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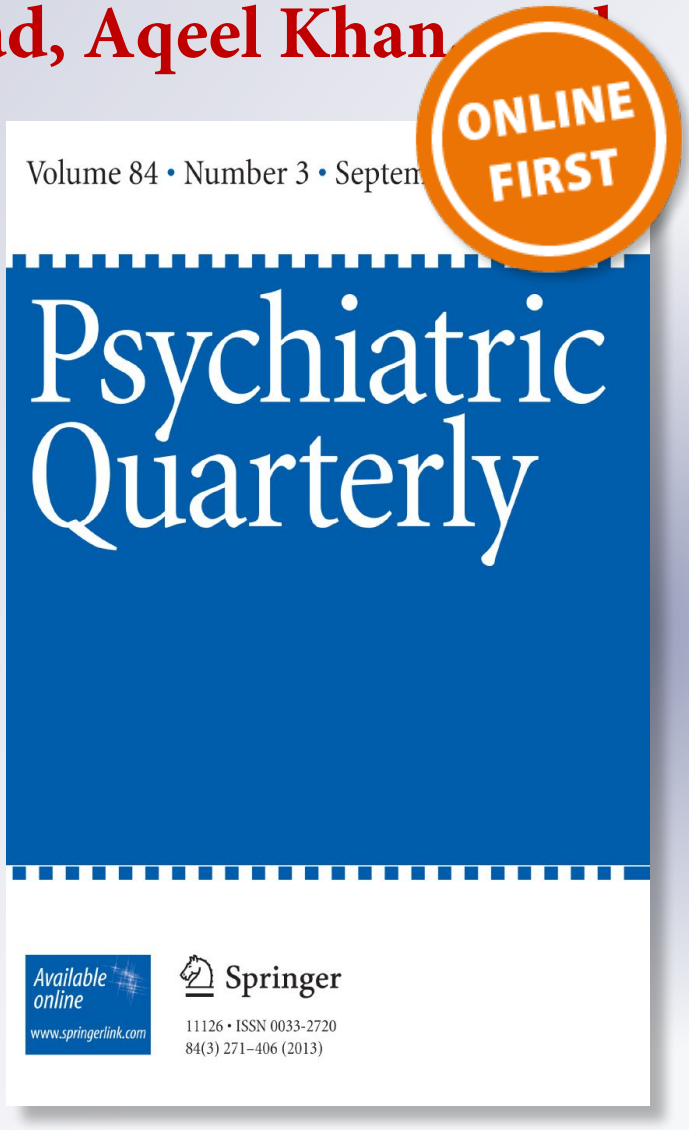

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ORIGINAL PAPER

Suicidal Thoughts, Attempts and Motives Among University Students in 12 Muslim-Majority Countries

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Abstract

There is a scarcity of research on suicidal phenomena in the Muslim world. Therefore, this study aimed at investigating the self-reported prevalence of suicidal thoughts, attempts and motives in 12 Muslim countries. A total of 8417 (54.4% women) university students were surveyed by means of a self-report questionnaire. Overall, 22% of the participants reported suicidal ideation and 8.6% reported attempting suicide. The odds of suicidal thoughts were elevated in Azerbaijan, Indonesia and Saudi Arabia, while reduced ORs were recorded in Egypt, Jordan, Lebanon and Malaysia. While odds of suicide attempts were high in Azerbaijan, Palestine and Saudi Arabia reduced odds ratios (OR) were detected in Indonesia, Iran, Jordan, Lebanon, Malaysia and Tunisia. Taking drugs and using a sharp instrument were the two most frequently used methods to attempt suicide. Only 32.7% of attempts required medical attention. Escape motives were endorsed more than social motives by participants who attempted suicide. Suicidal behaviors were more frequent in women than in men. Compered to men, fewer attempts by women required medical attention. Moreover, our results show that making suicide illegal does not reduce the frequency of suicidal behavior. Results from this comparative study show that suicidal thoughts and attempts are frequent events in young adults in countries where religious scripture explicitly prohibit suicide and the frequencies of nonfatal suicidal behavior show large variation in nations adhering to the same religion.

Keywords Suicide ideation · Suicide attempt · Suicidal motives · Young adults · Muslim world

Except the first author, the first twelve authors are by random order and the last seven authors are by alphabetical (first name) order.

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Introduction

Suicidal phenomena are a global public health concern and include suicidal thoughts, plans, attempts and deaths. Suicide is the cause of many premature deaths. It is a tragedy not only for the deceased but also for families, friends, neighbors and society. According to World Health Organization (WHO), 800,000 people die by suicide annually and it is the second leading cause of death among 15–29 year olds [1]. Seventy eight percent of all global suicides occur in low-middle income countries and the data indicate that there are 20 attempts for every suicidal death [1]. This means globally 16,000,000 individuals per annum make an attempt to kill themselves. Suicidal phenomena are therefore without a doubt significantly contributing to the burden on national health care systems [2]. For instance, the annual cost of suicide and suicide attempts are estimated to be 93.5 billion dollars in the United States [3].

Suicidal behavior is a multifaceted phenomenon that involves biological, genetic, psychological, social and cultural factors. As the WHO data suggest suicidal mortality peaks at 15–29 age group, corresponding roughly to the years during university education. Research indicates that factors associated with suicidal behavior in young people include mental health problems [4], alcohol and substance abuse [5], sexual minority status [6, 7], familial factors such as parental loss, discord and separation [8–10], academic stress [10, 11], economic difficulties [12] and low social support [13, 14].

All religions prohibit suicide with varying degrees of severity. Among the three Abrahamic religions, Islam has the most severe prohibitive attitude towards self-killing. In Judeo/Christian tradition, objections to suicide are based on the sanctity of life and the sixth commandment "Thou shalt not kill" [15]. In Islam, the objection against suicide comes as a word of God. The 4th surah of verse 29 of the Koran states "And do not kill yourselves [or one another]. Indeed, Allah is to you ever Merciful." [16]. Hence, low official suicide mortality rates in Muslim majority nations are often attributed to the religion's attitude. However, despite official statistics, the research suggests that the frequencies of nonfatal suicidal behaviors may indeed be high. In a number of cross-national comparisons, self-reported suicide attempts were significantly more frequent in Turkish adolescents and young adults than in their Austrian [17], Swedish [18] and Slovak [19] counterparts. Further, recently Eskin and colleagues [20] have shown that in 5572 university students from 12 countries, 29% reported suicidal ideation and 7% said that they attempted to kill themselves. Findings from this research showed that suicide attempts were more likely to be in the samples from Muslim majority countries such as Jordan, Palestine, Saudi Arabia and Turkey yet suicidal thoughts were less likely to be in those samples.

