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3

4 **Title: Suicide attempts requiring hospitalisation in patients with eating disorders:**  
5 **a retrospective cohort study**

6

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11

12 **Abstract**

13 Introduction

14 Suicide attempts requiring hospitalisation are known to be common in patients who are diagnosed with eating  
15 disorders. Attempting suicide is a major indicator for those at risk of completed suicide. Both the specific eating  
16 disorder diagnosis and the influence of psychiatric comorbidities on suicide attempts requiring hospitalisation  
17 were investigated, with demographic and socioeconomic variables as confounders, over a 10-year observation  
18 period from January 2007 to March 2017.

19 Methods

20 Anonymised health record data from the South London and Maudsley NHS Foundation Trust (SLaM) was  
21 retrieved through the Clinical Records Interactive Search (CRIS) data resource; this is linked to national  
22 Hospital Episode Statistics (HES) data. This data includes all diagnoses for inpatient admissions. Hazard ratios,  
23 with 95% confidence intervals, were calculated from cox regression analyses and the effects of a number of  
24 confounders were estimated by performing multivariable analyses.

25 Results

26 In total, 4,895 patients were diagnosed with either anorexia nervosa (AN), bulimia nervosa (BN) or eating  
27 disorder otherwise not specified (EDNOS). Of these, 331 (6.7%) had attempted suicide requiring hospitalisation  
28 and 21 (0.04%) completed suicide. The eating disorder category associated with the highest risk of a suicide  
29 attempt was AN (HR 1.43, 95%CI 1.08-1.89, p=0.01). The risk was significantly increased further if the patient  
30 had a comorbid diagnosis of personality disorder, depression, bipolar affective disorder and substance misuse.

31 Conclusion

32 Suicide attempts requiring hospitalisation have a high incidence rate amongst patients with eating disorders and  
33 the risk is significantly increased in AN. Co-morbid psychiatric illness and suicidal ideation should be carefully  
34 assessed in all eating disorder patients.

35

36 **Key Words: suicide attempt, self-harm, suicide, anorexia nervosa, bulimia nervosa**

37 **Word Count of total (inc references): 4261 (main text inc references)**

38 **Data availability Statement:** The data accessed by CRIS remain within an NHS firewall and governance is  
39 provided by a patient-led oversight committee. Subject to these conditions, data access is encouraged and those  
40 interested should contact RS ([robert.stewart@kcl.ac.uk](mailto:robert.stewart@kcl.ac.uk)), CRIS academic lead

41

42

43 Eating disorders (ED) include a variety of diagnoses such as anorexia nervosa (AN), bulimia  
44 nervosa (BN) and eating disorder otherwise not specified (EDNOS) (APA 2013). Eating  
45 disorder patients have high rates of mortality with psychiatric comorbidity contributing to  
46 these elevated rates (Himmerich et al 2018; Himmerich et al 2019). They are more likely to  
47 present to hospital with self-harm (Smithius et al 2018; Perez et al 2018) or a suicide attempt  
48 (Suokas et al 2014). Prevalence of self-harm has been reported between 13.6% - 42.1% for  
49 AN, between 26%-55.2% for BN, and 26.2% for EDNOS (Svirko & Hawton 2017; Claes et  
50 al 2013). There is also an increased risk of suicide attempts in the eating disorder population  
51 with reported prevalence being as high as 9.2% (Runfola et al 2014) and rates of completed  
52 suicide have been reported as 18 times more likely in AN and 7 times more likely in BN  
53 compared to the general population (Smith et al 2018).

54 Various explanations for the co-occurrence of EDs and suicidal behaviour have been  
55 explored. One explanation is that people with EDs have elevated rates of comorbid disorders  
56 that are in themselves associated with increased suicide risk (Hudson et al 2007). Several  
57 studies have found the association between EDs and suicide weakens when controlling for

58 comorbid diagnoses (Smith et al 2018; Forrest et al 2017; Bodel et al 2013; Yao et al 2016).  
59 Other studies have identified the possibility of shared genetic pathways predisposing to both  
60 conditions (Wade et al 2015). Another consideration is the association of EDs with  
61 emotional dysregulation (Dodd et al 2018): there is evidence to suggest that both BN and AN  
62 may be associated with this (Wang et al 2018).

