ORIGINAL ARTICLE

Deliberate Self-Harm in South India: Patterns, Outcomes and Public Health Implications from a Retrospective Study

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Abstract

***Background*:** Deliberate self-harm (DSH) represents a largely under-recognized public health crisis in low- and middle-income countries, particularly affecting young adults. Despite its significant contribution to morbidity, mortality, and long-term psychological and socioeconomic consequences, it continues to receive insufficient attention in public health agendas. We aim to describe the socio-demographic and clinical characteristics of patients who presented with DSH to a secondary care hospital in South India.
***Methods*:** This retrospective study was conducted using electronic medical records of patients presenting with DSH to the Emergency Department of a secondary care hospital in South India between 2019 and 2024. Data on sociodemographic characteristics, methods of self-harm, clinical features, and referral outcomes were extracted and analyzed. Descriptive statistics were used to summarize the findings.
***Results*:** Of 61,797 Emergency Department visits over five years, 179 (0.29%) were due to DSH. The mean (SD) age was 31.8 (14.1) years, with a slight female predominance (50.8%); most patients were aged 15–30 years (58.7%). Toxic ingestion was the predominant method, with agrochemicals forming the largest group (31.8%), followed by medication overdose (15.1%) and corrosive ingestion (11.2%); hanging accounted for 17.9% of cases. Most patients were referred to tertiary centres (64.8%), while 22.3% were admitted locally. Emergency department mortality was 1.7%.
***Conclusion*:** DSH remains a substantial public health burden in India, especially among young adults. The high proportion of impulsive, high-lethality attempts highlights the urgent need to strengthen emergency mental health services, pesticide regulation, and preventive strategies at the secondary care level.

Keywords: Deliberate self-harm, Suicide, Poisoning, Medical toxicology, Drug Overdose

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INTRODUCTION

Deliberate self-harm (DSH) remains a significant global public health problem, particularly in low and middle-income countries (LMICs), and often results in visits to hospital emergency departments (EDs) [1]. The pattern of DSH presentations in ED reflects a complex interplay of psychological distress, social factors, and access to means, which varies according to demographic and regional context. Understanding the pattern of DSH in Emergency settings, like the methods employed, frequency of repeat attempts, and demographic characteristics of the individual, is crucial for tailoring intervention and prevention strategies [2]. Despite the urgent nature of DSH cases, there is a significant variability noted in outcomes following ED visits, which is influenced by factors such as the severity of injury, underlying psychiatric conditions, and the availability of follow-up care [3]. Examining these patterns and outcomes in the ED setting provides vital insights into healthcare utilization and highlights opportunities for improving clinical management and suicide prevention efforts.

This study aims to investigate the patterns of DSH presentations to the emergency department of a secondary hospital in South India and analyze their clinical outcomes.

METHODS

Study Setting

This retrospective study was conducted at a 120-bed secondary care hospital in the Chittoor district of Andhra

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Pradesh, India. The hospital serves approximately 600 outpatients daily and provides 24-hour emergency services, with an average daily emergency department (ED) attendance of 33 patients. An electronic medical record (EMR) system is used for clinical documentation.

Study Design and Participants

A retrospective descriptive chart review was conducted. All patients presenting with DSH to the Emergency Department over a five-year period from 1 August 2019 to 31 July 2024 were identified. Patients aged 15 years and above who presented with intentional, self-inflicted injury or poisoning were included.

DSH was operationally defined as any intentional act of self-inflicted injury or poisoning, irrespective of stated suicidal intent, as documented in the emergency physician's clinical notes [4].

DSH cases were identified from the Electronic Medical Records using a combination of physician-entered clinical diagnoses and systematic keyword searches ("poisoning," "self-harm," "suicide attempt," "hanging," "overdose"). Data were collected using a standardized data abstraction form developed for the study. Extracted variables included demographic characteristics (age, sex), date of presentation, method of DSH, emergency department management, and short-term outcomes (discharge, hospital admission, referral, or death). Data were initially recorded on abstraction forms and subsequently entered into EpiData software. Records with missing or unclear information were retained in the analysis, with missing data reported as such; no imputation was performed. Patients presenting with accidental poisoning, unintentional injuries, or adverse drug reactions were excluded.

