

## Agents Used and Profiles of Non-Fatal Suicidal Behaviour in Mdantsane, East London: Part 1

Heloise Uys\*

Principal Psychiatrist, East London Mental Health Unit, Cecilia Makiwane Hospital, South Africa

### Abstract

**Objective:** The incidence of suicidal behaviour in South Africa compared to other countries is high. Organophosphate ingestion was found to be the most common single agent ingested in non-fatal suicidal behaviour amongst the youth in a study done in Frere Hospital (situated in East London) previously. This study was performed to investigate the most common agents ingested in patients admitted with suicidal behaviour in Cecilia Makiwane Hospital (located on the outskirts of East London.) Additional information obtained during the study was the demographic data of these patients.

**Method:** A prospective study of all non-fatal suicide attempts referred to the Mental Health Unit, Cecilia Makiwane Hospital, between March 2009 and February 2010 was undertaken. All patients who attempted suicide by means of overdose or poisoning were included in the study. The agents ingested were studied and classified into single, multiple or unknown. Additional factors such as demographic data were studied – these include age, gender, race and number of attempts.

**Results:** During this one year period 180 patients were referred to the Mental Health Unit and 172 were eligible to participate in the study. Of these patients 112 were females (65%) and 60 males (35%). Most of these patients were young –69 between the ages of 10-20 (40%) and 66 between the ages of 20-30 (38%). Most patients (131) had no previous attempt (75 first attempt).

Only one patient was not African. With reference to the agents most patients ingested a single agent (52%) followed by multiple agents (40%). The most common single agent ingested was organophosphates followed by rodenticides and combined antiretroviral agents. The most common agents ingested when multiple agents were used in non-fatal suicidal behaviour were paracetamol, ibuprofen and vitamin B complex.

**Conclusion:** In this study organophosphate was the single most common agent used in non-fatal suicidal behaviour. This is in accordance with previous research done in East London. The youth remains at high risk. Suicide prevention should include a multifaceted approach including means restriction.

**Keywords:** Non-fatal suicidal behaviour; Organophosphates; Youth

### Introduction

Suicidal behaviour can be used in the broad sense to include a wide range of self-destructive behaviour or self-damaging acts in which people engage. Suicidal behaviour is further divided into fatal and non-fatal suicidal behaviour. Fatal suicidal behaviour refers to completed suicidal behaviour with the victim's intent to die. Non-fatal suicidal behaviour on the other hand refers to self-inflicted suicidal behaviour which did not succeed in ending the victim's life. According to Schlebusch non-fatal suicidal behaviour includes attempted suicide (survival of intended suicide) and para suicide (no intention to die) [1].

It is interesting to note that in the past suicidal behaviour has been claimed to occur less frequently in black Africans. Although more research is needed recent reports suggest that suicidal behaviour in Africa is far more serious than previously thought [1]. The suicide prevalence rates in South Africa seem to be much higher than reported in other parts of Africa and the world. These comparisons need to be interpreted with caution however as compared to many African countries more research on suicidal behaviour is available in South Africa [2].

The incidence of suicidal behaviours in South Africa compared to other countries is high. Divergent suicidal prevalent rates were reported in earlier research in South Africa due to several reasons such as inadequate reporting of suicidal behaviour particularly among black South Africans, inadequate gathering of statistics (many relate only

to academic hospitals), hidden burden of suicidal behaviour, cultural factors and lack of representative samples influenced by apartheid policies [2]. For Asian, Black and Coloured South Africans, suicide was found to be the third major contributor to deaths and for white South Africans the second major contributor [2].

The method of choice for suicide is influenced by many factors such as accessibility, knowledge (or lack thereof) of the lethality of the method, level of intent, experience with the method, cultural factors and the mental status of the person at the time [2]. In South Africa the main method of non-fatal suicide attempts are self-poisoning/overdosing. The agents most often used are analgesics, benzodiazepines, antidepressants, household poisons, insecticides and household products. Other methods especially amongst adolescents include self-cutting and among fatal suicidal behaviour poisoning, hanging, firearms, gassing and burning are most common [2].

**\*Corresponding author:** Heloise Uys, Principal Psychiatrist, East London Mental Health Unit, Cecilia Makiwane Hospital, South Africa, Tel: 083 264 5767; E-mail: [psyc@sainet.co.za](mailto:psyc@sainet.co.za)

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In a study done at Pelonomi Hospital the majority of patients with non-fatal suicidal behaviour were female, average age of 22 and the most common method was drug overdose with antidepressants and analgesics being the most common. In a study done by Sukeri the most common agents used in overdoses in patients between the ages of 10-20 years in East London were organophosphates, antidepressants and analgesics [3,4]. In a study done in adolescent non-fatal suicidal behaviour in Weskoppies the most common methods were cutting, overdosing, hanging and jumping from a height [5].

