

Original research
**Predictors of suicidal ideation among depressed inpatients
in a Malaysian sample**

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Abstract: This study aims to determine the clinical and psychosocial predictors of suicidal ideation among depressed inpatients in a Malaysian sample. Seventy-five psychiatric inpatients with a depressive disorder according to the Structured Clinical Interview for DSM-IV Axis I Disorders-Clinical Version (SCID-CV) were assessed between May 2007 and December 2008 for the presence or absence of suicidal ideation, severity of suicidal ideation (Scale for Suicidal Ideation, SSI), severity of depression (Beck's Depression Inventory, BDI), recent life event changes (Social Readjustment Rating Scale, SRRS) and other relevant clinical and psychosocial factors. Suicidal ideation was present in 75% of subjects. Bivariate analysis showed that significant factors for suicidal ideation ($p < 0.05$) were previous suicide attempt, current and previous alcohol abuse or dependence, current poly-substance abuse or dependence, any current substance use disorder, hopelessness, a change in sleep and social activities. Multivariate logistic regression showed that independent predictors of suicidal ideation were previous suicide attempt (OR=31.16, 95% CI=3.16-307.05), higher total scores of SSI (OR=1.58, 95% CI=1.15-2.18) and higher total scores of SRRS (OR=1.009, 95% CI 1.002-1.016). In a multi-ethnic, heterogeneous society, the known predictors of suicidal ideation among depressed inpatients i.e. previous suicide attempts, severity of suicidal ideation and possibly recent life events, are also applicable. The small sample size and urban tertiary locale limits the generalizability of these findings.

Keywords: suicidal ideation, predictors, depressed inpatients, Malaysia

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The assessment of suicidal ideation forms an important part of the management of depressed inpatients. McAuliffe (2002) highlighted the clinical utility of suicidal ideation as an implementable marker for suicide risk assessment and prevention. Suicidal ideation generally precedes more serious suicidal behavior such as attempted and completed suicide. Inpatients with mood disorders carry a very high risk of suicide. Angst et al.'s (2002) long-term follow-up study reported a Standardized Mortality Rate of 18.04 for suicide among inpatients with mood disorders. Depressive disorders were found to be the commonest diagnoses in a sample of patients who had attempted or completed suicide while receiving treatment in a Taiwanese university hospital psychiatric unit (Cheng et al., 2009). Morgan and

Stanton (1997) identified suicidal ideation as a paramount index of short-term suicide risk in a sample of psychiatric inpatients in England whereby most (74-83%) suicides that occurred in that population had expressed suicidal ideation prior to committing suicide. Coryell and Young's (2005) prospective study among depressed patients in an American university hospital also showed that suicidal ideation was a predictor of eventual suicide. Therefore, it is important to understand the interplay of multiple risk factors at the proximal end of the suicidal spectrum in terms of early detection and suicide prevention strategies.

Previous studies have identified the following risk factors for suicidal ideation among patients with mood disorders: alcohol disorder, hopelessness, low-level of socio-occupational functioning, poor perceived social support (Sokero et al., 2003), previous suicide attempts and severity of depression (Alexopoulos et al., 1999). In Asia, which has the highest burden of suicide in the world (Beautrais & Mishara, 2008), there is a growing body of literature on risk and protective factors of suicidal behavior (Vijayakumar et al.,

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2005; Wai et al., 1999; Wei & Chua, 2008). However, data are still lacking on predictors of suicidal ideation in depressed inpatients, especially amongst heterogeneous societies in Asia's developing regions. This study aims to determine the clinical and psychosocial predictors of suicidal ideation in a sample of Malaysian inpatients with depressive disorder.

Method

Participants and procedures

The study population was recruited from the National University of Malaysia Medical Centre (UKMMC), a national, tertiary-level, semi-government teaching hospital in Kuala Lumpur, Malaysia. This article presents baseline data of a larger naturalistic prospective study of the predictive risk factors for suicidal behavior among inpatients with depressive disorders. A hundred and thirty patients with a clinical diagnosis of a depressive disorder were screened for recruitment within the study period of May 2007 and October 2008. Eligible subjects included psychiatric inpatients between the ages of 18 to 76 years that were treated for a depressive disorder according to DSM-IV. Other inclusion criteria were as follows: able to comprehend Malay (national language of Malaysia) or English, able to give consent and not too psychotic or ill to complete the clinical interview and assessment. Seventy-five consecutive inpatients with a depressive disorder diagnosis according to the Structured Clinical Interview for DSM-IV Axis I Disorders, Clinician Version (SCID - I/CV) (First et al., 1997) were recruited into the study. Excluded patients were as follows: ineligible patients of which 11 did not give consent and 15 could not comprehend English or Malay; non-responders of which two were too ill to be interviewed and 30 were discharged before the complete assessment could be performed (Figure 1). The response rate was 64.6% of eligible patients. Study subjects were significantly older (mean age = 43.8 years, SD = 12.1) compared to non-responders (mean age 38.5 years, SD = 12.7, $p = 0.027$, 95%CI = 0.61-10.67). Otherwise, there were no significant differences between study subjects and non-responders in terms of gender ($p = 0.068$) and ethnicity ($p = 0.394$). The Medical Research and Ethics Committee of UKM Medical Centre granted ethics approval for this study.