63 Suicide attempts are associated with increased risk of suicide (Wang et al 2018).  
64 There are a number of allied factors that have been considered to increase the risk of  
65 completed suicide, such as interpersonal factors associated with EDs, fearlessness about  
66 death, perceived burden by patients and increased capability due to reduced responses to pain  
67 (Runfola et al 2014; Wang et al 2018; Goldstein & Gvion 2019; Navarro-Haro et al 2015).  
68 There are few large cohort studies with long mean follow-up periods that have been able to  
69 study patients with bulimia nervosa (BN), eating disorder otherwise not specified (EDNOS)  
70 and anorexia nervosa (AN) who either attempt or complete suicide.

71 The UK has an established 'National Health Service' where patients are referred by  
72 their GP (general practitioner; a family physician working in primary healthcare services) to  
73 specialist services, such as secondary mental healthcare services and these are publicly  
74 funded. The cumulated incidence and demographics of patients within a UK secondary  
75 mental healthcare service diagnosed as having an ED, who were subsequently admitted to  
76 hospital with a serious suicide attempt requiring hospital admission, were estimated. The  
77 effect of comorbid psychiatric diagnoses on the risk of suicide attempt was also investigated.

78

79

## Methods

### **Setting and study design**

81 A retrospective cohort study was conducted using data obtained from South London  
82 and Maudsley National Health Service Foundation Trust (SLaM). This is a secondary mental

83 health service covering southeast London; patients come from the London boroughs of  
84 Croydon, Lambeth, Lewisham, Southwark, Bromley, Bexley and Greenwich and has a local  
85 population of approx. 2 million people. This cohort was selected from this database to include  
86 patients diagnosed with an eating disorder. SLaM has fully electronic records since 2006 and  
87 the National Institute for Health Research funded Biomedical Research Centre supports the  
88 infrastructure for rendering its anonymised records available for research.

89

### 90 **Inclusion criteria and exposures**

91 The analysed cohort was extracted via Clinical Record Interactive Search (CRIS) and  
92 comprised individuals who received an International Classification of Diseases (ICD-10) of  
93 eating disorder, (F50.0-50.9) within the observation window of 1 January 2007 to 31 March  
94 2017. To extract relevant patients with a diagnosis of AN, BN or EDNOS, there were two  
95 methods available using the EHRs: firstly, using structured information on diagnosis from  
96 drop down fields in the source record, secondly supplementing this data by information  
97 extracted from open text fields searching for relevant diagnoses using a bespoke algorithm  
98 generated using the Generalised Architecture for Text Engineering (GATE) software. The  
99 comorbidity exposures of interest were diagnoses of substance misuse (F10-F19), bipolar  
100 disorder (F31), depression (F32 and F33) and personality disorder (F60) determined by  
101 structured information in EHRs on diagnoses from drop down fields in the source record.  
102 The selection of comorbid diagnoses was based on previous studies using similar data  
103 sources, which were known to be most associated with this study's primary outcome of  
104 interest (Himmerich et al 2019).

105

### 106 **Primary Outcome**

107           The outcome of interest was a hospitalised episode of care for self-harm (X60-X84)  
108 (hereafter termed a suicide attempt requiring hospitalisation) ascertained using linkage to  
109 Hospital Episode Statistics (HES) carried out by NHS Digital using NHS numbers, which are  
110 unique patient identifiers. A record in the CRIS/SLaM register will have linked HES records  
111 that include admissions to SLaM, to other mental health providers in England, and to general  
112 hospitals (Davis et al 2018) . Only patients who required admission to the medical hospital  
113 following an act of self-harm were included; this was assumed as a suicide attempt due to the  
114 increased lethality of the self-harm act, as the act required medical intervention. Although it  
115 is not possible to determine the suicidal intent using this dataset, there is some evidence to  
116 suggest that an act with higher lethality is associated with increased suicidal intent (Kumar et  
117 al 2006; Beck et al 1975). Furthermore, research demonstrates that a more violent act is  
118 associated with subsequent completed suicide (Runeson et al 2010).

119           It is important to note that all community and inpatient services are provided by the  
120 same healthcare system, the NHS, with patients transitioning between the services within the  
121 NHS, depending on their needs and severity of illness. Care within the NHS is catchment-  
122 area based, therefore everyone living within an area accesses the same services and the  
123 majority of people do not have alternative routes for help; estimates suggest that 11% of the  
124 whole population in the UK have a form of private medical insurance, which does not cover  
125 for presentations to accident and emergency therefore almost all patients who require medical  
126 help following an emergency will present through NHS systems (The Kings Fund 2014).

