Suicide in Sri Lanka: points to ponder

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Introduction

Sri Lanka has one of the highest suicide rates in the world. The rate has remained relatively static over the last several years (35 to 47/100 000 population) (1). It has shown a 7-fold increase since the 1950s, and the rate of increase is most marked in young people (2). There are 14 times as many suicide attempts as suicide deaths. More people are estimated to have died from suicide in the last 15 years than in the civil war, and self-poisoning kills more people in rural Sri Lanka than ischaemic heart disease and tropical diseases taken together (3). The high number of deaths in Sri Lanka is at least partly due to the higher fatality rate of 10 to 30% compared to less than 1% in the UK in suicide attempters (4,5). Factors leading to suicide or parasuicide in developed countries would clearly differ from those in countries such as Sri Lanka, and conclusions reached from western studies may not be relevant to our country.

Although a number of descriptive medical studies have been published in our country (4-10) they concentrate on the method of suicide and demographic features of the victims (11,12). No attempt has been made to understand the reasons for suicide and parasuicide. Sociologists have explored this area (13), but their investigations have neglected important clinical aspects of the problem. Collaboration between sociologists and medical researchers would greatly enhance the ability to formulate effective strategies for prevention of suicide (12).

Scope and objectives

The data presented here analyse hospital admissions related to parasuicide and attempt to identify factors which may predispose to parasuicide and influence its management. All investigations were done between January 1993 and December 1997. Ethical approval was obtained from the ethics committees of the Peradeniya and Kelaniya medical faculties.

Retrospective hospital based study of suicide and parasuicide in central Sri Lanka

To obtain socio-demographic data and details of in-hospital care, all cases of parasuicide and suicide admitted over a 5 year period (Jan 1987 to Dec 1991) were traced by examining hospital records. This was done by trained research assistants who were given guidelines for selecting patient records, as it was found that most records do not mention the terms 'suicide' or 'parasuicide', but use diagnoses such as 'poisoning'. Where it was clearly stated that poisoning was accidental, that record was not included in the analysis. The study was carried out at Kandy, Peradeniya, Kurunegala, and Matale hospitals between January 1993 and December 1994. Data from the four hospitals were entered into pretested data sheets and combined for analysis.

The total number of suicides and parasuicides admitted to the hospitals was 6014. There was an increasing trend in suicide related admissions over the five year period, accounting for nearly 1% of all admissions by 1991 (Table 1). The male: female ratio was 1.92: 1. 60% were Sinhalese, and the ethnic distribution of the study population reflected the distribution in the relevant community. Information regarding religion was inadequate. 39.9% of suicides and parasuicides were in the age group 16 to 20 years, and 20.6% in the age group 21 to 25 years. About 60% of admissions occurred in the 16 to 25 years age group. 11.2% of the individuals were over 40 years of age, and 4% were between 11 to 15 years old.

The average number of days spent in hospital ranged from 1.9 days in 1987 to 2.7 days in 1991. Hospital mortality for the period was 18.1% (Table 1), and mainly from acute and subacute effects of poisons or drugs, where intensive care and assisted ventilation were required for management.

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Table 1. Admissions, deaths and diagnoses documented in patient records in parasuicide and suicide related hospital admissions (data from all hospitals combined)

Year	1987	1988	1989	1990	1991
Admissions*	1006 (0.7)	1254 (0.8)	1053 (0.7)	1342 (0.8)	1359 (0.9)
Deaths**	181 (17.9)	229 (18.2)	174 (16.5)	171 (20.1)	223 (17.1)
Documented diagnosis#					
Suicide	0.6	0	1.3	0	0
Attempted suicide	0	0.5	0	0.8	1.1
Parasuicide	0	0	0	0	0
Poisoning	80.5	76.6	76.5	93.7	92.5
Other	18.9	22.9	22.2	5.5	6.2

* Total number (and as a percentage of all hospital admissions within parentheses)

** Total number (and as a percentage of parasuicide/suicide related admissions within parentheses)

As a percentage of parasuicide/suicide related admissions ('accidental poisoning' was usually mentioned distinct from 'poisoning' for legal purposes and was excluded from the analysis).

