

Factors associated with suicidal behaviour among depressed patients in Penang, Malaysia

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Abstract

Introduction: This study aims to highlight the factors associated with suicidal behavior among patients with depressive disorders.

Material and methods: A retrospective (Jan 2002 – Dec 2007) evaluation of medical records was done at the psychiatric clinic at the Penang (Malaysia) Public Hospital. Data was analyzed using Statistical Package for Social Science SPSS version 13[®]. Chi-square (χ^2) test was used to assess the association among variables. Odds ratios were calculated. Multiple logistic regression was applied to identify the predictors for suicidal behavior.

Results: Of 298 patients, 99 patients reported having thoughts of suicide. Overall, female respondents, particularly Chinese, constituted the majority reporting suicidal thoughts ($p = 0.01$). Cigarette ($p < 0.01$) and alcohol use ($p < 0.01$) were found to be associated with suicidal ideation. Among patients with medical comorbidities, diabetics were at a high risk for suicidal thoughts (odds ratio – OR = 1.05, 95% confidence interval – CI 0.45-2.46). In terms of social problems, marital and relationship difficulties were the main risk factors (OR = 2.03, 95% CI: 1.16-3.58). The significant predictors for suicidal behavior were found to be smoking and alcohol use (adjusted $R^2 = 0.39$, F change = 75.55, $p < 0.01$).

Conclusions: Chinese females were found at higher risk of suicidal ideation, as were smokers and alcohol users. The elderly aged 50 and over were also at a higher risk, followed by adolescents and youths aged 15-24 years. Comorbid medical complications and social problems were other factors that may contribute to suicidal ideation among the patients with depressive disorders.

Key words: suicidal behaviour, Penang Public Hospital, comorbidities, social problems, smoking and alcohol use.

Introduction

Depression with suicide attempts is a public health challenge around the world. The World Health Organization (WHO), 1996 has provided evidence that in the United States (US), more than 30,000 individuals commit suicide annually, and the estimated loss of productivity due to suicide is over \$11.8 billion [1-4]. Globally, it is estimated that one million suicides are recorded annually [1, 2]. According to the WHO, suicides share the highest burden of intentional injuries in developed countries [5] and a massive increase in the suicide rate is expected in the coming decades [6, 7]. In response to the anticipated elevation in the suicide rate, the WHO and the US government have been highly motivated to expand their

knowledge on the incidence of and the factors associated with both fatal and non-fatal suicidal behaviour [2, 3, 8]. It is believed that such efforts will aid in the planning of public health policies in this regard [2, 3, 8]. While discussing the factors associated with suicide, one cannot ignore the mental disorders that pose a potential risk for suicidal behaviour and self-harm. Also, many studies have identified ethnic differences in the incidence of mental disorders and suicide [5], but very few researchers have considered the cultural epidemiology of self-harm. It is therefore essential to investigate the issue of suicide in diverse societies [5, 6], since culture does affect the rate and method of self-harming across countries [8-10]. Other factors playing a vital role in suicide rates include social segregation, unemployment, and financial strain [1-4, 11, 12].

Scenario in Malaysia

Malaysia is a multicultural country, with an estimated population of 27 million. The population of Malaysia comprises Malays (Bumiputras), Chinese, Indians, and other minorities. A literature search revealed that Murungesan and Yeoh (1978) were the first to record the suicide rate in Malaysia [13]. They reported a high incidence of suicide among men, with an estimated male to female ratio of 2.9 : 1. Indians were found to have the highest rate of suicide, followed by the Chinese and Malays. However, other studies conducted in the year 1980 reported the male to female suicidal ratio to be 1 : 2.8 at the psychiatric ward at the Kuala Lumpur General Hospital [14]. Earlier studies reported a higher incidence of suicide among Indians, particularly among women [15-19].

The Malaysian Health Minister revealed in an interview that the estimated national average for suicide is 13 for every 100,000 people in the population, compared to just eight in the 1980s [20]. However, a senior consultant psychiatrist at the Hospital Universiti Kebangsaan Malaysia believes that this figure could actually be higher: "Due to various cultural, religious and legal prohibitions, suicides are grossly under-reported in Malaysia. Among Indians the estimated suicide rate is 30 to 35 in 100,000 compared with 15 Chinese and 6 Malays in every 100,000" [20].

