population because of their age group between 16-24 years old (which has been identified as "high risk"), as well as the stress of being a medical student.^{4,5} In the transformation from insecure students to young knowledgeable physicians, medical students are known to encounter multiple stressors. Thus, medical students represent a highly educated population under significant pressure. Studies have found that undergraduate medical students are the most stressful group as compared to other undergraduate course students.⁶⁻⁸

MATERIALS AND METHODS

This was an analytical cross-sectional study, which was conducted at the Faculty of Medicine and Health Sciences (FMHS) of a public university in Selangor, Malaysia. Data were collected among all undergraduate medical students (N = 625) from Year One to Year Five enrolled in FMHS between 29th January 2013 to 8th February 2013. Students who did not give consent to participate in this study or who were absent during the data collection period were excluded. Ethics approval was obtained from the Medical Research Ethics Committee, FMHS and Deputy Vice Chancellor (Student Affairs and Alumni) from the selected public university prior to data collection. The respondents were also informed that they had the right to know their current status on suicidality, and if they needed help and/ or further clarification of their status, they could consult a team of experts which consisted of a psychiatrist, a family medicine specialist and a public

This article was accepted: 11 December 2014

Corresponding Author: Sherina Mohd Sidik, Department of Psychiatry, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia Email: sherina@upm.edu.my

health physician for advice. The respondents were assured that all their information and identities were kept private and confidential at all times.

A self-administered validated pretested instrument in Malay and English languages was used for data collection. The questionnaire was divided into ten sections; which consisted of Section A to J. Permission to use the questionnaires was obtained from each author/ copyright holder of the particular questionnaire.

Section A consisted of questions on socio-demographic profile; which included questions on the respondents' gender, ethnicity, religion, year of study and self-satisfaction with academic performance.

Section B consisted on questions on smoking, and other personal risk factors such as drinking alcohol and drug abuse.

Section C consisted of Suicidal Behaviours Questionnaire-Revised (SBQ-R) which contained four items. These four items measured suicidality based on the respondents' lifetime suicide ideation and/ or suicide attempt, frequency of suicide ideation over past one year, threat of suicide attempt and self-reported likelihood of suicidal behaviour in the future. This brief, valid and reliable questionnaire screens for potential suicide risk.⁹ A cut-off point of seven was suggested for the undergraduate population. The SBQ-R had high internal consistency (alpha value 0.8 to 0.9) and good concurrent validity (correlation 0.6 to 0.9).⁹ A study conducted by Xiang *et al* among 139 college students to find out their attitude regarding suicide, religious commitment and suicidal behaviours, from two universities colleges in Klang Valley, Malaysia showed that the Cronbach alpha of SBQ-R was acceptable at 0.7.¹⁰ The SBQ-R was back-translated to the Malay version for this study, and the Cronbach alpha coefficient in the pilot study was 0.8.

Section D of the questionnaire consisted of questions on the respondents' and their immediate family members' past history of psychiatric illnesses.

Section E consisted of questions to assess the lifetime suicide attempt of the respondents and their immediate family members. These questions were obtained from the SUPRE-MISS Suicidality Questionnaire used in NHMS 2011.^{5,11}

Section F consisted of the nine-item Patient Health Questionnaire (PHQ-9) which was used to determine whether the respondents were depressed or not in the past two-weeks. A PHQ-9 score of ≥ 10 was used to determine depression. The PHQ-9 was found to be a valid and reliable tool to determine depression;¹² and has also been validated in the Malay language among women in a primary care clinic, with a sensitivity 87.0% and specificity 82.0%.¹³

