1 **Suicidal acts and thoughts among persons with psychotic disorders**

2 **in the Finnish SUPER study**

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Abstract

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Background: Psychotic disorders, including schizophrenia (SZ), schizoaffective disorder (SZA), bipolar disorder (BD), psychotic depression (PD), and other non-affective psychoses (ONAP), are associated with increased risk of suicidal acts. Few studies have compared suicidal act prevalence across psychotic disorders using both self-report and register data. The impact of hospitalization duration on subsequent suicidal acts is unclear.

Methods: We used data from the SUPER-Finland study, involving 7,067 participants with register-based ICD-10 diagnoses of psychotic disorders (SZ, SZA, BD, PD, ONAP). Lifetime suicidal acts were identified through self-report and register-based records of intentional self-harm events requiring medical treatment. Associations between diagnostic categories and suicidal acts were assessed using logistic regression, adjusted for sex, duration of illness, socioeconomic status, childhood abuse, and substance use. Survival analysis was used to examine the impact of hospital stay length on post-discharge self-harm.

Results: Lifetime suicide attempts (39.1%) and register self-harm (19.3%) were prevalent. 40.5% of those with self-reported suicide attempts also had register-based self-harm. Self-harm and suicide attempts were significantly more prevalent in SZA, BD, and PD compared to schizophrenia, with large differences between groups (24.1 – 46.4% for suicide attempts, 11.1 – 23.9% for self-harm). Adjusted odds of self-harm were higher for disorders with a mood component. Shorter hospitalizations were associated with an elevated hazard ratio for subsequent self-harm.

62   **Conclusions**: Prevalences of register-based self-harm and self-reported suicide attempts differ

63   markedly. Suicidal acts are common in psychotic disorders, particularly in those with a mood

64   component. Very short inpatient stays may not be adequate in these disorders.

65

66   **Key words**: *Suicide, Suicide attempt, Self-harm, Schizophrenia, Schizoaffective disorder,*

67   *Bipolar disorder, Psychotic depression*

68

Introduction

Suicidal behavior remains a major concern in psychotic disorders. Among individuals with schizophrenia (SZ), approximately 5% die by suicide, while 25–50% have at least one suicide attempt [1]. Among those with bipolar disorder (BD) or depressive disorders, 2–8% of psychiatric inpatients with bipolar disorder (BD) or depressive disorders will die due by suicide in the long term [2]. A further 30–40% in major depressive disorder (MDD), and 50% in BD, attempt suicide [2]. Schizoaffective disorder (SZA), psychotic depression (PD), and other non-affective psychoses (ONAP) are also associated with suicide risk, but are less studied [3,4]. SZA may be associated with greater risk of suicide, due to the overlap of mood and psychotic symptoms[3].

There is no universal nomenclature for suicidal behavior currently [5]. There are two primary methods of obtaining suicide attempt rates: self-report, and medical records of self-harm-associated events [6]. The agreement between these methods among patients with psychotic disorders is unknown. Not all self-harm behavior is suicidal [7], and more than half of those who commit suicide die on their first attempt [8]. Nonetheless, survivors of suicide attempts provide important insights, and remain at elevated risk of suicide over time [2]. In this paper, we refer to self-reported suicide attempts and register-based self-harm episodes, and use the term "suicidal acts" to encompass both suicide attempts and self-harm.

Important risk factors for suicide across diagnostic categories include adverse life events, substance use, comorbid depression, and deliberate self-harm [1,9,10]. While women may be more likely to attempt suicide, men are more likely to die by suicide, a pattern that holds true even in psychotic disorders [1,2,10–12]. Case fatality ratios differ greatly by method used [13]. Among patients admitted to psychiatric care, risk factors for suicide may differ from the general population [14]. The period immediately after discharge from inpatient care in particular increases risk for suicidal behavior [15–17]. Shorter hospital stays have been linked with greater risk of post-discharge suicide or self-harm in

93   several studies [18–21], but other recent studies have not supported the association with suicide

94   [17,21–23].