Bias

Selection bias was minimized by including all consecutive eligible patients presenting with DSH during the study period. Information bias was reduced through the use of predefined variable definitions and a standardized data abstraction form.

Statistical Analysis

Descriptive statistics were used to summarize patient characteristics and clinical variables. Continuous variables were expressed as mean and standard deviation, and categorical variables as frequencies and percentages. Data analysis was conducted using SPSS version 25.

Ethical approval

Ethical clearance was obtained from the Institutional Review Board (IRB Min No. 2410161 dated 16.10.24). Patient confidentiality was ensured through the use of unique identifiers and password-protected databases with restricted access.

RESULTS

During the five-year study period, there were 61,797 Emergency Department (ED) visits, of which 179 (0.29%) were due to DSH. Table 1 summarises the sociodemographic and clinical profile of the study population. The mean (SD) age was 31.8 (14.1) with a slight female predominance (50.8%). Most patients were young adults, with 58.7% aged between 15 and 30 years. A prior history of DSH was documented in only 6 patients (3.3%), while 18 patients (10%) had a recorded history of psychiatric illness. Alcohol use at the time of presentation was noted in 12 patients (6.7%).

The various DSH methods used are shown in Table 2. Toxic ingestion was the predominant method of self-harm. Pesticides and agricultural chemicals constituted the single largest group (31.8%), followed by medication overdose (15.1%) and corrosive ingestion (11.2%). Plant poisons and rodenticides were also frequently encountered. Hanging was the most common non-ingestive method, reported in 17.9%. Other methods, including burns and superficial cutting, comprised 7.8% of cases. All patients underwent emergency evaluation and received appropriate supportive and antidotal therapy in the ED. A subset required advanced interventions, most commonly airway protection, with nearly one-quarter undergoing endotracheal intubation. Decontamination measures such as gastric lavage and activated charcoal administration were used in a smaller proportion.

Table 3 summarises the disposition from the emergency department. The Majority of the patients were referred to tertiary care centres for further management (64.8%), with 22.3% admitted to the secondary care facility. A small proportion left against medical advice. Emergency department mortality was 1.7% (n = 3), and 7 patients (3.9%) were brought dead. Among those admitted to the medical ward, 87.5% were discharged alive, with no in-hospital deaths recorded. The duration of hospital stay was less than two days in 57.5%, three to five days in 40%, and more than six days in 2.5% of admissions.

The most frequently identified toxidrome among patients presenting to the emergency department was cholinergic toxicity (11.5%), followed by sedative–hypnotic toxidrome (2.2%). Among patients admitted to the medical ward, the majority had employed high-lethality methods (81%). Furthermore, 62% demonstrated high intentionality, and 97.2% of DSH events were documented as impulsive in nature, based on emergency physician assessment.

DISCUSSION

This study describes the spectrum, management, and short-term outcomes of patients presenting with DSH to a secondary care hospital in South India. It contributes important data from a level of care that remains underrepresented in the Indian literature, which is largely derived from tertiary care centres.

The sociodemographic profile and methods of self-harm observed in this study are broadly consistent with previous reports from tertiary hospitals in India, particularly with respect to age distribution, near-equal gender representation, and the predominance of poisoning as a method of self-harm. Abhilash et al. reported a similar mean age of presentation (approximately 32 years) with slight female

Table 1. Baseline characteristics and age–gender distribution of patients with deliberate self-harm (n = 179)

A. Baseline characteristics			
Characteristic		**Number of patients (%)**	
Age in years (mean, SD)		31.8 (14.1)	
Female sex		91 (50.8)	
History of previous DSH*		6 (3.3)	
History of past psychiatric illness**		18 (10)	
DSH under influence of alcohol		12 (6.7)	
B. Age-group and gender distribution			
Age group (years)	**Male n (%)**	**Female n (%)**	**Total n (%)**
15–30	50 (27.9)	55 (30.7)	105 (58.7)
31–40	18 (10.1)	20 (11.2)	38 (21.2)
41–50	8 (4.5)	9 (5.0)	17 (9.5)
51–60	9 (5.0)	2 (1.1)	11 (6.1)
>60	3 (1.7)	5 (2.8)	8 (4.5)
Total	88 (49.2)	91 (50.8)	179 (100)

SD Standard Deviation, DSH Deliberate self-harm.
*Previous DSH refers to a documented history of prior deliberate self-harm.
** Information on previously reported or clinically diagnosed psychiatric illnesses was obtained from the medical records.

predominance and agrochemicals being the most commonly used method of self-harm [5]. A notable trend across studies is the declining proportion of agrochemical poisoning, from approximately 46% in earlier reports by Jegaraj et al. (2011–2013) [6] to around 33.5% in 2017–2018 [5] and 31.8% in the present study. Conversely, there has been a marked increase in presentations due to hanging, rising from 5.3% to 8% in earlier studies, to 17.9% in our cohort. This shift suggests evolving patterns of self-harm methods, possibly reflecting changes in access, awareness, and sociocultural influences.