There is a dearth of scientific investigations on suicidal behavior in the Muslim majority countries and the existing ones are at the descriptive level [21]. The assumption that suicidal phenomena are rare in Muslim countries may be problematic for several reasons. First, official suicide rates are prone to be under and/or misreported because of the major stigma that resides with this issue [22]. Second, the Muslim majority world is not a homogenous entity. Muslim countries vary in their legal systems, social structures, values and attitudes, economic development, educational systems, indigenous cultures, ethnic composition, legal status of suicide and so on. As reported by the World Health Organization [1], 78% of all suicidal mortality occur in low-middle income countries, and the majority of Muslim nations lie within this category. From a methodological point of view, asking participants whether they have considered, and/or attempted suicide may sometimes provide a vague picture in what attempting suicide clearly entails. Indeed, in a recent paper Eskin, and colleagues [20] have called for an in-depth investigations of suicidal behavior especially in Muslim majority countries.

Bearing these considerations in mind, we designed this study to explore the aspects of suicidal thoughts, attempts, methods used and motives for suicide attempts in samples of university students from 12 Muslim majority countries. To the best of our knowledge, this is the first large scale comparative empirical study of suicidal behavior in the Islamic world. From a methodological perspective, cross-national comparative studies require that participants are comparable [23]. University students are similar in age and level of education, intellectual capacity, media exposure and stress levels. Therefore, we have chosen to study aspects of suicidal ideation and attempts in university students.

Methods

Participants

Participants in this cross-sectional study were 8417 university students from 12 Muslim majority countries (Azerbaijan, Egypt, Indonesia, Iran, Jordan, Lebanon, Malaysia, Pakistan, Palestine, Saudi Arabia, Tunisia and Turkey). The number of participants refusing to take part in the study were 10 in Malaysia and Turkey, 40 in Palestine, 115 in Iran, 145 in Tunisia, 20 in Egypt, and 28 in Pakistan. No one refused participation in Azerbaijan, Indonesia, Lebanon and Jordan yet it was not documented in Saudi Arabia. Seven questionnaires in Egypt and Jordan, 23 in Azerbaijan and Malaysia, 12 in Palestine, 14 in Iran, 48 in Tunisia, 40 in Turkey, 170 in Lebanon and 462 questionnaires in Saudi Arabia and no questionnaires in Indonesia and Pakistan were discarded due to incomplete information. Table 1 shows the sociodemographic characteristics of the participants. Overall, there were more women (54.4%) than men (45.6%) in our sample, $\chi^2 = 64.47$, df = 1, $p < 0.001$ (15 students did not report their gender). The gender distribution of students differed significantly by country, $\chi^2 = 104.86$, df = 11, $p < 0.001$; there were more women than men in the Indonesian, Palestinian, Saudi Arabian and Turkish samples, while the opposite was true for Malaysian sample.

Table 1 Demographic characteristics of participants according to country

Country	N	Gender				Age		Mother died		Father died		Par.Sep.		# of siblings	
		Women		Men											
		n	%	*n*	%	*M*	*SD*	*n*	%	*n*	%	*n*	%	*M*	*SD*
Azerbaijan	711	356	50.9	344	49.1	20.1	2.2	18	2.6	39	5.8	35	5.7	1.8	1.0
Egypt	653	328	50.3	324	49.7	20.3	1.2	10	1.5	64	9.9	27	4.7	2.6	1.4
Indonesia	300	208	69.3	92	30.7	19.8	1.0	9	3.0	9	3.0	10	3.4	2.2	1.3
Iran	700	350	50.0	350	50.0	22.1	4.0	13	1.9	41	5.9	10	1.5	2.6	1.8
Jordan	700	350	50.0	350	50.0	21.1	1.6	17	2.4	35	5.0	23	3.5	5.0	2.7
Lebanon	706	361	51.1	345	48.9	19.8	1.6	6	0.8	23	3.3	39	5.8	2.7	1.7
Malaysia	560	267	47.7	293	52.3	26.8	3.3	13	2.3	12	2.1	16	2.9	1.9	1.1
Pakistan	700	376	53.7	324	46.3	21.1	2.2	21	3.3	50	7.1	15	2.4	3.3	2.3
Palestine	793	474	60.0	316	40.0	20.4	3.1	14	1.8	48	6.1	16	2.2	5.3	2.1
Saudi Arabia	1137	711	62.5	426	37.5	22.0	3.6	17	1.5	88	7.7	96	9.4	5.8	2.9
Tunisia	707	355	50.2	352	49.8	21.0	2.0	9	1.3	30	4.2	27	4.1	2.6	1.4
Turkey	750	433	57.7	317	42.3	20.6	2.1	10	1.3	29	3.9	45	6.4	2.1	1.7
Total	8417	4569	54.4	3833	45.6	21.3	3.1	157	1.9	468	5.6	359	4.6	3.4	2.4

The mean age of the total sample was 21.28 (SD = 3.10) years with a range from 17 to 45 years. The mean ages differed significantly among countries, $F_{(11, 8405)} = 305.48$, $p < 0.001$. Indonesian and the Lebanese samples were the youngest and the Malaysian sample was the oldest. National samples differed significantly in the numbers of siblings, $F_{(11, 8405)} = 413.50$, $p < 0.001$. The Pakistani, Jordanian, Palestinian and the Saudi Arabian samples had the largest number of siblings, while the Azerbaijani, Malaysian, Turkish and the Indonesian samples had the smallest number of siblings.

While there were no differences between samples in terms of maternal death, $\chi^2 = 18.78$, df = 11, $p > 0.05$, they differed significantly from one another in paternal death, $\chi^2 = 66.90$, df = 11, $p < 0.001$. The largest percentages of Egyptian, Pakistani, Palestinian and Saudi Arabian but the smallest percentages in Indonesian, Lebanese, Malaysian and Turkish samples reported having gone through paternal death. Similarly, samples differed from one another in parental separation, $\chi^2 = 99.08$, df = 11, $p < 0.001$. Students from Saudi Arabia, Turkey, Lebanon and Azerbaijan reported highest numbers of parental separation and, those from Iran, Palestine, Pakistan, and Malaysia reported the lowest numbers.