95   This study seeks to: 1) clarify the risk of suicidal acts associated with different psychotic disorders,

96   including schizophrenia, SZA, BD, PD, and ONAP, by assessing both register-based self-harm and self-

97   reported suicide attempts; 2) compare these two methods of identifying suicidal acts; and 3) examine

98   the relationship between hospitalization duration and subsequent suicidal acts in the different

99   disorders a large clinical population. Additionally, the timing of self-harm, prevalences of violent and

100   repeating self-harm, as well as suicidal ideation, both lifetime and in past 12 months, are reported. To

101   clarify the association between diagnostic category and suicidal acts, demographic variables as well as

102   questionnaire data on childhood adversity, socioeconomic status, and substance use were adjusted

103   for.

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Materials and methods

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Study population and design

108   The SUPER-Finland study group recruited 10474 people with a diagnosis of psychotic illness in Finland

109   from primary and specialized psychiatric care, supported housing units, and the general population via

110   newspaper advertising [24]. Participants over 18 years old and capable of informed consent gave their

111   written informed consent.

112   Participants completed a questionnaire form and were interviewed in person by research nurses using

113   a pre-set interview form. These data were associated with register records.

114   All diagnosis data used in this study was based on the <u>Finnish Care Register for Health Care</u>. The register

115   includes the start and end dates of each treatment episode, ICD-10 diagnosis for each episode, medical

116   specialty of the service provider, and ICD-10 external cause of accident where appropriate.

117   The Ethics Committee of the Hospital District of Helsinki and Uusimaa approved the study (Reference

118   number 202/13/03/00/15).

119

120   *Psychotic disorders*

121   The psychiatric diagnostic category was based on ICD-10. Participants were classified according to the

122   most severe lifetime psychiatric diagnosis received ("major diagnosis"), in the following hierarchical

123   order of severity: 1. SZ (F20), 2. SZA (F25), 3. BD (F30, F31), 4. PD (F32.3, F33.3), 5. ONAP (F22, F23,

124   F24, F28, F29, F10.5, F10.75, F11.5, F12.5, F13.5, F14.5, F15.5, F16.5, F18.5, F19.5, F00.11, F00.21,

125   F00.12, F00.22, F01.11, F01.12, F01.81, F01.82,F02.11, F02.02, F02.11, F02.12, F02.31, F02.32, F02.41,

126   F02.42, F02.81, F02.82, F06.0, F06.2), per the SUPER study protocol [24]. For the dates of onset as

127   defined below, first psychosis refers to the first psychiatric episode with a diagnosis of any of the

128   previous categories, and first psychiatric diagnosis refers to any ICD-10 psychiatric diagnosis found in

129   the records. The WHO ICD-10 Classification of Mental and Behavioural Disorders Diagnostic Criteria

130   for Research are used for classification of psychiatric disorders in Finland [25]. The Care Register for

131   Health Care has used ICD-10 codes since 1996 [26].

132   To ensure homogeneity of diagnostic criteria, the participants in this sub-study had a register-based

133   ICD-10 diagnosis of SZ, SZA, BD, PD, or ONAP diagnosed for the first time in 1996 or later.

134   Case selection, missing values and outlier exclusion

135   Out of the original SUPER study, valid consent information was available for 10409 separate

136   participants. Valid register-based major diagnoses set after 1996 were identified for 7460 participants

137   which were the population for this sub-study. Missing age and education data could be inferred from

138   register data or year of birth. Any interview or questionnaire data were missing for 5.2% (n=393) of

139   these participants, with the highest number of missing responses in the drug abuse question at 3.3%

140   (n=243). Complete case (n=7067) analysis was pursued. To study the effect of the date cutoff for the

141   start of ICD-10 records, a subset of participants born after 1990, i.e. aged 6 years or less at the start of

142   record were examined separately.

143

144   **Suicidal acts**

145

146   *Self-reported suicide attempts and suicidal ideation*

147   Participants were asked "Have you ever had suicidal thoughts?", with the response options: never, yes

148   during the past 12 months, and yes more than 12 months ago. They were also asked "Have you ever

149   attempted suicide?", with the response options: never, once, more than once, and a field for writing

150   the number of times.

