



# Suicide and Associated Risk Factors Among College Students

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## Abstract

**Background and aims:** Despite the growing epidemic of suicide among college students, the associated risk factors have not been properly understood in developing countries. This study was conducted to estimate the prevalence of suicide ideation and attempt and associated risk factors among university students.

**Methods:** We performed this cross-sectional study in the Hamadan University of Medical Sciences from January to May, 2016, and invited university students to participate voluntarily in the study. The outcomes of interest were suicide ideation and attempt. The exposures of interest were behavioral risk factors, including having girlfriends/boyfriends, emotional breakdown (also known as mental breakdown), illegitimate heterosexual and/or homosexual intercourse, cigarette smoking, drug abuse, psychiatric disorders, and social media.

**Results:** Of 1254 participants, 146 (11.7%) had suicidal ideation during the past year and 63 (5.0%) had attempted suicide at least once in the past year. After adjusting the odds ratio (OR) (95% CI) for age and sex, it was found that suicide ideation was significantly associated with emotional breakdown 2.33 (1.64, 3.31), heterosexual intercourse 2.71 (1.77, 4.15), homosexual intercourse 3.21 (1.97, 5.25), cigarette smoking 4.03 (2.65, 6.11), drug abuse 12.09 (7.97, 18.35), psychiatric disorders 12.48 (7.59, 20.53), no interest in the discipline 2.08 (1.40, 3.07), and despair about the future 2.18 (1.49, 3.19). There was no significant association between suicide ideation and using social media 1.13 (0.65, 1.96).

**Conclusion:** This study provided beneficial information about the association between suicidal ideation and attempted suicide and some behavioral risk factors among university students and emphasized the importance of these modifiable risk factors which if neglected, may severely impair the students' function.

**Keywords:** Student, Suicide, Risk factors, Prevalence

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## Introduction

Suicide is the second leading cause of death in 15-29-year-olds<sup>1</sup> and one of the greatest sources of premature death.<sup>2</sup> Suicide is estimated to account for 1.4% of total mortality and 15% of injury mortality of the world in . These figures seem to underestimate the problem, because for each death due to suicide, there are almost 10 to 40 attempted suicides.<sup>4</sup> Furthermore, many people who have suicide ideation and plan, never seek services.<sup>5</sup>

Suicide is a multifactorial phenomenon which is associated with several psychological, social, biological, and cultural factors.<sup>6,7</sup> Psychiatric disorders<sup>8,9</sup> and high-risk behaviors such as harmful use of alcohol,<sup>10</sup> drug

abuse,<sup>11</sup> and even cigarette smoking<sup>12</sup> are among the major contributing risk factors for suicide. University students are a large part of young adults among whom the incidence of certain mental disorders and high-risk behaviors associated with suicide have been estimated to be relatively high.<sup>13-20</sup> It is estimated that almost 19.4% of the Iranian university students are smokers, 3.9% use illegal drugs, and 10.1% use alcohol.<sup>21</sup> Despite the growing epidemic of suicide among university students and its residual effects,<sup>22,23</sup> the risk factors of suicide among university students have not been properly investigated particularly in developing countries. Unless reliable information about the burden and causes of suicide behaviors is collected,

it is difficult or even impossible to design effective intervention strategies and carry out preventive measures. The present study was carried out to estimate the prevalence and associated risk factors of suicide ideation and attempt among university students.

## Methods

We conducted this cross-sectional study from January to May 2016. We invited the students of the university to participate voluntarily in the study. In order to increase the generalizability of the results, we performed a proportional random sampling. For this purpose, we divided the university into colleges (strata) and then, we took random samples from each stratum. We just enrolled students who had passed at least one semester and excluded the newcomers.

We invited 1338 eligible university students; 45 subjects refused to fill out questionnaires, 30 did not return questionnaires, and 9 were excluded from the analysis because they did not complete the questionnaires. The analysis was based on data from the remaining 1254 participants. The acceptance rate was 94%. The mean (SD) age of the participants was 22.54 (3.34) with a range of 18 to 49 years, including 492 (39.2%) males and 762 (60.8%) females.

