DELIBERATE SELF-HARM AT RK KHAN HOSPITAL INTERNAL MEDICINE DEPARTMENT:

THE INFLUENCE OF AGE ON THE LIKELIHOOD OF ADMISSION, TRIGGERS, METHODS USED AND OUTCOMES

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DEDICATION

To those who took the time to read this dissertation.

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ABBREVIATIONS

DSH: Deliberate Self-harm

WHO: World Health Organization

SD: Standard deviation

ICU: Intensive Care Unit

CNS: Central nervous system

ARVs: Anti-retrovirals

ABSTRACT

A prior suicide attempt is the most important risk factor for complete suicide. For every completed suicide it is estimated that more than 20 suicide attempts are made. From July to December 2016, Deliberate Self-Harm (DSH) was the top admission diagnosis in RK Khan Hospital Internal Medicine Department.

We investigated the incidence and demographic patterns of DSH in this department. In addition, the influence of age on the likelihood of admission, triggers, methods used and outcomes was explored.

The method used was a retrospect chart review for the period January 2017 to June 2017 of all patients admitted with DSH. Data analysis of continuous variables was summarized as medians for highly skewed variables. Categorical data were summarized using portions and percentages. Proportions were compared using PEARSON'S CHI SQUARE test and FISHER EXACT test as appropriate.

A total of 226 patients were included in the study. The incidence of DSH in the study period was 5.12% of total admissions, a reduction from the 9.16% that it represented in the 6 months prior to the study. There was a higher proportion of females admitted compared to the total admissions. The median age was 26 years, with the median age of females being 7 years younger than that of males. There was a higher proportion of adolescent patients admitted with DSH versus the total admissions than other age groups. 18.1% of the study patients reported a previous history of self-harm. Alcohol was involved in 10.6% of cases. The commonest method used was drug overdose, analgesia being the most common agent. The most frequent triggers were that of domestic dispute and romantic/marital relationship problems. There was a low mortality rate of 1.77% and patients stayed on average for 3.05 days.

Age and gender were not dependant factors in the outcomes of patients that presented with DSH. Interpretation of age and gender associations with means of DSH, may point to the easy accessibility of drugs playing the decisive role in the choice of method used. The triggers used need to be further explored using qualitative methods for better understanding of their association with age.

CHAPTER ONE

1.1 Introduction

Suicide is the second leading cause of death amongst 15 to 29 year olds worldwide[1] A prior suicide attempt is the most important risk factor for complete suicide.[1] For every completed suicide it is estimated that more than 20 suicide attempts are made. The latest mortality data from StatsSA ranks suicide as the 6th cause of non-natural deaths in SA in 2015.[2] The lifetime prevalence of suicidal attempts in SA is 2.9 to 3.4%[3, 4].

There is much debate and no consensus on the terminology to describe suicidal behaviour[1,5]. The term "Deliberate self-harm" is used in this dissertation. It is defined as "an intentional self-poisoning or self-injury, irrespective of motivation and does not require for its usage the establishment of suicidal intent."[6]

Considering that a prior episode of DSH can predict repeat self-harm[1,7-11], studying DSH has important practical implications. Research on suicidal behavior helps to define the problem and to develop strategies for prevention. Data collection on DSH is problematic. Only 10% of member countries in Africa (composing of 15% of the population) report suicide data to the World Health Organization (WHO)[4]. South Africa is one of the few African countries that have data from multiple studies on suicidal behavior[3.]

Most studies designs on DSH are retrospective descriptive studies in general medical wards, hospital emergency departments and psychiatric hospitals. Studies generally relied on hospital admission records. A few studies conducted population based studies using community surveys[3,8,12,13.] Studies however at a national level are limited as few countries have national statistical databases on DSH. There were systemic literature reviews on DSH done in Africa[4] and the United Kingdom[10.] However, there is a paucity of recent data on DSH in KZN, with most studies being done in the 1980's and 1990's[5,14.] Long-term data in South Africa is limited[15].

Research on DSH has focused on epidemiology, socio-demographics, risk factors and methods used[3,4 7-10,12,14,16-18.] Most studies analyze the gender difference of these various aspects in DSH, however, fewer studies explore the association of these characteristics across different age groups. A number of studies have investigated DSH in adolescence[13,14]; however, the impact of DSH outside adolescence has not been addressed in depth.

Age associations of DSH with gender have been well examined in the literature[9,15-18.] Studies analyzing gender differences in suicidal behavior have found that women are more likely to engage in DSH than men [3,7,8,12,14,16-18.] Variation in psychiatric disorders in patients with DSH reveal men are more likely to suffer from psychotic and substance use disorders and women from mood and adjustment disorders[8,11,12.] The most common method used is self-poisoning with men having been shown to use more violent methods such as firearms and hanging. This accounts for men having a higher fatality rate. Limited studies have looked at age in relation to triggers (including psychiatric disorders) or methods for DSH. Whilst there have been case fatality rates of DSH in terms of age described[1], there are no age-related data with respect to other outcomes such as length of hospital stay, management setting or psycho-social intervention.

RK Khan Hospital is a 543 bedded district and regional hospital located in the suburb of Chatsworth, KwaZulu Natal. Its catchment population is estimated to be just over 200 000[19]. In July 2016, a data record of admission diagnosis of all patients admitted to the Internal Medicine Department was initiated. At the end of 2016, it was shown that Deliberate Self-Harm (DSH) was the top admission diagnosis. It accounted for 9.16% of total admissions. The WHO notes that the primary cost of DSH is on health service staff and not bed occupancy[1]. DSH, therefore, has considerable economic implications for this resource restricted hospital. This prompted the department to change its admission criteria of patients presenting with Deliberate Self-Harm. Whilst the incidence of DSH at RK Khan Hospital Internal Medicine Department was evaluated, other demographic characteristics including the age of these patients were not. At RK Khan Hospital, there was a single study conducted in 1984 investigating the epidemiology of DSH[18]. This study did not focus on age in relation to DSH.

This study will provide insight into the incidence of admissions, triggers, methods used and outcomes of patients engaging in DSH at RK Khan Hospital. More importantly, it will analyze

the impact that age has on these various aspects. This will help identify high-risk groups to which intervention to prevent DSH can be directed. It will explore the admission trend of this diagnosis to assess the impact that the change of the admission criteria has had and help guide admission policies. It is important to provide the characteristics of DSH at this hospital, as it will serve as a baseline for which monitoring of interventions can be measured.

1.2 Literature Review

The databases used to source articles for the literature review included Pubmed and Google Scholar. Search terms used included: deliberate self-harm, parasuicide, self-injury, suicidal behavior and suicide attempts. Further eligible articles were identified from the reference list of these papers. Only English published papers were considered and studies in the paediatric population were excluded.

According to the 2012 WHO Global Health Estimates, 804 000 suicide deaths occurred globally.[1] Worldwide, studies on deliberate self-harm have been done in both high and low-income countries [3,4, 7-10,12,14,16-18.] The largest study on deliberate self-harm was conducted by the WHO/EURO multicenter study on Parasuicide in 1989 involving 25 centers in 19 European countries[6.] In 2015, 78% of suicide occurred in lower to middle-income countries. Low to middle-income countries report a higher incidence of self-harm in young adults and elderly women, whilst high-income countries have the highest incidence in middle aged men[1.] In a study of DSH in Irish adolescences which found that for every suicide, there were 34 patients admitted with DSH and 555 patients who self-reported suicidal behaviour [13.]

The peak incidence of DSH is in adolescence and young adults. Suicide is the second leading cause of death amongst 15 to 29 year olds worldwide[1]. It is the fifth leading cause of death in those between 30 to 49 years of age[1]. Most studies report a mean age of patients in the 15 to 24 age group[4, 7-9, 11,13,16,20,21.] In a systemic literature review, 11 publications from 7 African countries, consistently showed that the incidence of DSH was between 15 to 30 years[4.] The lowest incidence is in those > 55 years old[8,18,20.]

The mean age of women who engage in DSH was noted on average to be between 1.5 to 3.4 years lower than their male counterparts in South African studies[11, 15]. The peak occurrence in women is noted to be in the 10 to 24 year age groups whilst that of men was in the 25 to 54 year age groups according to international data.[9,16, 18]

Few studies have explored race in DSH, let alone its relation with age. In South Africa, studies done in the 1990's, examined DSH amongst the youth[14] and black[7] patients at regional hospitals. It was commented that in black patients DSH was most prevalent in those less than 30 years old[7]. A more recent population-based national study established that the Coloured population group had the highest life time prevalence of suicide attempts[3].