We have retrieved age standardized suicide rates (per 100,000 population) for the countries included in the study from the World Health Organization's data base for the year 2015 [24]. The suicide rates were as follows for men, women and both, respectively: Azerbaijan (5.30, 1.10, 3.10), Egypt (4.50, 1.80, 3.10), Indonesia (4.50, 1.60, 3.00,), Iran (4.20, 2.90, 3.60), Jordan (5.30, 2.40, 3.90), Lebanon (4.00, 2.00, 3.10), Malaysia (9.50, 3.40, 6.50), Pakistan (2.50, 2.40, 2.50), Palestine (NA), Saudi Arabia (5.50, 2.20, 3.90), Tunisia (6.70, 4.10, 5.40) and Turkey (12.60, 4.70, 8.60).

Instrument

A self-administered questionnaire was used to collect the data which contained questions and measures about aspects of nonfatal suicidal behavior, religious affiliation and strength of religious belief, knowledge about affiliated religion's attitude to suicide, negative life-events, attitudes towards suicide, social support, self-construal, religious coping, motives for suicide attempts and impacts of suicide attempts on personal-social relationships. In this article, the prevalence of suicidal behavior, and methods and motives for suicide attempts are reported. (In order to keep a clear focus, the associations of suicidal behavior to religion, suicidal attitudes, negative life-events and social support, and self-construal will be reported in separate papers). The questionnaire was translated into home languages (Arabic, Azerbaijani, Indonesian, Malay, Persian, Urdu and Turkish) by using the parallel blind method [25].

Suicidal Behavior

Two yes-no questions (Have you ever thought of killing yourself? and Have you ever attempted to kill yourself?) were administered on life-time suicide ideation and attempts.

Self-Rated Frequency and Severity of Suicidal Behavior

The frequency and severity of suicidal thoughts and attempts were asked on 5-point scales ranging from 1 (only once/not at all serious) to 5 (more than five times/very serious).

Time of and Desire to Die in Suicide Attempts

The time of and the intensity of desire to die in the latest attempts were asked. The responses were obtained on a 5-point scale ranging from 1 (1 year ago) to 5 (five or more years ago) for the former question and on a 5-point scale ranging from 1 (none) to 5 (very strong) for the latter.

Method of Suicide Attempts

The methods used to attempt suicide were enquired with a list of 10 methods. Participants could choose more than one method if they had more than one suicide attempt. Since fewer persons attempted suicide by burning ($n = 7$) and natural gas ($n = 7$) they were collapsed into the other methods category (see Table 4).

Medical Attention

To determine whether medical attention was required for an attempt or not, participants who attempted suicide were asked: What happened after the latest attempt? They responded to this question by choosing one of the four alternatives: (1) Nothing happened because it was not serious. (2) I was conscious, and they took me to the hospital and discharged me after a few hours. (3) I was conscious, and they took me to the hospital and I stayed in the hospital for a day or more for treatment. (4) I was unconscious, and they took me to the hospital and I stayed in the hospital for a day or more for treatment.

Attempts in the first alternative were denoted as "attempts requiring no medical attention" and those in the second to fourth categories as "attempts requiring medical attention".

Motives for Suicide Attempts

Nine possible reasons for attempting suicide [26] were presented to participants and asked to indicate how important was each of them for their latest attempt on 5-point Likert scales ranging from "not at all important = 1" to "extremely important = 5". To group the reasons, a principal component analysis with varimax rotation was employed. Results of the analysis revealed two factors which explained 61.26% of the total variance. Six items loaded on the first factor (1. To find out whether someone really loved me or not; 2. To try to influence someone or get them to change their mind; 3. To show how much I loved someone; 4. To make people sorry for the way they have treated me; 5. To frighten or get someone back; 6. To seek help from someone and to make people understand how desperate I was feeling). The factor loadings ranged from 0.62 to 0.82 and this factor was named as social motives ($\lambda = 3.75$; attributable variance = 41.65). Three items loaded on the second factor (1. To get relief from a terrible state of mind; 2. To escape for a while from an impossible situation; 3. To die). Factor loadings ranged from 0.64 to 0.85 and this factor was named as escape motives ($\lambda = 1.77$; attributable variance = 19.62). The internal consistency coefficient (Cronbach's α) for social motives factor was 0.86 and it was 0.65 for escape motives factor. Two factor scores were computed by summing up individual responses on the items loading on the respective factor and dividing this sum by the number of items corresponding to that factor. Hence, the possible range of factor scores was from 1 to 5. Higher scores indicate greater amount of factor content.

Demographics

Students were asked about their gender, age, number of siblings, parental loss and separation.

Procedure

The questionnaire and the study protocol were first prepared by the principal investigator (M. Eskin) in English. The principal investigator tracked the researchers through their publication records and invited them for collaboration via e-mail. The mail explained the background and the method (sample and the questionnaire) of the study. The researchers are psychologists, psychiatrists, epidemiologists, psychological counsellors and public health specialists. Four of the researchers (A. Mechri, H. Harlak, M. Hamdan, Y. Khader) collaborated in a previous international research project on suicide with the principle investigator.

Ethical or IRB approval was obtained in all study sites. Except for Saudi Arabia where data collection was done via a web-based survey, a paper and pencil questionnaire were used in the remaining study sites. On the first page of the questionnaire it was highlighted that the study was anonymous. The students were reminded that they did not need to provide personal details. The name, telephone number and e-mail address of the local investigator were provided on the first page of the questionnaire for participants who might have had personal concerns over the questions.

No adverse effects were observed during data collection. Site (country) researchers were sent a follow up researcher survey about the practicalities of data collection and the legal status of suicide. According to the responses to the researcher survey, the site researchers reported having no difficulty in obtaining IRB approval and permission from the administration of universities for collecting the data. Attempting suicide was illegal in Jordan, Malaysia, Pakistan, Palestine and Saudi Arabia according to the responses to the survey.