The predominance of agrochemical ingestion continues to reflect the widespread availability of highly hazardous pesticides and agricultural chemicals, particularly in semi-rural and agrarian communities, where impulsive acts may be facilitated by easy access to lethal agents. This finding reinforces the urgent need for policy-level interventions, including the implementation of restricted pesticide lists, regulation of sales, and promotion of safe storage practices [7].

The method of self-harm is influenced by substance availability, occupational exposure, socioeconomic context, and livelihood patterns. In the present study, Amitraz was the most frequently ingested agrochemical. Amitraz, a formamidine compound used as a veterinary ectoparasiticide and agricultural insecticide, is generally associated with favourable short-term outcomes, with most patients showing clinical improvement within 48 hours, as reported in prior systematic reviews [8]. However, the continued widespread availability of such compounds highlights the importance of regulatory control, including prescription-only access and strengthened monitoring of pesticide distribution as effective preventive strategies.

India, now the world's most populous nation, also has the largest population of adolescents and young adults — the most socially and economically productive segment of society. Alarmingly, the country also reports the highest absolute number of adolescent suicide deaths globally. Recent analyses have shown that a substantial proportion of these deaths occur among students in the final years of schooling, those preparing for competitive examinations, or young adults pursuing higher education, most of whom are under 30 years of age [9]. In our study, more than half of the patients were below 30 years, underscoring the disproportionate vulnerability of this age group.

Suicide and DSH are complex, multifactorial phenomena arising from the interaction of biological, psychological, and sociocultural determinants. Among young people, heightened impulsivity, ongoing neurodevelopmental changes, substance use, and increasing capacity to conceptualize and act on suicidal thoughts contribute to elevated risk [10]. Academic stress, perceived failure to meet family expectations, interpersonal conflicts, psychiatric morbidity, and substance abuse are consistently identified as contributors. More recently, institutional-level stressors — including bullying, caste-based discrimination, ragging, and harassment — have been recognized as important drivers of suicidal behavior among students in India [11].

Evidence from large multicentric surveys of Indian college students demonstrates a substantial hidden burden of suicidality, with nearly one-fifth reporting lifetime suicidal

Table 2. Methods of deliberate self-harm among patients presenting to the emergency department (n = 179)

Methods of DSH	Number of patients (%)
Hanging	32 (17.9)
Pesticides/agricultural chemicals	57 (31.8)
Amitraz	(8.4)
Organophosphorus	(7.8)
Pyrethroids	(2.8)
Organophosphorus and pyrethroid	(2.8)
Carbamates	(2.8)
Paraquat	(1.8)
Formamidine$	(1.1)
Cypermethrin/Chlorpyrifos	(1.1)
Cypermethrin	(1.1)
Fenvalerate	(0.5)
Neonicotinoid	(0.5)
Unknown*	(1.1)
Medication overdose	27 (15.1)
Benzodiazepines	(4.4)
Paracetamol	(1.7)
Antihistamines	(1.7)
Antidepressants	(1.1)
Antipsychotics	(0.6)
Multiple medications**	(3.9)
Others	(1.7)
Corrosive ingestion	20 (11.2)
Acids	(8.4)
Alkali	(2.8)
Plant poisons	16 (8.9)
Oleander	(3.4)
Cleistanthus collinus	(5.0)
Others	(0.5)
Rodenticides	13 (7.3)
Yellow phosphorus	(2.8)
Zinc phosphide	(2.2)
Others	(1.2)
Unknown*	(1.1)
Other methods (Burns, Superficial cutting)	14 (7.8)

DSH = Deliberate self-harm.
Percentages in parentheses under each category indicate the proportion of the total study population. Subcategory percentages represent the distribution within the respective method group.
$Compounds other than Amitraz was included in this group
*Cases in which the specific agent could not be identified from medical records were classified under unknown.
**Patients with ingestion of multiple substances were classified under "multiple medications.

ideation, over one-tenth reporting ideation in the past year, and 6.7% reporting prior suicide attempts [12]. These findings indicate that the true burden of suicidal behaviour far exceeds what is captured through hospital-based data alone. Nearly 40% of suicide victims in India are under the age of 30, reflecting a significant loss of productive years in the most economically active segment of society [9].