151

152   *Register-based information on self-harm episodes*

153   Self-harm events requiring medical attention were identified in the register data. To avoid counting

154   repeat diagnoses of one incident (e.g. consultations from different specialties or hospital transfers) as

155   separate incidents, self-harm diagnoses were studied by episode. An episode was defined as the period

156   between the first date of arrival at a healthcare provider and the last date of discharge among those

157   episodes with a date of arrival during an episode.

158   For all participants with a valid major diagnosis, separate episodes ending after the year 1996 and

159   containing a ICD-10 external cause diagnosis of intentional self-harm (X60–X84) were identified

160   (Supplement table 1). Intentional self-poisoning (X60–X69) was analyzed collectively regardless of the

161   poison used and termed non-violent self-harm, while the other diagnostic categories of self-harm were

162   analyzed separately and collectively termed violent self-harm, in accordance with previous research

163   [27]. Multiple self-harm refers to a participant having more than one separate self-harm episode.

164

165   *Time intervals and psychiatric hospitalization*

166   Participant age at the following events was calculated: first psychiatric diagnosis, first psychosis, major

167   psychotic disorder diagnosis, start of self-harm episode. The following time intervals were calculated:

168   first psychiatric diagnosis to self-harm, first psychosis to self-harm, major diagnosis to self-harm.

169   For each self-harm episode, the records were scanned for the previous and following psychiatric

170   hospitalization episode, defined as a separate episode which contained at least an overnight stay at a

171   unit specialized in psychiatry. Time from the previous hospitalization to self-harm episode was

172   calculated. The duration of this hospitalization was calculated as defined above for episodes.

173   Additionally, the previous healthcare record for an episode of any specialty was identified and time

174   from this to the self-harm episode was calculated. The number of separate psychiatric hospitalizations

175   had been calculated for a previous study for this sample [28] using a similar definition of separate

176   episode.

177

178   **Background variables**

179

180   *Sociodemographic variables*

181   The participants were interviewed using questions derived from the Finnish Health 2000 and 2011

182   general population surveys about their marital status and whether they have children, where a

183   response of married, civil union, registered partnership, or common-law marriage was collectively

184   termed "currently married or cohabiting" (short: "married") [24]. Education level was assessed in the

185 interview and classified according to the Health 2000 study [29]. Low level of education refers to no

186 secondary degree after compulsory education. Sex corresponds to sex recorded the Finnish Population

187 Information System, which is binary, and corresponds to sex assigned at birth or confirmed gender.

188 Participants also provided information on their employment during the last year, where working,

189 working part-time or studying were considered "working or studying" and on their housing status,

190 which was classified as supported housing or independent living as detailed in a previous article [28].

191 *Adverse childhood experiences*

192 The participant was asked about adverse childhood experiences, with response options of yes, no, or

193 I cannot say, including bullying at school, physical assault, and sexual abuse. Responses of yes were

194 used in the analysis.

195

196 *Self-reported lifetime drug use*

197 The participant was asked about lifetime abuse of cannabis, ecstasy, amphetamine, cocaine, heroin,

198 buprenorphine, benzodiazepines, central nervous system affecting medications, LSD, inhalants,

199 psilocybin, and any other drugs, with the response options of: 1) not having used; 2) having used

200 occasionally; or 3) having used more than 50 times. For this study, drug use was defined as self-

201 reported abuse of at least one of these drugs at least occasionally. Lifetime alcohol use information

202 was not available. Use of any of these drugs was used as a covariate in the logistic regression models.

203 For the pairwise associations, cannabis was studied separately as the most prevalent drug of abuse.

204

205 **Statistical analysis**

206 Prevalences were calculated for reported suicide attempts and register self-harm. Pairwise

207 associations were also studied for presence of multiple self-reported suicide attempts, multiple

208 register-based self-harm episodes, and violent register-based self-harm. In the survival analysis, time

209   to event was the outcome of interest. Chi-square tests for association were performed for the

210   association between suicidal acts, violent self-harm, multiple self-harm, suicidal thoughts in the past

211   12 months and the following predictors: female sex, working or studying, currently married or

212   cohabiting, having children, low education level, living independently, reported childhood bullying,

213   physical abuse, sexual abuse, use of cannabis, use of other drugs, and hospitalizations over median.