127

## 128 **Covariates**

129           The year and month of birth, gender, ethnicity and marital status were retrieved from  
130 the CRIS database. Age in years was calculated from the individual's first eating disorder  
131 diagnosis in the observation window or from January 2007 if the diagnosis preceded the

132 observation window. Recorded ethnicity was classified into three categories: ‘White UK’  
133 (including ‘any other White background’ and ‘Irish’), ‘Black’ (including ‘African’,  
134 ‘Caribbean’ and ‘any other Black background’) and ‘Mixed/others/unknown’. Recorded  
135 marital status was classified into four groups: ‘married’ (including cohabitation, married, and  
136 married/civil partnership), ‘single’, ‘divorced’ (including separated, civil partnership  
137 dissolved) and ‘others’ (including not known). Multiple deprivation score is a small-area-  
138 level measure of socioeconomic status, based on the individual’s address closest to the  
139 diagnosis of the eating disorder in the observation window, covering the following seven  
140 components: ‘employment, income, education, health, barriers to housing and services, crime  
141 and the living environment’ with specific weightings. The Index of Multiple Deprivation  
142 score is a well-established measure which has been widely used as a regional indicator for  
143 socioeconomic status in previous studies. The score is then transformed into percentiles (from  
144 1 to 100), with higher scores indicating greater deprivation (and thus a lower socioeconomic  
145 status in the neighbourhood). In the analysis, deprivation score was grouped into tertiles.

146

#### 147 **Statistical analysis**

148 Analysis was completed using Stata software. All patients were eligible for analysis.  
149 Descriptive statistics were used to characterise the study participants. Proportional hazards  
150 assumptions were checked by assessing interactions with survival time using appropriate  
151 methods. Univariate cox proportional hazards regression was used to calculate hazard ratios  
152 with 95% confidence intervals using the suicide attempt requiring hospitalisation as the  
153 ‘event’ within the observation period. Comparisons were then made between AN, BN and  
154 EDNOS. The observation period started on the date of the first diagnosis after the 1 January  
155 2007 or on this date if the diagnosis was made prior to this date. The observation period  
156 ended on either the final date of data collection: 31 March 2017 or if the study subject

157 attempted suicide or died before this date, the date this was recorded by the EHRs. As the  
158 dataset are linked to HES data, which are a national dataset of hospital admissions, those  
159 emigrating to another part of the country will still be captured by the data; anyone who exits  
160 the NHS system will be censored at this time point. Multivariable analyses were then  
161 performed to estimate the effect of the psychiatric comorbidities.

162

### 163 **Ethical Approval**

164 Ethical approval was obtained from the Oxfordshire Research Ethics Committee for  
165 the use of CRIS as a source of data for secondary analysis (reference 08/H0606/71+5),  
166 alongside the linkage to both Office of National Statistics (ONS) and HES data sources.

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## Results

### **Descriptive Statistics**

A total of 4,895 individuals with a diagnosis of AN, BN and EDNOS were identified from the CRIS system. Of these, 4490 (91.8%) were female and the mean age was 25.9 (SD 11.1) with an age range of 4.8-90.6 years old. Detailed information is available about the age distribution in Table 1. In those under 10 years of age, 25 of these had a diagnosis of EDNOS with only 4 diagnosed with AN (and the youngest three below the age of 6 were all diagnosed with EDNOS). In those over 50 years of age, 66 had a diagnosis of EDNOS, 98 had a diagnosis of AN, with 54 patients diagnosed with BN.

### **Eating Disorder Diagnoses**

Of the 4895 individuals, 2264 had a diagnosis of AN (46.3%), 1420 (29.0%) had a diagnosis of BN and 1211 (24.7%) had a diagnosis of EDNOS. During the study period there were multiple diagnoses; 143 (2.9%) individuals with diagnoses of both AN and BN at some point over the study period, 272 (5.6%) with both diagnoses AN and EDNOS and 137 (2.8%) had both EDNOS and BN; 26 (<1%) patients had all three diagnoses at some point during the study period. An appropriate diagnostic hierarchy of AN > BN and a specific diagnosis (eg AN or BN) > EDNOS was used for analysis, to ensure patients were not double-counted. During the observation period 331 (6.8%) patients had a suicide attempt requiring hospitalisation at least once. Amongst the 331 who were admitted, the mean number of suicide attempts was 2.74 (SD 4.13) admissions with a range of 1-39 admissions. In total there were 21 (<1%) completed suicides during the follow-up period. Further information about the breakdown of eating disorder diagnosis and number of suicide attempts is available in Table 2.