A clinical interview was conducted with all the study subjects by the first author within 72 hours from their admission to the ward. The interviews were conducted in a private room. Subjects were given assurance of confidentiality. The following data on socio-demographic and clinical factors were gathered during the clinical interview: suicide attempt (current and previous),

suicidal ideation, previous psychiatric admission or a newly diagnosed case on admission, co-morbid chronic medical conditions, psychotic or melancholic features, compliance to psychiatric medication, family history of attempted or completed suicide and history of sexual abuse. Compliance was assessed based on the patient's self-report of not missing more than 30% of prescribed medication over a month (Scott, 2000). In this study, suicide attempt was defined as any act of self-harm with explicit or inferred intent to die (O'Carroll et al., 1996; Oquendo et al., 2004; Sokero et al., 2005). Occurrence of a suicide attempt was determined based on both the clinical interview and psychiatric records. A current suicide attempt referred to any suicide attempt that occurred within a month prior to clinical interview. A previous suicide attempt referred to any previous history of suicide attempt. Suicidal ideation was defined as the intention (thought) of attempting suicide that was present within the period of admission and clinical interview. Two aspects of suicidal ideation were studied: the presence of suicidal ideation was determined by a clinical interview and psychiatric records. Secondly, the severity of suicidal ideation was assessed with the Scale for Suicidal Ideation (SSI) (Beck et al., 1979) and documented as a continuous score.

SCID - I/CV was used for Axis I diagnoses including substance use disorders and anxiety disorders. SCID -I /CV is a semi-structured, interviewer-rated diagnostic instrument that has been used in research as a gold standard in determining the accuracy of clinical diagnosis (Shear et al., 2000). The national language (Malay) version of the Beck Depression Inventory (BDI) was used to assess depression severity (Chan et al., 2011). The internal reliability coefficient (Cronbach's alpha) of this Malay version of the 21-item BDI was 0.956 (Chan et al., 2011). Psychosocial factors were assessed based on patients' self-report of the magnitude of life event changes within the past 12 months according to the Malay version of the Social Readjustment Rating Scale (SRRS) (Othman, 1986). The original SRRS was shown to have good concordance (Spearman's rho: 0.97 to 0.91) between Malaysian and American samples in terms of the order of magnitude to changes in life events (Woon et al., 1971). The Malay version of the SRRS used in this study was from a Malay version translated by Othman (1986), including the addition of twenty questions that Othman had omitted from the original SRRS. Both this author and Othman used the back-translation technique. The Scale for Suicidal Ideation (SSI) (Beck et al., 1979), an interviewer-administered rating scale, was used to measure the severity of suicidal ideation. SSI has been shown to have adequate construct and convergent validity as well as moderately high internal consistency (Cronbach

Table 1: Differences in socio-demographic characteristics between depressed inpatients with and without suicidal ideation

Characteristic	Suicidal Ideation	No Suicidal Ideation	All patients	Significance χ^2 , (df), p
Total patients, n (%)	56 (74.7)	19 (25.3)	75 (100)	
Age (years), mean (SD)	42.7 (11.5)	47.2 (13.6)	43.8 (12.1)	0.167 ^a
Female, n (%)	31 (73.8)	11 (26.2)	42 (56)	0.037, (1), $p = .847$
Ethnicity, n (%)				5.195, (2), $p = .074$
Malay	17 (60.7)	11 (39.3)	28 (37.3)	
Chinese	26 (86.7)	4 (13.3)	30 (40)	
Indian	13 (76.5)	4 (23.5)	17 (22.7)	
Religion, n (%)				7.678, (2), $p = .104$
Muslim	16 (59.3)	11 (40.7)	27 (36)	
Buddhist-Taoist	15 (93.8)	1 (6.3)	16 (21.3)	
Hindu	10 (76.9)	3 (23.1)	13 (17.3)	
Christian	14 (82.4)	3 (17.6)	17 (22.7)	
Others	1 (50)	1 (50)	2 (2.7)	
Married, n (%)	38 (76)	12 (24)	50 (66.7)	0.141, (1), $p = .707$
High educational level [†] , n (%)	52 (78.8)	14 (21.2)	66 (88)	3.290 ^b , (1), $p = .07$
Unemployed, n (%)	22 (68.8)	10 (31.3)	32 (42.7)	1.033, (1), $p = .309$