According to the Head of Psychiatry Services at the Ministry of Health Malaysia, mental disorders, depression, emotional stress, relationship problems, anxiety, poverty, physical abuse, alcoholism, drug abuse, unemployment, and financial problems are possible risk factors for suicide in the Malaysian society. It has also been highlighted that men are four times as likely as women to successfully kill themselves. This is because men are less likely to

seek help; they tend to employ more violent methods than women and are also more likely to abuse drugs and/or alcohol [20].

In a letter of intent, the Malaysian National Institute of Health [21] mentioned the unavailability of reliable and more recent data on the suicide rate in Malaysia. The earliest study in this regard was conducted in 1995 [19]. Afterward, there has been little information available. This study aims to provide the incidence of suicidal behaviour among depressed patients at the psychiatric Out Patient Department (OPD), public hospital Penang since there is no current or recent study that focuses on this area. Moreover, this study will also highlight the possible factors associated with suicidal behaviour.

Material and methods

This is a descriptive study based on retrospective evaluations of the medical records at the psychiatric Out Patient Department, public hospital Penang. Penang is one of the thirteen states and is geographically situated in northern Malaysia. It has an estimated multi-ethnic population of 1.5 million, comprising Malays (42.5%), Chinese (46.5%), Indians (10.6%) and others (0.4%) [22].

Patients

All registered patients medical records from January 2002 to December 2007 at the psychiatric Out Patient Department were reviewed. A total of 410 cases were registered during this time frame, of which 298 cases had a confirmed diagnosis of depressive disorders. Those cases with confirmed diagnosis of depression ($n = 298$) were considered for inclusion in this study. A data collection form was used to collate the information from the patients' records, such as socio-demographic data, family and personal medical history, comorbid medical complications, and types of symptoms reported. In case further information was required, patients on follow-up were also interviewed.

Terminology and definitions in suicide research

Standard definitions are used for terms such as "suicide" and "suicidal ideation" [23-25]. "Suicide" is defined as the act of intentionally ending one's own life, while "suicidal ideation" refers to thoughts of engaging in behaviour intended to end one's life. "Suicide attempt" refers to engagement in potentially self-injurious behaviour in which there is at least some intent to die [26, 27].

Ethical considerations and statistical analysis

The study protocol was approved by the Clinical Research Centre (CRC), Penang General Hospital,

and the Ministry of Health, Malaysia. The data were analysed using the statistical software SPSS version 13[®]. The data with quantitative variables were expressed in terms of mean (\pm standard deviation – SD) and range while the qualitative variables were expressed as frequency and percentage. However, to further evaluate the association of race/ethnicity, gender, and age group with the incidence of suicidal ideation, a χ^2 test was applied. Furthermore, odds ratios were observed, and multiple logistic regression was applied to identify the relationship predictors/risk factors (i.e. smoking, alcohol use, social problems and medical complications) that potentially contribute to subsequent suicidal thoughts [1-4, 11, 12, 20, 47]. Four models were defined. The first model determined whether there was a significant association between suicidal ideation and smoking. The second model examined the association between suicidal ideation and alcohol use. The third model evaluated the association between suicidal ideation and social problems (financial, job related problems, educational issues, relationship problems, childhood problems). The final regression model determined whether there is a potential effect of medical complications (renal dysfunction, relapse of depression, ischemic heart disease, gastritis, stroke, diabetes mellitus, hypertension) on the suicidal ideation. Goodness of fit for the models was tested using R^2 , and overall level of statistical significance was checked through F-test by using suicidal ideation as a dependant variable. Values α less than 0.05 were considered significant.

Results

A total of 298 patient records were reviewed. The evaluation revealed that 99 patients reported having suicidal thoughts. Overall, the highest number of patients reporting suicidal thoughts were females, particularly Chinese ($\chi^2 = 12.18$, $df = 5$, $p = 0.01$), followed by Indians and Malays. Moreover, those disclosing cigarette smoking ($\chi^2 = 46.48$, $df = 1$, $p < 0.01$) and alcohol use ($\chi^2 = 73.29$, $df = 1$, $p < 0.01$) were more likely to report suicidal ideation. Details on the association of demographics with suicidal thoughts are shown in Table I. Of the 99 cases, 16 (15.2%) had made one or more suicide attempts. The majority, i.e. 12 (80.00%), of these attempters were Chinese, followed by Malays (2 [13.30%]) and Indians (1 [6.70%]) (Table II).