The outcomes of interest were suicide ideation and attempt. Suicidal ideation was defined as serious thought about committing suicide during the past year. Suicide attempt was defined as actually attempting suicide during the past year. The exposures of interest were behavioral risk factors, including having boyfriends/girlfriends, emotional breakdown (also known as mental breakdown), illegitimate heterosexual and/or homosexual intercourse, cigarette smoking, drug abuse including narcotic and/or psychotropic drugs, psychiatric disorders based on GHQ-28 questionnaire, and using social media.

The participants filled out an anonymous self-administered questionnaire. The questionnaire included demographic characteristics, personal information, behavioral risk factors, and the Persian version of the GHQ-28 questionnaire which was developed by Goldberg and Hillier in 1979 as a screening tool for detecting psychiatric disorders<sup>24</sup> and was translated into Persian by Noorbala et al in 2009.<sup>25</sup>

We used the chi-square test for the analysis of categorical variables and the simple and multiple logistic regression analysis to measure the association between suicide ideation and attempt and the behavioral risk factors. All statistical analyses were performed at a significance level of 0.05, using Stata software, version 11 (StataCorp, College Station, TX, USA).

## Results

Of 1254 participants, 146 (11.7%) had suicide ideation during the past year and 63 (5.0%) had attempted suicide at least once in the past year. The details of the demographic and personal characteristics of the study population are given in Table 1. The prevalence of suicide ideation was higher among males (14.0%;  $P=0.035$ ), 22-25-year-olds (12.2%;  $P=0.782$ ), who were fourth born children (18.2%;  $P=0.010$ ), were divorced (20.9%;  $P=0.106$ ), lived in distant towns (13.1%;  $P=0.451$ ), lived in dormitory (12.1%;  $P=0.453$ ), were the MSc students (18.7%;  $P=0.115$ ) with  $\geq 7$  years of education (16.0%;  $P=0.851$ ), were uninterested in the discipline (19.3%;  $P=0.001$ ), and despaired about the future (19.3%;  $P=0.001$ ).

The prevalence of behavioral risk factors is given in Table 2. Of 1254 university students, 648 (51.7%) had girlfriends/boyfriends, 165 (13.2%) had heterosexual intercourse, 100 (8.0%) had homosexual intercourse, 204 (16.3%) were smokers, 123 (9.8%) used opium or psychedelic drugs, 513 (40.9%) had psychiatric disorders, and 1101 (87.9%) used at least one type of social media.

As shown in Table 2, after adjusting the odds ratio (OR) (95% CI) for age and sex, suicidal ideation was significantly associated with having girlfriends/boyfriends 2.06 (1.42, 3.00), emotional breakdown 2.33 (1.64, 3.31), heterosexual intercourse 2.71 (1.77, 4.15), homosexual intercourse 3.21 (1.97, 5.25), cigarette smoking 4.03 (2.65, 6.11), drug abuse 12.09 (7.97, 18.35), psychiatric disorders 12.48 (7.59, 20.53), no interest in the discipline 2.08 (1.40, 3.07), and despair about the future 2.18 (1.49, 3.19). Suicide ideation was not statistically associated with using social media 1.13 (0.65, 1.96).

In addition, according to our results presented in Table 2, after adjusting the OR (95% CI) for age and sex, attempted suicide was significantly associated with having girlfriends/boyfriends 2.90 (1.61, 5.24), heterosexual intercourse 4.48 (2.53, 7.91), homosexual intercourse 5.78 (3.10, 10.78), cigarette smoking 6.72 (3.70, 12.20), drug abuse 16.50 (9.20, 29.57), psychiatric disorders 4.95 (2.73, 8.96), and no interest in the discipline 1.86 (1.05, 3.30). Attempted suicide was not statistically associated with using social media 1.13 (0.65, 1.96), emotional breakdown 1.50 (0.89, 2.52), and despair about the future 1.66 (0.94, 2.92).