Note: [†]High educational level refers to high-school and tertiary level education; a. $t = 1.397$, d.f.=73, independent t -test; b. Yates chi-square test

coefficient alphas: 0.84 to 0.89) among psychiatric inpatients (Beck et al., 1979). All the interviews and assessments were conducted by the first author.

Statistical Analysis

A sample size of 75 patients provided a statistical power of more than 80% to identify the main predictor of suicidal ideation that is previous suicide attempts. The Statistical Package for the Social Sciences (SPSS) software, version 12.0, was used in data analysis. The following tests were used in bivariate analysis: chi-square, independent t , Mann-Whitney, Kruskal-Wallis, Pearson and Spearman's rank correlation. Suicidal ideation was analyzed as a dichotomous (yes or no) dependent variable. The severity of suicidal ideation as measured by the SSI was analyzed as a continuous independent variable. The independent predictive risk factors for suicidal ideation were formulated based on multivariate logistic regression models.

Results

The study population of 75 depressed inpatients showed a female to male ratio of 1.3:1 with a mean age of 44 years. In terms of ethnicity, 30 (40%) of the subjects were Chinese of whom 53.3% were Buddhists-Taoists and 46.6% were Christians; followed by Malays ($n = 28$, 37.3%) who were all

Muslims, and Indians ($n = 17$, 22.7%) who were predominantly Hindus (82.4%) (Table 1). These figures from an urban population are consistent with the hospital utilization pattern by different ethnic groups but differ from the composition in the general population which consists of Chinese: 26%, Malays: 65% and Indians: 8% (Lahmeyer, 2004). A majority of subjects was married (66.7%), employed (57.3%) and had at least secondary (high-school) level education (88%) (Table 1). Major depressive disorder (56.2%) was the most common diagnosis followed by bipolar disorder, most recent episode depressed (29.3%); major depressive disorder superimposed on dysthymia (double depression, 6.7%); adjustment disorder with depressed mood (6.7%) and dysthymia (1.3%). A co-morbid diagnosis of substance abuse or dependence disorder was found in 41.3% of the subjects, with nicotine ($n = 25$) and alcohol ($n = 18$) being the commonest substances used. Poly-substance abuse occurred among 14 (18.7%) subjects. The majority of the subjects ($n = 72$, 96%) were treated with antidepressants or mood-stabilizers (Table 2). Suicidal ideation was present in 75% ($n = 56$) of the subjects (Table 1). Factors significantly associated with suicidal ideation were previous suicide attempt, current and previous alcohol abuse or dependence, current poly-substance abuse or disorder, hopelessness (as

Table 2: Differences in clinical characteristics between depressed inpatients with and without suicidal ideation