Statistical Analyses

Data were analyzed by using the SPSS-19 for windows. Percentages of suicidal thoughts and attempts, suicide methods and demographic characteristics of participants were calculated by country and gender. First, twelve countries and nine suicide methods were coded as dummy variables. The associations of country, gender, age, parental separation-loss and number of siblings were tested by calculating the odds ratios (OR) for suicidal thoughts and attempts by using logistic regression and Chi-square procedures. In calculating country ORs for suicidal behavior, age, gender and number of siblings were taken as covariates. The ORs between two dichotomous variables were calculated by Chi-square procedure. Group means were compared by means of *t-tests* and one-way analysis of variance (one-way ANOVA). Associations between two continuous variables were tested by Pearson product moment correlation coefficient and the associations between continuous and categorical variables were tested by point-biserial correlation coefficient procedures. Countries with legal sanctions against suicide and those without legal sanction were dichotomized into two groups. The difference between the two groups in country suicide rates ($n = 11$) was tested by Mann-Whitney U test procedure. Odds ratios between the legal status of suicide dichotomy and suicidal thoughts, attempts and medical attention were calculated by Chi-square procedure. The differences between the two groups in self-rated frequency and seriousness of suicidal thoughts and attempts, and timing of and intensity of death desire expressed in suicide attempts were tested by *t-test* procedure.

Results

Distribution and Characteristics of Suicidal Behavior

Table 2 displays the numbers, percentages, and mean frequency, severity, time and intensity of death desire in suicidal behavior by country. Overall, 1825 participants (22.1%) reported having had thoughts of killing themselves and 712 students (8.6%) reported having made at least one attempt to kill themselves.

Table 3 presents the country and gender odds ratios for suicide ideation and attempts. The odds for suicidal thoughts were significantly larger for participants from Azerbaijan, Indonesia and Saudi Arabia, while for the participants from Egypt, Jordan, Lebanon and Malaysia they were significantly smaller. The odds for suicidal attempts were significantly larger for

Table 2 Prevalence, frequency, severity of suicidal ideation and attempts

Country	Suicidal ideation						Suicidal attempt									
	N	%	Frequency		Severity		*N*	%	Frequency		Severity		Time of attempt		Desire to die	
			M	*SD*	*M*	*SD*			*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Azerbaijan	195	31.1	2.4	1.6	2.9	1.2	129	20.5	2.2	1.5	3.2	1.3	2.7	1.6	3.0	1.2
Egypt	114	17.5	2.5	1.5	2.4	1.3	46	7.1	2.2	1.6	2.9	1.3	2.8	1.6	3.1	1.4
Indonesia	95	31.7	2.0	1.5	1.3	0.8	12	4.0	1.3	1.2	1.8	1.0	2.7	1.9	2.5	0.9
Iran	160	22.9	3.1	1.6	2.1	1.3	36	5.1	1.8	1.1	3.1	1.3	2.5	1.6	3.1	1.3
Jordan	87	12.4	2.6	1.5	2.5	1.3	39	5.6	2.1	1.1	3.0	1.3	2.7	1.5	2.9	1.3
Lebanon	87	12.3	2.4	1.5	2.1	1.3	36	5.1	1.8	1.2	3.0	1.5	2.9	1.6	2.7	1.1
Malaysia	5	0.9	1.8	0.4	2.2	0.4	5	0.9	2.0	0.7	2.6	0.5	2.8	0.4	3.4	0.9
Pakistan	152	21.7	2.9	1.7	2.9	1.4	48	6.9	1.9	1.1	3.3	1.4	2.8	1.6	3.3	1.1
Palestine	174	23.6	2.7	1.6	2.2	1.3	125	17.6	2.1	1.3	2.7	1.4	2.2	1.3	2.6	1.3
Saudi Arabia	439	38.7	3.2	1.6	2.3	1.3	152	13.4	2.0	1.4	2.9	1.3	2.9	1.7	3.5	1.2
Tunisia	136	19.2	2.7	1.6	2.3	1.2	35	5.0	1.6	1.0	2.9	1.5	3.6	1.8	2.9	1.3
Turkey	181	24.1	2.8	1.7	2.8	1.2	49	6.5	2.2	1.5	3.6	1.1	2.6	1.5	3.3	1.1
Total	1825	22.1	2.8	1.6	2.4	1.3	712	8.6	2.0	1.3	3.0	1.3	2.8	1.6	3.1	1.2
χ^2 or *F*	465.17*		7.43*		14.63*		319.99*		1.30		2.90*		1.74		3.51*	

* All chi-square and F values are significant $p < 0.01$

Orderings of country frequency, seriousness, timing and death desire ratings from the lowest to the highest mean values:

Suicide Ideation:

Frequency: Malaysia, Indonesia, Lebanon = Azerbaijan, Egypt, Jordan, Palestine = Tunisia, Turkey, Pakistan, Iran, Saudi Arabia

Seriousness: Indonesia, Iran = Lebanon, Malaysia = Palestine, Saudi Arabia = Tunisia, Egypt, Jordan, Turkey, Azerbaijan = Pakistan

Suicide Attempts:

Frequency: Indonesia, Tunisia, Iran = Lebanon, Malaysia = Pakistan, Saudi Arabia, Jordan = Palestine, Azerbaijan = Egypt = Turkey

Severity: Indonesia, Malaysia, Palestine, Egypt = Saudi Arabia = Tunisia, Jordan = Lebanon, Iran, Azerbaijan, Pakistan, Turkey

Time of: Palestine, Iran, Turkey, Azerbaijan = Indonesia = Jordan, Egypt = Malaysia = Pakistan, Lebanon = Saudi Arabia, Tunisia

Desire to die: Indonesia, Palestine, Lebanon, Jordan = Tunisia, Azerbaijan, Egypt = Iran, Pakistan = Turkey, Malaysia, Saudi Arabia

Table 3 Country and gender odds ratios for suicidal ideation and attempts

Countries	Suicidal thoughts				Suicide attempts			
	Country		Gender (women = 1; men = 0)		Country		Gender (women = 1; men = 0)	
	OR	*(95% CI)*	*OR*	*(95% CI)*	*OR*	*(95% CI)*	*OR*	*(95% CI)*
Azerbaijan	1.72*	(1.43 — 2.07)	2.05*	1.40 — 2.98	3.61*	(2.88 — 4.52)	2.16*	1.39 — 3.36
Egypt	0.73*	(0.59 — 0.90)	3.18*	1.96 — 5.16	0.80	(0.58 — 1.09)	2.71*	1.33 — 5.54
Indonesia	1.52	(1.18 — 1.96)	0.81	0.47 — 1.38	0.39*	(0.22 — 0.70)	2.01	0.41 — 9.83
Iran	1.19	(0.99 — 1.44)	0.96	0.66 — 1.39	0.64**	(0.45 — 0.90)	0.38**	0.18 — 0.81
Jordan	0.43*	(0.34 — 0.55)	1.08	0.65 — 1.78	0.53*	(0.38 — 0.75)	0.93	0.46 — 1.88
Lebanon	0.44*	(0.35 — 0.55)	2.60*	1.55 — 4.38	0.51*	(0.36 — 0.72)	1.71	0.83 — 3.51
Malaysia	0.03*	(0.01 — 0.08)	2.37	0.21 — 27.27	0.14*	(0.06 — 0.35)	2.39	0.21 — 27.43
Pakistan	0.98	(0.81 — 1.19)	1.43	0.97 — 2.12	0.77	(0.57 — 1.05)	1.17	0.61 — 2.23
Palestine	0.90	(0.75 — 1.09)	1.10	0.75 — 1.62	2.12*	(1.69 — 2.65)	1.16	0.74 — 1.83
Saudi Arabia	2.90*	(2.50 — 3.37)	1.26	0.96 — 1.64	1.69*	(1.37 — 2.09)	2.03*	1.31 — 3.15
Tunisia	0.87	(0.71 — 1.06)	1.69**	1.14 — 2.53	0.57*	(0.40 — 0.80)	2.79*	1.29 — 6.03
Turkey	1.15	(0.96 — 1.38)	1.46**	1.01 — 2.10	0.74	(0.55 — 1.00	1.14	0.60 — 2.17

