

*Short communication*

## RISK FACTORS FOR SELF-HARM IN CHILDREN AND ADOLESCENTS ADMITTED TO A PSYCHIATRIC HOSPITAL IN MALTA

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**Abstract.** The aim of this research was to identify risk factors for self-harm amongst the total population of children and adolescents admitted to an in-patient psychiatric hospital over a five-year period. A retrospective audit of patient records ( $N = 212$ ) covering 2010 to 2014 (both years included) showed that approximately 38% of all children and adolescents who were in-patients at the psychiatric hospital during the study period harmed themselves prior to admission. Male gender was found to be associated with self-harm. Results also suggested that family factors, specifically living with a single parent, significantly added to the risk of self-harm amongst the study population. Although the findings revealed that being male and hailing from a single-parent family are significant risk factors for self-harm in Maltese children and adolescents, this study did not establish why this is the case, therefore suggesting the need for further research. A prospective, longitudinal design would assess predictors of self-harm more clearly. Furthermore, self-reports would increase accuracy and reduce third-party reporter bias, while permitting more in-depth exploration of the risk factors involved in child and adolescent deliberate self-harm.

**Keywords:** Malta, self-harm, psychiatry, child, adolescent

### 1 Introduction

The Maltese Islands are situated in the central Mediterranean Sea and have the lowest total population of any European Union Member State, estimated to be approximately 425,000 in the 2011 National Census (National Statistics Office, 2012). In recent years, strategic planning and policy makers have acknowledged that mental health is an area which requires major development and investment in order to bring

services in line with the present international standards for good practice in the field. However, Malta lacks precise data regarding mental disorder amongst the population in general and, more specifically, regarding factors related to the uptake of psychiatric services by children and adolescents (Grech & Axiak, 2015). Although national Child and Adolescent Mental Health Services (CAMHS) operate from a range of settings, there is only one psychiatric hospital which serves the population of Malta.

### 1.1 Background

In Europe, deliberate self-harm (DSH) is a commonly used, broad term for self-injurious behaviours, inclusive and exclusive of those with non-fatal suicidal intent (Hagell, 2013). In the United States, the term non-suicidal self-injury (NSSI) is employed to describe self-injurious behaviours that exclude suicidal intent. In a systematic review of global empirical studies reported between 2005 and 2011, Muehlenkamp et al. (2012) reviewed research on all possible types of self-harm, focusing on 11-18-year-olds in community and school settings. Across all the studies, mean lifetime prevalence was 18% for NSSI and 16% for DSH. However, the authors noted that varying estimates of prevalence are attributable to disparate definitions of DSH and NSSI and also to incongruent research methodologies. Hagell (2013) seemed to concur with the latter point in noting that a shortage of reliable data such as that collected through self-reporting may be both misleading and inaccurate. Hjelmeland and Grøholt (2005, p. 64) stated that the rate of self-harm amongst adolescents “is higher than the average rate for the total population in most Western countries, especially among females”. The latter statement was borne out by a prolific comparative community study conducted in seven different countries which encompassed self-reports of over 30,000 adolescents, with findings revealing deliberate self-harm to be twice as common amongst females as males (Madge et al., 2008). Hjelmeland and Grøholt (2005) noted that the reason for incidence being higher in females is as yet an unanswered question. However, they did propose that a number of circumstances associated with adolescence may

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be influential in the high rate of self-harm amongst this age group, including the arbitrariness of adolescence, lack of life experience, impulsiveness and cognitive immaturity. In a comparative study which considered self-harm amongst adolescents compared to self-harm amongst adults, these authors found that while increasing age, female gender, a history of trauma and a diagnosis of depression are well-known risk factors for self-harm, their results confirmed that family factors, in particular living with a step-parent, significantly added to the risk (Hjelmenland & Grøholt, 2005). A study conducted by de Kloet et al. (2011) aimed to identify risk factors for self-harm for children and adolescents in a mental health in-patient unit in Australia. This study identified several factors that increased the likelihood of self-harm, including a diagnosis of depression, female gender, increasing age, living with a step-parent and having family problems. Brent (2011), in an editorial discussing prevention of self-harm in adolescents, claimed that risky health behaviours, including self-harm, are less likely to occur in the presence of a strong parent-child bond and consistent parental supervision. This view is supported by the findings of a study conducted by O'Connor, Rasmussen and Hawton (2014), which addressed risk factors for self-harm amongst school children in Northern Ireland. In this study, boys and girls who reported having self-harmed shared common characteristics, which included not living with both parents, parents who divorced, some degree of substance abuse, mood and personality factors and a history of physical and sexual abuse.