Characteristic	Suicidal Ideation	No Suicidal Ideation	All patients	Significance χ^2 , (df), p
Suicidal behaviour-related features				
Previous suicide attempt, n (%)	41 (95.3)	2 (4.7)	43 (57.3)	22.79, (1), $p < .001$
Family history of suicide attempt, n (%)	3 (100)	0 (0)	3 (4)	0.124 ^c , (1), $p = .725$
Family history of compl. suicide, n (%)	3 (100)	0 (0)	3 (4)	0.124 ^d , (1), $p = .725$
Depression-related features				
Diagnosis, n (%)				3.193, (4), $p = .526$
Bipolar Disorder	17 (77.3)	5 (22.7)	22 (29.3)	
Major Depressive Disorder	31 (73.8)	11 (26.2)	42 (56)	
Dysthymia	0 (0)	1 (100)	1 (1.3)	
Adjustment Disorder	4 (80)	1 (20)	5 (6.7)	
Double Depression	4 (80)	1 (20)	5 (6.7)	
Psychotic features, n (%)				
Current	19 (86.4)	3 (13.6)	22 (29.3)	2.252, (1), $p = .133$
Lifetime	29 (85.3)	5 (14.7)	34 (45.3)	3.714, (1), $p = .054$
Melancholic features, n (%)				
	30 (75)	10 (25)	40 (53.3)	0.005, (1), $p = .943$
Co-morbid disorders				
Anxiety disorder, n (%)	10 (76.9)	3 (23.1)	13 (17.3)	0 ^e , (1), $p = 1$
Substance abuse/dependence, n (%)				
Nicotine	22 (88)	3 (12)	25 (33.3)	3.524, (1), $p = .06$
Alcohol (current)	18 (100)	0 (0)	18 (24)	8.036, (1), $p = .012$
Alcohol (past)	20 (100)	0 (0)	20 (26.7)	9.253, (1), $p = .002$
Others (including amphetamines, opiates, sedatives)	6 (100)	0 (0)	6 (8)	0.996 ^f , (1), $p = .318$
Any poly-substance	15 (100)	0 (0)	15 (20)	4.798, (1), $p = .028$
Any substance use disorder	28 (90.3)	3 (9.7)	31 (41.3)	6.849, (1), $p = .009$
Chronic medical condition, n (%)	25 (80.6)	6 (19.4)	31 (41.3)	0.998, (1), $p = .318$
Other clinical features				
Newly diagnosed depression, n (%)	11 (78.6)	3 (21.4)	14 (18.7)	0.001 ^g , (1), $p = .975$
Previous psychiatric admission, n (%)	28 (50)	8 (42.1)	36 (48)	0.354, (1), $p = .552$
Medication non-compliance, n (%)	29 (78.4)	8 (21.6)	37 (49.3)	1.807, (3), $p = .613$
History of sexual abuse, n (%)	11 (78.6)	3 (21.4)	14 (18.7)	0.001 ^h , (1), $p = .975$
Symptom scores				
BDI total score t0 mean, (SD)	28.5 (13.2)	20 (11)	25 (13.1)	$p = .014$ ⁱ
Hopelessness (SD)	1.5 (1.1)	0.7 (1.0)	1.3 (1.2)	$p = .006$ ^j
SSI total score t0 median, (SD)	10.5 (7.8)	3 (3)	8 (7.9)	$p < .001$ ^k
SRRS total score t0 median, (SD)	277.5 (207.8)	143 (109)	201 (200.6)	$p = .001$ ^l

c, d, e, f, g, h. Yates chi-square test; i. $t = -2.507$, d.f.=73, independent t -test; j. $t = -2.027$, d.f.=73, independent t -test; k. $Z = -4.858$, d.f.=134, Mann Whitney test; l. $Z = -3.356$, = d.f.=256, Mann Whitney test

Table 3: Differences in psychosocial characteristics between depressed inpatients with and without suicidal ideation

Characteristic	Suicidal Ideation	No Suicidal Ideation	All patients	Significance χ^2 , (df), p
<i>Life change events (SRRS items)</i>				
Change in sleeping habits, n (%)	38 (88.4)	5 (11.6)	43 (57.3)	10.008, (1), p = .002
Change in social activities, n (%)	15(26.8)	0 (0)	15 (20)	4.798 ^m , (1), p = .028

Note: m. Yates chi-square test

measured by BDI item pessimism number 2) as well as higher total scores of BDI, SSI and SRRS respectively (Table 2). An analysis of the individual items in the SRRS showed that a change in sleeping habits was significantly associated with suicidal ideation ($p = 0.02$). There was a significantly higher rate of suicidal ideation among patients with a change in social activities ($p = 0.028$) (Table 3).

Based on multiple logistic regression analysis (Table 4), the independent predictive risk factors for suicidal ideation were previous suicide attempt (OR=31.16, 95% CI=3.162-307.052), and higher total scores of SSI (OR = 1.578, 95% CI = 1.145-2.176) and higher total scores of SRRS, which was marginally significant (OR = 1.009, 95% CI = 1.002-1.016).

Discussion

A vast majority (75%) of patients in this population experienced suicidal ideation. The presence of suicidal ideation in itself may have influenced the decision to hospitalize this group of inpatients. This higher figure compared to 58% in Sokero et al.'s (2003) study, which consisted of a mixed group of inpatients and outpatients, is probably reflective of the greater severity of depression among hospitalized patients. The relatively high rate of lifetime psychotic features (45.3%) compared to Sokero et al.'s (2005) study which included outpatient subjects probably reflects the higher severity of depression among subjects who were exclusively inpatients in this study. In addition to that, almost a third (29.3%) of subjects in this study had bipolar depression which in turn had the highest rate of lifetime psychotic features (68.2%) within other depressive disorders. Angst et al.'s (2002) study showed an even higher rate of lifetime psychotic features (61%) among inpatients with mood disorders whereby the majority (54%) of subjects had bipolar disorder.