193 **Method of suicide attempt**

194 The most common method of suicide attempt, requiring admission to hospital, was an  
195 overdose or poisoning attempt, out of the total number of recorded diagnoses for admission,  
196 some admissions had multiple causes recorded in diagnosis (total=2256), 789 of these were  
197 documented as having taken an OD or self-poisoned.

198

199 **Statistical analysis of suicide attempts**

200 Further descriptive information for age, gender, marital status, ethnicity, social  
201 deprivation and comorbidities on suicide attempt admissions, is available in Table 3.  
202 Univariate cox regression analyses were used to calculate unadjusted hazard ratios for each  
203 demographic.

204

205 **Multivariable analysis by Cox Regression**

206 The total number of patients with a comorbid psychiatric diagnosis was 991 (20.3%)  
207 of the cohort. Cox Regression univariate analyses revealed significant independent  
208 associations of suicide attempt with each comorbid diagnosis, including: substance misuse (in  
209 particular alcohol and cocaine use), personality disorder, bipolar disorder and depression.  
210 Multivariate Cox regression analysis was calculated for adjusted hazard ratios for age,  
211 gender, marital status, ethnicity & social deprivation scores (refer to table 4).

212

213

**Discussion**

214 This study demonstrates that eating disorders are associated with a high incidence rate  
215 of suicide attempts requiring hospital treatment and admission. In total 6.8% of patients in  
216 this sample had attempted suicide following diagnosis of ED and <1% had completed  
217 suicide. Comorbid diagnosis, in particular personality disorder, depression, bipolar illness,

218 substance misuse increased the risk even further. In particular both personality disorder (HR=  
219 8.40,  $p < 0.001$ ) and bipolar disorder (HR 3.41,  $p < 0.001$ ) appeared to have the strongest  
220 association of attempted suicide. Those most at risk of a suicide attempt requiring hospital  
221 admission in this sample were having a diagnosis AN, deprivation group 2 and any comorbid  
222 diagnosis to include personality disorder, substance misuse, depression and bipolar disorder.

223 This study provides further evidence that those with a diagnosis of AN are most at  
224 risk of attempted suicide when compared to BN and EDNOS populations. One recent meta-  
225 analysis suggests that attempted suicide was more frequent in those diagnosed with BN  
226 (21%) than in AN (12.5%), but the difference was statistically significant only when BN was  
227 compared with AN restrictive type (9-10%) (Mandelli et al 2019). A further systematic  
228 review also reported that suicide attempts and serious self-harm were more frequent in the  
229 purging disorders such as BN or AN purging subtype, (21.8% for AN and 32.7% for BN)  
230 (Cucchi et al 2016). However, this study did not seek to separate subtypes of AN, perhaps  
231 one explanation for this difference in results. Moreover, other studies looking longitudinally  
232 at suicide attempts in eating disordered patients, demonstrated that AN patients were most  
233 likely to attempt suicide with relative risk rates as high as 8.01 compared to BN at 5.34, other  
234 literature states that double the numbers of AN (22%) patients attempt suicide in comparison  
235 to BN (11%) at least once (Suokas et al 2014; Franko & Keel 2006). Furthermore, literature  
236 suggests that those with a diagnosis of AN were 18 times more likely to complete suicide and  
237 BN patients were 7 times more likely to complete suicide (Smith et al 2018).

238 There are particular risk factors amongst those diagnosed with eating disorders that  
239 may increase the risk further, studies suggest substance misuse, depression and personality  
240 disorder increase the risk of suicide attempt or serious self-harm (Yao et al 2016; Dodd et al  
241 2018; Goldstein & Gvion 2019; Cucchi et al 2016; Forcano et al 2011). This study provides  
242 further evidence that substance misuse, in particular alcohol and cocaine (although relatively

243 low numbers), personality disorder, bipolar and depressive disorders all increased the risk  
244 further significantly.