In view of the paucity of research available locally, the central aim of the present study was to establish reliable, baseline information to inform strategic planning and organisation of future CAMHS that reflect Malta's unique needs.

## 2 Methods

A retrospective survey of patient case notes was undertaken so as to provide a national snapshot of the socio-demographic characteristics of CAMHS users and details regarding their contact with, and uptake of, in-patient psychiatric services. The prevalence of child and adolescent self-harm in Malta and its associated factors are unknown. This paper reports on just one dataset that stemmed from the survey, namely risk factors of self-harm.

### 2.1 Sampling methodology

The study was based on data from a convenience sample, namely all children and adolescents ( $N = 212$ ) who were in-patients at Malta's only psychiatric hospital between 1st July 2010 and 31st July 2014 (both years included). A data gathering instrument was developed in order to conduct systematic evaluation and verification of factors related to the total population of child and adolescent in-patients during the five-year period. The data gathering instrument included 46 data points, with information mined from the patient records ranging from basic demographics, to

diagnosis, medication, length of stay and reported instances of self-harm (Grech & Axiak, 2015). Data for this study was extracted from the data point related to self-harm. Instances of self-harm were recorded whenever case notes indicated an observed or reported deliberate self-injury prior to admission. The data did not reveal the presence or absence of suicidal intent.

### 2.2 Ethical approval

This research study is based solely on secondary data mined from records and did not involve any human interventions. Permission to access records was sought from and given by the Data Protection Controller at the institution where the research was conducted.

### 2.3 Statistical analysis

Risk factors associated with adolescent self-harm were modelled through the technique of logistic regression using SPSS statistical software. Regression methods have become an integral component concerned with describing

**Table 1.** Diagnosis on admission

Diagnosis on admission	Count	%
Hyperkinetic Disorder	11	5.2
Conduct Disorder	46	21.7
Tic Disorder	2	0.9
Depressive Disorders	20	9.4
Anxiety Disorders	7	3.3
Eating Disorders	2	0.9
Personality Disorders	5	2.4
Developmental Disorder	5	2.4
Schizophrenia/Schizoaffective Disorder	12	5.7
Attention Deficit Hyperactivity Disorder	5	2.4
Obsessive Compulsive Disorder	2	0.9
Autistic Disorder	1	0.5
Conversion Disorder	1	0.5
Adjustment Disorder	1	0.5
Intellectual Disability	5	2.4
Drug-related Disorder	1	0.5
Other	20	9.4
Information not available	66	31.1

the relationship between a response variable and one or more explanatory variables. In the case where the response variable is measured on a binary scale (Yes, No), the regression method of choice is the binary logistic (Rathnayaka, 2008). The binary response variable in this study was Self-harm, which consisted of two levels: 1 was Yes and 2 was No. The last category of the response variable (No) was set to be the reference category. The response variable Self-harm was related to four predictors, namely Gender, Ethnicity, Family Structure and Substance Abuse. Gender was a factor with two levels (Males, Females), Ethnicity was a factor with two levels (Foreigner, Maltese), Family Structure was a factor with two levels (One-parent, Two-parent) and Substance Abuse was a factor with two levels (Yes, No). These predictors were all included as main effects in the model fit and the last category of each predictor was aliased (set to 0).

### 3 Results

During the period under study there were 212 child and adolescent admissions to the psychiatric hospital. Of these, 121 were males and 91 were females. Diagnosis on admission was distributed as indicated in Table 1.

**Table 2.** Risk factors for self-harm with their corresponding degrees of freedom and *p*-values

Risk factors	Chi-square	Degrees of freedom	<i>p</i> -value
Gender	6.112	1	0.013
Ethnicity	11.565	1	0.001
Family Structure	3.852	1	0.049
Substance Abuse	7.971	1	0.005

