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An Analysis of the Profile of Deliberate Self-Harm Cases in South Africa

A.G. Lentoor and H. Fumani

Department of Clinical Psychology, School of Medicine,
Sefako Makgatho Health Sciences University, Pretoria, South Africa

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ABSTRACT Deliberate self-harm (DSH) which includes self-poisoning or self-injurious behavior regardless of intent is a global public health concern. Little is known about the profile of patients admitted following DSH at Dr George Mukhari Tertiary Hospital (DGMTH) in the north region of Gauteng, South Africa. This study aimed to determine the profile of patients and reasons for DSH. In a retrospective chart review study, data was collected on all the patients referred to the Clinical Psychology Unit at DGMTH between January 2018 and January 2019 following DSH. The results showed that the cases of DSH were mostly young, single African females, unemployed with at least a secondary-level education. Females chose less lethal methods such as poisoning, specifically non-prescriptive drug overdose, while males chose highly lethal methods such as hanging. For females, relationship and family problems remained the main reason for DSH, while males reported financial problems.

INTRODUCTION

Deliberate self-injurious suicidal behaviour remains to be a serious social and public health problem not only in South Africa but globally (Anton et al. 2016). It is one of ten leading causes of death globally (Orpana et al. 2019). Each year, more than 800 000 people die by taking their own life and there are many more people who attempt deliberate self-harm (DSH). Research has estimated for every death by suicide there are more than 20 DSH attempts (Orpana et al. 2019). The World Health Organization estimates that as many as 80 percent of the world's suicides occur in low-and middle-income countries (LAMICs) (WHO 2021), yet there is a lack of research on risk factors for DSH. Research suggest that in South Africa, suicide approximately contribute to almost 10 percent of unnatural deaths, with young people 15-35 years being the most vulnerable group (Kootbodien et al. 2020). A recent systematic review showed in comparison to other African countries, the incidence of self-injurious suicidal behaviour is reportedly higher in South Africa (Quarshie et al. 2020). According to the 2016 Global Burden of Disease study the suicide rate in South Africa is estimated to range from 11.5 to 25 deaths per 100 000 members of the population, which means about one death every 20 seconds (Orpana et al. 2019). DSH puts a huge load on already overburdened healthcare systems in LAMICs. Conducting further research to understand DSH better is important and needed in developing countries to find ways to manage this growing social and public health problem effectively.

It is evident in the literature that there is no uniformity in the definition of suicide and suicidal behaviour in research studies, which often leads to confusion and limits the generalizability of results (Hill et al. 2020). Suicidal behaviour includes; suicidal ideation (thinking about ending one's life); suicidal attempt (non-fatal self-harm behaviour), and suicide (fatal self-harm behaviour)(Dendup et al. 2020).Fatal suicidal behaviour involves a completed suicide with the intent to die, whereas, non-fatal suicide refers to deliberate self-inflicted, habitual suicidal behaviour without any intention to die or where the attempted suicidal behaviour did not successfully result in the death of the victim (or parasuicide) (Lindh et al. 2018). In recent years the preferable term adopted has been deliberate self-harm (DSH) to include deliberate self-injurious suicidal behaviour with intention to die and non-fatal suicide attempts without intention to die (Mangnall and Yurkovich 2008).

Previous research estimated that rates of non-fatal self-harm behaviour are about 10-20 times more common than actual suicides (Bantjes et al. 2016). In South Africa, non-fatal self-harm behaviour rates

Address for correspondence:
Antonio G. Lentoor, PhD
https://orcid.org/0000-0001-7838-2721
*E-mail:*dr.lentoor.antonio@gmail.com

are at least 3 times higher in females than males, while fatal act of DSH is more evident in males. Following the first attempt, about 10 percent repeat self-harm within one year. Importantly, the risk of suicide is greater with a previous history of DSH and in the first year after the self-harm act (Zyl et al. 2021).

Research suggests that there are considerable variability in the choice of DSH methods across regions of the world (Hassamal et al. 2015; Qin and Mehlum 2020). The research showed that the socioeconomic levels of countries, socio-cultural and religious beliefs influence the particular method (Samari et al. 2020). Notably, issues of accessibility, knowledge of lethality (or lack thereof) of the method, level of intent, experiment with methods have been reported in the literature (Sarchiapone et al. 2011). Socially acceptability of methods and mental status at the time of attempt has also been shown to determine the choice of DSH (Ajdacic-Gross 2008).With most of the research conducted internationally, there is evidence suggesting that these trends of DSH may be changing (de Silva et al. 2012).