In this study, the majority of patients (64.8%) were referred to tertiary care facilities, suggesting that many cases of DSH require resources beyond what is routinely available in secondary care settings. This highlights the critical need for upgrading emergency preparedness, poison management protocols, and integrated psychiatric services at secondary hospitals.

Table 3. Emergency department interventions and short-term outcomes among patients presenting with deliberate self-harm (n = 179)

Interventions in ED	Number of patients (%)
Intubation	44 (24.6)
Gastric lavage	10 (5.6)
Activated charcoal	8 (4.5)
Vasopressor support	6 (3.4)
Cardiopulmonary resuscitation	3 (1.7)
Patient outcome from emergency department	
Referred to tertiary care	116 (64.8)
Admitted to medical ward	40 (22.3)
Discharged against medical advice	13 (7.3)
Died in ED	3 (1.7)
Brought dead	7 (3.9)

ED: Emergency department

Furthermore, only 57.7% of patients returned for follow-up, and a small but clinically significant proportion (3.4%) reported repeat self-harm attempts. These findings highlight missed opportunities for early psychiatric intervention and structured follow-up. Routine psychiatric screening, particularly for young adults, and systematic referral pathways within secondary hospitals are essential to prevent recurrence.

Prevention requires a multilevel and multidisciplinary approach. At the primary prevention level, strategies include early identification of vulnerable youth, school-based resilience training, substance abuse prevention programs, and community campaigns to reduce stigma [13]. At the secondary prevention level, strengthening psychiatric services within secondary hospitals, establishing crisis helplines, and ensuring timely follow-up are vital. Tertiary prevention must focus on rehabilitation, vocational support, and long-term psychosocial care for survivors of repeated attempts.

From a public health perspective, DSH is a marker of systemic gaps in social and health systems. The burden extends beyond mortality, resulting in substantial disability-adjusted life years (DALYs) lost and significant socioeconomic consequences. Integrating suicide prevention into the National Mental Health Programme, expanding access to community- based mental health services, and addressing macroeconomic determinants such as poverty, gender inequity, and social exclusion are critical.

This study from a secondary care centre in South India reiterates the urgent need for such reforms and highlights the importance of viewing DSH not just as an isolated event but as a symptom of broader societal and systemic failures.

The retrospective design of this study limited the assessment of causal pathways and underlying risk factors for DSH. Important psychosocial variables, psychiatric diagnoses, substance use history, and prior self-harm episodes may have been underreported due to incomplete documentation. The single-centre setting may limit generalizability. Follow-up data were limited, as most patients were referred to tertiary care facilities, restricting

assessment of long-term outcomes and recurrence. These limitations highlight the need for prospective, multicentre studies with standardized documentation and longitudinal follow-up to better characterize the epidemiology and outcomes of DSH.

CONCLUSION

DSH remains a major public health concern in India, particularly among individuals in their most productive years. Beyond clinical care, routine psychiatric screening, structured follow-up, and accessible mental health services are critical. At a broader level, prevention requires population-based strategies that address macroeconomic determinants, social and gender inequities, and community-level stigma, while strengthening awareness and resilience.

Secondary hospitals are often the first point of contact in rural and semi-urban regions and must be equipped with psychiatric support, referral networks, and preventive frameworks. DSH serves as a marker of systemic gaps, underscoring the need for coordinated action across health, education, agriculture, and policy sectors to reduce access to lethal means, promote mental health literacy, and safeguard the productive years of India's youth.

Ethics approval and consent to participate

The Institutional Review Board (Silver Ethics and Research Committee) of the Christian Medical College Vellore reviewed the project on October 16, 2024, at 09.45 am in Office of Research and has approved the study. Ref: IRB Min. No. 2410161 dated 16.10.2024

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