214   This exploratory analysis was repeated within diagnostic groups.

215   Logistic regression analysis was performed for association between diagnostic category and suicidal

216   acts, adjusting for background variables linked to suicidal acts that differed between diagnostic

217   categories. The variables of sex, age, childhood sexual abuse and substance use were included due to

218   being associated with suicidal acts and their different distributions across diagnoses. Bullying and

219   physical abuse were distributed similarly across the diagnostic categories and thus not included in the

220   regression model. Employment status, low education level, and independent living were also included

221   given their relevance to suicidal acts and different distribution across diagnostic groups. Having

222   children was not found to have a pairwise association and did not improve model fit or associate with

223   suicidal acts in preliminary analyses and was not included. Duration of illness (from first psychiatric

224   diagnosis of any kind to start of the self-harm episode) and sex were included as covariates in model

225   A. Additionally, independent living, low education level, employment status, sexual abuse, and drug

226   use were included as covariates in model B. Model fit, linearity, and the inclusion of variables were

227   assessed using Hosmer and Lemeshow's test, generalized additive models, and Nagelkerke's pseudo-

228   R^2. A logarithm transformation was applied to duration of illness to improve calibration, as the

229   relationship between duration of illness and register self-harm showed nonlinearity after 30 years.

230   Cox regression (proportional hazards model) was performed and Kaplan-Meier plots produced to

231   assess survival without self-harm after hospitalization, where the population at risk consisted of all

232   instances of discharge (n=51127) from overnight psychiatric hospitalization starting from 1996 in all

233   study participants, with diagnostic category and hospitalization duration as predictor variables. The

234   final model was adjusted for age at the start of follow-up, sex, education level, and childhood sexual

235   abuse. Employment status, mode of habitation, and lifetime substance use were collected at point of

236   interview only and could not reliably be related to the follow-up periods. A frailty model was used to

237   adjust for repeat events [30]. The proportional hazards assumption was assessed using Schoenfeld

238   residuals. Sensitivity analyses included testing the association between hospitalization duration and

239   hazard within each diagnostic group separately. Follow-up started from the discharge date, and

240   survival time was the follow-up time to a self-harm episode (event) or next psychiatric overnight

241   hospitalization episode (if no event occurred before rehospitalization; no event) or the date of the end

242   of the electronic record available (no event), if no rehospitalization or event occurred. Events during

243   hospitalization or without previous hospitalization were excluded. Administrative censoring was

244   performed at 720 days. In total, the Cox regression models included 37074 person-years.

245

246

247 **Results**

248

249 **Prevalence of suicidal acts and thoughts across psychotic disorders**

250 Lifetime self-reported suicide attempts (39.1%) and self-harm events requiring medical attention

251 (19.3%) were common among persons with psychotic disorders. However, significant variation was

252 observed between diagnostic groups. The prevalence of suicide attempts ranged from 24.1 (ONAP)

253 percent to 46.4 percent (SZA). Corresponding prevalences for register-based information on self-harm

254 events ranged from 11.1 percent (ONAP) to 23.9 percent (PD). Having any of self-reported suicide

255 attempts, suicidal ideation or register-based information on self-harm event, was highly prevalent in

256 all diagnostic groups ranging from 61.4 percent (ONAP) to 81.5 percent (PD) (Table 1).

257 Overall, 49 individuals (0.69%) were identified as extreme outliers among individuals with multiple

258 episodes (over 9 self-harm episodes, median 16). They accounted for 1073 episodes (31.9%) in total.

259 In this sub-population there were significantly more self-harm episodes than reported suicide

260 attempts, in contrast to the whole population, where a greater number of suicide attempts are

261 reported than self-harm episodes. Where noted below, statistical tests were run with and without

262 these outliers. Summary statistics for the outliers are reported in the supplement.

263 Of those reporting suicide attempts, a minority (40.5%) had register-based self-harm episodes. Of

264 those with register-based self-harm episode, a majority (82.1%) reported suicide attempts. The

265 proportion of suicide attempts associated with self-harm was higher in SZA, BD, and PD than in SZ or

266 ONAP. In the subgroup born after 1990, similarly, a minority (48.1%) of those reporting suicide

267 attempts had register-based self-harm (reported in the supplement).

