Age at onset of first suicide attempt: Exploring the utility of a potential candidate variable to subgroup attempters

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ABSTRACT

Purpose: Our objective was to explore the utility of age at first suicide attempt in identifying subgroups of suicide attempters.
Methods: In a retrospective study design, we collected information from the clinical charts of 895 patients assessed over a seven-year period. Admixture analysis was used to determine the best fitting theoretical model for distribution of age at first attempt that divided the sample. Subsequently, multivariate analysis was performed to identify variables that distinguished the subgroups identified.
Results: The theoretical solution that best explained the observed distribution of age at first suicide attempt was a mixture of two Gaussian distributions with a cut-off of 31 years for the two subgroups. In logistic regression analysis, male gender (Odds ratios [OR] 3.047, 95% Confidence Interval (CI) 1.818–5.106), fewer years of formal schooling (OR 3.384, 95% CI 1.701–6.734) and being married (OR 23.36, 95% CI 10.753–50.000), were more commonly associated with the late onset subgroup (age at first attempt > 31 years). Further, the late onset subgroup had poorer global functioning (OR 0.980, 95% CI 0.962 to 0.998).
Conclusion: Age at onset of first suicide attempt is a useful candidate marker to delineate an early and late onset subgroup among suicide attempters. These results are likely to inform customization of suicide prevention strategies.

1. Introduction

Suicidal behaviour is a complex biopsychosocial outcome seen in numerous psychiatric conditions. Moreover, it includes many subpopulations such as suicide ideators, attempted suicide and completed suicide (Nock et al., 2008; Pandey, 2013; van Heeringen, 2012). A prior history of attempted suicide is one of the strongest predictors of eventual suicide (Diekstra, 1993), and as such, this phenotype has been widely studied from the standpoint of suicide prevention. A growing body of research suggests that there is a need to identify subpopulations of suicide attempters with a view to customize treatment interventions and optimize treatment uptake. In a study employing latent class analysis of suicide attempters, a statistical approach to determine population subgroups based on continuous or categorical observed variables, the authors found evidence for psychiatric diagnostic subgroups of

suicide attempters (Ginley and Bagge, 2017). Leboyer et al. (1998) have suggested that it may be possible to identify homogenous subtypes of conditions by refining phenotype definition. Based on this suggestion, age at onset of the condition has been studied as a key variable in approaches aimed at reducing the heterogeneity of the underlying condition. Some of these have yielded interesting results in diverse psychiatric populations with schizophrenia, bipolar disorder and major depressive disorder (Schürhoff et al., 2004; Tozzi et al., 2011; Zhu et al., 2012).

Preliminary data from suicide research suggest that an earlier age at onset of first suicide attempt may be independently associated with higher familial risk of suicide and greater incidence of childhood trauma (Brent et al., 2003; Roy, 2004a,b). Further, life events that may trigger suicide attempt have been found to vary according to age at first suicide attempt (Heikkinen et al., 1995). The concept of the suicidal

process also implies that age of onset is earlier for suicidal ideation and later for suicide attempts (Thompson et al., 2012). Hence, age at first attempt appears to have potential utility in reducing heterogeneity of suicidal behaviour spectrum by facilitating identification of subgroups. The potential clinical and research benefits of this would include informing suicide prevention activities and catalysis of further research on validation of these subgroups based on factors such as course, genetic transmission and pathophysiology. To date, there has been no formal attempt to validate thresholds based on age at onset of first suicide attempt in our setting. Only two previous studies have looked at subtyping suicide attempters based on age at first attempt (Blasco-Fontecilla et al., 2012; Slama et al., 2009). Both have been carried out in different settings and suggested varying thresholds.

Against this background, we carried out the present exploratory work to identify the optimal threshold of age at onset of first suicide attempt which will yield clinically meaningful subpopulations of suicide attempters in our population. Admixture analysis presents a sophisticated statistical methodology to segregate population samples comprising of several subgroups based on identifying the optimal theoretical mixture for given distribution of a continuous variable. Hence, our objectives were to determine whether age at first suicide attempt could be used as a clinical variable to identify different subgroups among suicide attempters using this approach. Specifically, we sought to evaluate differences in socio-demographic variables, co-morbidity patterns and attempt correlates between subgroups defined by age at first suicide attempt according to admixture analysis.