It is well known that previous suicide attempts are risk factors for future attempts and even completed suicide. A report compiled by the Eastern Cape Department of Health on completed suicides showed that 56% of completed suicides were between the ages of 15 and 34 in other words the youth. The most common causes of completed suicides were hanging, poisoning and drug-overdose [6].

The World Health Organization (WHO) reports that one person in 40 seconds die by suicide with a global mortality rate of 16 per 100,00 [7]. The overall suicide rates for South Africa is between 17, 2 and 25 per 100 000 of the population. This is higher than some African countries and the reported world average of 16 per 100 000 [2]. The report compiled by the Eastern Cape Department of Health reported that the death by suicide was lower in the Eastern Cape compared to the global rates as stated above. WHO states that suicide is amongst the three leading causes of death in some countries and the second leading cause of death in the 10 - 24 age groups [6]. According to WHO suicide attempts are 20 times more frequent than completed suicides [7].

Statistics South Africa in October 2007 estimated the total population of Buffalo City (also commonly referred to as East London) to be 724 306. The age group 0 - 14 totals 196 085 of the 724 306. The East London district has a population of 204 862 and is serviced by Frere Hospital. Mdantsane district has a total population of 168 284 and is serviced by Cecilia Makiwane Hospital. Frere Hospital is located in East London whereas Cecilia Makiwane Hospital is located in the township of Mdantsane on the outskirts of East London. The King Williams Town district and rural South and North districts make up the rest of the population which is also serviced by Cecilia Makiwane Hospital.

Description	Number	%
<b>Language:</b>		
Xhosa speaking	171	99%
<b>Gender:</b>		
Male	60	35%
Female	112	65%
Total	172	100%
<b>Age:</b>		
10 - 20 years	69	40%
20 - 30 years	66	38%
30 - 40 years	24	14%
40 - 50 years	9	5%
50 - 60 years	3	2%
• 60 years	1	1%
Total	172	100%
<b>Number of attempts:</b>		
First attempt	131	76%
Second attempt	39	23%
Third attempt	1	0,5%
Fourth attempt	1	0,5%
Total	172	100

Table 1: Demographic data.

The aim of the study was to investigate the most common agents used in suicide attempts in patients admitted to Cecilia Makiwane Hospital. In addition the investigator wanted to compare the agents used to that studied by Sukeri when he analysed agents used in patients admitted to Frere Hospital as well as to compare the ages of the patients [4]. Cecilia Makiwane and Frere Hospital form part of the East London Hospital Complex but are located in different areas and therefore suicide methods and patient demographics may differ. This information would be forwarded to the relevant departments in order to assist with suicide prevention strategies in this area. Data on suicide methods and demographics are lacking in area.

## Method

A prospective study of all non-fatal suicide attempts referred to the Mental Health Unit, Cecilia Makiwane Hospital, between March 2009 and February 2010 was undertaken. All patients who attempted suicide by means of overdose and poison ingestion were included in the study. Written consent was obtained from the patient and from the parent or guardian in case of minors (<18 years). Consent forms were available in English and Xhosa. Ethics approval was obtained from the East London Hospital Complex ethics committee.

It is standard procedure in the East London Hospital Complex to refer all patients who attempted suicide to the Mental Health Unit. These patients are then assessed by a medical officer or registrar on a daily basis. In this study all these patients were seen by the investigator using a standard clerking format used in the Mental Health Unit which includes DSM IV diagnostic criteria. Where possible collateral was obtained. All adolescents' parents were seen.

The following information was obtained during the interviews: 1) Age, 2) Gender, 3) Number of attempts, 4) Single, multiple or unknown agent, 5) Type of agents ingested. This information will be discussed in part 1.

Additional information obtained was: 1) DSM -IV diagnosis, 2) Substance abuse history, 3) Suicide note or not, 4) Place and time of day when attempt occurred, 5) Comorbid medical disorders (specifically HIV), 6) Seasonal trends. This information will be discussed in part 11.

## Results

During the study period 180 patients were referred mainly by the medical wards in Cecilia Makiwane Hospital. Of these 172 were eligible to be included in the study. Of these patients 112 were females (65%) and 60 males (35%). Most of the patients were in the age group 10-20 years (40%) followed closely by the age group 20 - 30 years (38%). Most patients had no prior suicide attempts (76%). All the patients with the exception of one were Xhosa speaking (Table 1).