Ingesting poison or taking an overdose of drugs with suicidal intent accounted for more than 80% of suicide attempts. Ingestion of organophosphorus chemicals was the single most important method, accounting for 60% of attempts. Use of alcohol before or during the act was reported in only 6% cases, from information given in the patient records.

When documenting the diagnosis, the terms 'suicide', 'parasuicide', 'deliberate self-harm' or even 'attempted suicide' were stated in only 42 (0.7%) of the 6014 patient records. The commonest diagnoses recorded were 'poisoning' or 'ingestion of poison' (Table 1). Any reference to special advice given to the patient on discharge from hospital was documented in only 3 patient records. During the whole 5-year study period only 10 patients had a documented referral to a psychiatrist while in hospital, and only 14 were documented as having been referred to a psychiatric clinic on discharge. There was no mention of any form of counselling in the patient records.

Attitudes of hospital personnel towards parasuicide

Illnesses are best treated by a team comprising different categories of health personnel having a positive and sympathetic attitude to the patient and his illness (14). Most medical curriculums in our country concentrate on the learning domains of knowledge and skills. Attitudes are neglected, partly because they are difficult to evaluate. It is a general view that most of our doctors are inept at

evaluating and managing psychological and social aspects of illnesses. Little is known about the attitudes of health personnel to different illnesses in Sri Lanka. We attempted to assess the attitudes of selected groups of hospital health care personnel towards parasuicide and compared these with their attitudes to patients admitted for other illnesses (15).

A validated questionnaire (both in English and Sinhalese) was administered to interns (IMO), registrars and senior house officers (SHO), consultants, nurses and attendants attached to Colombo North and Negombo hospitals. They were requested to record both their personal and professional attitudes towards patients admitted for stroke, heart attack, asthma, kidney failure, leukaemia, congenital heart disease, alcoholic liver disease and parasuicide. A semantic differential scale was used with the extremes marked very sympathetic and very non-sympathetic. The scale had five intervals, the central interval representing neutral feelings. Neutral and sympathetic attitudes were combined and compared with non-sympathetic attitudes for each illness.

Responses to the questionnaire were obtained from 75 (91.5%) of 82 IMOs to whom it was sent, 52 (85.2%) of the 61 registrars and SHOs, 16 (80%) of the 20 consultants, 94 (90%) of the 105 nurses and 67 (95.7%) of the 70 attendants. Non-sympathetic attitudes expressed towards different illnesses are shown in Table 2. A significant proportion of all categories of health personnel expressed non-

sympathy towards parasuicide and alcoholic liver disease compared with their attitudes to other illnesses. There was no significant difference between the expressed personal and professional attitudes.

Association between parasuicide and serum cholesterol levels

Low serum cholesterol is associated with a rise in suicide risk, presumably because it is linked to reduced serotonin in the brain, which may contribute to poor suppression of harmful behavioural impulses (16). Recently, the value of lowering (or low) serum cholesterol concentrations has been questioned (17). A meta-analysis of 6 primary prevention trials suggested that, although coronary heart disease mortality tended to be lower in men who were treated with cholesterol lowering regimens, the overall mortality did not decline because of a significant increase in death from accidents, suicide or homicide (18), whether cholesterol lowering was by drug or dietary intervention. Subsequent studies have reported both positive and negative associations between serum cholesterol and suicide (19,20,21). However, randomised controlled drug trials using statins to reduce cholesterol did not show an increase in suicide rates with reduction in serum cholesterol levels (22,23). The diet of Sri Lankans is more carbohydrate than fat based, and cholesterol levels are generally lower than in people living in developed countries (24). So we investigated whether serum cholesterol and parasuicide are associated in a Sri Lankan population (25).

A prospective case control study was carried out on parasuicides admitted to the University Medical Unit, Colombo North General Hospital, Ragama, from March 1 1996 to January 31 1997. Data were obtained from the individual, relatives, friends and hospital records. Each parasuicide was matched for age, sex, presence or absence of diabetes mellitus and systemic hypertension, substance abuse, body mass index and socioeconomic status (using a scoring system) (26). Parasuicides and controls were not matched for psychiatric illness or personality disorders. Parasuicides with nephrotic syndrome, hypothyroidism, obstructive jaundice or those taking cholesterol lowering drugs were excluded. None of study population admitted to a family history of hyperlipidaemia. Blood samples for cholesterol estimation were collected within 24 hours of admission, as acute illness, surgery and trauma can lead to a drop in cholesterol concentration.