Section G consisted of the 20-item Beck Hopelessness Scale (BHS) which measured the level of negative attitude (pessimism) perceived by adults and adolescents about the future. The internal consistency of this scale ranged from 0.8 to 0.9, while its test-retest score was 0.7.¹⁴ The cut-off point of nine was used to determine hopelessness among the

respondents. The Malay version of the BHS was used in this study.¹⁵

Section H consisted of the Generalized Anxiety Disorder - 7 Scale (GAD-7) to determine anxiety among the respondents at a cut-off point of eight and above. The GAD-7 was found to be a valid and efficient tool for the detection of anxiety disorders among adult patients in 15 primary care clinics in the United States.¹⁶ The Malay version of the GAD-7 was also found to be valid and reliable in a study among patients attending a primary care clinic in Malaysia, with a sensitivity and specificity of 76.0% and 94.0%, respectively.¹⁷

Section I consisted of nine items from The List of Threatening Experiences Questionnaire (LTE-Q).¹⁸ In Malaysia, the parallel and test-retest reliability were acceptable for seven out of 12 items (Kappa $\kappa = 0.7$ to 0.9) tested among 237 medical students (Year One, Four and Five) in a study by Ng *et al* on the reliability of LTE in the Malay language.¹⁹

Section J consisted of the Universiti Sains Malaysia Personality Inventory (USMaP-i) which covered five personality traits such as extroversion, conscientiousness, agreeableness, neuroticism and openness. This 15-item USMaP-I was shown to be the best model as it had an acceptable level of goodness of fit indices indicating model fit. These results were based on a cross-sectional study by Yusoff among 567 medical students (Year One, Three and Five) in a public medical school. It showed an acceptable reliability with Cronbach alpha values of 0.6 to 0.7 for each item.²⁰

The Statistical Package for Social Sciences Software (SPSS) Version 21 was used for data analysis. Descriptive statistics was conducted to obtain frequency and percentage of variables. Inferential analysis was done using chi-square (for categorical data) to determine the association between variables at a level of significance, $p < 0.05$. Variables with p -value less than 0.25 were selected for multivariate logistic regression analysis in order to determine the predictors of suicidality (categorical dependent variable) while the confounders were controlled. Hosmer and Lemeshow recommended this p -value as they found that $p < 0.05$ might not be able to identify some important and significant variables.²¹ The results were expressed as odds ratio with 95% CI. A two-sided p -value less than 0.05 was considered as statistically significant. Analysis was also done to obtain the value of Nagelkerke R Square, assessment of the goodness of fit, Hosmer and Lemeshow Test, and classification table. Multicollinearity was checked for intercorrelations among the predictors.

RESULTS

Out of 625 undergraduate medical students, 537 completed the questionnaires in this study; giving a response rate of 85.9%. Table I shows the socio-demographic profile of the respondents. The number of female respondents was almost two times higher than the males. Approximately half of the respondents were Malays (54.4%) and Muslims (56.8%). The medical course is a five-year programme; and there were more year-one undergraduate medical students participating in this study compared to other years of study. The lowest number of respondents were from year five. Majority (65.3%)

of respondents were satisfied with their academic performance.

The prevalence of suicidality among the 517 respondents who completed the SBQ-R was 7.0%. From the Chi-Square analysis, 23 factors were selected for multivariate analysis based on $p < 0.25$. These 23 factors were gender, ethnicity, religion, year of study, academic performance, drinking alcohol, past history of psychiatric illnesses, family history of psychiatric illnesses, past history of lifetime suicide attempt, family history of suicide attempt, family history of successful suicide, depression, hopelessness, anxiety, broken off a steady love relationship, serious problem with a close friend and / or neighbour and /or relative, major financial crisis, problems with the police and / or a court appearance, something valued was lost or stolen, extroversion, conscientiousness, agreeableness and neuroticism. All these factors were entered into the multiple logistic regression model to determine the predictors of suicidality.