Common triggers for DSH are family conflict, romantic relationship problems financial concerns/unemployment, poor academic performance, illness and unwanted pregnancies[7,11,14,20]. In a 2017 published study at an urban hospital in Cape Town, the main triggers for suicidal behavior were family conflict, marital/relationship problems and financial concerns, whilst 38% had a previous history of DSH[11]. Risk factors especially in disadvantaged communities described include, poor socio-economic circumstances, low education level, being single/divorced or living alone[3,4,8,10,12]. Few studies explore the influence of age on triggers. There is a single study that noted the high rate of suicide attempts in single people may be related to the high incidence of suicide behavior in the 15 to 19 year age group, a time when most patients are not married[12].

Mental health problems pose a fourfold increased risk for DSH [3,4]. Common disorders associated with DSH are mood, anxiety, impulse and substance abuse disorders. Impulsivity was found to be linked to 23.5% of patients in a South African study[11]. Whilst in a Canadian population-based study, 70.8% of patients that required admission due to DSH had a mental condition[12]. Whilst these studies looked at gender in relation to mental health conditions (including impulse disorders), there are no studies that examined the relationship of these conditions and age in DSH.

A European study noted that at 1 year after an episode of DSH, 1.6% would commit suicide, whilst 16.3% will make another non-fatal attempt[10]. The 10 year risk of a repeat non-fatal attempt is 4.2%[8]. Studies report an incidence of recurrence in DSH between 4 to 13%[7-9,20] . The risk is significantly greater in men[9]. There are lower levels of a repeat episode in Asian than

European countries attributed to the higher case fatalities in Asian countries where more lethal means are used[10]. More than one DSH attempt doubles the risk of suicide versus a single attempt[10]. In a meta-analysis of recurrence of self-harm one year after an index event, age was noted to be a significant study characteristic in a repeat fatal attempt[10]. In those patients who age was above the median age, the occurrence of non-fatal self-harm was 17.9% versus in those whose age was below the median age in which the incidence was 16.5%[10].

Self-poisoning is the most common method reported in DSH[4, 7,8,11,18,20]. The availability of substances is the over-riding factor in the choice of method[1,14,17]. In low-income countries where there is a larger portion of rural inhabitants and agricultural practices, chemical ingestion such as pesticides is more common[1,4,9,117]. In a Tehran study focusing on the influence of age and gender on method of self-poisoning in DSH, it was found that the frequency of drug overdose increased from ages 10 to 50 years and then declined after age 50[17]. The opposite was found to be the case in pesticide use, in which the incidence was greatest in the over 50 year age group and declined with age from 50 to 10 years old[17]. A study in a critical care setting in Eastern Cape found that the average age of patients using cholinesterase inhibitors was 30 years, whilst the average age of patients taking a paracetamol overdose was 27 years. In an Irish study in a cohort of 15 to 17 year olds, it was noted that self-cutting was a feature of adolescent self-harm[13].

In South Africa, alcohol has been implemented in 40% of suicides. One in 5 patients in a study in Spain used alcohol whilst engaging in DSH. Men are more likely to use alcohol than women in DSH[4,8,17]. No studies have looked at age and its association with alcohol in DSH.

The WHO organization reports that the in the 15 to 29 year age group, suicide is the second leading cause of death accounting for 8.5% of all deaths.[1] In the 30 to 49 year age group it is the fifth leading cause accounting for 4.1% of all deaths.[1] High income countries that report case fatalities of serious medically treated self-harm, report a stepwise increase in mortalities with age.[1]

The median length of stay in hospital of DSH patients is 3 to 4 days in low-income countries compare to the average of less than one day in high income countries. This is ascribed to the more toxic means used in developed countries which require longer observation or treatment. A South African study, noted the gender difference in length of stay of self-harm patients being

longer in men (7.05 days) than women (4.73 days)[11].   However no studies have analyzed the influence of age on length of stay. Nor are there studies focusing on age in relation to psycho-social follow up or management setting.

There was a single study in 1984 investigating the epidemiology of DSH at RK Khan Hospital[20]. Deliberate self-harm accounted for 10.3% of all medical admissions. Other key findings of the study showed a female predominance, a peak age group of 15 to 24 year, drug overdose was the commonest method used and marital/family problems was the most frequent trigger.

1.3 Research Objectives

1. To estimate the incidence of deliberate self-harm (DSH) at RK Khan Hospital Internal Medicine Department form January 2017 to June 2017 in relation to total admissions.
2. To describe the demographic patterns of patients with DHS at RK Khan Hospital.
3. To identify the influence of age on triggers for DSH of patients at RK Khan Hospital.
4. To describe the methods used by patients with DSH at RK Khan Hospital in relation to age.
5. To investigate the influence of age on the outcomes of patients admitted with DSH at RK Khan Hospital.

1.4 Research Question

1. What is the incidence of deliberate self-harm (DSH) at the RK Khan Hospital Internal Medicine department in relation to total admissions?
2. What are demographic patterns of patients with DSH at RK Khan Hospital?
3. What are the triggers for DSH of patients at RK Khan Hospital in different age groups?
4. What are the methods used by patients with DSH at RK Khan Hospital in relation to age?
5. What is the influence of age on the outcomes of patients admitted with DSH at RK Khan Hospital?

CHAPTER TWO

2.1 Research Methodology

The study is a descriptive, retrospect, clinical chart review of patients admitted with Deliberate Self-Harm to the Internal Medicine Department of RK Khan hospital for the period 1 January 2017 to 30 June 2017.

2.1.1 Study Design

A retrospective observational descriptive study

2.1.2 Study population

The study population will include all patients admitted to the RK Khan Hospital Internal Medicine Department with the diagnosis of Deliberate Self-Harm

2.1.3 Sampling strategy, statistical planning, sample size

The study population was stratified into 4 groups namely: <20 years, 20 to 29 years, 30 to 39 years and $\geq$ 40 years.

We determined the sample size on the basis of statistical power of 80% and significant level of 95%. The following statistical parameters were used.

Effect size = 0.35

Type 1 (alpha error =0.05) (possibility of rejecting the null hypothesis = 5%)

Type 2 (beta error = 0.2) (the probability of falsely retaining the null hypothesis = 20%)

Statistical power = 80%. Number of groups for the analysis variants = 4.

On the basis of the above statistical parameters, a sample size of 96 was determined to be sufficient to provide a statistical power of 80%. Therefore 96 divided by 4 = 24 individuals per age group.

2.1.4 Inclusion/Exclusion criteria

1. All patients admitted with a diagnosis of Deliberate self-harm to RK Khan Internal medicine department was included
2. The period of admission was 1 January 2017 to 30 June 2017.
3. Patients not admitted and managed as out-patients were excluded

2.1.5 Data collection methods and tools

1. Patients admitted with deliberate self-harm were identified using the admission records of RK Khan Hospital Internal Medicine Department.
2. Hospital charts were reviewed by the Principal investigator and data were recorded on the Data Collection Tool.
3. Information including age, gender, race, length of hospital stay, method used, trigger, outcomes and management setting were recorded.
4. The data was anonymized and stored in a password-protected computer only accessible to the Principal investigator.

2.1.6 Data analysis techniques

All analysis was performed using SAS 9.4 (SAS Institute Cary USA) and SPSS version 24 (IBM Corp released in 2016). Continuous variables were summarized as means +/- standard deviation (SD). Medians and interquartile ranges were used for variables that were highly skewed. Categorical data were summarized using portions and percentages. Proportions were compared using PEARSON'S CHI-SQUARE test and FISHER EXACT test as appropriate.

2.1.7 Statistical analysis

An ANOVA was used to determine if there is a statistically significant difference in each of the factors or variables in one group to the other. In the event that an ANOVA gave a statistically significant difference between age groups with regards to their variables being investigated, then a follow-up test, namely a Post Hoc was conducted to determine the differences. There were different types of Post Hoc tests: Tukey test, LSD test of Bonferroni test. Post Hoc tests are pair-wise. Reliability and validity were ascertained using Chonbach's alpha. The statistician validated the data.

2.1.8 Ethical Considerations

The study was a descriptive, retrospective clinical chart review. No consent was needed. Data was anonymized and is only accessible to the Principal investigator. Therefore there are no ethical considerations.

CHAPTER THREE

3.1 Results

The results of the study are outlined as follows:

- Incidence
    - Age
    - Gender
    - Race
- Triggers
    - Previous self-harm
    - Psychiatric condition
- Methods used
    - Alcohol used
- Outcomes
    - Length of stay
    - Management setting
    - Psycho-social assessment and follow-up

3.1.1 Incidence

The total number of patients that were admitted to the RK Khan Hospital Internal medicine department with deliberate self-harm for the period January 2017 to June 2017 was 226. The total number of general admissions for the same period was 4413. Therefore deliberate self-harm equated to 5.12% of the general admissions to the department.