Previous suicide attempt emerged as the most robust independent predictor of suicidal ideation. This is an expected finding that is consistent with current suicidological research (e.g., Oquendo et al., 2006). The severity of suicidal ideation as measured by the SSI was another

significant independent predictor of suicidal ideation, a finding that is in line with previous research (Sokero, 2006). Overall, the magnitude of life event changes was found to be a marginally significant independent predictor of suicidal ideation. Monroe et al (2004) also showed that severe life events were associated with suicidal ideation in major depression.

The role of alcohol as a strong risk factor for suicidal behaviour has been well-established in developed and developing nations including Asian countries such as Taiwan and India (Vijayakumar et al., 2005; Wei & Chua, 2008). A case-control study by Maniam in Cameron Highlands among people who have attempted suicide did not show significant association with alcoholism (Maniam, 1994). A more recent study in a sample of clinically depressed Malaysian patients has shown a significant association between co-morbid alcohol used disorder and suicide attempts (Chan et al., 2011). In this study, co-morbid substance disorders did not emerge as independent predictors of suicidal ideation. However, a significant association (bivariate analysis) between current and previous abuse or dependence of alcohol and suicidal ideation was found. The presence of any current substance use disorder was also shown to be significantly associated with suicidal behaviour in this population. Cheng et al. (2000) also showed similar findings in Taiwan although their study sample differed in terms of being in the general population. The finding of poly-substance abuse as a significant factor suggests that the number of substances involved may also play an important role with regards to suicidal behaviour (Borges et al., 2000).

In addition to that, the severity of depression was also significantly associated with suicidal ideation, though not as an independent predictor as was shown by Alexopoulos et al. (1999). There was a significant association between changes in sleep and suicidal ideation. This is in concordance with a review by Bernert and Joiner (2007), which showed that depressed patients with sleep disturbances had an increased risk of suicidal ideation. However, the effect of sleep on suicidal

Table 4: Independent predictive risk factors of suicidal ideation from multivariate logistic regression

Variables	B	S.E.	p	Wald, χ^2	OR	95 % CI	
Previous suicide attempt	3.439	1.167	.003	8.681	31.161	3.162	307.052
SSI total score t_0	0.456	0.164	.005	7.754	1.578	1.145	2.176
SRRS total score t_0	0.009	0.004	.013	6.174	1.009	1.002	1.016

Note: S.E.= Standard Error

Nagelkerke R Square = 0.728

ideation was not shown to be independent of depression severity in our study. Other studies among psychiatric and non-psychiatric outpatients have shown that the association between sleep disturbances and suicidal behaviour, including ideation, remained significant after controlling for the level of depression (Bernert et al., 2005; Krakow et al., 2011). Another factor shown to be significantly associated with suicidal ideation from bivariate analysis alone included a change in social activities. We postulate that maladaptive or high-risk social activities such as alcohol or substance use may play a role in this association.

Hopelessness was shown to be significantly associated with suicidal ideation. The predictive value of hopelessness in terms of eventual suicide has been shown by Beck et al. (1985). However, more recent prospective studies did not find hopelessness to be an independent risk factor for attempted suicide (Oquendo et al., 2006). Larger prospective studies may further clarify the relationship between hopelessness and the progression of ideation to attempts to completed suicide in depressed inpatients.

Ethnicity was not shown to be significantly associated with suicidal ideation in this study. These negative findings raise some interesting questions regarding the role of ethnicity in suicidal behavior. Chan et al. (2011) found that Chinese ethnicity was an independent predictor of suicide attempts in the same study population. That particular finding seemed to suggest that Malay or Indian patients with depression were at a lower risk of attempted suicide compared to Chinese patients. Similarly, albeit in a different population, Chen et al. (2005) found that there was no significant association between ethnicity and suicidal ideation, but significant association was found between ethnicity and attempted suicide. In the light of such findings, we hypothesize that the effect of ethnicity on suicidal behavior may become more prominent at the more severe end of the continuum of suicidal behavior. This study did not find any association between religion and suicidal ideation. In contrast, Zuraida et al.'s (2007) study alluded to religiosity as a protective factor against suicidal ideation. The degree to which different dimensions of religiosity may protect against other forms of suicidal behaviour such as attempted suicide varies across cultures as shown by Sisack et al. (2010) in their

cross-cultural study. Ethnicity and religion are closely intertwined factors, especially in Malaysia where they are highly correlated with each other. For example, practically all Malaysian Malays identify themselves as Muslims. Whether or not mediating factors such as religion exist in the complex relationship between ethnicity and suicidal ideation needs further exploration.