2. Methods

2.1. Setting and design

The present record-based study was conducted in the Crisis Intervention Clinic (CIC) of the Department of Psychiatry of a tertiary care government hospital in Puducherry, South India. The hospital is located in a semi-urban area and mainly draws its clientele from Puducherry and adjoining districts of Tamil Nadu. Owing to high burden of suicide attempters in this part of the country (Lingeswaran, 2012), the Department of Psychiatry initiated the weekly specialty Crisis Intervention Clinic (CIC) in January 2010 on its outpatient premises to cater to the special needs of this group and to augment follow-up services. As part of hospital protocol, all clients with attempted suicide, following medical stabilization, are referred to this clinic for evaluation and management. The case definition of suicide attempt used in the clinic is the one proposed by Silverman and colleagues - "a self-inflicted, potentially injurious behaviour with a nonfatal outcome for which there is evidence, either explicit or implicit, of intent to die" (Silverman et al., 2007). The team manning the CIC comprises of a consultant psychiatrist, a resident psychiatrist, clinical psychologist and psychiatric social worker. Patients are evaluated by the resident doctor, posted on rotation, using a pre-designed intake proforma. Information is collected from the patient and verified with the key informant. Following discussion with the consultant, a detailed management plan is drawn up that comprises of either outpatient or inpatient based pharmacotherapy and counseling.

2.2. Assessments and procedures

For the present study, we performed a retrospective chart review of all consecutive subjects who were assessed in the CIC over a seven-year period from January 2010 to January 2017. The clinical charts of every patient included a semi-structured proforma designed to tap relevant socio-demographic data. The following structured instruments are also part of the routine assessment for every patient in the CIC:

1 Beck Hopelessness Scale (BHS): This 20 item scale developed by Beck et al. measures the cognitive construct of hopelessness (Beck

et al., 1974). It includes 9 positively framed and 11 negatively framed statements about one's future. The subject has to read the statements and respond true/false as it applies to him or her. The scale is designed to measure three major aspects of hopelessness, that is, feelings about the future, loss of motivation, and expectations. The internal reliability of the scale has been found to be high. The scale has been validated for age 17–80 years and has been previously used in Indian studies on suicide attempters (Kattimani et al., 2015). Subjects were assessed for the presence of hopelessness during their visit in the CIC. Total score ranges from 0 to 20; higher scores suggest a higher level of hopelessness.

2 Coping Strategies Inventory-Short Form (CSI-SF): This brief 16 item scale was derived from the 78-item Coping Strategies Inventory (Addison et al., 2007; Tobin et al., 1989). The items are scored on a 5 item Likert scale from 1 to 5 rated as never, seldom, sometimes, often, and almost always. The different forms of self-reported coping responses that are generally used when faced with difficult situations are evaluated. Coping responses are classified into emotion-focused and problem-focused, which are further sub-classified as either engagement type or disengagement type of strategy. Thus, a total of four subscale scores are derived.

3 Presumptive stressful life events scale (PSLES): This scale has been developed and validated in the Indian population and measures stressful life events for an individual (Singh et al., 1984). This 51-item yes-no self-rated scale takes about 5 min to complete. It is based on the Holmes and Rahe scale (Holmes and Rahe, 1967) and includes both positive and negative life events, each having different scores. In the CIC, the PSLES was predominantly used to assess the number of stressful life events in the past one-year period.

4 Global Assessment of Functioning (GAF) Scale: Axis V of the DSM-IV (American Psychiatric Association, 2000) that records the highest level of adaptive functioning, with regard to social relations, occupational functioning, and use of leisure time, demonstrated by the individual during the past one year.

Information collected from the patient as well as the key informant is recorded into the proforma under the guidance of a consultant psychiatrist. Psychiatric diagnoses are made in accordance with the chapter V of International Classification of Diseases-10, clinical descriptions and diagnostic guidelines (World Health Organization, 1992). For the present record-based study, patient data including socio-demographic details and clinical variables including the structured instruments mentioned above were extracted from the clinical charts using standard procedures (Sarkar and Seshadri, 2014).

2.3. Statistical analysis

Routine methods to define sub-groups for continuous variable often use cut-off's as given either by the arithmetic mean, median or percentiles. Admixture analysis is a classification technique which helps to identify various sub-groups or sub-populations by fitting different mixtures of theoretical distributions for given data. For age at first suicide attempt (continuous data), we fitted different mixtures of normal distributions as appropriate. The choice of number of mixtures was determined by the log-likelihood ratio. This statistic provides the significance of adding an extra mixture component to the previous mixture with corresponding improvement in likelihood ratio. The determined mixtures were expressed by respective summary statistics (mean, standard deviation) using expectation maximization algorithm. Weights or mixing proportions gives the proportion of observed data utilized in each of the mixtures. The posterior probability of each age at first suicide attempt belonging to each sub-group (mixture) was calculated using Bayes rule. This helps to identify sub-group cut-offs for further analysis.

Subsequently, the two groups, based on the identified cut-off for age at first suicide attempt were compared on basic socio-demographic and