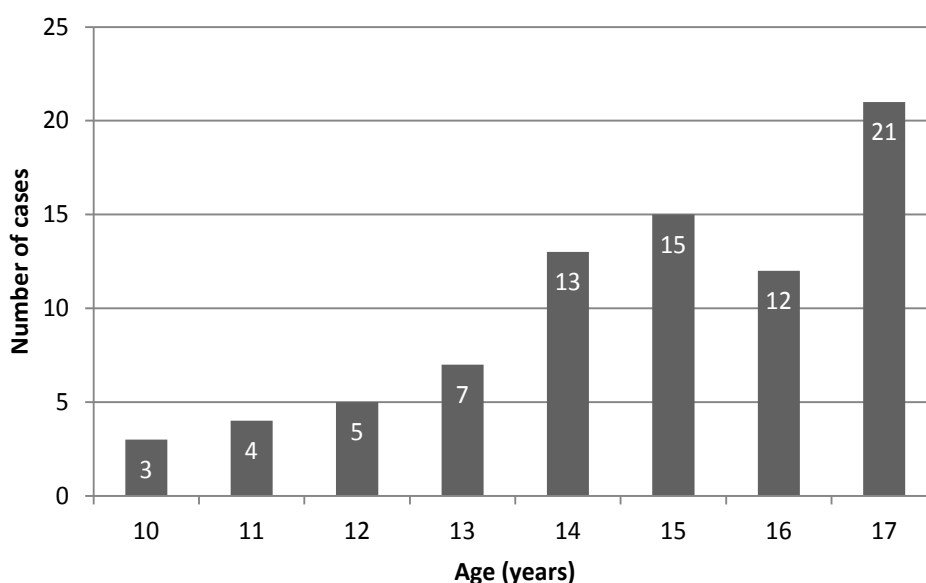
Within the total number of 212 admissions, there were 80 reported cases of self-harm prior to admission (approximately 38% of total admissions). There were no reported incidences of self-harm in any patient under 10 years of age. The majority of cases were aged between 14 and 17 years (76%). The distribution of cases by age is shown in Figure 1.

Since it was of interest to check whether various factors usually associated with adolescent self-harm were associated with an individual in the study sample being a self-harm case or not, a Chi-Square test of Independence was carried out for each of the risk factors as a preliminary analysis. Table 2 lists various risk factors for self-harm with their corresponding degrees of freedom and significance values. All risk factors were found to have a *p*-value less than the 0.05 level of significance, which shows that they all had a significant association with self-harm.

Risk factors were then analysed through the use of binary logistic regression. Table 3 shows the parsimonious model, which includes two significant main effects (Gender and Family Structure) since their corresponding *p*-values were less than 0.05. Gender was the best predictor of the response

**Table 3.** Variables in the logistic regression model

Variables	Parameter estimates	Degrees of freedom	<i>p</i> -value	Odds ratio
Gender (Male)	1.118	1	0.004	3.059
Gender (Female)	0 (aliased)			
Family Structure (One-parent)	0.799	1	0.038	2.223
Family Structure (Two-parent)	0 (aliased)			
Constant	0.165	1	0.587	1.180



**Figure 1.** Distribution of cases by age

outcome (Self-harm) since it had the smallest  $p$ -value (0.004).

Ethnicity and Substance Abuse were found to be weak predictors since their  $p$ -values (0.427 and 0.247 respectively) exceeded the 0.05 level of significance. These predictors were removed from the model fit since their contribution in explaining variation in the response outcomes was negligible.

Variable selection for identifying the parsimonious model in all attempts was based on the stepwise procedure. This involves entering the variable that has the strongest positive or negative correlation with the dependent variable into the model and at each subsequent step, adding the variable with the strongest partial correlation. With the stepwise procedure, variables are tested at each step for removal on a 0.05 level of significance and are re-entered on a 0.01 level of significance. This procedure continues until there are no further variables that make worthwhile additional contributions to the fit of the model.

The binary logistic regression model when the outcome is Self-harm (Yes) is:

$$\ln\left(\frac{p}{1-p}\right) = 0.165 + 1.118x_1 + 0.799x_2$$

where  $p$  represents the probability that an adolescent engages in self-harm given the predictors  $x_1$  and  $x_2$  representing Gender and Family Structure.  $x_1 = 1$  for male and  $x_1 = 0$  for female adolescents;  $x_2 = 1$  for a single-parent and  $x_2 = 0$  for a two-parent family structure.

The parameter estimate for males (1.118) was significantly larger than 0, which indicates that males were more at risk for self-harm than their female counterparts. The odds ratio for Gender (Male) was 3.06. Hence, the odds that male adolescents inflict self-harm was 3.06 times higher than females. On the other hand, the parameter estimate of single-parent family structure (0.799) was significantly larger than 0, which implies that those living in a one-parent family were more at risk for self-harm than their counterparts who lived in a two-parent family. The odds ratio for Family Structure (One-parent) was 2.223. Hence, the odds that adolescents living with one parent inflict self-harm was 2.223 times higher than adolescents living with two parents.