3.1.1.1 Age

Table 3.1 shows the age of patients with deliberate self-harm. Normality tests for age, showed skewed variables. The median age of all patients with DSH was 26.00 years (SD 11.061, range

12 to 79 years). The median age of women was 22.0 years (standard deviation [SD] 9.905, range 12 to 61years) and that of men were 29.00 years (SD 12.088, range 14 to 71 years).

Table 3.1: Age of patients with Deliberate Self Harm

	AGE (years)		
	ALL	**FEMALES**	**MALES**
MEAN	27.88	25.2	31.94
MEDIAN	26.00	22.0	29.00
STD DEVIATION	11.061	9.905	12.088
VARIANCE	122.340	98.117	146.125
RANGE	59	49	57
MINIMUN	12	12	14
MAXIMUM	71	61	71

In terms of age, patients were stratified into 4 groups namely: less than 20 years, 20 to 29 years, 30 to 39 years and $\geq$ 40 years (see table 3.2). The highest number of general admissions for all admissions was in the $\geq$ 40 years age group (n=2833, 64.2%), with the highest number of patients with DSH in the 20 to 29 years age group (n=83, 36.7%).

Table 3.2: Age groups of patients with DSH and all admissions.

	DSH		ALL ADMISSIONS		Chi square	P value	DSH/ALL ADMISSSIONS
	No.	% of DSH	No.	% of all admissions			%
<20 years	62	27.4	210	4.8	197.710	<0.0001	29.5
20 to 29 years	83	36.7	598	13.5	92.629	<0.0001	13.9
30 to 39 years	39	17.3	774	17.5	0.006	0.9385	5.0
≥40 years	42	18.6	2833	64.2	189.663	<0.0001	1.5
TOTAL	226		4413				

The proportion of general admissions that DSH accounted for, was 29.5% in those less than 20 years, 13.9% in the 20 to 29 year age group, 5% in the 30 to 39 year age group and 1.5% in those ≥ 40 years. There was a statistically significant association between age and the proportion of patients with DSH versus general admissions. There was a statistically greater proportion of patients with DSH in the less than 20 years (x^2=197.710, p=<0.0001) and the 20 to 29 years age group (x^2=92.629, p=<0.0001). There was a statistically lesser proportion of patients in the ≥ 40 age group (x^2=189.663, p=<0.0001) and no difference in the proportion of patients in the 30 to 39 year age group. (x^2=0.006, p=0.9385).

3.1.1.2 Gender

Table 3.3 shows the gender profile of patients with DSH and all admissions. Admission data for all patients revealed a higher proportion of females 2322 (52.6%) than males 2091 (47.3%) for the study period. The number of female patients with Deliberate self-harm was 144 (63.7%) and the number of men was 82 (36.3%). There was a statistically significant gender difference when comparing the proportion of patients admitted with DSH versus the general admissions, with more women (x^2=10.635, p=0.0011) and fewer men (x^2=10.447, p=0.0012). The percentage of DSH patients in relation to the general admissions was 6.20% for females and 3.92% for males.

Table 3.3: Gender profile of patients with DSH and all admissions

	DSH		ALL ADMISSIONS		Chi square	P value	DSH/ALL ADMISSSIONS
	No.	% of DSH	No.	% of all admissions			%
FEMALES	144	63.7	2322	52.6	10.635	0.0011	6.20
MALES	82	36.3	2091	47.3	10.447	0.0012	3.92
TOTAL	226		4413				5.12

3.1.1.4 Race

The RK Khan Hospital Internal Medicine Department only began collecting data on the race of their admissions from March 2017. Therefore the racial characteristics of all general admissions in January and February of 2017 are unknown. The racial composition of the 2866 general admissions for the time period March 2017 to June 2017 (see table 3.4) revealed, 66.6% blacks, 0.84% coloured, 29.1% Indian and 3.5% white patients. The racial composition of the study patients was 61.1% black, 1.3% coloured, 34.1% Indian and 3.5% white patients. When comparing the proportion of each race group of patients with DSH and the general admissions, there was no statistical difference. (x^2 =2.831, p=0.0925). There was a significant difference in the racial profile with respect to age. (x^2=28.653, p=00007) Most patients in the black (n=52) and Indian (n=28) population were in the 20 to 29 year age group. There was no data of the general admission and race with respect to age to compare with.

Table 3.4: Racial profile of patients with DSH and all admissions.

	DSH		ALL ADMISSIONS*		Chi-square	P value
	No.	% of DSH	No.	% of all admissions		
BLACK	138	61.1	1908	66.6	2.831	0.0925
COLOURED	3	1.3	24	0.84	0.4744	0.512
INDIAN	77	34.1	835	29.1	2.519	0.1125
WHITE	8	3.5	99	3.5	0.000	1.0000
TOTAL	226		2866			

*Data for all admissions from March 2017 to June 2017.

Table 3.5: Racial profile according to age groups in patients with DSH

RACE	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
BLACK	49	21.7	52	23.0	23	10.1	14	6.2		
COLOURED	0	0	0	0	3	1.3	0	0	28.653	0.0007
INDIAN	13	5.8	28	12.4	10	4.4	0	0		
WHITE	0	0	3	1.3	3	1.3	2	0.9		

3.1.2 Triggers

Tables 3.6 and 3.7 shows a list of triggers for self-harm was derived using those most frequently cited in the literature. The study patients indicated that the two most common triggers were marital/romantic relationship problems (n=72, 31.9%) and domestic disputes (n=76, 33.6%). Marital /romantic relationship problems were statistically significantly higher in the 20-29 year age group (x^2=12.661, p= 0.005) and domestic dispute was significantly higher in the less than 20 year age group (x^2= 10.427, p=0.015). Ill health was significantly higher in the 30 to 39 year age group (x^2= 8.220, p=0.42). There was an association with gender (x^2=6.306, p=0.12) and domestic dispute with three times as many men (n=57, 25.2%) than women (n=19, 8.4%) reporting it as a trigger.

Table 3.6: Triggers according to gender in patients with DSH

TRIGGER	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Marital /Romantic relationship problems	72	31.9	43	19.0	29	12.8	0.729	0.393
Domestic dispute	76	33.6	57	25.2	19	8.4	6.306	0.012
Bereavement	4	1.8	3	1.3	1	0.4	0.224	0.636
Ill health	9	4.0	6	2.7	3	1.3	0.035	0.851
Drug addiction	5	2.2	2	0.9	3	1.3	1.224	0.265
Unknown	27	11.9	13	5.8	14	6.2	3.215	0.073
Unemployment	6	2.7	4	1.8	2	0.9	0.023	0.879
Financial problems	13	5.8	9	4.0	4	1.8	0.181	0.670
Poor academic performance	1	0.4	0	0.0	1	0.4	0.572	0.449
Pregnancy	4	1.8	0	0.0	4	1.8	2.319	0.128
Other	16	11.5	10	7.1	6	4.4	0.060	0.806

Table 3.7: Triggers according to age groups in patients with DSH

TRIGGERS	<20 yrs		20 to 29 yrs		30 to 39yrs		>40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Marital /Romantic relationship problems	10	4,4	32	14,2	18	8,0	12	5,3	12.661	0.005
Domestic dispute	31	13,7	24	10,6	10	4,4	11	4,9	10.427	0.015
Bereavement	1	0,4	0	0,0	1	0,4	2	0,9	3.808	0.283
Ill health	0	0,0	2	0,9	4	1,8	3	1,3	8.220	0.042
Drug addiction	1	0,4	1	0,4	3	1,3	0	0,0	6.856	0.077
Unknown	7	3,1	11	4,9	3	1,3	6	2,7	1.049	0.789
Unemployment	0	0,0	5	2,2	1	0,4	0	0,0	6.483	0.090
Financial problems	1	0,4	5	2,2	3	1,3	4	1,8	3.344	0.342
Poor academic performance	1	0,4	0	0,0	0	0,0	0	0,0	2.657	0.448
Pregnancy	1	0,4	3	1,3	0	0,0	0	0,0	3.093	0.378
Other	9	4,0	7	3,1	4	1,8	6	2,7	1.700	0.637

3.1.2.1 Previous self-harm

Table 3.8 shows previous self-harm according to gender in patients with DSH. The number of
patients that reported having a previous episode of self-harm was 41 (18.1%), with 25 patients
(11.1%) being female and 16 patients (7.1%) being male). 156 patients (69%) reported not
having a prior episode of self-harm, with 109 patients (48.2%) being females and 47 patients
(20.8%) being males. A history of previous self-harm was not known for 29 patients. When
these unknown patients were excluded from the analysis, there was no association between
gender and previous self-harm. (x^2 =1.181, p=0.227) Nor was there an association of previous
self-harm and age. (x^2=0.798, p=0.794) as shown in table 3.9.