The method of the suicide attempt was classified according to the International Classification of Diseases, tenth revision (ICD-10) on the basis of the level of violence employed (14,27); group (a) 'low violence: ingestion of drugs, petroleum derivatives, pesticides or other agro-

chemicals or inhalation of toxic gases; group (b) 'high violence': hanging, suffocating, drowning, shooting, use of explosives, fire and flames, cutting, jumping from a height and throwing oneself under a moving vehicle. Each parasuicide also underwent an assessment by a specialist psychiatrist who did not participate in the study.

Of 177 parasuicides admitted to hospital 9 died, 5 of them even before a blood sample could be obtained for cholesterol measurement, and were excluded from the analysis. Table 3 summarises the characteristics of the 172 parasuicides (cases) and controls. Agrochemicals were ingested by 115 (66.8%), a drug overdose taken by 25 (14.5%), while other poisons were used by 32 (18.6%). Of the 172, 33 (19.1%) had a psychiatric illness (depression - 31, schizophrenia - 2). 139 were considered to have impulsive personalities; 31 of them needed follow up in the psychiatric clinic for observation before a major psychiatric illness was excluded. All suicide attempts in our study were low violence methods ie. group "a". There was no significant difference between serum cholesterol concentrations of parasuicides and controls (Table 3), or between cases with psychiatric illness and controls.

Association between sociological factors and parasuicide

This study sought to determine social factors associated with parasuicide. It was based on sociological analysis of patient narratives and in-depth patient interviews during the period June 1993 to December 1994. Narratives were recorded while the patients were in hospital (Teaching Hospital, Peradeniya) by a specially trained sociology graduate interviewer. Although 182 parasuicides were admitted during the study period, narratives and interviews could be obtained from only 119 (16 refused to consent, 9 left hospital within 48 hours of admission, and 38 had major psychiatric illness and were excluded). Their mean age was 23.4 years (range 16 to 43). All narratives obtained were recorded in Sinhala in the first person. The following is a summary of the analysis of narratives.

Although suicide attempts appear to arise out of petty issues, they are the result of complex social and cultural dynamics (long standing personal conflicts with sociological implications). Certain untenable personal ideals of life seem to play a contributory role, and social and familial expectations that are not easy to meet are also associated with suicidal ideation. The perception of society as threatening, unfair and exploiting, and a lack of religious base or a life philosophy in the individuals and their immediate environment surfaced many times. In most instances family contexts of these individuals are disrupted, and they do not seem to have the necessary skills to deal with problems.

Table 2. Hospital staff expressing non-sympathetic attitudes to illnesses. Personal attitude followed by professional attitude in parentheses, given as a percentages for each category of staff

Illness	Category of hospital staff				
	Interns (n=75)	Registrars/ SHO (n=52)	Consultants (n=16)	Nurses (n=94)	Attendants (n=67)
Parasuicide*	64 (61.3)	48 (46)	31 (31)	45 (42.6)	67.2 (47)
Alcoholic liver disease*	81.3 (77.3)	76.9 (73.1)	68.8 (62.5)	82.9 (81.9)	64.2 (62.6)
Stroke	8 (5.3)	9.6 (7.7)	12.5 (12.5)	5.3 (4.2)	6 (4.5)
Heart attack	6.7 (5.3)	7.7 (7.7)	6.3 (6.3)	4.2 (3.2)	6 (4.5)
Asthma	5.3 (5.3)	7.7 (7.7)	6.3 (6.3)	4.2 (3.2)	4.5 (2.9)
Kidney failure	8 (8)	9.6 (7.7)	12.5 (12.5)	4.2 (4.2)	6 (6)
Leukaemia	2.7 (1.3)	3.8 (3.8)	6.3 (6.3)	2.1 (2.1)	1.5 (1.5)
Congenital heart disease	0 (0)	3.8 (3.8)	6.3 (0)	0 (0)	1.5 (0)

* $p < 0.01$ compared with stroke, heart attack, asthma, kidney failure, leukaemia, congenital heart disease (Chi-square test).