## Discussion

We indicated that suicidal ideation was significantly associated with several behavioral factors, including having girlfriends/boyfriends, emotional breakdown, heterosexual intercourse, homosexual intercourse,

**Table 1.** Characteristics of the College Students With and Without Suicide Ideation and Attempt During the Past Year

Variables	Suicide Ideation				P Value	Suicide Attempt				P Value
	No (n = 1107)		Yes (n = 146)			No (n = 1191)		Yes (n = 63)		
	No.	%	No.	%		No.	%	No.	%	
Sex					0.035					0.734
Male	423	86.0	69	14.0		466	94.7	26	5.3	
Female	684	89.9	77	10.1		725	95.1	37	4.9	
Age group (y)					0.782					0.026
18-21	486	88.5	63	11.5		518	94.2	32	5.8	
22-25	483	87.8	67	12.2		532	96.7	18	3.3	
26-29	98	88.3	13	11.7		103	92.8	8	7.2	
≥30	40	93.0	3	7.0		38	88.4	5	11.6	
Birth order					0.010					0.001
First	393	88.5	51	11.5		430	96.9	14	3.1	
Second	360	91.4	34	8.6		380	96.2	15	3.8	
Third	201	88.2	27	11.8		213	93.4	15	6.6	
Forth	153	81.8	34	18.2		168	89.8	19	10.2	
Marital status					0.106					0.130
Single	926	88.4	122	11.6		999	95.2	50	4.8	
Married	147	90.7	15	9.3		154	95.1	8	4.9	
Divorced	34	79.1	9	20.9		38	88.4	5	11.6	
City					0.451					0.416
Hometown	336	89.4	40	10.6		362	96.0	15	4.0	
Surrounding towns	353	89.1	43	10.9		372	93.9	24	6.1	
Distant towns	418	86.9	63	13.1		457	95.0	24	5.0	
Residence					0.453					0.480
Parents' house	329	89.4	39	10.6		352	95.7	16	4.3	
Dormitory	778	87.9	107	12.1		839	94.7	47	5.3	
Educational level					0.115					0.224
BSc	530	89.1	65	10.9		568	95.3	28	4.7	
MSc	78	81.3	18	18.7		88	91.7	8	8.3	
MD	459	88.4	60	11.6		496	95.6	23	4.4	
PhD	40	93.0	3	7.0		39	90.7	4	9.3	
Years of education					0.851					0.054
1-2	222	87.1	33	12.9		235	92.2	20	7.8	
3-4	360	87.8	50	12.2		393	95.9	17	4.1	
5-6	139	88.5	18	11.5		150	95.5	7	4.5	
≥7	42	84.0	8	16.0		50	100.0	0	0.0	
Interested in the discipline					0.001					0.028
Yes	923	90.1	102	9.9		981	95.6	45	4.4	
No	184	80.7	44	19.3		210	92.1	18	7.9	
Despair about the future					0.001					0.056
Yes	898	90.3	96	9.7		951	95.6	44	4.4	
No	209	80.7	50	19.3		240	92.7	19	7.3	

cigarette smoking, drug abuse, psychiatric disorders, no interest in the discipline, and despair about the future.

On the basis of our results, university students who had a friend of the opposite sex or had illegitimate sexual contact with the same or opposite sex were at higher risk of suicide ideation and attempt. Evidence has shown a strong association between sexual assault and suicide risk in both males and females.<sup>26</sup> Mood

disorder and suicide risk are more common among young people who have suffered sexual violence.<sup>27</sup> Furthermore, adolescents and young adults who are identified as lesbian, gay, or bisexual are at increased risk of suicide than heterosexual youths.<sup>28,29</sup> Indeed, these subjects are associated with higher risk of mood or anxiety disorders<sup>30</sup> which are major risk factors for suicide.<sup>8,9</sup>