245         Although the focus of this paper is not to explore mechanisms, literature suggests a  
246 number of potential reasons for the increased risk of suicidal behaviour in eating disorder  
247 populations. Factors potentially involved include body dissatisfaction and low self-esteem  
248 (Perez et al 2018). Growing evidence suggests the risk of self-harm is related to emotional  
249 dysregulation present in both EDs and patients who self-harm or attempt suicide, where both  
250 self-harm and altered eating behaviour are used to self-punish and avoid negative emotions  
251 (Smithius et al 2018; Svirko & Hawton 2017; Muehlenkamp et al 2012; Muehlenkamp et al  
252 2019). Both groups of patients reported similar intent to hurt themselves both in the short and  
253 long term. In particular restrictive eating was associated with death-related intentions (Fox et  
254 al 2019), perhaps one reason behind a higher rate of attempted and completed suicide in AN  
255 populations whereas BN was associated with higher emotional reactivity resulting in a greater  
256 risk of impulsivity and less severe, but more frequent suicide attempts and self-harm  
257 (Goldstein & Gvion 2019; Cucchi et al 2016; Varela-Besteiro et al 2017; Kostro et al 2014).  
258 Furthermore, studies suggest that there is an increased difficulty in effective emotional  
259 regulation, rather than impulsive regulation in the AN population, increasing distress further  
260 and resulting in more serious attempts of self-harm and suicide (Suokas et al 2014; Wang et  
261 al 2018). There is also a suggestion that in all ED groups there is a reduction in the pain  
262 response and increased dissociation symptoms, due to chronic starvation, perhaps dampening  
263 down the concerns or fear of a serious suicide attempt (Goldstein & Gvion 2019; Navarro-  
264 Haro et al 2015) interestingly, BN groups have a higher fearfulness about death than AN  
265 groups (Witte et al 2016).

266         The main strengths of this study are the study design and size of cohort using CRIS as  
267 the data source. CRIS is one the largest collections of users for secondary mental healthcare

268 services in Western Europe. Using this data source, a retrospective cohort study of 4895  
269 patients with an ED were identified, 331 of these patients had attempted suicide. Systematic  
270 and narrative reviews on the subject matter report a lack of longitudinal designs as most  
271 research is cross sectional or retrospective (Kostro et al 2014; Goldstein & Gvion 2019).  
272 Therefore, the longitudinal nature in design, with the diagnosis of ED preceding the suicide  
273 attempt is a strength of this study.

274         The main limitation is that this study analyses only hospital-admission suicide  
275 attempts, rather than all presentations to the emergency department such as suicide attempts  
276 that do not make it further than the emergency department. Therefore, these results may only  
277 be generalisable to suicide attempts requiring hospitalisation. The study does not capture past  
278 history of suicide attempts and self-harm and assumes they start after the diagnosis of the ED  
279 for the purpose of the regression analysis.

280         The EDNOS diagnosis refers to DSM-IV which had been issued in 2000 (APA 2013).  
281 DSM-IV was followed by DSM-5 in 2013 (APA 2000). DSM-5 led to significant changes  
282 within this diagnostic category (APA 2000). The EDNOS equivalent in the 10<sup>th</sup> edition of the  
283 International Classification of Diseases (ICD-10) was “eating disorder, unspecified” (WHO  
284 1992). This diagnosis has been revised in ICD-11 which will be introduced in the UK  
285 probably in 2020 (ICD-11 2019).

286 This cohort started in 2007 well before DSM-5 and ICD-11. Therefore, the data had to refer  
287 to the DSM-IV and ICD-10 diagnostic categories. Meanwhile, the EDNOS diagnosis has  
288 undergone a major development with a more differentiated view on ED which are not AN or  
289 BN. The new approved diagnoses according to DSM-5 and ICD-11 include binge eating  
290 disorder (BED; characterised by binge eating episodes, loss of control and feelings of shame  
291 and guilt), avoidant/restrictive food intake disorder (ARFID; an eating disturbance  
292 manifested by a restrictive eating pattern with persistent failure to meet appropriate

293 nutritional needs), pica (the consumption of non-food) and rumination disorder (regurgitation  
294 and re-chewing food). Further provisional diagnoses of DSM-5 called “Other Specified  
295 Feeding and Eating Disorders (OSFED)” include atypical AN, BN of low frequency and/or  
296 limited duration, BED of low frequency and/or limited duration, purging disorder and the  
297 night eating syndrome (APA 2013).