Table 3. Socio-demographic characteristics and serum cholesterol levels on cases and controls [cholesterol levels in mg/dl; expressed as mean (SD)]

	Cases (n=172)	Controls (n=172)
Males : Females	75:97	75:97
Age (years)* mean (SD)		
males	24 (5)	24 (4.6)
females	19 (4)	19 (4.3)
Median BMI (kg/m²)*	20.4	20.9
Socioeconomic score* mean (SD)	14.3 (2.8)	16.6 (4.7)
Other illnesses:		
Diabetes mellitus	1	1
Hypertension	0	0
Alcoholism	19	19
Serum cholesterol levels:*		
Overall (n=172)	193.5 (7.4)	193.6 (7.0)
Males (n=75)	197.2 (8.8)	197.8 (8.1)
Females (n=97)	190.4 (7.3)	190.3 (6.9)
Psychiatric illness present (n=33)	196.9 (9.2)	196.1 (9.8)#
Impulsive behaviour present (n=139)	192.4 (8.4)	193.1 (7.2)**

* $p = \text{NS}$ for all comparisons (Student's t test)

Not matched for psychiatric illness.

** Not matched for impulsive behaviour.

Table 4. Parasuicide: review two years after the event (n=74)

	Major psychiatric disorders (n=18)	No major psychiatric disorders (n=56)
Mean age years (range)	38 (32-78)	21 (15-38)*
Suicide attempt serious	10 (55%)	1 (2%)*
Re-attempts over last two years	0	0
Suicidal ideation	4 (22%)	0*
'Original problem' not resolved	10 (55%)	3 (5%)*
Shame and guilt	1 (6%)	48 (86%)

*p<0.05 (Chi-square test and Fisher's exact test). **p<0.05 (Student's t test)

Association between mental disorders and parasuicide

To investigate the pattern of mental disorders among parasuicides, a prospective hospital based study was performed at the Teaching Hospital, Peradeniya between June 1993 and May 1994. After emergency medical treatment was given, and the patients were physically stable, all parasuicides underwent a formal psychiatric assessment by the same specialist psychiatrist using a pretested questionnaire and an 8-point depression scale. All patients who were diagnosed as having mental disorders were offered treatment and follow up or referred to a psychiatrist in a hospital nearer their homes.

The suicide attempts were also categorised as either serious attempt or not serious. This was done after considering intent (whether the suicide was carefully planned), the method used and physical effects on the individual (whether the suicide attempt was violent, resulted in severe injury and needed prolonged hospitalisation), and continuing suicide risk as assessed by the psychiatrist. A cohort of them who lived within a 50 km radius of the Peradeniya Teaching Hospital were reviewed at the end of two years after the suicide attempt. This was done by a research assistant who visited the individuals in their homes, often more than once, and interviewed them using a pre-tested questionnaire.

140 parasuicides who were admitted to hospital were studied in this way. [75 (53.5%) were males; mean age 27.1 years (SD 12.1, range 15 to 78 years); 119 (85%) Sinhalese, 13 (9.2%) Tamils, 8 (5.7%) Muslims]. In 129 (92.1%) of them, this was the first suicide attempt. In five (3.5%) it was the second, while in six (4.2%) it was the third attempt or higher. At the psychiatric assessment 45 (32.1%) were diagnosed as having a major psychiatric disorder [depression in 38 (27.1%) patients (20 males), schizophrenia in 7 (5%)]. Among these 45 patients, there were 8 with alcohol depen-

dence. Of the 38 patients who were diagnosed as having depression, 28 (73.7%) had been undetected until the present suicide attempt. 28 (73.7%) of the 38 had been depressed for more than one month, but only 4 (14.3%) of them were on treatment. In 5 (12%) patients the depression was acute, being present for less than one week before the attempt. 95 had no major psychiatric disorder; 39 of them were considered to have an impulsive personality, and the remaining 56 had no detectable mental or personality disorder. All 11 persons with a history of previous suicide attempts were either depressed or had schizophrenia. Those who had a major psychiatric disorder were significantly older [mean 38 years (range 26 to 78)] than those who did not [mean 20.2 years (range 15-40)] (p<0.01. Student's t test). The gender ratios were similar in the two groups.