Table 3.8: Previous self-harm according to gender in patients with DSH

PREVIOUS SELF-HARM	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Yes	41	18.1	25	11.1	16	7.1	1.181	0.227
No	156	69.0	109	48.2	47	20.8		
Unknown	29	12.8	10	4.4	19	8.4		

Table 3.9: Previous self-harm according to age groups in patients with DSH

PREVIOUS SELF-HARM	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Yes	11	4.9	17	7.5	5	2.2	8	3.5		
No	48	21.2	55	24.3	26	11.5	27	11.9	0.798	0.794
Unknown	3	1.3	11	4.9	8	3.5	7	3.1		

3.1.2.2 Psychiatric condition

A psychiatry history according to gender and age groups are illustrated in tables 3.10 and 3.11. There were 32 patients that reported having a history of a known psychiatric condition. These were categorized into commonly encountered psychiatry diagnosis at RK Khan Hospital. There was no association between age groups and a previous psychiatric history ($x^2 = 4.792$, p=0.1877) nor was there an association of gender and a previous psychiatric history ($x^2 = 12.897$, p=0.1673). There were 5 men with mental and behavioural disorders due to psychoactive substance abuse or other psychiatric conditions, with no women in these categories. There was equal representation of gender with a prior history of schizophrenia, schizotypal and delusional disorders (n=3). Men accounted for twice as many mood disorders as women (12 versus 6).

Table 3.10: Psychiatry history according to gender in patients with DSH.

PSYCHIATRY HISTORY	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Mental & behavioural disorders due to psychoactive substance use	5	2.2	0	0.0	5	2.2		
Schizophrenia, schizotypal and delusional disorders	6	2.7	3	1.3	3	1.3	4.792	0.1877
Mood disorders	18	8.0	6	2.7	12	5.3		
Other psychiatric condition	3	1.3	0	0.0	3	1.3		
None	194	85.8	135	59.7	59	26.1		

Table 3.11: Psychiatry history according to age groups in patients with DSH

PSYCHIATRY HISTORY	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Mental & behavioural disorders due to psychoactive substance use	1	20.0	2	40.0	2	40.0	0	0.0		
Schizophrenia, schizotypal and delusional disorders	2	33.3	1	16.7	0	0.0	3	50	12.897	0.1673
Mood disorders	0	0.0	7	38.9	4	22.2	7	38.9		
Other psychiatric condition	0	0.0	2	66.7	0	0.0	1	33.3		
None	59	30.4	71	36.6	33	17.0	31	16.0		

3.1.3 Methods used

Table 3.12 categorises self-harm according to the most common methods used at RK Khan Hospital in terms of gender and table 3.13 uses the same categorisation in terms of age groups . The most frequently encountered method was ingestion of analgesia (n=64, 28.3%). The second most frequent method was ingestion of other agents not categorised on the data collection list (n=62, 27.4%). Altogether, overdose of drugs accounted for 182 (80.5%) of patients. Chemicals/fumes and pesticides were used in 27 (11.9%) of cases, with self-injury being reported in 9 instances (4.0%). The method used was unknown in 17(7.5%) patients.

Table 3.12: Method used according to gender in patients with DSH

METHOD USED	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Analgesia	64	28,3	46	20,4	18	8,0	2.570	.109
Anxiolytic-hypnotics, Antidepressant/psychotics, central nervous system (CNS) agents	39	17,3	16	7,1	23	10,2	10.497	.001
Other agents	62	27,4	44	19,5	18	8,0	1.943	.163
Self-injury	9	4,0	4	1,8	5	2,2	1.506	.220
Antihypertensive, Oral hypoglycaemic agents	33	14,6	23	10,2	10	4,4	0.598	.439
Anti-tuberculosis drugs, antiretrovirals (ARVs)	33	14,6	26	11,5	7	3,1	3.797	.051
Chemicals/fumes/pesticides	27	11,9	9	4,0	18	8,0	12.244	0.00

There were statistically significant associations between age groups and method used. Anxiolytic-hypnotics, antidepressant/psychotic and CNS agents were most common in the 20 to 29 year group (x^2= 8.759, p= 0.33). Antihypertensive/oral hypoglycaemic agents were most common in the less than 20 years age group (x^2=10.411, p=0.015). Chemicals/fumes and pesticides were reported for 8 patients in each age group except the less than 20 years old age group in which only 3 patients used this method (x^2=8.132, p=0.043). In terms of gender, there was an association with methods used. Men were significantly more likely to use anxiolytic-hypnotic, antidepressant/psychotic and CNS agents (x^2= 8.759, p= 0.033) as well as chemical/fumes and pesticides (x^2=8.132, p=0.043)

Table 3.13: Methods used according to age groups in patients with DSH

METHOD USED	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Analgesia	20	8,8	26	11,5	10	4,4	8	3,5	2.760	0.430
Anxiolytic-hypnotics, Antidepressant/psychotics, CNS agents	5	2,2	14	6,2	12	5,3	8	3,5	8.759	0.033
Other agents	21	9,3	26	11,5	5	2,2	10	4,4	6.383	0.094
Self-injury	1	0,4	4	1,8	1	0,4	3	1,3	2.365	0.500
Antihypertensive, Oral hypoglycaemic agents	16	7,1	7	3,1	3	1,3	7	3,1	10.411	0.015
Anti-tuberculosis drugs, ARVs	5	2,2	14	6,2	7	3,1	7	3,1	2.961	0.398
Chemicals/fumes/pesticides	3	1,3	8	3,5	8	3,5	8	3,5	8.132	0.043
Unknown	8	3,5	5	2,2	2	0,9	2	0,9	3.630	0.304

Table 3.14: Methods used in patients with DSH

METHOD USED	No.	%
Single method	151	66,8
More than one method	58	25,7
Unknown	17	7,5
Substance ingestion	182	80,5
Chemical/fumes/pesticides and self-injury	27	11,9
Unknown	17	7,5

Patients reported using a single method in 151 (66.8%) of cases. (see table 3.14) Multiple methods were reported in 58 (25.7%) of patients. Whilst the number or the nature of the method in 17 (7.5%) was unknown.

3.1.3.1 Alcohol use

Table 3.15 shows the use of alcohol in patients with DSH stratified by gender. There were 7 women (3.1%) and 17 (7.5%) men that admitted to using alcohol during their episode of self-harm. 114 (50.4%) women and 45 (19.9%) of men denied any alcohol use during the index episode. There were 43 (19.0%) patients overall in which it was unknown if alcohol was involved. When these unknown patients were excluded from the analysis, it was found that there was a statistically significant association between gender and alcohol consumption with DSH. (x^2 =16.8385, p=0.001)

Table 3.15: Alcohol use according to gender in patients with DSH

ALCOHOL USE	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Yes	24	10.6	7	3.1	17	7.5		
No	159	70.4	114	50.4	45	19.9	16.8385	0.001
Unknown	43	19.0	23	10.2	20	8.9		

3.1.4 Outcomes

The outcomes of patients according to age groups and gender are illustrated in tables 3.16 and 3.17 respectively. The mortality rate of patients admitted with DSH was low. Only 4 (1.77%) demised, giving a survival rate of 98.23% (n=222). Majority of the patients were discharged (n=215, 95.13%). 2 patients (0.88%) were transferred to another facility and 5 patients (2.2%) refused hospital admissions. There was no association between the outcome of patients and their age groups (x^2=, p=0.266) and gender (x^2=0.655).