298         These more specific diagnoses will allow a more nuanced ED research perspective in  
299 the future. However, the data do not permit such a sophisticated view, and it will be  
300 necessary to plan coming studies to investigate mortality and suicidality of patients using  
301 these more advanced diagnostic categories.

302

### 303 **Clinical Implications**

304         These results provide evidence that there are risks of suicide attempts and self-harm in  
305 all ED patients, but AN patients in particular are at a higher risk when compared to BN and  
306 EDNOS patients. Therefore, screening and risk assessments in this patient group is especially  
307 important. A screening tool specific to eating disorders highlighting some of the factors  
308 associated with an increased risk of suicide could be developed using this data as a starting  
309 point. Further research on the mechanisms underlying the co-occurring conditions need more  
310 exploring and there is increasing evidence on the similarities in emotional dysregulation and  
311 the use of treatments traditionally aimed at self-harm and repeated suicide attempts, such as  
312 dialectical behavioural therapy, as a promising adjunct treatment in eating disorders (Peterson  
313 et al 2019; Lynch et al 2013; Fischer & Peterson 2015).

314

### 315 **Conclusion**

316         The study demonstrates that suicide attempts and serious self-harm among all patients  
317 with ED are frequent, with a higher risk in those diagnosed with AN compared to BN or

318 EDNOS. Comorbid psychiatric diagnoses attenuate the risks further, in particular personality  
319 disorder, substance misuse and bipolar disorder. Therefore, the assessment of suicidal  
320 ideation is crucial as part of routine risk assessment in patients with all forms of eating  
321 disorder, but in particular AN and those with comorbid psychiatric illnesses.

322

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331 Some of this data has been previously presented at the American Academy of Child &  
332 Adolescents Conference, AACAP Chicago October 2019 and the abstract published in their  
333 conference journal (Cliffe et al 2019).

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**Table 1 Summary statistics of age, suicide attempt, death, comorbid diagnoses and eating disorder diagnoses**

<b>Age group Years , (n)% total</b>	<b>Suicide Attempt, n (% in age group of total ing)</b>	<b>PD n (%)</b>	<b>Bipolar n)</b>	<b>Depression n (%)</b>	<b>Substanc e n (%)</b>	<b>AN (% by age group with a diagnosis)</b>	<b>BN</b>	<b>EDNOS</b>
<b>&lt;10 (29) &lt;1%</b>	0	0	0	2 (6.9%)	0	4 (13.8%)	0	25 (86.2%)
<b>10-19 (1739) 35.5%</b>	123 (7.1%)	142 (8.2%)	48 (2.8%)	224 (12.9%)	8(<1%)	1037 (59.6%)	248 (14.3%)	478 (27.5%)
<b>20-29 (1764) 36.0%</b>	128 (7.3%)	134 (7.6%)	44 (2.5%)	180 (10.2%)	33 (1.9%)	727 (41.2%)	744 (42.2%)	343 (19.4%)
<b>30-39 (800) 16.3%</b>	40 (5.0%)	63 (7.9%)	34 (4.3%)	110 (13.8%)	29 (8.3%)	271 (33.9%)	348 (43.5%)	205 (25.6%)

<b>40-49 (348)</b>  <b>7.1%</b>	30 (8.6%)	42 (12.1%)	13 (3.7%)	55  (15.8%)	29 (8.3%)	127  (36.5%)	137  (39.4%)	94 (27.0%)
<b>50+ (215)</b>  <b>4.4%</b>	10 (4.7%)	22 (10.2%)	10 (4.7%)	39 (18.1%)	11 (5.1%)	98  (46.3%)	54  (25.1%)	66 (30.7%)
<b>TOTAL</b>  <b>N= 4895</b>	331	403	149	610	110	2264  (46.3%)	1531  (31.3%)	1211 (24.7%)

**Table 2: Eating disorder subtypes and frequency of suicide attempt requiring hospital admission**

<b>Eating disorder type, n (% of total)</b>	<b>No Suicide Attempt % (%C.I of those with AN, BN, EDNOS who</b>	<b>1-2 attempts</b>	<b>3-10 attempts</b>	<b>10+ attempts</b>