Based on the assessment described above, 41 (29.2%) suicide attempts were considered serious, with a high risk of a subsequent attempt. This included 26 (68.4%) of the 38 patients with depression, 2 (28.5%) of the 7 with schizophrenia, (and 4 (57.1%) of the 7 who were alcohol dependent). In contrast, the suicide attempt was considered serious in only 2 (5.1%) of the 39 persons with impulsive personalities, and in 7 (14.5%) of the 48 in whom a mental or personality disorder could not be detected.

Of the 140 patients initially referred to the psychiatrist, 85 were eligible for review two years after the suicide attempt, based on distance from the hospital to the home. 11 of them had either left the original address or refused interview. 74 (87.1%) of those eligible were reviewed [male: female = 1.5: 1, mean age 28.1 years (range 17-72). 18 of the 74 had been diagnosed as having a major psychiatric disorder, and were being treated and followed up at psychiatry clinics. Details of the review are given in Table 4. There were no subsequent suicide attempts during the two year period. However, suicidal ideation or feelings that original

problem that made them attempt suicide remained unresolved, were more common among persons with major psychiatric disorders than those without psychiatric illness, whereas guilt and shame about the event was more common among those without major psychiatric disorders.

Discussion

Most of the earlier studies on suicide and parasuicide in Sri Lanka have been based on Registrar General's data and small community based surveys. Many parasuicides, even those admitted to hospitals, go unreported as such. A great many are not classified as 'suicide' or 'parasuicide' in hospital records. This makes the accuracy of the Registrar General's data doubtful. Our study was the largest hospital based survey of suicide and parasuicide conducted in this country. The investigation was done in hospitals, as it was felt that a community survey would be impractical because of socio-cultural factors and the resources at our disposal. Most suicide attempts would be admitted to hospital, and a hospital based study would also give us an opportunity to study some aspects of hospital management of these patients. Because of the retrospective nature of the study, there are limitations. The most important is that heavy reliance had to be placed on data entered in the patient record by hospital doctors who appeared to have little concern for social and psychological aspects of parasuicide. The distinction between accidental and non-accidental poisoning was usually made for legal purposes because, at the time of study, a suicide attempt was considered a criminal offence.

There was an increase in hospital admissions related to a suicide attempt over the 5-year study period, to nearly 1% of admissions by 1991. The socio-demographic characteristics of persons admitted to hospital after a suicide attempt were similar to those reported earlier (4-10). The majority of admissions were in the 16 to 25 year group. The male: female ratio was about 2:1. This male preponderance may reflect the fact that many social, cultural and economic pressures, such as those regarding employment and self esteem, are traditionally borne by Sri Lankan males. There was a trend for increased in-hospital stay and nearly 20% of suicide attempters admitted to hospital died. This could be due to a number of factors; type of poison, severity of poisoning, attitude of hospital staff, resources available in the hospital to manage acute poisoning (especially facilities for intensive care and assisted ventilation), and distance to the nearest hospital. Ingesting poison or taking an overdose of drugs accounted for more than 80% of suicide attempts in this study, with ingestion of organophosphates being the single most important method. This may be due to two reasons; the central region of our country has a strong agricultural base with easy access to agrochemicals, and more violent methods of suicide such as

hanging, setting oneself on fire etc. may not be commonly encountered in a hospital ward setting. There is an urgent need to improve hospital resources for acute management of poisoning, especially facilities for intensive care and assisted ventilation. The easy availability of pesticides and other chemical substances should be restricted. However, naturally occurring alternatives such as yellow oleander seeds are widely available and are increasingly used (12).

A worrisome feature is the apparent lack of concern shown by doctors regarding social and psychological aspects of parasuicide, which are vital for long term management. Doctors seemed to perceive them only as medical emergencies and have apparently failed to provide any type of counselling or psychiatric help in hospital or on discharge. This is despite the well known associations between social and psychological factors and parasuicide, and the continued high risk of suicide among patients with psychiatric illness, especially depression (27,28,29).