Table 3.16: Outcome according to age groups in patients with DSH

OUTCOME	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Discharged	56	24.8	80	35.4	39	17.3	40	17.7		
Demised	3	1.3	0	0.0	0	0.0	1	0.4	11.139	0.266
Transferred to another facility	1	0.4	0	0.0	0	0.0	1	0.4		
Refused hospital treatment	2	0.9	3	1.3	0	0.0	0	0.0		

Table 3.17: Outcome according to gender in patients with DSH

OUTCOME	TOTAL		FEMALES		MALES		Chi Square	P value
	No.	%	No.	%	No.	%		
Discharged	215	95.1	138	61.1	77	34.1		
Demised	4	1.8	3	1.3	1	0.4	1.620	0.655
Transferred to another facility	2	0.9	1	0.4	1	0.4		
Refused hospital treatment	5	2.2	2	0.9	3	1.3		

3.1.4.1 Length of stay

The mean length of stay as shown in table 3.18 was 3.05 days (SD 0.558, range 1-12).
Normality tests for the length of stay showed skewed variables. The median was 3.00 days. 154
(68.1%) of patients stayed for 3 days or less, 63 (27.9%) of patients stayed between 4 to 6 days
and only 9 patients (4%) had an admission duration of 7 days or more. There was no association
between age and length of stay x^2=1.854, p=0.993) (see table 3.19)

Table 3.18: Length of stay of patients with DSH

<table>
<tr><td colspan="3" align="center">LENGTH OF STAY (days)</td></tr>
<tr><td align="center">MEAN</td><td colspan="2" align="center">3.05</td></tr>
<tr><td align="center">MEDIAN</td><td colspan="2" align="center">3.00</td></tr>
<tr><td align="center">STD DEVIATION</td><td colspan="2" align="center">.558</td></tr>
<tr><td align="center">VARIANCE</td><td colspan="2" align="center">4.438</td></tr>
<tr><td align="center">RANGE</td><td colspan="2" align="center">11</td></tr>
<tr><td align="center">MINIMUM</td><td colspan="2" align="center">1</td></tr>
<tr><td align="center">MAXIMUM</td><td colspan="2" align="center">12</td></tr>
<tr><td></td><td align="center">No.</td><td align="center">%</td></tr>
<tr><td align="center">≤ 3 days</td><td align="center">154</td><td align="center">68.1</td></tr>
<tr><td align="center">4 to 6 Days</td><td align="center">63</td><td align="center">27.9</td></tr>
<tr><td align="center">≥ 7 days</td><td align="center">9</td><td align="center">4.0</td></tr>
</table>

Table 3.19: Length of stay according to age groups in patients with DSH

LENGTH OF STAY	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
<3 days	40	17.7	60	26.5	25	11.1	29	12.8		
4 to 6 days	17	7.5	18	8.0	12	5.3	10	4.4	1.854	0.933
>7 days	5	2.2	5	2.2	2	0.9	3	1.3		

3.1.4.2 Management setting

The majority of patients (n=201, 88.9%) were managed in the general medical ward. (see table 3.10) No patients were treated in the psychiatry ward. There were 3 patients (1.3%) that were managed as outpatients. 16 patients (7.1%) received care in the medical high care unit, whilst 6 patients (2.7%) were treated in the intensive care unit. There was no association between age group and management setting (x^2 =10.997, p= 0.277). (see table 3.21)

Table 3.20: Management setting in patients with DSH

MANAGEMENT SETTING	No.	%
Outpatient	3	1,3
General medical ward in-patient	201	88,9
Psychiatry ward	0	0,0
High Care Unit	16	7,1
Intensive Care Unit (ICU)	6	2,7

Table 3.21: Management setting according to age groups in patients with DSH

MANAGEMENT SETTING	<20 yrs		20 to 29 yrs		30 to 39yrs		≥40 yrs		Chi Square	P value
	No.	%	No.	%	No.	%	No.	%		
Outpatient	1	0,4	2	0,9	0	0,0	0	0,0		
General medical ward in-patient	52	23,0	79	35,0	35	15,5	35	15,5	10.977	0.277
High Care Unit	7	3,1	1	0,4	3	1,3	5	2,2		
ICU	2	0,9	1	0,4	1	0,4	2	0,9		
Psychiatry ward	0	0,0	0	0,0	0	0,0	0	0,0		

3.1.13 Psycho-social assessment or follow up

Referral of patients for psycho-social assessment to the departments of social worker, psychology and psychiatry is note in table 3.22. Patients were sometimes referred to more than one department. Most patients (n=203, 89.8%) of patients were referred to the social worker department. The department of psychology had 70 referrals (31%) whilst the department of psychiatry consulted 35 patients (15.5%). There was no psycho-social referral or follow up in 14 (6.2%) patients.

Table 3.22: Psycho-social assessment or follow up in patients with DSH

PSYCHO-SOCIAL ASSESSMENT OR FOLLOW UP	No.	%
Social worker	203	89,8
Psychology	70	31,0
Psychiatry	35	15,5
None	14	6,2

3.2 Discussion

In this study, the total number of patients that presented with Deliberate Self harm (DSH) to the RK Khan Hospital Internal Medicine Department was 226. This represented 5.12% of the total admissions for the time period January 2017 to June 2017. Early studies reported higher percentages of 11.8 % and 17.7% of DSH in relation to general hospital admissions in Durban[14,20]. A study done at RK Khan Hospital in 1984 attributed 10.3% of all admissions to DSH. Additionally, this percentage is lower than the 9.16% of total admissions that DSH accounted for in the same department from June 2016 to December 2016. The prime reason for this decline is the change in the admission criteria for patients that present with DSH to the RK Khan Hospital Internal Medicine Department. Previously all such patients were admitted. Patients were then referred to either the social worker, psychology or psychiatry department as in-patients. Due to limited bed resources, admissions are now restricted to only patients that require medical intervention or observation, are still suicidal or those whose social circumstances pose a high suicide risk. Out-patient referrals to the department of social worker, psychology or psychiatry are done for patients not admitted.

The median age of patients in the study was 26 years (range 12 to 79 years). The incidence of DSH was highest in the adolescent age group, denoting 29.5% of the total general admissions. There was a decrease in this percentage to 13.9% in those 20 to 29 years old, 5% in those 30 to 39 years old and 1.5% in those 40 years and older. This sharp decline with age was illustrated in other studies[8, 11,12,18,20,21.] Younger age is thought to be a risk factor for suicidal behaviour. According to the WHO, suicide accounted for 8,5% of all deaths in those between 15 to 29 years, making it the second leading cause of death in this age group, traffic accidents being the first[1].Adolescence is a challenging period. Young people are prone to developmental and emotional problems. The lack of maturity in dealing with stressful situations and the impulsivity of younger people, place them at risk of suicidal behaviour. Older age seems to be a protective factor against suicidal behaviour[12], though the exact reason has not been fully explored. It is possible though that older patients maybe more successful in suicide attempts.

 Women were noted to be 7 years younger than their male counterparts. The median age of female patients was 22 years and that of male patients was 29 years. This was comparable to

other studies which also noted that women engage in DSH at a younger age than men[9,11,15-18]. There was a significant association between age groups and gender. Most patients were in the 20 to 29 year age group for both genders. The second highest incidence for men occurred in the > 40 year age group and for women it was in the < 20 year age group. This supports the finding from previous studies that show that young females are more at risk than older females[16,18]. It is also similar to results from high-income countries that report that older males in addition to young adults have a higher prevalence of self-harm[1].

In the study population, 144 (63.7%) patients with DSH were female. This proportion was significantly higher than the proportion of female general admissions of 52.6%. The male to female ratio was 1: 1.76. It is in keeping with most studies that report a female predominance in DSH[3,7,8,12,14,16-18]. The WHO estimates women are 2.5 times more likely to engage in DSH[21] and previous local studies reported the range of female subjects made up 59.5 to 72% of the study participants[4,6,11,14,15,20]. This is in accordance with the widely reported "gender paradox" of suicidal behaviour in which women are more prone to non-fatal suicide attempts whilst men are more likely to commit suicide. Explanations for this "gender paradox" are that gender-specific socio-cultural roles may place women at a higher risk of suicide behaviour[12]. Whilst the more violent methods used by men, resulting in them having a higher case fatality[14]

In the study patients, the highest incidence of black and Indian patients was in the 20 to 29 year age group, which was statistically significant, compared to the other age groups. Collection of the racial profile of admitted patients at the RK Khan Hospital, Internal Medicine Department was only commenced in March 2017. This information however was not stratified according to age. Therefore there was no data to compare, the race findings of our study in terms of age, with. Additionally, there are few studies that explore race in DSH and there are no studies that focus on age in relation to race. The majority of patients in the study were black (61.0%) followed by Indians (34,1%) and there were few coloured (1.3%) and white patients (3.5%). This racial profile was not significantly different than that of all general admissions from March 2017 to June 2017.

The most common triggers reported as reasons for DSH was domestic disturbances (n=76, 33.6%) and martial/relationship problems (n=72, 31.9%). This is comparable to the family conflict and marriage problems reported in earlier South African studies[7,11,14,20.] Domestic dispute in the less than 20 years and the 20 to 29 year age group had a higher occurrence than those 30 years and older. Domestic dispute was also three times more common in men (n=57, 25.2%) than women (n=19, 8.4%). Domestic dispute was highest in the less than 20 year age group, marital and romantic relationship problems in the 20 to 29 year age group. Ill health as a trigger had the highest association in the 30 to 39 year age group. Though the study explored commonly encountered reasons for self-harm, the motives and intent of such actions were not. Therefore it is difficult to interpret this quantitative data. This may be an area for future qualitative research.