In most parts of the world the prevalent methods of DSH includes hanging, use of firearms or poisoning (Wu et al. 2021). Värnik and colleagues collected data and compared the pattern of DSH methods from 16 European countries (Värnik et al. 2008). The research revealed that hanging was the most common method of DSH used in all of the European countries combined, followed by self-poising, while the use of firearms, a highly lethal method, was found to be the third most used method in European countries combined (Värnik et al. 2008). In contrast to Europe and the United States, in most Asian (Li and Katikireddi 2019) and Latin American countries (Pritchard and Hean 2008) the use of firearms as a means of DSH was less common compared to self-poising by pesticides and hanging (Singh et al. 2019). In South Africa, hanging and poising were reported as the most common methods of DSH (Engelbrecht et al. 2017). Hospital-based epidemiological studies in rural and urban settings of South Africa conducted over the last decade suggest that the main methods of DSH are self-poisoning (Malangu and Ogunbanjo 2009) and hanging (van Hoving et al. 2018). More specifically, overdosing on prescriptive and non-prescriptive medication appears to be the most common form of self-poisoning among young people in South Africa (Pieterse et al. 2020). Similar trends are observed in India (Singh et al. 2016).

DSH methods variability by gender has been reported, with males more likely to use methods of suicide with high lethality like hanging than females (Hassamal et al. 2015). Similar to Europe and US, research from Australia suggest that males had a higher risk of using more lethal methods like firearms and hanging than females (De Leo et al. 2002). In South Africa, as in many other LAMICs, females are more likely than males to use self-poisoning as a method of DSH. Similar to South Africa, females outnumbered males in the use of pesticide self-poison as the most common means of DSH in India (Bonvoisin et al. 2020). This perhaps this is indicative of the wide range of agriculturally hazardous pesticides that is easily available within homes and accessible from shops in most rural and semi-rural Asian and African communities. Pesticide poison are often used impulsively and without effort of preparation for DSH attempts which makes it a convenient choice for females in times of acute stress (Benedict et al. 2019).

A limited number of studies on DSH are available in South Africa. Understanding the profile of patients that presents to tertiary hospitals following DSH may help in recognizing those at risk of suicide and useful to plan suicide-related intervention for individuals at risk. In the absence of a nationalized reporting system, hospitals provide a unique opportunity to study this high-risk population and to add to epidemiological data locally. An advantage of investigating DSH in this way is that it allows the collection of information directly as reported by the attempters themselves. The number of referrals to the Clinical Psychology Unit of Dr George Mukhari Tertiary Hospital for DSH highlight the need to better understand the factors contributing to DSH.

Objectives

The current study aimed to determine the profile of deliberate self-harm (DSH) cases presented to the Clinical Psychology Unit at Dr George Mukhari Tertiary Hospital, Pretoria in Gauteng Province of South Africa on 1 January 2018 and 1 January 2019. A secondary aim of the study was to clarify the gender differences in precipitating factors, and the choice of method used in DSH among patients.

MATERIAL AND METHODS

Study Design

This was a descriptive, retrospective chart review cross-sectional study. A convenience sampling method was employed in which all the files of DSH patients admitted to the hospital,and who were referred to the Clinical Psychology Unit during the 12-month study period were identified from the department register. The clinical files of the patients were reviewed and relevant information were extracted and captured (Matt and Matthew 2013).

Study Location

The study site was part of a tertiary hospital that serves a large urban, peri-urban and rural population and is situated in Ga-Rankuwa, in the northern parts of Gauteng province. The purposively selected study site serves the broader part of northern Pretoria and the bordering communities of the North-West province, which makes it an ideal study location. While Dr George Mukhari Tertiary Hospital is accessible to everyone, black African families with limited socio-economic resources, mostly, access the hospital. It is standard procedure at the hospital that all patients who present to the emergency unit with deliberate self-harm to be referred to the Clinical Psychology Unit. These patients are then assessed by an intern clinical psychologist or consulting clinical psychologist daily. Depending on the outcome of the psychological evaluation, a referral may be made to a psychiatrist.