$df = 1$ for all; * Wald statistics are significant $p < 0.01$; ** Wald statistics are significant $p < 0.0.5$

participants from Azerbaijan, Palestine and Saudi Arabia yet were significantly smaller for participants from Indonesia, Iran, Jordan, Lebanon, Malaysia and Tunisia.

Table 2 shows that while Pakistani, Iranian and Saudi Arabian students reported having had the most frequent thoughts of suicide, Malaysian, Indonesian, Lebanese and Azerbaijani students reported the least frequent suicidal thoughts. Turkish, Azerbaijani and Pakistani students rated their suicidal thoughts as the most serious yet Indonesian, Iranian and Lebanese students as the least serious. The most frequent suicide attempters were from Azerbaijani, Egyptian and Turkish samples, least frequent attempters were from Indonesian, Tunisian, Iranian and Lebanese samples. While Azerbaijani, Pakistani and Turkish suicide attempters rated their attempts as the most serious, Indonesian, Malaysian and Palestinian attempters the least serious. Palestinian, Iranian, and Turkish students reported the most recent attempts yet Lebanese, Saudi Arabian and Tunisian students reported the most earlier attempts. Pakistani, Turkish, Malaysian and Saudi Arabian attempters expressed the intense desire to die at most, Indonesian, Palestinian and Lebanese attempters expressed the same motive at least.

In the total sample, suicidal thoughts were significantly more common in women (B = 0.42, $\text{Wald}_{(1)} = 52.47$, $p < 0.001$, OR = 1.52, 95%CI = 1.36 — 1.70) than men. Table 3 shows also that the odds for suicidal thoughts were significantly larger for women than men in Azerbaijan, Egypt, Lebanon, Tunisia and Turkey. In the whole sample, significantly more women than men reported attempting suicide (B = 0.44, $\text{Wald}_{(1)} = 24.17$, $p < 0.001$, OR = 1.54, 95%CI = 1.30 — 1.87). Table 3 displays that the odds for suicide attempts were significantly larger for women than men in Azerbaijan, Egypt, Saudi Arabia and Tunisia yet it was significantly smaller in Iran.

Significantly more participants who were younger (B = −0.08, $\text{Wald}_{(1)} = 56.77$, $p < 0.001$, OR = 0.93, 95%CI = 0.91 — 0.95), whose mothers died ($\chi^2 = 5.84$, $p < 0.05$, OR = 1.54, 95%CI = 1.08 — 2.18), whose parents separated ($\chi^2 = 53.08$, $p < 0.001$, OR = 2.25, 95%CI = 1.80 — 2.81), and those with larger number of siblings (B = 0.04, $\text{Wald}_{(1)} = 12.94$, $p < 0.001$, OR = 1.04, 95%CI = 1.02 — 1.06) reported suicide ideation.

Similarly, significantly more participants who were younger (B = −0.10, $Wald_{(1)} = 34.68$, $p < 0.001$, OR = 0.91, 95%CI = 0.88 — 0.94), whose mothers ($\chi^2 = 13.90$, $p < 0.001$, OR = 2.22, 95%CI = 1.44 — 3.40) and fathers ($\chi^2 = 8.18$, $p < 0.01$, OR = 1.52, 95%CI = 1.14 — 2.04) died, whose parents separated ($\chi^2 = 39.19$, $p < 0.001$, OR = 2.45, 95%CI = 1.83 — 3.27) and those with larger number of siblings (B = 0.06, $Wald_{(1)} = 16.93$, $p < 0.001$, OR = 1.08, 95%CI = 1.06 — 1.09) stated attempting suicide.

Methods Used to Attempt Suicide

Table 4 displays the number and percentages of suicide attempts by country. The two most frequently used methods for attempting suicide were by taking chemicals, i.e. pills, and using a sharp instrument, e.g. knife. As the table shows, methods used for attempting suicide differ significantly between countries, $\chi^2_{(88)} = 248.54$, $p < 0.001$.

Methods used for attempting suicide differed significantly between genders, $\chi^2_{(8)} = 73.97$, $p < 0.001$. Methods of hanging ($\chi^2_{(1)} = 15.22$, $p < 0.001$, OR = 0.33, 95%CI = 0.19 — 0.59), using fire arms ($\chi^2_{(1)} = 14.62$, $p < 0.001$, OR = 0.17, 95%CI = 0.06 — 0.47), jumping ($\chi^2_{(1)} = 14.15$, $p < 0.001$, OR = 0.35, 95%CI = 0.20 — 0.62), and drowning ($\chi^2_{(1)} = 3.92$, $p < 0.05$, OR = 0.42, 95%CI = 0.18 — 1.02) were significantly more likely to be used by men but taking chemicals such as pills ($\chi^2_{(1)} = 37.21$, $p < 0.001$, OR = 3.13, 95%CI = 2.15 — 4.56) and using a sharp instrument ($\chi^2_{(1)} = 4.48$, $p < 0.05$, OR = 1.58, 95%CI = 1.03 — 2.40) were more likely to be used by women.