A non-sympathetic attitude towards parasuicide and alcoholic liver disease – both acknowledged as national problems – was expressed by a high proportion of all categories of health personnel who were administered the questionnaire. There was little difference between their expressed personal and professional attitudes. This contrasts with the low number of health personnel with negative attitudes to other illnesses. Although attitudes expressed may not always predict subsequent negative behaviour towards patients, non-sympathetic attitudes are known to adversely affect patient management decisions (30), and this seems to be borne out in our retrospective hospital study. Negative attitudes to situations where they must deal with social and psychological aspects of illness points to a deficiency in our medical and paramedical training programs. More emphasis must be placed on teaching and evaluation of attitudes, and training students to adopt a holistic approach to patient management.

There was no significant difference between the serum cholesterol levels of parasuicides and matched controls. The results were similar even when subgroup analyses were performed taking into account psychiatric illness among parasuicide patients. As there was no long term follow up in our investigation, before or after the suicide attempt, it is not possible to be certain whether the cholesterol levels measured were lower than what is usual for the patient. There were relatively few persons with major psychiatric disorders and the controls were not matched for psychiatric illness. Therefore, the comparison of cholesterol levels between psychiatric cases and controls have to be interpreted with caution.

Our results do not agree with the Italian or French studies which found lower cholesterol levels in parasuicide patients compared to controls (20,21) but are sup-

ported by several randomised interventional studies which failed to establish an association between low serum cholesterol and parasuicide (22,23). There are no similar studies from other developing countries with which to compare our results.

There seem to be many conflicts at the level of the family and society in Sri Lankans who attempt suicide. Most of the victims preferred to return to a different environment after surviving. There are societal and cultural demands which cannot be easily met by these individuals. Most of them do not have access to social support systems or possess skills necessary to deal with their problems. A lack of a life philosophy usually provided by religion, heavy familial and social demands, and disruption of social and family bonds, seem to be contributory factors for attempted suicide. These findings are in general agreement with other studies investigating sociological aspects of suicide here (13).

Mental and personality disorders (impulsive personality traits) appear to be common among parasuicides. These are well known associations (27,28,29). In the majority of our cases depression had not been detected before the suicide attempt. The risk of suicide seemed to persist in many with serious psychiatric disorders, and guilt or shame about the attempt were uncommon in this group. In contrast, the great majority who had no psychiatric disorders expressed a sense of shame or regret regarding the act, and continued risk of suicide among them seemed to be low. Our findings emphasise the need for better community mental health care in order to detect and treat serious psychiatric conditions such as depression, and for community counselling programs (village level social support systems) to discuss the problems of youth and improve individual coping skills necessary to deal with them.

Conclusions

Parasuicide continues to be a major cause of hospital admission in Sri Lanka. The majority who attempt suicide are young males. About one in five of those admitted to hospital after an attempt die. Ingestion of pesticides, particularly organophosphates, is the commonest method used. There is an urgent need to improve hospital facilities for the treatment of acute poisoning, including intensive care and assisted ventilation. Doctors seem to perceive parasuicide only as a medical emergency, and appear to lack adequate concern for social and psychological aspects of management. This behaviour may reflect the non-sympathetic attitude that a large proportion of health personnel, including doctors, seem to have towards parasuicide patients.

We did not find an association between low serum cholesterol levels and parasuicide. However, there are strong

associations between parasuicide and social factors, personality disorders and psychiatric illnesses. Two main types of parasuicide were noted in our study. The commoner type is in young people who do not have major psychiatric illnesses, but have an inability to cope with family and social conflicts. In the majority of these cases the attempts are not serious and the continued risk of suicide is probably low. The other type is in older persons, many of whom have serious psychiatric disorders (usually undetected till the event), especially depression, where the attempts are of a serious nature, and probably associated with a continued high risk of suicide.

Preventive intervention should be multi-pronged. For primary prevention, community based social support systems should be commenced to enhance the coping skills of youth. There should also be improvement in community mental health services to detect early and treat serious mental illness. The easy availability of pesticides and toxic chemicals should be restricted, although this would probably be of short term benefit. For secondary prevention to be effective, the negative attitudes of health personnel towards parasuicide should be changed. This can only be achieved by fundamental changes in curriculums so as to emphasise the importance of a holistic approach to patient care.

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