The agents used in the suicide attempts were categorized into single, multiple and unknown agents. The agents were analysed for the most common single agents and most common multiple agents used. The categories of agents used are as stipulated by Sukeri [4] (Table 2). Out of the 172 patients, 89 (52%) used a single agent, 70 (40%) patients used multiple agents and in 13 (8%) patients the agents were unknown (Table 3).

The most common agent used in non-fatal suicides involving a single agent amongst the 172 patients was organophosphates. The second most common agent was rodenticides followed by antiretroviral agents in third place. Refer to Table 4 for the eight most common single agents used.

Category	Agents
Organophosphates	Cattle dip, pesticides
Corrosive agents	Jik, battery acid
Volatile agents	Paraffin, diesel, brake fluid
Antidepressants	Amitriptyline, fluoxetine
Anti-epileptic drugs	Carbamazepine, phenytoin
Benzodiazepines	Oxazepam, diazepam, alprazolam, lorazepam
Asthmatic agents	Theophylline
Paracetamol	
Combined antiretroviral agents	
Multivitamins	Vitamin B co, folic acid
Antibiotics	
Neuroleptics	Haloperidol, Chlorpromazine
Antihypertensive agents	
Diabetic agents	
Lithium carbonate	
Analgesics	Ibuprofen
Rodenticides	Rattex

Table 2: Categories of agents used in non-fatal suicides.

Number of agents	Number of patients	%
Single	89	52%
Multiple	70	40%
Unknown	13	8%
Total	172	100%

Table 3: Number of agents used in non-fatal suicide attempts.

Agent	Number	%
Organophosphates	20	12%
Rodenticides	8	5%
Combined antiretroviral agents	7	4%
Paracetamol	5	3%
Antiepileptic drugs	5	3%
Corrosive agents	5	3%
Antidepressants	4	2%
Benzodiazepines	4	2%

Table 4: Eight most common single agents used.

In case of the multiple agents used in the non-fatal suicide attempts the commonest agent used was paracetamol followed by ibuprofen, Vit B co and codeine containing analgesics (Adcodol). The commonest groups of agents used by these patients were analgesics, non-steroidal anti-inflammatory agents, psychotropic drugs, antihypertensive drugs and antibiotics.

## Discussion

It is clear from the literature that inconsistencies regarding the prevalence of suicide exist as some reports claim the prevalence is higher in South Africa than globally but the report by the Eastern Cape Department of Health documented a lower rate of completed suicide in the Eastern Cape. No explanation was offered for this finding [6]. This highlights the need for accurate data collection on suicide attempts, completed suicides and the associated risk factors in South Africa and in this case the Eastern Cape.

Suicide attempts are more common in young females. In addition to this the completed suicide rates among young people have been increasing to the level of they are now the group at highest risk in certain countries which included both developing and developed countries [7]. The study done by the Eastern Cape Department of Health also confirmed the pre-dominance of completed suicides amongst the

youth, amongst males and amongst Xhosa speaking people. Sukerini his study on non-fatal suicide attempts done in Frere Hospital found that 79% of his study population between the ages 10-20 were black (unpublished data) [8].

In the present study the youth were also at high risk for non-fatal suicide behaviour as most were between the ages of 10-20 years followed closely by the age group 20-30 years with a predominance of females. Most of these patients had no prior attempts. However it has been well documented that prior suicide attempts increase the risk for completed suicides. A non-fatal suicide attempt is the strongest known clinical predictor of eventual suicide. Suicide risk amongst people with prior attempts is estimated to be hundreds of times higher as compared to the general population [1]. The risk is between 50 (3) to 100 (4) times higher in the first 12 months after a prior attempt as compared to the general population [2]. It was found that after a suicide attempt by self-poisoning completed suicides continue to accumulate over several decades. Suominene et al. demonstrated in their follow up of patients for a period of 37 years after self-poisoning that the suicide attempt appears to be a high risk for completed suicide though the adult life [9,10]. Chen et al. reported that the risk of suicide after self-harm is highest in the first year after the attempt. Furthermore Chen et al. reported that the risk of suicide after self-harm was higher for men than women and the risk increased with age at the time the self-harm (risk particularly high for those over 64 years) [11].

At present all suicide attempt cases are referred to the psychiatric department in Cecilia Makiwane Hospital for an assessment by a medical doctor trained in psychiatry. The patients are then either discharged without follow up or referred to a psychologist or social worker if indicated or followed up by the psychiatric department. Future research should be conducted to establish whether the repeat suicide attempts had any intervention as well as the nature of the intervention.