Methods of suicide attempts differed significantly according to whether an attempt required medical attention or not, ($\chi^2_{(1)} = 21.04$, $p < 0.01$. Significantly more attempts involving taking chemicals such as pills required medical attention ($\chi^2_{(1)} = 12.77$, $p < 0.001$, OR = 1.88, 95%CI = 1.33 — 2.66) but significantly fewer attempts involving a sharp instrument ($\chi^2_{(1)} = 7.90$, $p < 0.01$, OR = 0.53, 95%CI = 0.33 — 0.83) and other methods ($\chi^2_{(1)} = 4.94$, $p < 0.05$, OR = 0.48, 95%CI = 0.25 — 0.93) required medical attention.

Medical Attention

Of 712 suicide attempters, 612 (85.96%) responded to the question about what happened after the latest attempt. An overwhelming majority ($n = 412$, 67.30%) said "nothing happened because it was not serious". One hundred and eleven (18.10%) said they were conscious and taken to hospital and discharged after a few hours. Fifty-two (8.50%) said they were conscious and taken to hospital and stayed there for a day or more for treatment. Finally, 37 (6.00%) said they were unconscious and taken to hospital and stayed there for a day or more for treatment after the attempt. Thus, suicide attempts by 200 (32.70%) participants required medical attention.

Comparison of participants whose attempts required medical attention to those whose attempts did not require medication attention revealed that fewer attempts by women (women $n = 108$, 27.8% versus men $n = 91$, 40.8%; $\chi^2 = 10.85$, OR = 0.56, 95% CI = 0.40 — 0.79) required medical attention however the two groups did not differ in age, number of siblings, parental separation and loss. Compared to participants whose attempts did not require medication attention, those whose attempts required medical attention rated their attempts as more serious (M = 2.76, SD = 1.25 versus M = 3.57, SD = 1.28, $t_{(607)} = 7.42$, $p < 0.001$, Cohen's d = 0.64) and gave higher death desire ratings (M = 2.91, SD = 1.22 versus M = 3.57, SD = 1.16, $t_{(603)} = 6.34$, $p < 0.001$, Cohen's d = 0.55). The two groups were similar in the frequency ratings and timing of their attempts.

Table 4 Methods used for attempting suicide by country

Countries	Hanging		Fire arms		Throwing		Jumping		Sharp Instr.		Drowning		Chemicals		Poisoning		Other	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Azerbaijan	10	8.3	3	2.5	4	3.3	12	10.0	21	17.5	9	7.5	41	34.2	6	5.0	14	11.7
Egypt	1	2.2	0	0.0	2	4.4	3	6.7	6	13.3	1	2.2	19	42.2	4	8.9	9	20.0
Indonesia	0	0.0	0	0.0	0	0.0	1	8.3	5	41.7	1	8.3	2	16.7	2	16.7	1	8.3
Iran	5	13.9	0	0.0	0	0.0	2	5.6	7	19.4	0	0.0	15	41.7	1	2.8	6	9.7
Jordan	5	13.5	0	0.0	0	0.0	5	13.5	6	16.2	3	8.1	12	32.4	1	2.7	5	13.5
Lebanon	4	11.1	4	11.1	3	8.3	3	8.3	5	13.9	0	0.0	15	41.7	1	2.8	1	2.8
Malaysia	0	0.0	3	60.0	2	40.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Pakistan	2	4.2	1	2.1	2	4.2	3	6.3	16	33.3	2	4.2	13	27.1	7	14.6	2	4.2
Palestine	13	28.9	2	4.4	5	11.1	4	8.9	9	20.0	1	2.2	7	15.6	2	4.4	2	4.4
Saudi Arabia	10	6.6	2	1.3	3	2.0	13	8.6	46	30.3	4	2.6	56	36.8	2	1.3	16	10.5
Tunisia	2	5.7	1	2.9	0	0.0	5	14.3	6	17.1	1	2.9	18	51.4	0	0.0	2	5.7
Turkey	2	4.1	5	10.2	2	4.1	4	8.2	2	4.1	0	0.0	29	59.2	1	2.0	4	8.2
Total	54	8.7	21	3.4	23	3.7	55	8.9	129	20.8	22	3.5	227	36.6	27	4.4	62	10.0

While the odds for attempts requiring medical attention were significantly greater for the attempts being from Lebanon ($\chi 2$ (1) = 7.02, $p < 0.01$, OR = 2.44, 95% CI = 1.24 — 4.80), and Malaysia ($\chi 2$ (1) = 10.39, $p < 0.01$, OR = 0.1.03, 95% CI = 1.01 — 1.05), yet smaller for the attempts being from Saudi Arabia ($\chi 2$ (1) = 9.77, $p < 0.01$, OR = 0.51, 95% CI = 0.33 — 0.78).

Motives for Attempting Suicide

Participants who attempted suicide gave the highest ratings to the two escape related items (to escape for a while from an impossible situation; to get relief from a terrible state of mind) and to one item related to social motives (to make people sorry for the way they've treated me; frighten or get someone back). Table 5 presents the means and standard deviations for the two motives for attempting suicide factor scores by country. The countries significantly differed in the mean scores of escape and of social motives for attempting suicide. The highest mean of escape motives was noted in Saudi Arabian, Turkish and Iranian attempters yet the lowest were seen in Malaysian, Indonesian and Palestinian attempters. The highest mean of social motives was observed in Azerbaijani, Iranian and Pakistani attempters while the lowest were noted in Turkish, Saudi Arabian and Indonesian attempters.

The mean of escape motive scores for men (M = 3.04, SD = 1.14) and women (M = 3.18, SD = 1.11) were similar, t(603) = 1.53, $p > 0.05$ while the mean of social motive scores for men (M = 2.61, SD = 1.11) were significantly greater than the mean of social motive scores for women (M = 2.30, SD = 1.17), t(602) = 3.25, $p < 0.01$.