Description of Process

Deliberate self-harm was taken to mean attempted suicide, and parasuicide. All DSH patients, regardless of the intention of self-harm, who was consulted at the Clinical Psychology Unit of Dr George Mukhari Tertiary Hospital during the study period, was included. A registered intern clinical psychologist retrieved from the Clinical Psychology Unit's electronic register system the patient numbers of all the patients who were treated for DSH during the study period, and collected their medical files. The intern psychologist performed all data extraction from the medical files of patients. The data extraction from the files was based on a data collection tool (measure) that the researchers adapted (Malangu and Ogunbanjo 2009).

Data Extraction Tool

The following was data extracted from the medical files:

Sociodemographic Information

Recorded age (or date of birth), gender, race, occupation, education status, religion, relationship status, employment status, source of income.

Health Information

Recorded medical conditions (for example,HIV), current treatment. Also, psychiatric conditions (for example, depression) and current treatment. Substance use and abuse. Place and time where the suicide attempt occurred.

Methods of Self-harm

Recorded non-fatal self-harm, the distinction between forms of self-poisoning (non-violent); for example, overdose by non-prescriptive medication and prescriptive medication, ingestion of poison including pesticides, organophosphate poisoning, rodenticides and acts of violent (for example, acts involving damages to bodily tissue such as hanging).

Statistical Analysis

All the extracted data were entered into SPSS for analysis. Descriptive statistics, including frequencies. Chi-square test (χ^2) and Fisher's exact test of association were conducted to determine the association between variables. The significant level was set at a p-value < 0.05.

Ethical Consideration

This study was approved by Sefako Makgatho University Research Ethics Committee (SMUREC/M/277/2018: PG) and conformed to the provisions of the Declaration of Helsinki. The hospital director granted permission to conduct the study. All extracted clinical information from the medical files of patients were anonymised.

RESULTS

A total of 203 medical files were identified in the electronic register of patients that was referred for DSH to CPU during the study period. Of these, 203, all were black African, of which 139 were female (68%) and 64 were male (31.5%). The average age of the participants was 27.8 years (std. dev.=10.9), with the majority of patients falling in the age group 19-35 years (117; 57.6%) followed closely by the age group 10-18 years (43; 21.1%). The majority of the cases represented the first act of DSH (189; 93.1%).Majority of the patients were single (157; 77.3%), unemployed (81; 39.9%) or were students (53; 26.1%) with at least a high school level of education (90; 44.3%) from a low socio-economic background (132; 65%). Of the total patients, 159 were from the urban community (78.9%), within a nuclear family (94; 46.3%) or extended family (80; 39.4%) context. Most of the acts of DSH occurred at home (178; 87.9%) as presented in Table 1.

As presented in Table 2 the most common methods of DSH amongst the patients were self-poison, with patients frequently presenting with overdose, followed by ingestion of pesticides poison. The rate of patients who overdose (83; 40.9%), and ingested poison (49; 24.1%), or both poison ingestion and overdose (9; 4.4%) was significantly higher in females, while the most common violent methods of DSH, hanging (3; 1.5%) and self-bunt (3; 1.5%), was higher in males (χ^2=18.415, p= 0.005). The type of agents used in DSH has a significant association with gender (χ^2=54.884, p=0.04) with more females than males overdosingon paracetamolfollowed by antiretroviral agents, and ingesting-poisonby using single agentssuch as organophosphates (pesticides).

Precipitating Factors of DSH and Gender Differences

There was a significant difference in mean age and precipitating factors between males and females. A higher proportion of patients presenting with DSH were young female (χ^2=10.764, p=0.05) who were either unemployed or a student (χ^2= 35.620, p=0.000) with at least a secondary school education or in university (χ^2=14.691, p=0.005). A total of 13 cases reported the use of substance at the time of the attempt, where polysubstance use (alcohol and cannabis) (χ^2=8.257, p=0.04), was sig-