Clinical implications

Clinicians must pay special attention to depressed inpatients with previous suicide attempts, more severe suicidal ideation and a higher magnitude of change in life events as these factors are associated with suicidal ideation which may serve as 'red flags' for a higher risk of suicidal acts. Increased awareness and education in the detection of such predictors of suicidal ideation, especially among 'front-line' clinicians, would play an important role in suicide prevention. Mann et al.'s (2005) review on suicide prevention strategies highlighted the impact of primary care physician education programs targeting depression recognition and treatment on reducing suicide rates.

Limitations

Due to the relatively small sample size, this study runs the risk of a type II error, i.e. insufficient power to detect other significant risk factors of suicidal ideation that may actually exist among the independent study variables. Another limiting factor would be the lack of validation of the self-report scales such as the BDI and the SRRS.

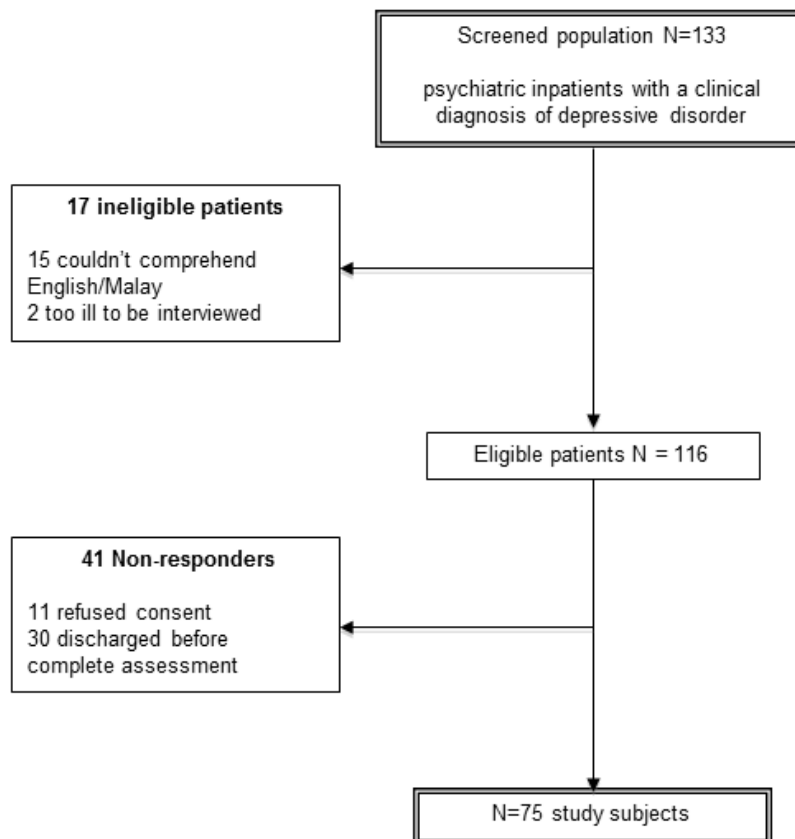
There may have been a selection bias in this sample of patients towards a higher socio-economic class, probably due to the urban study setting as well as the exclusion of patients who were unable to comprehend Bahasa Malaysia or English. This may limit the generalizability of the findings from this study. Some other possible confounding variables that were not studied include the role of media in suicidal behaviour (Pirkis et al., 2006) and co-morbid personality disorders (Hansen et al., 2003).

Conclusion

This study supports the notion that globally established predictors of suicidal ideation among depressed inpatients, i.e. previous suicide attempts, severity of suicidal ideation and possibly recent life events are equally applicable in a multi-

ethnic, heterogeneous society in a developing Asian nation (Malaysia). Further ethnographic research is recommended to delineate the relationship between such socio-cultural factors such as ethnicity and religion with suicidal ideation, especially in the context of exploring potential preventive strategies in terms of the progression of ideation to attempts.

Figure 1: Summary of study respondents



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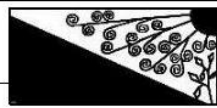
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