Table 5 Mean escape and social motives for attempting suicide by country

Countries	Escape motives		Social motives	
	M	*SD*	*M*	*SD*
Azerbaijan	2.77	1.21	2.58	1.18
Egypt	3.03	1.18	2.42	1.15
Indonesia	2.56	0.92	2.24	1.37
Iran	3.83	1.00	2.78	1.35
Jordan	2.81	0.92	2.39	0.98
Lebanon	2.65	0.99	2.57	0.98
Malaysia	2.40	0.55	2.53	0.68
Pakistan	3.38	1.04	2.98	1.27
Palestine	2.59	0.95	2.48	1.14
Saudi Arabia	3.50	1.04	2.10	1.07
Tunisia	2.77	1.00	2.25	1.15
Turkey	3.56	0.94	2.08	1.01
Total	3.13	1.12	2.41	1.15
F values*	8.19		3.28	

* df for F values for escape motives = $_{(11, 594)}$ and for social motives = $_{(11, 593)}$. Both F values are significant at $p < 0.001$

Orderings of country escape and social motive factor scores from the lowest to the highest mean values:

Escape motives:

Malaysia, Indonesia, Palestine, Lebanon, Tunisia, Azerbaijan, Jordan, Egypt, Pakistan, Saudi Arabia, Turkey, Iran

Social motives:

Turkey, Saudi Arabia, Indonesia, Tunisia, Jordan, Egypt, Palestine, Malaysia, Lebanon, Azerbaijan, Iran, Pakistan

While self-hanging to attempt suicide was inversely associated with escape motives, r = 0.10, $p < 0.05$, taking chemicals (pills) was positively related to escape motives, $r = 12$, $p < 0.01$. Only self-poisoning was related to endorsing more social motives, $r = 0.09$, $p < 0.05$.

Iranian ($r = 0.16$, $p < 0.001$), Saudi Arabian ($r = 0.19$, $p < 0.001$) and Turkish ($r = 0.12$, $p < 0.01$) attempters endorsed escape motives to attempt suicide to a greater extent than others, yet Lebanese ($r = -0.10$, $p < 0.05$), Palestinian ($r = -0.13$, $p < 0.01$) and Azerbaijani ($r = -0.16$, $p < 0.001$) attempters obtained lower escape motive scores than others. Iranian ($r = 0.08$, $p < 0.05$) and Pakistani ($r = 0.15$, $p < 0.001$) attempters obtained higher social motive scores while Saudi Arabian ($r = -0.15$, $p < 0.001$) and Turkish (r = 0.09, $p < 0.05$) attempters had lower social motive scores than others.

There were statistically significant correlation coefficients between escape motives and, self-rated severity of attempts ($r = 0.21$, $p < 0.001$) and intensity of desire to die ($r = -0.31$, $p < 0.001$). The social motives were related only to the time of latest attempt ($r = -0.11$, $p < 0.01$).

Legal Status of Suicide

Age standardized suicide rates (per 100,000 population) for countries where suicide is illegal were not different than the rates for countries where there is no legal sanction against suicide (rates for both sexes Z = −0.38, $p > 0.05$; men Z = −0.29, $p > 0.05$; women Z = 0.57, $p > 0.05$). Suicidal thoughts were equally frequent in the countries where suicide is illegal and in those where there is no legal sanctions against suicide, ($\chi 2$ (1) = 0.39, $p > 0.05$, OR = 1.03, 95% CI = 0.93 — 1.15) but suicide attempts were more frequent in the countries where suicide is illegal than in others, ($\chi 2$ (1) = 10.12, $p < 0.01$, OR = 1.28, 95% CI = 1.10 — 1.50). Equal numbers of attempts in these two group of countries required medical attention, ($\chi 2$ (1) = 2.31, $p > 0.05$, OR = 0.77, 95% CI = 0.55 — 1.08).

In countries where suicide is illegal participants reported having had suicidal thoughts more frequently (M = 2.99, SD = 1.64 versus 2.61, SD = 1.62, t(1752) = 4.82, $p < 0.001$) and expressed greater death desire in their attempts (M = 3.23, SD = 1.26 versus 3.00, SD = 1.23, t(625) = 2.18, $p < 0.05$) than their counterparts in countries where there is no legal sanction against suicide. The two groups were similar in seriousness of both suicidal thoughts and attempts and, frequency and timing of the attempts.

Discussion

This study revealed some aspects of nonfatal suicidal behavior in university students from 12 Muslim majority countries. Our findings, in line with some previous work, suggest that, suicidal thoughts (22.1%) and attempts (8.6%) are frequent events in young adults in Muslim majority countries despite explicit condemnation of suicide by Islam [17, 19, 27, 28]. These percentages speak for themselves in that so many gifted young women and men have considered and attempted to kill themselves despite a potential for a happy and productive life ahead. Mental disorders are associated with suicidal mortality [29, 30] and the burden of disease estimates indicate that the burden of mental disorders is rising and highest in the 25–49 age group in the Eastern Mediterranean Region [31] from where the majority of samples in this study originated.

It is interesting to note that the rates of suicidal ideation and attempts are comparable to or higher than the rates observed in university students in The United States [32, 33] and China

[34]. Considering the attitude of Islam to suicide one would have expected to see lower rates of suicidal ideation and attempts in the Islamic world. In the last decade Muslim societies have faced serious challenges. Political instability, lack of freedom and liberties, unemployment, gender inequality, large youth population competing for limited resources and dissatisfaction with the existing regimes are the major challenges [35, 36]. The high suicidal thought and attempt rates might reflect these instable and threatening social conditions.

The results from this multinational study show clearly that the frequencies of suicidal behaviors vary across nations included in the study. Compared to the rest, significantly more students from Azerbaijan, Indonesia and Saudi Arabia reported having thought to kill themselves in contrast to significantly fewer students from Egypt, Jordan, Lebanon and Malaysia reported suicide ideation. Significantly more students from Azerbaijan, Palestine and Saudi Arabia reported attempting suicide in comparison to fewer students from Indonesia, Iran, Jordan, Lebanon and Malaysia. In a previous multinational study, Eskin and colleagues found that significantly more Palestinian and Saudi Arabian students said that they attempted to kill themselves [20]. In line with this finding, Palestine had the largest burden of mental disorders among the EMR countries [31].

In surveys, what does an affirmative response to a question on suicide attempt entail is not clear. To gauge the nature of suicidal thoughts and attempts in detail participants were asked about their perceptions of frequency, seriousness, timing and death desire in their attempts. Frequency and seriousness ratings of participants with suicidal thoughts from national samples differed significantly in their responses from one another. Saudi Arabian, Iranian, Pakistani and Turkish students reported having entertained such thoughts more frequently than others. Students having more frequent suicidal ideation rated their thoughts more serious ($r = 0.22$, $p < 0.001$). Pakistani, Azerbaijani, Turkish and Jordanian students reported their suicidal thoughts to be more serious than others. Turkish, Pakistani, Azerbaijani, Iranian students rated their attempts more serious than others. Saudi Arabian, Malaysian, Turkish, Pakistani students reported having had more death desire in their attempts than others. Participants with more frequent attempts rated their attempts as more serious ($r = 0.19$, $p < 0.001$), as more recent ($r = -0.26$, $p < 0.001$) and involving more death desire ($r = 0.14$, $p < 0.01$). Students with more serious attempts reported more death desire in their attempts ($r = 0.58$, $p < 0.001$).