Table 1: **Socio-demographic characteristics of the study population (n = 203)**

Participant characteristics	*Frequency*	*Percent*
Age (mean ± std. dev) 27.8yr±10.9		
Age Groups in Years		
Teen to Adolescent [10-18]	43	21.1
Early adulthood [19-35]	117	57.6
Middle Adulthood [36-55]	38	18.7
Late Adulthood [56-65]	1	0.5
Sex		
Male	64	31.5
Female	139	68.5
Occupation		
Self employed	10	4.9
Unemployed	81	39.9
Student	53	26.1
Pensioner	2	1.0
Skilled worker	6	3.0
Unskilled worker	38	8.7
Unknown	13	6.4
Relationship Status		
Single	157	77.3
Married	19	9.3
Cohabiting	23	15.3
Divorced/Separation	1	0.5
Education Level		
No schooling	2	1.0
Primary school	5	2.5
High school	90	44.3
Tertiary education	22	10.8
Unknown	84	41.3
Socioeconomic Level		
Low	132	65.0
Middle	7	3.4
Family Type		
Joint/extended	80	39.4
Nuclear	94	46.3
Homeless	1	0.5
Unknown	28	13.8
Community		
Soshanguve	112	55.2
Ga-Rankuwa	17	18.4
Winterveld	6	3.0
Others	27	13.3
Unknown	41	20.2
Type of Area		
Rural	3	1.5
Urban	159	78.3
Unknown	41	20.2
Location of Deliberate Self-harm		
Home vicinity	178	87.7
Workplace	2	1.0
University	3	1.5
School	6	3.0
Not reported	14	6.9

Source: Authors

Table 2: Description of theprecipitating factors for deliberate self-harm and gender differences (n = 203)

	Female Frequency (%)	*Male Frequency (%)*	*p-values*	*χ^2 test/Fisher's exact test*
Age (mean ± std. dev)	25yrs±10	32.2yrs±11.7	**0.056**	10.764
Occupation			**0.000**	35.620
Self employed	4 (1.9)	6 (3.0)		
Unemployed	61 (30)	20 (9.9)		
Student	48 (23.6)	5 (2.5)		
Pensioner	1 (0.5)	1 (0.5)		
Skilled worker	4 (1.9)	2 (1)		
Unskilled worker	15 (7.4)	23 (11.3)		
Unknown	6 (3.0)	7 (3.4)		
Relationship Status			NS	
Single	106 (52.2)	51 (25.1)		
Married	13 (9.4)	6 (3.0)		
Cohabiting	19 (9.3)	6 (3.0)		
Divorced/Separation	0 (0.0)	1 (0.5)		
Education Level			**0.005**	14.691
No schooling	0 (0.0)	2 (1.0)		
Primary school	2 (1.0)	3 (1.5)		
High school	68 (33.5)	22 (10.8)		
Tertiary education	19 (9.3)	3 (1.5)		
Unknown	50 (24.6)	34 (16.7)		
Socioeconomic Level			NS	
Low	132 (65)	59 (29.1)		
Middle	7 (3.4)	5 (2.5)		
Family Type			NS	
Joint/extended	56 (27.6)	24 (11.8)		
Nuclear	66 (32.5)	28 (13.8)		
Homeless	0 (0.0)	1 (0.5)		
Unknown	17 (8.4)	11 (5.4)		
Number of Attempts				
Once	126 (62)	63 (31.0)	NS	
Twice	9 (4.4)	1 (0.5)		
Trice	4 (2.0)	0 (0.0)		
Method of Deliberate Self-harm			**0.006**	18.033
Overdose only	65 (32.0)	18 (8.7)		
Hanging	1 (0.5)	3 (1.5)		
Ingestion of Poisoning only	31 (15.3)	18 (8.7)		
Ingestion of poising and drug overdose (combined)	5 (3.6)	4 (2.5)		
Self-burnt	0 (0.0)	3 (1.5)		
Not Mentioned	20 (9.9)	14 (6.9)		
Substance Involvement			**0.041**	8.257
Alcohol only	4 (2.0)	7 (3.4)		
Alcohol and cannabis	1 (0.5)	1 (0.5)		
Mental Health Diagnosis			**0.033**	13.737
Depression	28 (13.8)	5 (2.5)		
Trauma and stress related disorder	3 (1.5)	1 (0.5)		
Psychosis	4 (2.0)	0 (0.0)		
Grief	3 (1.5)	0 (0.0)		
Others	2 (1.0)	3 (1.5)		
No diagnosis	98 (48.3)	52 (25.6)		
Reasons for Deliberate Self-harm			**0.003**	29.541
Academic failure	2 (1.0)	0 (0.0)		
Death of close relative	4 (2.0)	0 (0.0)		
Economic hardship	4 (2.0)	8 (3.9)		
Family quarrels	47 (23.2)	13 (6.4		
Relationship problem	52 (25.6)	24 (11.8)		
Marital disharmony	14 (6.9)	2 (1.0)		
Physical illness	5 (3.6)	6 (6.3)		
Psychiatric illness	6 (3.0)	2 (1.0)		
Raped	6 (3.0)	0 (0.0)		
Unknown	5 (2.5)	9 (4.4)		