Table I: Socio-demographic profile of the respondents (N=537)

Variables	Frequency	Percentages (%)
Gender		
Male	188	35.0
Female	349	65.0
Ethnicity		
Malay	292	54.4
Chinese	192	35.7
Indian	38	7.1
Others	15	2.8
Religion		
Muslim	305	56.8
Buddhist	161	30.0
Hindu	30	5.6
Christian	36	6.7
No religion	3	0.5
Others	2	0.4
Year of study		
1	129	24.0
2	101	18.8
3	108	20.1
4	113	21.1
5	86	16.0
Self-satisfaction with academic performance (n=533)		
Satisfied	348	65.3
Dissatisfied	185	34.7

Table II shows the five significant predictors of suicidality; which are past history of lifetime suicide attempt, depression, broken off a steady love relationship, hopelessness and loss of something valued. Medical students with a lifetime suicide attempt had 10 times higher risk of suicidality compared to those who did not have this history (Adjusted Odds Ratio(AOR) 10.4, 95% CI 2.7 to 40.9); those who were depressed had almost six times higher risk of suicidality as compared to non-depressed medical students (AOR 5.9, 95% CI 1.5 to 23.0); respondents who had broken off a steady love relationship had five times higher risk of suicidality compared to those who did not have this history (AOR 5.4, 95% CI 1.3 to 22.4); respondents who suffered from hopelessness had almost five times higher risk of suicidality compared to those without hopelessness (AOR 4.9, 95% CI 1.1 to 21.6); and respondents who had something valued lost or stolen had four times higher risk of suicidality compared to those without this history (AOR 4.4, 95% CI 1.2 to 15.9).

The value of Nagelkerke R square was 0.5. This showed that the whole model explained 50.0% of variance in suicidality. Hosmer and Lemeshow test indicated that this model was fit ($p=0.865$). Based on the classification table, 94.2 % of cases were classified correctly.

DISCUSSION

The prevalence of suicidality among undergraduate medical students in this study was 7.0%. Based on a research by Menezes et al (2012) at a medical college in Western Nepal, 10.7% and 18.4% of 206 students had suicidal ideation and

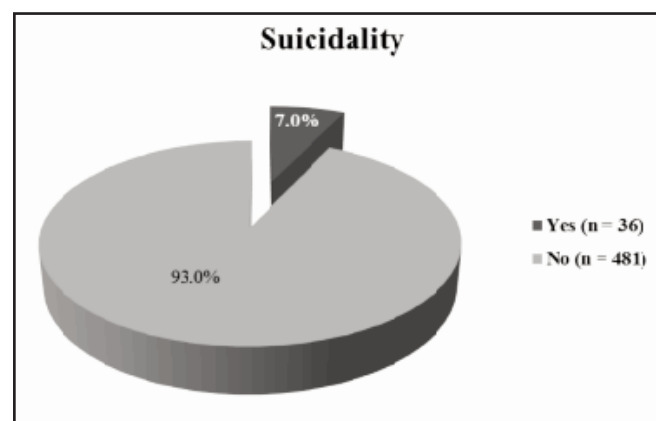


Fig. 1: Suicidality among the respondents based on the SBQ-R (n= 517).

Table II: Predictors of suicidality among the respondents

Variables	B	S.E.	Wald	df	p-value	AOR	95% CI for AOR	
							Lower	Upper
Personal history of lifetime suicide attempt	2.345	.697	11.318	1	0.001*	10.431	2.661	40.886
Depression	1.771	.696	6.472	1	0.011*	5.876	1.502	22.989
Broken off a steady love relationship	1.687	.725	5.412	1	0.020*	5.404	1.304	22.386
Hopelessness	1.597	.753	4.500	1	0.034*	4.938	1.129	21.598
Something valued was lost or stolen	1.471	.660	4.965	1	0.026*	4.352	1.194	15.867
Constant	-3.496		31.660	1	0.000	0.030		

* $p < 0.05$ significant, AOR – Adjusted Odds Ratio.

lifetime suicidal ideation respectively; while only 1.0% of respondents had a suicide plan or a suicide attempt.²² Menezes et al's study used four questions in the General Health Questionnaire (GHQ-28) to assess the prevalence of suicidal ideation in the past 12 months. Therefore the differences in the prevalence between Menezes et al's study compared to this study could be due to different types of questionnaires used for suicidality assessment. In Malaysia, the NHMS III, was conducted among community households based on the same questionnaire (GHQ-28) as Menezes et al's study and the 16-24 years age-group was found to have the highest prevalence of suicidal ideation at 11.0%.²³