Of the study patients, 41 (18.1%) reported a previous history of self-harm. This is similar to the repeat rate of suicidal behaviour reported in a systematic literature review of European countries[10]. The risk of a non-fatal suicide attempt at one year was found to be 16.3% in that study[10]. Asian countries are noted to have a lower incidence of DSH repetition than other European countries (10.0 vs 17.1%)[10]. This is thought to be due to the high fatality of first suicide attempts as low-income countries use more lethal methods such as pesticides[10]. However, there is a wide range of between 4 to 38.5% of previous suicide attempts reported in other studies[7,11]. Furthermore, there were contrary findings of no gender difference[11] or male preponderance[9] noted. In our study, more females (n=25, 11.1%) than males (n=16, 7.1%) had a prior history of suicidal attempt, however there was no gender association with previous self-harm. Additionally, there was no age association with a previous history of self-harm. This is also contrary to results in a meta-analysis study that show that patients who repeat self-harm are older than those who do not[10.] In a Sri Lankan study focusing specifically on recurrence of DSH, it was noted that those who repeat self-harm were on average 6 years older (29 years versus 23 years) than those who did not. The most important risk factor for complete suicide has been noted to be a previous suicide attempt[1]. These episodes, therefore, provide an important opportunity for intervention to prevent suicidal behaviour.

A pre-existing psychiatric condition was found in 14.2% (n=32) of patient, with more than half have had a mood disorder (n=18). There were twice as many men (n=12) with mood disorders than women (n=6). There were 5 male patients with mental and behaviour disorders due to

substance and an equal number of patients with psychotic disorders (n=3). This is dissimilar to other studies that show a more prevalent rate of mood disorders in women and psychotic disorders in men[8,11,12]. There was no association of age groups and a previous psychiatric history in the study. Nor are there any reports in the literature that focus on this aspect.

Previous studies show that 40% of patients presenting with self-harm have a known psychiatric condition, whilst 70 to 80% of patients that require hospitalization have a psychiatric condition subsequently diagnosed[8,12,17]. The varying incidences of pre-existing psychiatric conditions may be due to the different settings in which studies are conducted. Studies taking place in psychiatric facilities are a confounding factor for a higher incidence of psychiatric conditions being reported. Mental health problems are a major risk factor for DSH[3,4]. Patients are four times more likely to exhibit suicidal behaviour if they have a psychiatric condition[3,4]. It is therefore important to identify and treat these conditions. However, it has not been determined if mental disorders are the cause of deliberate self-harm or if they predispose patients to suicidal behaviour[12].

The commonest method employed for DSH was drug overdose (182=80.5%). This is in keeping with numerous other studies that reveal drug overdose to account for between 70 to 93% of DSH[4, 7,8,11,13,16,17]. Other studies reported an increase in drug overdose with age[3,17]. Interesting to note in this study though, is that anti-hypertensive and oral hypoglycaemic agents were used significantly more in the less than 20 years old population. Hypertension and Type 2 diabetes mellitus are rare diagnoses in this age group. These medications were unlikely to have belonged to the patients that used them, but rather are prescribed for family or friends. This highlights the easy accessibility of prescribed medication in the community that can be used for self-harm.

The most common drug used was analgesia which is widely accessible (n=64, 28.3%). The use of analgesia in patients less than 20 years (n=20) and those in the 20 to 29 year age group (n=26) were more than in those in the 30 to 39 years (n=8) and the over 40 year age group (n=5).However, this difference was not statistically significant. Prescribed medication for some of the most frequently treated medical conditions at RK Khan Hospital, that is diabetes,

hypertension, tuberculosis and HIV, comprised of 40.9% of patients. This supports the theory that the availability of a substance overrides the method of choice in DSH[1, 4, 14, 17].

Anxiolytics-hypnotics and antidepressants/psychotics are commonly prescribed psychiatry medications. There were a significantly higher proportion of men that used these drugs than women. This may be due to the increased availability of these drugs to our male study population when considering that more men than women had a history of mood and mental and behavioural disorders due to psycho-active substance. It is important to note these findings as limiting the access to both prescription and non-prescription drugs can be a crucial step in reducing DSH.

Drug overdoses have been noted to be a less toxic means of DSH than methods such as self-injury. It is easy to attribute drug overdose as an indication of low intent. However, we must be mindful that most people are not aware of the toxicity of ingested substances. Chemical, fumes and pesticide ingestion accounted for 11.9% (n=27) of patients and self-injury 4% (n=9) of patients. There was no significant difference however reported in our patient population with respect to self-injury and age. Most studies report violent methods like self-injury to be more prevalent in men than women[1,14]. Hanging and firearms are more often used by men versus drug overdoses by women[4,11-13]. This accounts for the higher fatality in men than women. It however must be kept in mind that patients that present with serious self-injuries are likely to be admitted to the Department of Surgery as opposed to the Medical Department. Therefore caution must be exercised when interpreting data with respect to the above violent methods used.

Chemical ingestion was found to be more widespread in low to middle-income countries where many rural inhabitants are involved in small-scale agriculture[1,4,9,17]. Similar to a previous study which showed a preponderance of pesticide use with increasing age, there were fewer patients in our study that used this method in the less than 20 year age group in comparison to the other age groups[17]. Like self-injury, pesticide ingestion, which is viewed as a more lethal means of self-harm, has been reported to be more common in men[4,11-13]. This study supported this theory as there was a significantly higher number of men than women that used chemicals/fumes or pesticides. This significance may very well be greater than indicated as patients that require

surgical intervention from sequela of ingestion of chemicals, fumes or pesticides may have been referred to the surgical department.

More than one method was employed by 58 patients (25.7%). A previous South African study reported multiple methods in 21,5% of participants[11] It was found that more than one DSH attempt doubles the risk of suicide versus a single attempt[10.]

Alcohol was implicated in 10.6% of the DSH episodes in this study. There was an association between gender and alcohol consumption. A higher proportion of men (n=17, 7.5%) than women (n=7, 3.1%) admitted to alcohol use. It is well documented that alcohol is more common in men than women in patients who present with DSH[4,8,15.] Alcohol has been reported to be 4 times more prevalent in men with DSH[4,17]. 40% of suicides in South Africa have implicated alcohol use[4]. Alcohol allows patients to become less inhibited and act impulsively. In addition, alcohol itself may be used as poisoning as a method for self-harm[8,17].

The overall survival of patients admitted with DSH was 98.23% (n=222). There were only 4 deaths reported during the study period. There was no association in terms of gender or age group when looking at survival outcomes. The mortality rate of patients hospitalized after an index event in this study was low (n=4, 1.8%). It is more in keeping with the mortality rate reported in Western countries of 0.5 to 1.5%[12]. This is most likely due to analgesia and psychotropic medication overdose being the most frequent method used in these countries[9]. In contrast Asian countries like Sri Lanka in which more toxic substances such as pesticides and yellow oleander are more commonly used have reported a higher mortality rate of 7.7%[9.] Similarly, a South African study in a critical care setting, in which cholinesterase inhibitors was the method used in 55% of cases had a mortality rate of 7.6%[15.]

The median in-patient length of stay of patients was 3.00 days. There was no association with age. The median length of stay was similar to the 3 to 4 days reported in other low to middle income countries[9]. High-income countries however report a shorter length of stay of less than one day[9]. This difference in the literature is attributed to more toxic methods being used in low

to middle-income countries[1,9]. These patients require more medical intervention and supervision and hence the longer duration of hospital care. This argument however, cannot be used this study as less toxic methods were mainly employed. An explanation for the longer length of stay is possibly related to the waiting times to access in-patient psycho-social services before discharge. Departments providing psycho-social services at RK Khan Hospital are understaffed and do not provide after-hour services. Patients admitted over the weekend or public holidays are seen on the next working day at the earliest. Moreover turnaround times for laboratory results can be delayed. These factors all contribute to prolonging the length of stay of these admissions

The relatively long length of stay may be protective in further suicide behavior as it has been reported that the possibility of repeat attempts is greatest in the period after an index event[10]. However long-term follow up is needed as it has been shown that the incidence of complete suicide after a suicide attempt is 1.6% at 1 year and 3.9% after 5 years[10.]

In the study, 88.9% (n=201) of patients were managed in the general medical ward and only 7.1 % (n=16) of patients required management in a high care setting and 2.7% (n=6) in the Intensive Care Unit. It must be kept in mind though that bed occupancy in the High Care Unit as well as the Intensive Care Unit at RK Khan Hospital is often at full capacity and patients needing high care or intensive care monitoring are regularly managed in the general medical ward due to lack of bed availability. There was no significant association of age on the management setting.

There were no patients that were managed in the psychiatry ward. This may indicate that impulsivity versus a primary psychiatric condition may play an important role in patients' decision to self-harm as was demonstrated in previous studies[3,9]. However, the department of psychiatry at RK Khan Hospital does not have a dedicated ward for female psychiatric patients due to the shortage of beds. Female in-patient psychiatric patients are managed in the general medical ward under the care of the department of psychiatry.