In this study the most common single agent was organophosphate ingestion. This was also the most common single agent used in the study done in Frere Hospital by Sukerini [4]. These are the only two public sector hospitals in East London so the conclusion can be drawn that organophosphate agents are the most common single agent used in non-fatal self-poisoning in this area. It is estimated that in the developing world organophosphate self-poisoning kills 200 000 people a year [12,13]. In a study done by Favara he documented that half of patients admitted into the critical care unit at Cecilia Makiwane Hospital over a 5 year period with non-fatal suicidal behaviour ingested organophosphates. The other most common agents ingested by patients admitted to the critical care unit were paracetamol, tricyclic antidepressants, corrosive agents and unknown agents. Although the mortality rates were lower for the organophosphate group as compared to the other agents ingested the organophosphate group stayed twice as long in the critical care unit. This adds to the already burdened medical services in Cecilia Makiwane Hospital [14]. Mortality rate is generally low with organophosphate poisoning if treated promptly. However mortality could cause the late onset of neuropathy and tremor. Convulsions and delirium could occur with large doses [12]. The cumulative effect of low doses of organophosphates is neuropsychological. These include excessive fatigue, poor concentration and suicidal thoughts.

Schlebusch further argues that the high suicidal behaviour prevalence rates have several implications for mental health care facilities and these patterns should be observed over time as suicidal behaviour could change over times [15]. There is no national suicide prevention programme in South Africa. A programme has been suggested for South Africa. This programme involves a multi-sectorial approach hand will

involve various stake holders (both health and non-health workers). Key prevention strategies for South Africa involve: recognition of risk factors, awareness, improving data collection, education on suicidal behaviour, research, access to treatment by knowledgeable health care practitioners, establishment and improvement of community services, restricting access to the methods, collaborative research and networking [15].

Shlebusch also states that additionally the following factors should be considered: To develop and strengthen primary health care settings in to detect and intervene accordingly. This is very important as several psychiatric/psychological problems and substance use disorders have been associated with an increase in suicidal behaviour and these may be detected at primary health care level already. Secondly those coming in contact with suicidal patients and their families must be educated and trained accordingly. Targets groups for this training does not just involve health care personnel but also very importantly the clergy, police and school personnel as well as parents. Thirdly means restriction is another important factor to consider [15,16].

Overdosing is a common choice of method in South Africa. Yip et al. reports that so called "means restriction" (modification of the environment to decrease general access to suicide means) has been shown to be effective in suicide reduction. Yip et al. furthermore reports that applied to the population as a whole means restriction would then affect persons whose suicide risk is undetected and who do not seek interventions. Removal or restriction of access to lethal method could change the context of the suicide by precluding potentially fatal actions or by using a less fatal method [17].

In a study done in the 2013 it was reported that legislation passed in the United Kingdom in 1998 to restrict the pack sizes of paracetamol was followed by a reduction in deaths due to paracetamol overdoses [18].

Suicidal behaviour is often as a result of various interactions between psychiatric factors, socio-environmental factors and behavioural factors. Intervention and identifying of risk factors will involve various factors and at various levels such as individual, family and community level [15-18]. The author argues that as organophosphates seem to be very dominant in the self-poisoning of patients in the East London area (especially amongst the youth) means restriction and education should be urgently explored. Further research on means restriction (for instance that of organophosphate and paracetamol) on suicide and attempted suicide in South Africa is urgently required. Further research is also needed to assess the effect of education and training of staff on suicide and attempted suicide. Such research done in the Netherlands (e-learning supported training of the multidisciplinary team in suicide assessments) and in the United Kingdom (training of residence life advisors in a college setting in suicide prevention) showed promising results for suicide prevention [19,20].

## Conclusion

It is clear that suicidal behaviour is a complex phenomenon and that appropriate interventions will involve various factors at different levels and involvement with a broad spectrum of organizations and society as a whole. It is also clear that adequate research must be performed in South Africa in order to obtain not only the true prevalence of suicide but also the associated risk factors. This information is much needed to assist in adequate and well planned suicide prevention programmes and education at various levels of society. From this study it is known that the youth remains a vulnerable group and self-poisoning remains

common with organophosphate poisoning at the forefront. This has several consequences including longer hospitalizations and adds to the already overburdened public sector in the Eastern Cape. Means restriction can reduce suicidal behaviour and it is argued that this option is investigated and applied by the relevant policy makers in the Eastern Cape. This is by no means the only option which should be investigated in suicide prevention but at least this could make a valuable contribution to suicide reduction whilst other options are investigated as well.

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