We showed that drug abuse increased the risk of

**Table 2.** Association Between Suicide Ideation and High-Risk Behaviors

Variables	Suicide Ideation				Suicide Attempt			
	No (n=1107)	Yes (n=146)	UOR (95% CI)	AOR (95% CI) <sup>a</sup>	No (n=1191)	Yes (n=63)	UOR (95% CI)	AOR (95% CI) <sup>a</sup>
<b>Having a boy/girlfriend</b>								
No	558	47	1.00	1.00	589	16	1.00	1.00
Yes	549	99	2.14 (1.48, 3.08)	2.06 (1.42, 3.00)	602	47	2.87 (1.61, 5.12)	2.90 (1.61, 5.24)
<b>Having emotional breakdown</b>								
No	765	71	1.00	1.00	800	36	1.00	1.00
Yes	342	75	2.36 (1.66, 3.34)	2.33 (1.64, 3.31)	391	27	1.53 (0.91, 2.56)	1.50 (0.89, 2.52)
<b>Having heterosexual intercourse</b>								
No	976	107	1.00	1.00	1044	40	1.00	1.00
Yes	126	39	2.82 (1.87, 4.25)	2.71 (1.77, 4.15)	142	23	4.22 (2.45, 7.26)	4.48 (2.53, 7.91)
<b>Having homosexual intercourse</b>								
No	1032	118	1.00	1.00	1106	45	1.00	1.00
Yes	72	28	3.40 (2.11, 5.47)	3.21 (1.97, 5.25)	82	18	5.39 (2.98, 9.74)	5.78 (3.10, 10.78)
<b>Smoking cigarette</b>								
No	956	91	1.00	1.00	1014	34	1.00	1.00
Yes	149	55	3.87 (2.66, 5.65)	4.03 (2.65, 6.11)	175	29	4.94 (2.93, 8.31)	6.72 (3.70, 12.20)
<b>Abusing substances</b>								
No	1045	85	1.00	1.00	1100	30	1.00	1.00
Yes	62	61	12.09 (7.97, 18.35)	12.45 (8.04, 19.26)	91	33	13.29 (7.75, 22.78)	16.50 (9.20, 29.57)
<b>Having psychiatric disorders</b>								
No	721	19	1.00	1.00	725	15	1.00	1.00
Yes	386	127	12.48 (7.59, 20.53)	12.43 (7.55, 20.48)	466	48	4.97 (2.75, 8.99)	4.95 (2.73, 8.96)
<b>Using social media</b>								
No	136	16	1.00	1.00	146	6	1.00	1.00
Yes	971	130	1.13 (0.65, 1.970)	1.13 (0.65, 1.96)	1045	57	1.32 (0.56, 3.13)	1.30 (0.55, 3.07)
<b>Interested in the discipline</b>								
Yes	923	102	1.00	1.00	981	45	1.00	1.00
No	184	44	2.16 (1.46, 3.18)	2.08 (1.40, 3.07)	210	18	1.86 (1.06, 3.29)	1.86 (1.05, 3.30)
<b>Despair about the future</b>								
Yes	898	96	1.00	1.00	951	44	1.00	1.00
No	209	50	2.23 (1.54, 3.25)	2.18 (1.49, 3.19)	240	19	1.71 (0.98, 2.98)	1.66 (0.94, 2.92)

Abbreviations: AOR, adjusted odds ratio; UOR, unadjusted odds ratio.  
<sup>a</sup>Adjusted for age and sex.

suicide. Epidemiological studies have also shown that drug abuse increases the risk of suicide. A meta-analysis conducted in 2015, including 43 studies with 870,967 participants, reported the association (OR; 95% CI) between substance use disorder and suicidal ideation 2.04 (1.59, 2.50), suicide attempt 2.49 (2.00, 2.98), and fatal suicide 1.49 (0.97, 2.00).<sup>11</sup>

According to our findings, there was a significant association between smoking and suicide. We indicated that suicide was more common among smokers or the prevalence of smoking habits was higher among suicidal individuals. That means smoking is associated with suicide, but it does not mean smoking necessarily causes suicide, because it is not clear whether smoking causes suicidal behaviors through a biological pathway of smoking itself or whether there is collinearity between smoking and other psychological disorders

and behavioral risk factors such as substance and alcohol use disorders.<sup>8,10,11,31</sup> However, a meta-analysis conducted in 2016, including 63 studies with 8,063,634 participants, reported a significant association (OR; 95% CI) between smoking and suicide ideation 2.05 (1.53, 2.58), suicide plan 2.36 (1.69, 3.02), suicide attempt 2.84 (1.49, 4.19), and fatal suicide 1.83 (1.64, 2.02).<sup>12</sup>

This study had a few limitations. The questionnaire that we used in this study included a number of sensitive questions. Answers to questions about sexual activities rely heavily on self-reported data. People usually do not answer to such questions correctly.<sup>32</sup> Considering this issue and the rejection rate of 6%, it seems that our results underestimated the prevalence of high-risk behaviors among the university students. The real prevalence of behavioral risk factors is

estimated to be higher than what we reported in this paper. Furthermore, the results of this cross-sectional study just reported an association between suicide and behavioral risk factors. However, the association does not necessarily imply a cause-and-effect relationship because exposures and outcomes were determined at the same time and the observed association may be confounded by other variables.