A self-reported suicidal behavior may have multiple meanings. One way of gauging the nature of suicide attempts is to see whether an attempt required medical attention or not. According to our results, 67.3% of attempters said that nothing happened after the attempt because it was not serious. Thus, only 32.7% of attempts required some form of medical attention. Significantly more attempts in Malaysian and Lebanese in contrast to fewer attempts from Saudi Arabian samples required medical attention. Further, our results revealed that attempts requiring medical attention were rated as more serious and involving more death desire than the attempts not requiring medical attention. The reason for most attempts not requiring medical attention may be due to three reasons. First, the lack of or scantiness of mental health services might lie behind this observation. Another reason might be the mental stigma. It is noted that mental stigma is widespread among Muslims [37]. A third reason might be an overlap between non-suicidal self-injurious acts and suicide attempts. Non-suicidal self-injurious acts are far more frequent than suicidal attempts and constitute a major risk factor for suicide [38]. It is possible that participants with suicide attempts requiring medical attention perceived their attempts as more serious and expressed greater amounts of death desire than those whose attempts did not require medical attention.

Suicide methods vary across cultural and/or national [39] and racial groups [40]. The most frequent methods used for attempting suicide, in this study, were taking chemicals e.g. pills,

using a sharp instrument, jumping from a high place and hanging, and they showed a large variation across nations under scrutiny. The variation of methods by country reflects probably the ease at reaching these means. It is interesting to note that significantly more attempts involving taking chemicals required medical attention, but fewer attempts involving use of sharp instrument required medical attention. Self -injurious behaviors such as cutting and carving the skin [41] has a potential to evolve into suicidal attempt [42]. However, it is interesting to note that significantly more attempts involving taking chemicals required medical attention, but fewer attempts made use of sharp instrument required medical attention.

Suicidal behavior and method choice show a gendered pattern. Women report suicidal thoughts and attempts more often than men yet men kill themselves more often than women [43]. Further compared to men, women choose less lethal methods for suicide [44, 45]. In line with this point, the present study revealed that significantly more women than men reported suicidal ideation (in the total sample, Azerbaijani, Egyptian, Lebanese, Tunisian and Turkish samples) and attempts (in the total sample, Azerbaijani, Egyptian, Saudi Arabian and Tunisian samples) but more men than women reported attempting suicide in the Iranian sample. More men than women reported using more lethal methods (hanging, fire arms, jumping and drowning) however more women than men used less lethal methods (taking pills and using sharp instrument). Accordingly, fewer attempts by women than men required medical attention.

Peoples' motives for attempting suicide may vary across cultural, gender, age groups and so on. Consistent with previous work [26] suicide attempters in our study endorsed escape motives to a greater extent than social motives. Attempters with higher mean of escape motives rated their attempts more serious and reported higher levels of death desire in their attempts. While Iranian, Turkish, Saudi Arabian and Pakistani attempters had the highest mean of escape motives Indonesian, Palestinian, Lebanese and Tunisian attempters had the lowest mean of escape motives. While Pakistani, Iranian, Azerbaijani and Lebanese attempters had the highest mean social motives Turkish, Saudi Arabian, Indonesian and Tunisian attempters had the lowest mean of social motive scores.

The goal of any legal sanction against suicidal behavior, whether it is based on religious or secular grounds, should be to lower the frequencies of suicidal behavior thereby save lives. But does it function as intended? Our results show that prohibiting suicidal behavior by law does not work in an intended direction. Official suicidal mortality rates and the frequencies of self-reported suicidal thoughts in the countries with and without legal sanction against suicide were similar. On the contrary, self-reported suicide attempts were more frequent in the countries with legal sanction against suicide than in those with no such sanction. Moreover, participants in the countries where suicide is illegal reported having had more frequent suicidal thoughts and expressed greater death desire in their suicide attempts than their counterparts in countries where suicide is not forbidden by law. Making suicide illegal may aggravate the further stigmatization of an already stigmatized phenomenon. This in turn may function as an obstacle against help seeking and a hinder for social connectedness which are both shown to be associated with lower propensity for suicidal behavior [2, 46, 47].

Limitations

Although current findings shed some light on the variation and the nature of suicidal phenomena in university students in Muslim majority countries, they should be approached with caution for several reasons. First, we have no claim that our samples are representative of

the general populations of countries under scrutiny. The university students are representative of neither the young segments of countries nor the whole populations. Second, though anonymous, self-administered paper and pencil questionnaires may not be suitable for collecting data on culturally sensitive topics such as suicide. Web-based surveys may be more suitable for this purpose. Since data collection was done via a web-based survey, greater reports of suicidal ideation and attempts in Saudi Arabian sample and lower frequencies in Jordanian, Malaysian and Pakistani samples may be reflecting the effects of the medium of data collection. Third, the cross-sectional nature of our study does not permit one to infer causality. Fourth, self-report nature of the data should be kept in mind when interpreting some aspects such as medical attention and so on.

Conclusions

Results from this comparative study of suicidal thoughts and attempts in young adults from 12 Muslim countries may have several implications for science, prevention and policy. First, the percentages of students reporting nonfatal suicidal behavior are high despite prohibiting religio-cultural attitudes to suicide and show considerable cross-national variation. Therefore, the national health policy makers should consider developing national strategies for tackling this serious health problem. Second, having legal sanctions against suicide does not lessen the frequencies of suicidal behavior. Making suicide illegal may indeed prevent suicidal persons from seeking help when they are in an urgent need. Further, making it illegal may present suicide as a means for rebellion for youth. Third, asking whether someone has attempted suicide may be an ambiguous question and therefore should be followed by an inquiry about what happens after an attempt. Our results showed that 67% of those reporting suicide attempt said that nothing happened afterwards because it was not serious. Therefore, future scientific investigations should bear this in mind. Fourth, given the variations in the frequencies of self-reported suicidal thoughts and attempts between countries with similar cultural background, future studies may benefit from an examination of cultural meaning of suicidal behavior. Finally, further scientific investigations on suicidal behavior in the Muslim majority world are warranted.

Compliance with Ethical Standards

Conflict of Interest There is no conflict of interest for this paper.

Ethical Approval Ethical or IRB approval was obtained in all study sites (countries). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Since participation in the study was voluntary and full anonymity was guaranteed informed consent was not obtained from all individual participants. This was written in the first page of the survey.

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