The strongest predictor for suicidality was a past history of lifetime suicide attempt. Medical students who reported that they have a past history of lifetime suicide attempts were 10.4 times more at risk for suicidality (AOR 10.4, 95% CI 2.7 to 40.9) than those who did not report this past history. This is a very important and significant finding as psychiatric patients with previous suicide attempts were shown to have a 31.1 times higher risk for suicidality based on a study conducted in another Malaysian government university medical centre (UKMMC).²⁴

The second strongest predictor for suicidality in this study was depression. Respondents with depression (based on the PHQ-9) had a 5.9 times higher suicidality risk (AOR 5.9, 95% CI 1.5 to 23.0) than those without depression. A Korean study showed that college students who were depressed (based on the Beck Depression Inventory [BDI] scores > 10) were 8.9 times more likely to have recent suicidal ideation (over two weeks based on Moscicki's suicide behaviour index) than those who were not depressed.²⁵ A longitudinal prospective study conducted among 1253 college students at a mid-Atlantic university from 2004 to 2008 showed that respondents with depressive symptoms (based on The Center for Epidemiological Studies Depression Scale) were 2.4 and 9.0 times more at risk to have one-time suicidal ideation and persistent suicidal ideation (based on Item-9 BDI), respectively.²⁶ An epidemiology study involved 19,309 Malaysian population showed that depression was a significant predictor of suicidality. Respondents with past (lifetime) history of depression were 8.3, 19.2 and 25.7 times more prone to have suicidal ideation, plan and attempt, respectively.²⁷ A national survey conducted among 20,552 Malaysian adults (16 years old and above) found that those with depression were 2.45 times more at risk to have suicidal ideation than those without depression.²⁸

Medical students who had broken off a steady love relationship were 5.4 times at higher risk of suicidality (AOR 5.4, 95% CI 1.3 to 22.4) than those who did not have a broken love relationship. Research conducted among 5989 college students from six universities in Wuhan, China found that respondents who experienced a rupture of love relationship were 1.3 times at higher risk to have suicidal ideations (AOR 1.3, 95% CI 1.1 to 1.5) but 1.7 times at higher risk to attempt suicide (AOR 1.7, 95% CI 1.2 to 2.3).²⁹

Respondents experiencing hopelessness in this study were 4.9 times at higher suicidality risk (AOR 4.9, 95% CI 1.1 to 21.6) compared to those without hopelessness. This finding was

supported by a 13-year longitudinal study among 3000 participants (aged 18 and above) from a community in the United States of America. Hopelessness was the strongest predictor for completed suicide (AOR 11.2, 95% CI 1.8 to 69.1), followed by suicide attempts (AOR 2.2, 95% CI 1.0 to 4.9) and suicide ideation (AOR 1.8, 95% CI 1.0 to 3.2).³⁰ A cohort study showed that hopelessness (based on BHS) was a significant predictor for suicide attempts among patients with psychosis. Psychotic disorder respondents showed a significant tendency in suicidality with hopelessness at modest levels (cut-off point of three on the BHS), compared to non-psychotic subjects.³¹

Respondents who had something valued lost or stolen had 4.4 times higher risk of suicidality (AOR 4.4, 95% CI 1.2 to 15.9) compared to those who did not lose anything valued in this study. This finding was supported by the Third National Survey of Psychiatric Morbidity (2007) that involved 7461 adults in England to determine the predictors of suicidal ideation in the past 12 months. Results found that respondents who had something valued lost or stolen in the past 6 months had 2.3 times higher risk of suicidal ideation (AOR 2.3, 95% CI 1.3 to 4.2) compared to those who did not lose anything valued.³² This predictor included any property or material stolen by theft, lost or home being broken-into.^{18,33}

The limitation of this study is that its findings cannot be generalized to all medical students in Malaysia as only one medical school (UPM) from the Klang Valley was studied.³⁴ Another limitation is that this was a cross-sectional study, therefore its findings can only be compared on performance association but not on causality effect.³⁵

CONCLUSION

The prevalence of suicidality among undergraduate medical students was 7.0%. The predictors were past history of lifetime suicide attempt, depression, breaking off a steady love relationship, hopelessness, and something valued being lost or stolen. As there are very few studies on suicidality, the present study fills the gap and need for research on suicidality, especially among undergraduate medical students in Malaysia.