Despite these limitations, this study provided useful information about the prevalence and potential risk factors of suicide among university students in a developing country. Such information may be useful for planning effective intervention strategies and implementing preventive measures. However, behavioral risk factors are closely related with sociocultural situation. Therefore, the results of this study may not be generalized to other countries such as American and European countries with different sociocultural situations. Therefore, these countries may require to investigate the prevalence and associated risk factors of suicide on their own university students.

### Conclusion

This study provided beneficial information about the prevalence of suicide, psychiatric disorders and behavioral risk factors among university students. Our findings highlighted the association between suicide and some behavioral risk factors and emphasized the importance of these modifiable and preventable risk factors, which if neglected, may severely impair the students' function and influence their subsequent development and productive lives. Thus, university students may benefit from interventions that target these risk factors.

### Ethical Approval

The Ethics Committee of the Hamadan University of Medical Sciences approved the study.

### Conflict of Interest Disclosures

The authors declare that they have no conflict of interests for this work.

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### References

1. World Health Organization. Preventing suicide: A global imperative. Geneva: WHO; 2014.
2. Poorolajal J, Esmailnasab N, Ahmadzadeh J, Motlagh TA. The burden of premature mortality in Hamadan province in 2006 and 2010 using standard expected years of potential

- life lost: a population-based study. *Epidemiol Health.* 2012;34:e2012005. doi: 10.4178/epih/e2012005.
3. Varnik P. Suicide in the world. *Int J Environ Res Public Health.* 2012;9(3):760-71. doi: 10.3390/ijerph9030760.
4. Miller M, Azrael D, Barber C. Suicide mortality in the United States: the importance of attending to method in understanding population-level disparities in the burden of suicide. *Annu Rev Public Health.* 2012;33:393-408. doi: 10.1146/annurev-publhealth-031811-124636.
5. Centers for Disease Control and Prevention. Understanding suicide: fact sheet. [http://www.cdc.gov/violenceprevention/pub/suicide\\_factsheet.html](http://www.cdc.gov/violenceprevention/pub/suicide_factsheet.html). Published August 20, 2013.
6. Amiri B, Pourreza A, Rahimi Foroushani A, Hosseini SM, Poorolajal J. Suicide and associated risk factors in Hamadan province, west of Iran, in 2008 and 2009. *J Res Health Sci.* 2012;12(2):88-92.
7. Poorolajal J, Rostami M, Mahjub H, Esmailnasab N. Completed suicide and associated risk factors: a six-year population based survey. *Arch Iran Med.* 2015;18(1):39-43. doi: 0151801/aim.0010.
8. Hawton K, van Heeringen K. Suicide. *Lancet.* 2009;373(9672):1372-81.
9. Abreu LN, Lafer B, Baca-Garcia E, Oquendo MA. Suicidal ideation and suicide attempts in bipolar disorder type I: an update for the clinician. *Rev Bras Psiquiatr.* 2009;31(3):271-80.
10. 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):e0126870. doi: 10.1371/journal.pone.0126870.
11. Poorolajal J, Haghtalab T, Farhadi M, Darvishi N. Substance use disorder and risk of suicidal ideation, suicide attempt and suicide death: a meta-analysis. *J Public Health (Oxf).* 2016;38(3):e282-e91. doi: 10.1093/pubmed/fdv148.
12. Poorolajal J, Darvishi N. Smoking and Suicide: A Meta-Analysis. *PLoS One.* 2016;11(7):e0156348. doi: 10.1371/journal.pone.0156348.
13. Poorolajal J, Ghaleiha A, Darvishi N, Daryaei S, Panahi S. The prevalence of psychiatric distress and associated risk factors among college students using GHQ-28 questionnaire. *Iran J Public Health.* 2017;46(7):957-63.
14. Said D, Kypri K, Bowman J. Risk factors for mental disorder among university students in Australia: findings from a web-based cross-sectional survey. *Soc Psychiatry Psychiatr Epidemiol.* 2013;48(6):935-44. doi: 10.1007/s00127-012-0574-x.
15. Hope V, Henderson M. Medical student depression, anxiety and distress outside North America: a systematic review. *Med Educ.* 2014;48(10):963-79. doi: 10.1111/medu.12512.
16. Ketchen Lipson S, Gaddis SM, Heinze J, Beck K, Eisenberg D. Variations in student mental health and treatment utilization across US colleges and universities. *J Am Coll Health.* 2015;63(6):388-96. doi: 10.1080/07448481.2015.1040411.
17. Przedworski JM, VanKim NA, Eisenberg ME, McAlpine DD, Lust KA, Laska MN. Self-reported mental disorders and distress by sexual orientation: results of the minnesota college student health survey. *Am J Prev Med.* 2015;49(1):29-40. doi: 10.1016/j.amepre.2015.01.024.
18. Patrick ME, Lee CM, Neighbors C. Web-based intervention to change perceived norms of college student alcohol use and sexual behavior on spring break. *Addict Behav.* 2014;39(3):600-6. doi: 10.1016/j.addbeh.2013.11.014.
19. Dijanic T, Kozul K, Miskulin M, Medic A, Jurcev-Savicevic A, Burazin J. Sexual behaviour and condom use as a protection against sexually transmitted infections in student population. *Coll Antropol.* 2014;38(1):31-7.
20. Lin LY, Sidani JE, Shensa A, Radovic A, Miller E, Colditz JB,