Source: Authors
Note: NS: Not significant

nificantly higher in males as compared to females. The rate of patients who were diagnosed with a psychiatric disorder was significantly higher in females (χ^2=13.737, p=0.033), with depression, trauma related disorder and grief reported as the most common diagnosis among them. Relationship problems and family quarrels were reported as common reasons for DSH amongst the patients. However, females compared to males reported significantly higher rates of relationship problems and family quarrels, whereas economic hardship was a more common reason for DSH among males (χ^2= 29.541, p=0.003) as presented in Table 2.

DISCUSSION

This study found that DSH was more common in the younger age group.This finding is consistent with previous reports from other hospital-based epidemiological studies from across different provinces in South Africa (Bantjes and Kagee 2013; Malangu and Ogunbanjo 2009; Pieterse et al. 2020).The finding is consistent with a recent study conducted in Cape Town, South Africa that found age-group vulnerability for parasuicide was apparent in the adolescent to young adult phase (18 -35 years) (Zyl et al. 2021). Likewise the finding is similar to studies conducted in US (Yard 2021), United Kingdom (UK)(Mayor 2019), and Oman (Zaidan et al. 2002) where rate of DSH was found to be higher in the younger age group (<35 years). In a study conducted in India, Singh and colleagues reported that the majority of patients presenting with DSH to an emergency unit were adolescents and young adults (Singh et al. 2019).

The researchers' findings showed that the majority of the patients presented for DSH at the hospital were black African. In general, the population surrounding the hospital in Pretoria North, Ga-Rankuwa and Soshanguve is predominantly black African. This might explain why other population groups are not represented in this study. Nonetheless, there are evidence suggesting that there is an increase in suicidal behaviour in black South Africans (Schlebusch et al. 2003).

In this study, self-poison was the most common method of DSH, with drug overdose and ingestion of poison been the most prevalent forms of self-poison among females, while violent methods such as hanging and self-burning were prevalent among males. Previous studies, conducted in both semi-rural (Sukeri 2009) and urban (Pieterse et al. 2020) South Africa, as well as, internationally (Bonvoisin et al. 2020) supports these findings. Evidence from the literature suggests that during the adolescent period, females compared to their male counterparts have an almost two-fold risk increase for self-poisoning (Miranda-Mendizabal et al. 2019). A study based in South Korea, found that the most commonly used methods for suicide attempts were poison by drug overdose and ingestion of pesticide poison and it was the most frequently preferred method in females (Lim et al. 2014). The gender differences in the choice of DSH is in keeping with the trends in South Africa, and other low-income countries (Quarshie et al. 2020) that suggest that men tend to use more lethal means, while women are more likely to choose self-poisoning (Wu et al. 2021). It lends support to the evidence that females are at a higher risk for suicide attempt and males for suicide death based on the choice of DSH method (Miranda-Mendizabal et al. 2019). A study conducted by Mergl and colleagues linked lethal methods of DSH used by males to higher levels of externalized emotional problems (for example, conduct disorder, substance use disorder, and impulsive disorder) (Mergl et al. 2015).

Some literature proposed that females are more likely to have access to poising than other forms of means. For example, this study echoes the findings by Raubenheimer and Jenkins that showed the most frequent poison by drug overdose by the females were analgesics, antiretroviral drugs, antihypertensive drugs and antidepressants (Raubenheimer and Jenkins 2015). Consistent with a recent local study (Pieterse et al. 2020), paracetamol overdose emerged as a frequent method of DSH among females in this study. This finding supports a previous toxicovigilance study that was conducted in South Africa and reported that medicines such as paracetamol and analgesic combined accounted for more than 40 percent of DSH by poisoning (Veale et al. 2013). These findings have important implications for public health intervention regarding medicine control in South Africa, since paracetamol and other analgesics are readily available and easily accessible in unlimited quantities from shops and pharmacies with no age restrictions (Padayachee et al. 2019). Evidence from the UK showed that restricting access to lethal drugs, by means of strict prescription practices and blister packaging, lead to decline suicide rates (Yip et al. 2012). Future