One of the recommendations based on this study is that mental health care services should be strengthened at the university level. Universities can collaborate with the Ministry of Health to organize several activities to promote mental health, such as organising seminars and workshops on mental health which are specific for students. Medical programs can be designed to support students and promote student well-being.

This study points to a need for an intervention programme to address the five significant predictors of suicidality; such as educating and guiding students to overcome depression, hopelessness, and loss of a steady love relationship or something valued. Those with personal history of lifetime suicide attempt should be encouraged to meet a psychiatrist for further management.

ACKNOWLEDGEMENT

We are grateful to the Deputy Vice Chancellor of the selected university and the Dean of the selected faculty for permission to publish this paper. We also thank each and every respondent for participating in this study.

REFERENCES

- World Health Organization. Suicide, 2013. Retrieved October 10, 2013, from <http://www.who.int/topics/suicide/en/index.html>
- U. S. Department of Health and Human Services. National Strategy for Suicide Prevention: Goals and objectives for action (p. 206). Washington: Public Health Service, 2001.
- World Health Organization. How can suicide be prevented?, 2012. Retrieved October 17, 2013, from <http://www.who.int/features/qa/24/en/index.htm>
- Ministry of Health Malaysia. National Suicide Registry Malaysia (NSRM) Annual Report 2009 (p. 34). Kuala Lumpur: Ministry of Health Malaysia, 2011.
- Institute for Public Health. National Health and Morbidity Survey 2011 (NHMS 2011). Vol. II: Non-communicable diseases (p. 188). Kuala Lumpur: Ministry of Health Malaysia, 2011.
- Ahmed I, Banu H, Al-Fogeer R, *et al.* Cognitive emotions: Depression and anxiety in medical students and staff. *J Crit Care* 2009; 24(3): e1-e18.
- Ko SM, Kua EH, Fones CSL. Stress and the undergraduates. *Singapore Med J* 1999; 40(10): 627-30.
- Smith CK, Peterson DF, Degenhardt BF, *et al.* Depression, anxiety, and perceived hassles among entering medical students. *Psychol Health Med* 2007; 12(1): 31-9.
- Osman A, Bagge CL, Gutierrez PM, *et al.* The Suicidal Behaviors Questionnaire-Revised (SBQ-R): Validation with clinical and nonclinical samples. *Assessment* 2001; 8(4): 443-54.
- Foo XY, Alwi MNM, Ismail SIF, *et al.* Religious commitment, attitudes toward suicide, and suicidal behaviors among college students of different ethnic and religious groups in Malaysia. *J Relig Health* 2014; 53(3): 731-46.
- World Health Organization. Multisite Intervention Study on Suicidal Behaviours – SUPRE-MISS: Protocol of SUPRE-MISS (p. 101). Geneva: World Health Organization, 2002
- Kroenke K, Spitzer RL, Williams JBW. The PHQ-9: Validity of a brief depression severity measure. *J Gen Intern Med* 2001; 16(9): 606-13.
- Sherina MS, Arroll B, Goodyear-Smith F. Criterion validity of the PHQ-9 (Malay version) in a primary care clinic in Malaysia. *Med J Malaysia* 2012; 67(3): 309-15.
- Beck AT, Steer RA. Beck hopelessness scale manual (p. 29). San Antonio: The Psychological Corporation, 1988.
- Mukhtar F, Oei TPS. Exploratory and confirmatory factor validation and psychometric properties of the Beck Depression Inventory for Malays (BDI-Malay) in Malaysia. *Malaysian Journal of Psychiatry* 2008; 17(1).
- Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: The GAD-7. *Arch Intern Med* 2006; 166(10): 1092-7.
- Sherina MS, Arroll B, Goodyear-Smith F. Validation of the GAD-7 (Malay version) among women attending a primary care clinic in Malaysia. *J Primary Health Care* 2012; 4(1): 5-12.
- Brugha TS, Bebbington P, Tennant C, *et al.* The list of threatening experiences: A subset of 12 life event categories with considerable long-term contextual threat. *Psychol Med* 1985; 15: 189-94.
- Ng CG, Amer Siddiq AN, Aida SA, *et al.* The reliability of Malay version of list of threatening experiences questionnaire: A study on a group of medical students in Malaysia. *Malaysian Journal of Psychiatry* 2009; 18(2): 46-52.
- Yusoff MSB. Construct validity, internal consistency and normative data of the USMaP-i in a sample of medical students. *International Medical Journal* 2013; 20(1): 1-7.
- Hosmer DW, Lemeshow S. *Applied logistic regression* (2nd ed.). Hoboken: Wiley, 2000.
- Menezes RG, Subba SH, Sathian B, *et al.* Suicidal ideation among students of a medical college in Western Nepal: A cross-sectional study. *Legal Med* 2012; 14(4): 183-7.
- Institute for Public Health. The Third National Health and Morbidity Survey 2006 (NHMS III): Psychiatric morbidity. Kuala Lumpur: Ministry of Health Malaysia, 2008.
- Fong CL, Shah SA, Maniam T. Predictors of suicidal ideation among depressed inpatients in a Malaysian sample. *Suicidology Online* 2012; 3: 33-41.
- Lee HS, Kim S, Choi I, Lee KU. Prevalence and risk factors associated with suicide ideation and attempts in Korean college students. *Psychiatry Investig* 2008; 5(2): 86-93.
- Wilcox HC, Arria AM, Caldeira KM, *et al.* Prevalence and predictors of persistent suicide ideation, plans, and attempts during college. *J Affect Disord* 2010; 127(1-3): 287-94.
- Maniam T, Marhani M, Firdaus M, *et al.* Risk factors for suicidal ideation, plans and attempts in Malaysia - Results of an epidemiological survey. *Compr Psychiatry* 2014; 55 Suppl 1: S121-5.
- Maniam T, Karuthan C, Lim CH, *et al.* Suicide prevention program for at-risk groups: Pointers from an epidemiological study. *Prev Med* 2013; 57 Suppl: S45-6.
- You Z, Chen M, Yang S, *et al.* Childhood adversity, recent life stressors and suicidal behavior in Chinese college students. *PLoS One* 2014; 9(3): e86672.
- Kuo WH, Gallo JJ, Eaton WW. Hopelessness, depression, substance disorder, and suicidality: A 13-year community-based study. *Soc Psychiatry Psychiatr Epidemiol* 2004; 39(6): 497-501.
- Klonsky ED, Kotov R, Bakst S, *et al.* Hopelessness as a predictor of attempted suicide among first admission patients with psychosis: A 10-year cohort study. *Suicide Life Threat Behavior* 2012; 42(1): 1-10.
- Meltzer H, Bebbington P, Brugha T, *et al.* Personal debt and suicidal ideation. *Psychol Med* 2011; 41(4): 771-8.
- Brugha TS, Cragg D. The list of threatening experiences: The reliability and validity of a brief life events questionnaire. *Acta Psychiatr Scand* 1990; 82: 77-81.
- Eisenberg D, Gollust SE, Golberstein E, *et al.* Prevalence and correlates of depression, anxiety, and suicidality among university students. *Am J Orthopsychiatry* 2007; 77(4): 534-42.
- Lee JI, Lee MB, Liao SC, *et al.* Prevalence of suicidal ideation and associated risk factors in the general population. *J Formos Med Assoc* 2010; 109(2): 138-47.