- et al. Association between social media use and depression among U.S. young adults. *Depress Anxiety*. 2016;33(4):323-31. doi: 10.1002/da.22466.
21. Jalilian F, Karami Matin B, Ahmadpanah M, Ataee M, Ahmadi Jouybari T, Eslami AA, et al. Socio-demographic characteristics associated with cigarettes smoking, drug abuse and alcohol drinking among male medical university students in Iran. *J Res Health Sci*. 2015;15(1):42-6.
  22. Schwartz AJ. College student suicide in the United States: 1990-1991 through 2003-2004. *J Am Coll Health*. 2006;54(6):341-52. doi: 10.3200/jach.54.6.341-352.
  23. Westefeld JS, Button C, Haley JT Jr, Kettmann JJ, MacConnell J, Sandil R, et al. College student suicide: a call to action. *Death Stud*. 2006;30(10):931-56. doi: 10.1080/07481180600887130.
  24. Goldberg DP, Hillier VF. A scaled version of the General Health Questionnaire. *Psychol Med*. 1979;9(1):139-45.
  25. Noorbala A, Bagheri Yazdi SA, Mohammad K. The validation of general health questionnaire- 28 as a psychiatric screening tool. *Hakim Health Sys Res*. 2009;11(4):47-53.
  26. Anderson LM, Hayden BM, Tomasula JL. Sexual assault, overweight, and suicide attempts in U.S. adolescents. *Suicide Life Threat Behav*. 2014. doi: 10.1111/sltb.12148.
  27. Mondin TC, Cardoso Tde A, Jansen K, Konradt CE, Zaltron RF, Behenck Mde O, et al. Sexual violence, mood disorders and suicide risk: a population-based study. *Cien Saude Colet*. 2016;21(3):853-60. doi: 10.1590/1413-81232015213.10362015.
  28. Lian Q, Zuo X, Lou C, Gao E, Cheng Y. Sexual orientation and risk factors for suicidal ideation and suicide attempts: a multi-centre cross-sectional study in three Asian cities. *J Epidemiol*. 2015;25(2):155-61. doi: 10.2188/jea.JE20140084.
  29. Shadick R, Backus Dagirmanjian F, Barbot B. Suicide risk among college student. The intersection of sexual orientation and race. *Crisis*. 2015;36(6):416-23. doi: 10.1027/0227-5910/a000340.
  30. Bostwick WB, Boyd CJ, Hughes TL, McCabe SE. Dimensions of sexual orientation and the prevalence of mood and anxiety disorders in the United States. *Am J Public Health*. 2010;100(3):468-75. doi: 10.2105/ajph.2008.152942.
  31. Paffenbarger RS Jr, Lee IM, Leung R. Physical activity and personal characteristics associated with depression and suicide in American college men. *Acta Psychiatr Scand Suppl*. 1994;377:16-22.
  32. Norris Turner A, Paul P, Norris AH. Limited benefit of repeating a sensitive question in a cross-sectional sexual health study. *BMC Med Res Methodol*. 2013;13:34. doi: 10.1186/1471-2288-13-34.

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