The fact that majority of patients were managed in the general ward together with the low mortality rate, demonstrates the low toxicity of the most common used method, namely drug overdose. Drug overdose has a lower fatality than other violent methods of self-harm and therefore provides an opportunity for secondary prevention of suicidal behaviour.

Age did not play a role in the psycho-social assessment and follow-up of patients. The social worker department was consulted for 89.8% (n=203) of patients but only 31.0% (n=70) and 15.5% (n=35) of patients needed psychology or psychiatry intervention respectively. This finding is understandable when considering that the top triggers described were marital and romantic relationship problems and domestic disputes; which are mainly social stressors. It is possible that most cases were not severe enough to warrant specialist psychiatry or psychology services. The Departments of Psychiatry and Psychology at RK Khan Hospital are overburdened and understaffed. This may influence the referral of patients to these departments. Although referral for initial consultation to the psycho-social services departments was recorded, the need for subsequent long-term follow-up of these patients was not. This information would have been useful to further examine the burden of disease that deliberate self-harm has on these departments.

3.2.1 Strengths and limitations

A strength of this study is, the data available from the RK Khan Hospital Internal Medicine Department admission records which allowed the tracing of study patients files. This data also enabled the comparison of the demographics of study patients to those of the general admissions. The quantitative nature of the study was important to gain statistical data. The study was conducted in RK Khan Hospital, a facility that represents the demographic profile of patients in Durban.

A limitation of the study was that it was retrospective. Clerking notes of doctors were not uniform. Some data was missing in terms of alcohol use, previous history of self-harm, the method used and triggers. A prospective study with a standard method of data collection may obviate these challenges. In addition, only patients that were admitted were included in the study. Not all patients that engage in DSH seek medical attention. Patients treated in the emergency department and discharged would have been excluded from the analysis. Also to consider is the fact that DSH patients presenting to RK Khan Hospital may also be admitted to other departments such as Surgery. This study did not analyse the timing of DSH in terms of time of day or year.

Data for this study was collected using hospital admission records. This method of data collection has its limitations. Not all patients that engage in suicidal behaviour seek medical attention. Hospital admission data may underestimate the true extent of self-harm.

3.2.2 Conclusion and recommendations

Important findings of this study are the reduced incidence of admission of DSH to the RK Khan Hospital, Internal Medicine Department. DSH was the highest proportion of admissions in the adolescent age group .There was a female preponderance with the median age of patients being 26 years old. The most frequent triggers noted were that of domestic dispute and romantic/marital relationship problems. A previous history of self-harm was reported in 18.1% of the study patients. The commonest method used was drug overdose, analgesia being the most common agent. Interpretation of age and gender associations with means of DSH, may point to the easy accessibility of drugs playing the decisive role in the choice of method used Alcohol was involved in 10.6% of cases. There was a low mortality rate of 1.77% and patients stayed on average for 3.05 days. Most patients were managed in the general medical ward and 89% were referred to the Department of Social Work.

Age did influence the likelihood of admission, triggers and methods used. However, it was not a dependent factor in the outcomes of patients.

The reduced admission rate of DSH to the RK Khan Internal Medicine Department is a positive development in view of the resource limitations that the hospital faces, especially with respect to bed availability The high proportion of DSH that constitutes the total admission to the adolescent age group needs to be further investigated to help target intervention. The triggers used need to be further explored using qualitative methods for better understanding of their association with age. Socio-economic data such as education, employment and educational status may have been worth collecting to stratify risk factors for DSH.

As the choice of method seems to be determined by the availability of drugs, limiting accessibility of these drugs is an important target to reduce DSH. Encouraging is the low fatality rate, however, the frequency of repeat attempts must be highlighted as every episode of DSH may provide an opportunity for intervention. However considering the low lethality of admissions, the average length of stay compared to high-income countries is long. Means to

reduce this length may include a more efficient psycho-social and laboratory service. The reasons for the discrepancy between the numbers of patients referred to the Departments of Social Worker, Psychology and Psychiatry needs to be examined in further detail to avoid over or under utilization of these services.

It has been shown that the incidence of suicidal behaviour is more prevalent in the community than those that are medically treated[13]. Population-based studies using self-reports may reflect a more accurate means of quantifying the incidence of DSH[13]. Despite the WHO ascertain that the primary burden of deliberate self-harm is on health service staff and not bed occupancy, it would be interesting to have calculated the cost of these medical admissions to the department.

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APPENDICES

Appendix 1: Ethics Approval Letter

UNIVERSITY OF
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YAKWAZULU-NATALI

09 January 2018
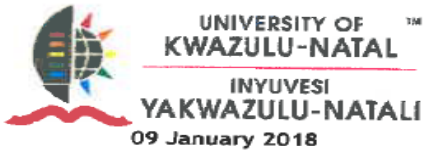
Dr A Soobramoney (203500377)
School of Clinical Medicine
College of Health Sciences
annelinesoobramoney@yahoo.com

Dear Dr Soobramoney

PROTOCOL: Direct Self-Harm at RK Khan Hospital Internal Medicine Department: The influence of age on the likelihood of admission, triggers, methods used and outcomes.　　　Degree: MMed
BREC Ref No: BE496/17

EXPEDITED APPLICATION

A sub-committee of the Biomedical Research Ethics Committee has considered and noted your application received on 01 August 2017.

The study was provisionally approved pending appropriate responses to queries raised. Your response received on 13 December 2017 to BREC correspondence dated 20 October 2017 has been noted by a sub-committee of the Biomedical Research Ethics Committee. The conditions have now been met and the study is given **full ethics approval** and may begin as from 09 January 2018.

This approval is valid for one year from **09 January 2018**. To ensure uninterrupted approval of this study beyond the approval expiry date, an application for recertification must be submitted to BREC on the appropriate BREC form 2-3 months before the expiry date.

Any amendments to this study, unless urgently required to ensure safety of participants, must be approved by BREC prior to implementation.

Your acceptance of this approval denotes your compliance with South African National Research Ethics Guidelines (2015), South African National Good Clinical Practice Guidelines (2006) (if applicable) and with UKZN BREC ethics requirements as contained in the UKZN BREC Terms of Reference and Standard Operating Procedures, all available at http://research.ukzn.ac.za/Research-Ethics/Biomedical-Research-Ethics.aspx.

BREC is registered with the South African National Health Research Ethics Council (REC-290408-009). BREC has US Office for Human Research Protections (OHRP) Federal-wide Assurance (FWA 678).

The sub-committee's decision will be RATIFIED by a full Committee at its next meeting taking place on **13 February 2018**.

We wish you well with this study. We would appreciate receiving copies of all publications arising out of this study.

Yours sincerely

Professor J Tsoka-Gwegweni
Chair: Biomedical Research Ethics Committee

cc supervisor: s.l.brown.mail@gmail.com
cc postgraduate administrator: SCMpgrad@ukzn.ac.za

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DIRECT SELF-HARM AT RK KHAN HOSPITAL INTERNAL MEDICINE DEPARTMENT:
THE INFLUENCE OF AGE ON THE LIKELIHOOD OF ADMISSION, TRIGGERS, METHODS USED AND OUTCOMES.

Mmed Protocol
Anneline Soobramoney
203500377

TITLE

Direct Self-Harm at RK Khan Hospital Internal Medicine Department: The influence of age on the likelihood of admission, triggers, methods used and outcomes.

AIM

To investigate Direct Self-Harm at RK Khan Hospital Internal Medicine Department from January 2017 to June 2017.

OBJECTIVES

6. To estimate the incidence of direct self-harm (DSH) at RK Khan Hospital Internal Medicine Department form January 2017 to June 2017 in relation to total admissions.

7. To describe the demographic patterns of patients with DHS at RK Khan Hospital

8. To identify the influence of age on triggers for DSH of patients at RK Khan Hospital

9. To describe the methods used by patients with DSH at RK Khan Hospital in relation to age.

10. To investigate the influence of age on the outcomes of patients admitted with DSH at RK Khan Hospital

RESEARCH QUESTION

6. What is the incidence of direct self-harm (DSH) at the RK Khan Hospital Internal Medicine department in relation to total admissions?

7. What are demographic patterns of patients with DSH at RK Khan Hospital?

8. What are the triggers for DSH of patients at RK Khan Hospital in different age groups?

9. What are the methods used by patients with DSH at RK Khan Hospital in relation to age?

10. What is the influence of age on the outcomes of patients admitted with DSH at RK Khan Hospital?

BACKGROUND AND LITERATURE REVIEW

RK Khan Hospital is a 543 bedded regional hospital in Kwa-Zulu Natal. In July 2016, a data record of admission diagnosis of all patients admitted to the Internal Medicine Department was initiated. At the end of 2016, it was shown that Direct Self-Harm was the top admission diagnosis. It accounted for 9.16% of total admissions. Considering the limited resources at this hospital, this prompted the Department to change its admission criteria of patients presenting with Direct Self-Harm.