Risk factors for suicidal ideation

Evaluation of the patients' medical records highlighted four possible risk factors for suicidal ideation: a) comorbid medical complications, b) social problems, c) smoking, and d) alcohol use. The data show that depressed patients with comorbid diabetes mellitus were at a high risk for

suicidal thoughts (odds ratio – OR = 1.05, 95% confidence interval – CI 0.45-2.46). Nearly all the patients had some social problems but those reporting marital and relationship problems were found to be at a higher risk (OR = 2.03, 95% CI 1.15-3.56). However, those with a smoking habit (OR = 7.10, 95% CI 3.94-2.83) and alcohol use (OR = 3.69, 95% CI 1.99-6.85) had the highest risk of suicidal ideation in comparison to others (Table III). To further clarify the predictors for suicidal behaviour, regression modelling was done using suicidal behaviour as the dependant variable and the four risk factors (comorbid medical complication with prevalence of depression, social problems, smoking and alcohol use) as the predictors. The significant predictors for suicidal behaviour were smoking and alcohol use (adjusted $R^2 = 0.39$, $p < 0.01$) (Table IV).

Discussion

Research on the epidemiology of suicide has resulted in a number of conclusions. Global approximations have shown that suicide continues to be a leading cause of death, and it is possible that there will be a substantial increase in the numbers over the next several decades [28]. Similarly, the findings of the current study demonstrate a significant increase in the number of cases reporting suicidal ideation from the year 2002 to 2007. The actual cause of this increase is still unknown, but it may be due to an increase in awareness among the public regarding suicide and suicidal ideation, resulting in a decline in the rate of underreporting. Another factor associated with underreporting may be the fact that the mental healthcare providers who assess psychiatric disorders use clinical diagnoses rather than standardised or validated assessment scales. The records demonstrated that a validated scale for the assessment of suicidal behaviour was only used in 35 (35.4%) of the cases [29]. More patients may have been identified if a validated scale had been used to assess suicidal behaviour. However, further research needs to be conducted on this factor as a cause of underreporting of suicidal ideation.

Nexus of demographic factors and suicidal ideation

In the current study, the majority had reported suicidal ideation rather than suicide attempts. On ethnic grounds, Chinese were found to be at a high risk for suicidal ideation, followed by Indians and Malays. These findings contradict with the past findings that reported a higher incidence of suicide among Indians [15, 17, 18, 30]. The factors responsible for this difference may be the population characteristics in the state of Penang, as the majority of the population residing in Penang Island are Chinese, followed by Malays, Indians, and others. An

Table I. Demographic information on patients with and without suicidal ideation (N = 298)

Demographic information	Suicidal ideation (n = 99) n (%)	No suicidal ideation (n = 199) n (%)	Value of p
Year			
2002	1 (8.3)	11 (91.2)	$\chi^2 = 14.51, df = 5$ $p = 0.01$
2003	7 (29.2)	17 (70.8)	
2004	11 (18.3)	49 (81.7)	
2005	25 (34.7)	47 (65.3)	
2006	20 (40.8)	29 (59.2)	
2007	35 (43.2)	46 (56.8)	
Gender			
Male	36 (28.1)	92 (71.8)	$\chi^2 = 4.51, df = 2$ $p = 0.05$
Female	63 (37.1)	107 (62.9)	
Race/ethnicity			
Chinese	61 (84.7)	11 (15.3)	$\chi^2 = 12.18, df = 5$ $p = 0.01$
Malay	17 (22.1)	60 (77.9)	
Indian	21 (42.9)	28 (57.1)	
Age [years] Median \pm SD 46 \pm 16.8 Range 15-84			
15-24	22 (50.0)	22 (50.0)	$\chi^2 = 12.88, df = 7$ $p = 0.05$
25-30	11 (45.8)	13 (54.2)	
31-35	4 (22.2)	14 (77.8)	
36-40	9 (33.3)	18 (66.7)	
41-45	9 (37.5)	15 (62.5)	
46-50	12 (30.8)	27 (69.2)	
> 50	32 (26.4)	89 (73.6)	
Marital status			
Single	35 (36.5)	61 (63.5)	$\chi^2 = 11.01, df = 5$ $p = 0.05$
Married	48 (27.9)	124 (72.1)	
Widowed	6 (50.0)	6 (50.0)	
Divorced	10 (55.6)	8 (44.4)	
Occupation			
Not mentioned in record	16 (42.1)	22 (57.9)	$\chi^2 = 9.41, df = 7$ $p = 0.22$
Professional	8 (22.2)	28 (77.8)	
Students	17 (47.2)	19 (52.8)	
Stay at home only	12 (27.9)	31 (72.1)	
Unemployed	3 (37.5)	5 (62.5)	
Retired	29 (41.4)	41 (58.6)	
Worker	14 (20.1)	53 (79.1)	
Smokers	64 (64.6)	35 (35.4)	$\chi^2 = 46.48, df = 1$ $p < 0.01$
Alcoholics	52 (52.5)	47 (47.5)	$\chi^2 = 73.29, df = 1$ $p < 0.01$