## 4 Discussion

This study found that approximately 38% of all children and adolescents who were in-patients at the psychiatric hospital during the study period harmed themselves prior to admission. In common with the extant literature (de Kloet et al., 2011; Hjelmenland & Grøholt, 2005; Madge et al., 2008), gender was found to be associated with self-harm. However, our results paradoxically indicate that in this study, males were more likely than females to self-harm. This finding varies from that obtained in other similar studies, which suggest that self-harm is less likely to occur in males than females (Brent, 2011; O'Connor, Rasmussen & Hawton, 2014). Furthermore, it was demonstrated that, in line with the findings of O'Connor, Rasmussen and Hawton (2014), living with a single parent significantly added to the risk of self-harm amongst our study population. Whilst it

is possible to postulate reasons for these associations, they are clearly factors which require further research in order to better understand and predict the risk of self-harm amongst this specific group.

## 4.1 Limitations

These findings need to be considered in the light of certain limitations. The main limitation of this study was a reliance on generalised data which prevented a more rigorous approach to analysis from being employed. The data collection tool only recorded the incidence of self-harm and did not delve into specifics such as number of instances or types of self-harm. Moreover, the strength of having access to the records of the total population of in-patients in the period surveyed was negated somewhat by incomplete records. Furthermore, there are currently no comprehensive electronic patient information systems available within mental health services in Malta and all data was mined from predominantly handwritten entries in patients' medical and nursing notes. Consequently, the data gathering process was laborious and time-consuming (taking around 12 weeks) and rendered the findings liable to human error and researcher interpretation.

## 5 Conclusion

Population-based studies on early precursors of deliberate self-harm are key for preventive, clinical and research purposes. In view of the paucity of local research, this small, exploratory study sought to report initial empirical data on the incidence and predictive factors of self-harm within the local context. Whilst the findings have revealed that being a male and hailing from a single-parent family are significant risk factors for self-harm in Malta, it has not sought to establish why this is the case. Therefore, this study supports the need for further research, ideally of a prospective, longitudinal design, in order to clearly assess predictors of self-harm. Furthermore, self-reports would increase accuracy, reduce third-party reporter bias and permit more in-depth exploration of the risk factors involved in child and adolescent deliberate self-harm.

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## 7 Conflicts of interest

The authors report no conflict of interest.

## References

- Brent, D. (2011) Prevention of self-harm in adolescents. *British Medical Journal*, 342, d592.

- Grech, A. & Axiak, S. (2015) A national snapshot of substance misuse among child and adolescent psychiatric inpatients in Malta. *Psychiatrica Danubina*, 27 (Suppl. 1), pp. S353-356.
- Hagell, A. (2013) Adolescent self-harm. Association for Young People's Health (AYPH) Research Summary No. 13, March 2013. [Online] Available from [http://www.ayph.org.uk/publications/316\\_RU13%20Self-harm%20summary.pdf](http://www.ayph.org.uk/publications/316_RU13%20Self-harm%20summary.pdf). [Accessed 14th February 2015].
- Hjelmeland, H. & Groholt, B. (2005) A comparative study of young and adult deliberate self-harm patients. *Crisis: Journal of Crisis Intervention & Suicide*, 26(2), pp. 64-72.
- de Kloet, L., Starling, J., Hainsworth, C., Berntsen, E., Chapman, L. & Hancock, K. (2011) Risk factors for self-harm in children and adolescents admitted to a mental health inpatient unit. *Australian and New Zealand Journal of Psychiatry*, 45(9), pp. 749-755.
- Madge, N., Hewitt, A., Hawton, K., de Wilde, E. J., Corcoran, P., Fekete, S., van Heeringen, K., De Leo, D., Ystgaard, M. (2008) The prevalence of deliberate self-harm within an international community sample of young people: findings from the Child & Adolescent Self-harm in Europe (CASE) Study. *Journal of Child Psychology and Psychiatry*, 49(6), pp. 667-677.
- Muehlenkamp, J., Claes, L., Havertape, L. & Plener, P. (2012) International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health*, 6(10). doi: 10.1186/1753-2000-6-10.
- National Statistics Office (2012) *Census of Population and Housing 2011. Preliminary Report*. Valletta: National Statistics Office.
- O'Connor, R. C., Rasmussen, S. & Hawton, K. (2014) Adolescent self-harm: a school-based study in Northern Ireland. *Journal of Affective Disorders*, 159, pp. 46-52.
- Rathnayaka, R. (2008) *Survey Study of the Requirement of a Teller Machine within University Premises for the Public Usage*. Unpublished dissertation. University of Ruhuna, Sri Lanka.