According to the 2012 WHO Global Health Estimates, 804 000 suicide deaths occurred globally.[1] Suicide is the second leading cause of death amongst 15-29 year olds.[1] A prior suicide attempt is the most important risk factor for complete suicide.[1] For every completed suicide it is estimated that more than 20 suicide attempts are made.[1] The latest mortality data from StatsSA ranks suicide as the 6th cause of non-natural deaths in SA in 2015.[2]

Worldwide, studies on direct self-harm have been done in both high and low income countries.[3-13] In 2015, 78% of suicide occurred in lower to middle-income countries.[1] Focus has been on epidemiology, socio-demographics, risk factors and methods used.[3-13] The largest study on direct self-harm was conducted by the WHO/EURO multicenter study on Parasuicide in 1989. This study involved 25 centers in 19 European countries. The study is ongoing and is now known as the WHO/EURO Multicenter Study on Suicidal Behavior.

Studies analyzing gender differences in suicidal behavior have found that women are more likely to engage in DSH than men.[3-9,11] Men however have a higher fatality rate, as men have been shown to use more lethal methods of suicide.[3]

Most studies designs were retrospective descriptive studies in general medical wards, hospital emergency departments and psychiatric hospitals. There were systemic literature reviews done in Africa[13] and the United Kingdom[12]. Studies however at national level are limited as few countries have national statistical databases on DSH.

Most studies relied on hospital admission records. A few studies conducted population based studies using community surveys.[5,8-9,14]

In South Africa, studies done in the 1990's, examined DSH amongst the youth[3] and black[4] patients at regional hospitals. More recent studies include a small qualitative study conducted in Limpopo examining reasons for suicidal behavior.[15] A study in a critical care setting in Eastern Cape found a mortality rate of 7.6% in 419 patients admitted following DSH.[16] Cholinesterase inhibitors was the method used in 55% of these patients. A population-based national study established that the Coloured population group had the highest life time prevalence of suicide attempts.[9] In a 2017 published study at a urban hospital in Cape Town, drug overdose was the method used in 93% of patients.[17] 38% had a previous history of DSH and the main triggers for suicidal behavior was family conflict, marital/relationship problems and financial concerns.

At RK Khan Hospital, there was a single study in 1984 investigating the epidemiology of DSH at this institute.[18] Direct self-harm accounted for 10.3% of all medical admissions. Other key findings of the study showed a female predominance (72%) and a peak age group of 15-24 years. The most common method used was drug overdose and the prime reason for DSH was marital/family problems.

Currently there is no national data base on DSH in South Africa There is a paucity of recent data on DSH in KZN. Data collection on suicidal behavior helps to define the problem and to develop strategies for prevention. It would be beneficial to analyze DSH at RK Khan Hospital considering the burden of disease it has on this resource limited hospital.

KEY WORDS
direct self-harm
parasuicide
non-fatal suicide
internal medicine

South Africa

RK Khan Hospital

KEY REFERENCES

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SUMMARY OF PROPOSED RESEARCH METHODOLOGY

The study is a descriptive, retrospect, clinical chart review of patients admitted with Direct Self-Harm to the Internal Medicine Department of RK Khan hospital for the period 1 January 2017 to 30 June 2017.

STUDY DESIGN

A retrospective observational descriptive study

Study population

The study population will include all patients admitted to the RK Khan Hospital Internal Medicine Department with the diagnosis of Direct Self-Harm

Sampling strategy, statistical planning, sample size

Our population is going to be stratified into 4 groups namely: adolescents (<20 years), young adults (20-39 years), middle aged adults (40-65 years) and elderly (>65 years).

We determined the sample size on the basis of statistical power of 80% and significant level of 95%. The following statistical parameters were used.

Effect size = 0.35

Type 1 (alpha error =0.05) (possibility of rejecting the null hypothesis = 5%

Type 2 (beta error = 0.2) (the probability of falsely retaining the null hypothesis = 20%

Statistical power = 80%. Number of groups for the analysis variants = 4.

On the basis of the above statistical parameters, sample size of 96 was determined to be sufficient to provide a statistical power of 80%. Therefore 96 divided by 4 = 24 individuals per age group.

A random sampling procedure will be used. However there should be an equal representation of male and female.

Inclusion/Exclusion criteria

4. All patients admitted with a diagnosis of Direct self-harm to RK Khan Internal medicine department will be included
5. Admission must be within the period 1 January 207 to 30 June 2017.
6. Patients not admitted and managed as out-patients will be excluded

Data collection methods and tools

5. All patients admitted with direct self-harm will be identified using the pre-recorded electronic admission records of RK Khan Hospital Internal Medicine Department.
6. The period will include 1 January 2017 to 30 June 2017.

7. Once identified, the hospital charts will be accessed from the RK Khan Hospital Medical Records department.

8. The charts will be reviewed by the Principal investigator and data will be recorded in the Data Collection Tool (see appendix) electronically.

9. Information including name, hospital number, age, gender, race, length of hospital stay, method used, trigger, outcomes and management setting will be recorded.

10. The data be anonymised and will be stored in a password protected computer only accessible to the Principal investigator.

Data analysis techniques

All analysis will be performed using SAS 9.4 (SAS Institute Cary USA) and SPSS version 24 (IBM Corp released in 2016). Continuous variables will be summarized as means +/- deviation (ST). Medians and interquartile ranges will be used for variables that are highly skewed. Categorical data will be summarized using portions and percentages. Proportions will be compared using PEARSON'S CHI SQUARE test or FISHER EXACT test as appropriate.

Statistical analysis

An ANOVA will be used to determine if there is a statistically significant in each of the factors or variables in one group to the other. In the event that an ANOVA gives a statistically significant difference between age groups with regards to their variables being investigated then a follow up test, namely a Post Hoc will be conducted to determine the differences. There are different types of Post Hoc tests: Tukey test, LSD test of Benferroni test. Post Hoc tests are pair-wise.

Reliability and validity will be ascertained using Choribach's alpha. The statistician will validate.

Study location

RK Khan Hospital, Durban, South Africa

Study period

1 January 2017 to 30 June 2017.

TIME FRAME

1. Identification of patients and retrieval of charts: 1 month
2. Data collection and data analysis: 2 months
3. Write up of dissertation: 2 months

LIMITATIONS OF STUDY

1. The study is restricted only to patients who are seen at the Department of Internal Medicine Department.
2. Only patients that are admitted will be selected
3. The study period is restricted to 6 months only
4. Not all charts may be retrieved from medical records
5. The quality of data available depends on the note keeping of the admitting health care worker and not all information may have been recorded.

ETHICAL CONSIDERATIONS

The study is a descriptive, retrospective clinical chart review. No consent is needed. Data will be anonymized and only accessible to the Principal investigator. Therefore there are no ethical considerations.

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Appendix 3 : Data Collection Tool

Age (years)						
Race	Black	White		Indian	Coloured	Other
Gender	Male			Female		
Length of stay (days)						
Previous Self harm	YES		NO		UNKNOWN	
Psychiatric condition	1	Mental and behavioural disorders due to psychoactive substance use				
	2	Schizophrenia, schizotypical and delusional disorders				
	3	Mood disorders				
	4	Other psychiatric condition				
	5	None				
Alcohol use	YES		NO		UNKNOWN	

Method used	Self-poisoning	M1	Analgesia	M7	Antihypertensive
		M2	Anxiolytic-hypnotics	M8	Oral hypoglycaemic agents
		M3	Antidepressant/psychotics	M9	Anti-tuberculosis drugs
		M4	CNS agents	M10	ARVs
		M5	Other agents	M11	Chemicals/fumes/pesticides
		M6	Self-injury	M12	Unknown

Trigger	T1	Marital /Romantic relation. probs	T7	Unemployment
	T2	Domestic dispute	T8	Financial problems
	T3	Bereavement	T9	Poor academic performance
	T4	Ill health	T10	Pregnancy
	T5	Drug addiction	T11	Other
	T6	Unknown		

Management setting	1	Outpatient
	2	General medical ward in-patient
	3	Psychiatry ward
	4	High Care Unit
	5	ICU

Outcome	1	Discharged
	2	Demised
	3	Transferred to other facility
	4	Refused hospital treatment

psycho-social assessment/ long term ffg	1	social worker
	2	psychology
	3	psychiatry
	4	none