important issue in this regard is religion. Suicide is a prohibited act in Islam and virtually all Malays are Muslims, so we can assume that religion is one of the factors that prohibit Malays from thinking of or making a suicide attempt [31]. Moreover, the fear of psychiatric hospitalization, loss of face, and dishonour to their families may be other factors accounting for the low incidence or underreporting of suicide among Malays [20, 32].

The majority of Chinese and Indians are Buddhists and Hindus, respectively. Buddhism promotes the attitude among its believers not to commit acts such as taking one's life [33], while Chinese values do permit suicide in certain situations, such as to

maintain honour and integrity [34]. Similarly, in Hinduism suicide is allowed in some cases, especially as an escape from present difficulties [35].

In addition to religion and ethnicity, one cannot ignore the other demographic factors, such as gender, age, marital status, and occupation. The records indicate that females were at a high risk, particularly Chinese females aged 50 years, followed by the age group of 15-24 years. Previous studies in this regard had reported a high incidence of suicide among Indian females aged under 30 years [7, 15, 18, 30], but according to the recent facts, men were found four times more likely to commit suicide than women [20]. Our findings reveal the male to female

Table II. Demographic information on patients who had made a suicide attempt

Demographics	N = 15	Percentage
Race/ethnicity		
Chinese	12	80.00
Malay	2	13.30
Indian	1	6.70
Gender		
Male	2	13.30
Female	13	86.70
Age [years]		
15-24	6	40.0
25-30	3	20.0
31-35	1	6.70
36-40	1	6.70
41-45	0	0.00
46-50	2	13.30
> 50	2	13.30
Marital status		
Single	9	60.00
Married	3	20.00
Widowed	1	6.70
Divorced	2	13.30
Smokers	10	66.70
Alcohol users	6	40.00
History of medical complications		
Hypertension	3	20.00
Diabetes mellitus	2	13.30
Gastritis	1	6.70
Social problems		
Relationship problems	7	46.60
Childhood problems	1	6.70
Financial problems	1	6.70

ratio to be 1 : 1.75. Among young female patients aged 15-24 years, educational and relationship problems were obvious complicating factors [20]. However, among the patients aged over 50 years, medical complications were observed to be a possible factor for depression which further leads to suicidal ideation [16, 17, 40]. The main medical complication proved to be diabetes mellitus; in other words, it can be assumed that those with diabetes mellitus were more likely to report suicidal ideation.

Table IV. Predictors for suicidal ideation

Model	R	R ²	Adjusted R ²	F Change	Df	Significant F change
1	0.49	0.24	0.24	96.56	df 1 = 2 df 2 = 295	< 0.01
2	0.79	0.39	0.39	75.56	df 1 = 2 df 2 = 295	< 0.01
3	0.18	0.03	0.01	0.69	df 1 = 6 df 2 = 290	0.65
4	0.12	0.01	-0.09	0.64	df 1 = 5 df 2 = 291	0.73