	<b>did not attempt suicide)</b>			
AN 46.3%	2076, 91.7% (90.4-92.8%)	145, 6.4% (5.5-7.5%)	38, 1.7% (1.2-2.3%)	5, <1% (0.09-0.5%)
BN, 29.0%	1446, 94.4% (93.2-95.5%)	63, 4.1% (3.2-5.23%)	16, 1.1% (0.64-1.70%)	6, <1% (0.18-0.87%)
EDNOS, 24.7%	1145, 94.6% (93.1-95.7%)	48, 4.0% (3.0-5.22%)	12, 1.0% (0.56-1.7%)	6, <1% (0.22-1.1%)
<b>TOTAL</b>	<b>93.2% (92.4- 94.0%)</b>	<b>5.1%</b> (4.5-5.8%)	<b>1.3%</b> (1.0-1.7%)	<b>&lt;1% (0.20- 0.53%)</b>

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**Table 3: Demographics and Comorbid diagnoses: Summary statistics and Cox regression analysis for suicide attempts with hospitalisation**

<b>Variables</b>	<b>Number (%)</b> Age=Mean +/- SD	<b>Number of suicide attempts</b>	<b>Crude Hazard Ratio (95% CI)</b>	<b>P value</b>
<b>Age (years)</b>	25.9 (11.1)	331	0.99 (0.98-1.0)	0.43
<b>Gender %</b>				0.06
Female	4490 (91.8%)	313	1.59 (0.97-2.59)	



Male	403 (8.2%)	17	ref	ref
<b>Marital Status</b>				
Single	3606 (73.7%)	251	ref	
Married	491 (10.0%)	29	0.82 (0.56-1.20)	0.31
Divorced	97 (2.0%)	7	0.88 (0.42-1.87)	0.74
Others	701 (14.3%)	44	0.92 (0.67-1.27)	0.60
<b>Ethnicity</b>				
White	3897 (79.6%)	277	ref	
Black	227 (4.6%)	11	0.64 (0.35-1.18)	0.152
Others/mixed	771 (15.8%)	43	0.79 (0.57-1.09)	0.156
<b>Deprivation Score</b>				

Group 1	1,339 (27.4%)	100	ref	
Group 2	1,613 (33.0%)	97	0.75 (0.57-0.10)	0.047
Group 3 (most deprived)	1859 (38.0%)	125	0.86 (0.66-1.12)	0.28
Not known	84 (1.7%)	9	1.65 (0.83-3.27)	0.15
<b>Presence of each eating Disorder</b>				
BN	1420 (29.0%)	77	ref	ref
AN	2264 (46.3%)	188	1.66 (1.27-2.2)	<0.001
EDNOS	1211 (24.7%))	66	1.62 (0.84-1.62)	0.37
<b>All substance misuse</b>				

None	4785 (97.8%)	297	ref	
Alcohol	85 (1.7%)	27	4.92 (3.32-7.30)	<0.001
Opioid	13 (0.3%)	2	2.20 (0.54-8.85)	0.27
Cocaine	12 (0.3%)	5	6.30 (2.60-15.26)	<0.001
<b>Depression</b>				
No	4285 (87.5%)	239	ref	
Yes	610 (12.5%)	92	2.64 (2.08-3.36)	<0.001
<b>Personality Disorder</b>				
No	4582 (93.6%)	225	ref	
Yes	403 (6.4%)	133	8.75 (7.01-10.90)	<0.001

<b>Bipolar Disorder</b>				
No	4746 (97.0%)	301	ref	
Yes	149 (3.0%)	30	3.34 (2.30-4.86)	<0.001

**Table 4: Multivariable analyses for suicide attempts and self-harm**

<b>Variable</b>	<b>Adjusted hazard ratio</b>	<b>95% CI</b>	<b>P value</b>
Personality Disorder	8.40	6.68-10.54	<0.001
Substance Misuse	2.25	1.83-2.76	<0.001
Bipolar Disorder	3.41	2.34-4.99	<0.001
Depression	2.67	2.09-3.43	<0.001

BN	ref	ref	ref
AN	1.43	1.08-1.89	0.01
EDNOS	1.15	0.82-1.61	0.40