research in South Africa needs to establish whether the restriction of over the counter medication may help in reducing rates of DSH, locally. The deliberate self-poisoning with antiretroviral drugs overdose in this study is consistent with previous studies in the Eastern Cape (Uys 2014) and Bloemfontein (Benedict et al. 2019). Like with the use of pesticide, antiretroviral drugs is widely available, since it get to dispensed in communities across South Africa for the treatment of HIV (Johnson et al. 2017).This likely made the drugs easily accessible to use for DSH. Previous research showed that it is not unusual for patients to overdose on medication that belongs to family, or was obtained from friends or bought from someone else (Wong 2002). This finding emphasized the importance of locked storage of medication prescribed to any family members if they can be lethal in overdose or discarding of un-used drugs in the home. Educating the public about the lethality and proper use of medication may also help reduce or prevent a fatal suicide attempt.

In this study, organophosphates was the most frequently reported method of ingested poison. This is a finding that has been shown in KwaZulu Natal (Khuzwayo et al. 2018), Eastern Cape (Uys 2014) and Tswane District (Razwiedani and Rautenbach 2017) in South Africa. This finding supports the idea that ingestion of organophosphate poison as a method of DSH is common in rural and semi-rural areas of South Africa as appose to urban communities (Pieterse et al. 2020). Organophosphate poison is the most common single used agent in DSH and poses a major public health problem for South African rural communities (Uys 2014).This is mainly due to the fact that it is readily available, indiscriminately handled and stored; and accompanied by lack of awareness of the lethal consequences (Razwiedani and Rautenbach 2017). Notable, organophosphate poison accounts for more than 30 percent of all acts of DSH in the world and in sub-Saharan Africa, it remains as one of the most used agent in DSH (Mars et al. 2014).

Of those who reported substance use in the study, male attempters were more frequently using polysubstance, tend to be influenced by financial problems, and use violent methods of DSH. Substance use is well-known factor worldwide and is associated with increased risk for DSH (Peppin et al. 2020) and the use of lethal means (Miller et al. 2020).

Similar to the current study, Sukeri found that majority of the patients presenting with DSH did not have a psychiatric disorder or a prior history of DSH (Sukeri 2009). Social problems such as relationship difficulties and family quarrels at home were the most commonly reported reasons for DSH in this study. Compared to high-income countries, studies in low and middle-income countries, including South Africa documents the relationship between DSH and psychosocial stress (socioeconomic variables such as poverty, financial stress, and relationship problems) (Bantjes et al. 2016).It is possible that the females engaged in DSH in response to stressful life events or perhaps impulsivity (Narishige et al. 2014) rather than due to a psychiatric illness.

For the majority in this study it was their first DSH attempt, a finding that has been consistently documented in research. Since a large number of first attempters of DSH go on to reattempt in the future makes it all more important for at-risk individual to receive timely psychosocial care and support.

CONCLUSION

The study contributes to emerging literature on DSH in a developing country context. This study suggests that based on the cases treated for DSH at Dr George Mukhari Tertiary Hospital, young, black African, female remains a vulnerable group for DSH.The most frequent method used in acts of DSH was self-poison, specifically poison by drug overdose and single agent organophosphate ingestion. Psychosocial problems, including relationship problems and family quarrels, were the most common precipitating factors for DSH. In most cases, it was the first act of DSH. These findings suggest the need for continual monitoring, accurate and updated epidemiological data on an ever-evolving public health problem.

RECOMMENDATIONS

The study highlights important implications for mental health interventions with this vulnerable population. First, psycho-educational intervention around risk recognition and assessment, at school, family and community level is needed. Second, particular focus should be given to prescribing and dispensing patterns, especially in relation to over-the-counter analgesics; training in relation to

assessing for mental illness, especially given the consistent findings of a drug overdose in South Africa; and refer patients for specialist care timeously. Third, the need for stronger medicine and poison control regulation is highlighted. Last, integrated gender-specific suicide risk reduction intervention that addresses issues of inequality, violence, help-seeking behaviour, emotional attachment relationships, needs to be prioritized.

LIMITATIONS

This study is not without limitations. The retrospective, cross-sectional design of the study precludes drawing inference on the cause and effect relationship. The convenience sampling method uses to select the specific hospital restricts our ability to generalize the findings to other hospitals in South Africa. The researchers relied on information recorded by the treating clinician from the medical files. Thus, recoding bias could inherently limit the findings.

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