Dependant variable: Suicidal ideation. Model 1: predictors (smoking), Model 2: predictors (smoking and alcohol use), Model 3: predictors (social problems): financial, job related problems, educational issues, relationship problems, childhood problems, Model 4: predictors (medical problems): renal dysfunction, relapse of depression, ischemic heart disease, gastritis, stroke, diabetes mellitus, hypertension

Table III. Medical and social history of patients with and without suicidal ideation

Medical and social history	Odds ratio	95% CI
History of medical complications		
Hypertension	0.82	0.39-1.71
Diabetes mellitus	1.05	0.45-2.46*
Stroke	0.59	0.06-5.80
Ischemic heart disease	0.41	0.08-2.02
Gastritis	0.98	0.32-3.05
Previous depressive episodes	0.56	0.26-1.25
Renal dysfunction	0.92	0.16-5.17
Social problems		
Marital/relationship problems	2.03	1.15-3.56*
Childhood problems	3.32	0.72-5.17
Educational issues	1.15	0.23-5.88
Job related problems	0.57	0.16-2.09
Financial problems	1.07	0.46-2.49
Smokers	7.10	3.94-2.83*
Alcohol use	3.69	1.99-6.85*

*Significant p value less than 0.01, CI – confidence interval

Risk factors for suicidal behaviour

Psychiatric disorders on the whole have been consistently reported as a risk factor for suicidal behaviour/ideation [36-39]. About 90-95% of the people who die by suicide had some type of psychiatric disorder at the time of the suicide [40]. Those reporting low mood, poor impulse control, alcohol/substance use, and/or psychotic and personality disorders are at the highest risk for suicide and suicidal behaviour/ideation [27, 36, 38, 39, 41-43], while the presence of multiple disorders is associated with an even more elevated risk [36, 37, 43-45]. The present study revealed that diabetes mellitus, marital and relationship problems, smoking, and alcohol use are conspicuous potential risk factors for suicidal ideation. Regression modelling revealed the contribution of smoking and alcohol use to suicidal behaviour to be about 39.0% ($p < 0.01$). The latest statistics of the use of alcohol and cigarettes in Malaysia revealed a total consumption of 12.7% of beer and about 0.70% avail-

ability of alcohol drinks in Malaysia [46]. However, the overall incidence of smoking among Malaysians is about 31.40% and the majority among these are young men aged 15-30 years [47]. Although it is difficult to draw any conclusions or associate any one factor with suicidal behaviour [32, 48, 49], our findings point to the need for a thorough screening of patients with depressive disorders and current smoking [50] and alcohol use.

In conclusion, the overall findings suggest that Chinese females are a higher risk group, both in terms of suicide attempts and suicidal behaviour. Smoking and alcohol use are central risk factors associated with suicidal behaviour. The elderly aged 50 years and over are at higher risk, followed by adolescents and youths aged 15-24 years. In addition to smoking and alcohol abuse, a history of medical complications and social problems are other factors that may contribute to suicidal ideation among patients with depressive disorders.

The small sample size is one of the main limitations of this study. Furthermore, this was a retrospective study it is possible that some information such as patient socio-economic and financial profile, clinical symptoms and other social or medical predictors that may help us in drawing a pin point conclusion were missed or not recorded in the medical records.

There is an immediate need to improve the management of patients' records at the psychiatric clinics in Malaysia. Certain demographic information, such as occupation, employment information, social issues, and income status, which may be helpful in uncovering the risk factors for suicidal ideation, are often missing in the medical records. The Ministry of Health Malaysia should link all the psychiatric healthcare settings through online software that covers all aspects, such as date of registration, diagnosis, types of symptoms reported, proposed therapy, suicidal thoughts, suicide attempts, follow-up, recovery, and default rate. This initiative would not only help the Ministry to get mental health updates in Malaysia but also help to design some strategies for the management of patients with suicidal ideation. Once patients with suicidal ideation are identified, community psychiatric care services can help in preventing suicidal attempts by such patients.

Randomised trials can be designed to further study the correlation between smoking and alcohol abuse on the one hand and suicidal attempts and suicidal ideation on the other. There is also a need to study the nexus of social, ethnic, and cultural issues with the incidence of suicidal behaviour. Finally, it would be more effective if future studies focus on the monthly rather than annual incidence of suicide, as such data may provide insights into the effects of seasonal, economic, or regional changes.

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