268 Results for the exploratory pairwise chi-square tests of association between the background variables

269 and suicidal acts are shown in Table 2. The tests of association within diagnostic groups as well as with

270   suicidal thoughts, and associations with violent and multiple self-harm episodes are reported in the

271   supplement.

272   Adjusting for the background factors, the associations between diagnostic category and suicide

273   attempts were broadly similar to the associations between the diagnostic category and self-harm, Of

274   the background variables, sexual abuse was more associated with suicide attempts than self-harm. The

275   results of the logistic regression analyses are presented in figure 1.

276   Self-harm episodes had a median between 20 and 30 years-of-age and left-skewed distributions,

277   except in bipolar disorder where the distribution was wider with a median of 35.3 years-of-age. The

278   distribution peak was mostly within 1 year of the first occurrence of the major diagnosis. A healthcare

279   episode preceded 80.8% of all self-harm episodes; the healthcare episode was on median within 1

280   week of the self-harm episode. Summary statistics about methods and participant age at the start of

281   the self-harm episode are shown in the supplement.

282

283   Length of hospitalization

284   Follow-up to 2 years without a self-harm episode was significantly less likely for shorter

285   hospitalizations. Kaplan-Meier curves without frailty from the survival analysis are presented in figure

286   2. Results for the main Cox regression model are presented in Table 3. Results for the survival analysis

287   within diagnostic categories and without the outliers are presented in the supplement. The outliers

288   were found to not affect the results of the Cox regression. The relationship between hospitalization

289   duration and self-harm hazard was present in all diagnostic categories except ONAP.

290

291 **Discussion**

292

293 *Register-based self-harm events vs. self-reported suicide attempts*

294 Most participants with suicide attempts would not have been identified by surveying register-based

295 self-harm. Previous research in Finland has found that only approximately two thirds of those with

296 bipolar disorder [31] and depression [32] were referred to emergency medical care; most did not

297 communicate their attempt to healthcare personnel. In our study population, less than half (32.7-

298 49.0%) of those who reported suicide attempts had a recorded diagnosis of intentional self-harm. This

299 indicates that a survey of rates of suicide attempts based on register diagnoses would significantly

300 underestimate the frequency of suicide attempts among persons with psychotic disorders. Most

301 participants with register-based self-harm (82.1%) reported suicide attempts. The prevalence of

302 suicidal acts is correspondingly slightly higher than self-reported suicide attempts.

303 Results for the logistic regression analysis were broadly similar regardless of which outcome variable

304 was used. So, while understating the proportion with suicide attempts, register-based self-harm

305 seemed to act as a valid proxy for the positive presence of suicide attempts. However, the associations

306 between childhood sexual abuse, self-harm and suicide attempts were notably different. One

307 explanation could be differences in help seeking in the context of suicidal behavior.

308 *Differences between disorders*

309 Suicidal acts and thoughts were common across the studied psychotic disorders. Those with a mood

310 component - SZA, BD, and PD - were associated with a particularly high prevalence of self-harm and

311 for reported suicide attempts. This association remained after adjusting for background factors.

312 Clinical differences, in particular depressed mood [1,8], may account for the difference between

313 disorders. In schizophrenia, negative symptoms and poor cognitive functioning may paradoxically

314 reduce suicidal ideation and self-harm risk due to a reduced capacity for emotional distress and ability

315   to execute a suicide attempt [33], and lack of insight is associated with less depression [34]. Indeed,

316   prevalences of suicidal acts were similar among those who had had suicidal thoughts across

317   schizophrenia, SZA, BD and PD.

318   Schizophrenia, PD, and ONAP associated with violent self-harm, with the highest proportion of violent

319   self-harm in PD. PD has recently been associated with violent suicide over non-psychotic depression

320   [4]. The hazard ratio for subsequent self-harm was higher in schizophrenia, SZA, PD, and BD after a

321   hospitalization lasting less than 1 week. This association did not hold in ONAP. Short hospitalizations

322   could be more appropriate in this group, which includes brief acute psychoses.

323

Duration of hospitalization

325   We found a short hospitalization was associated with a significantly higher hazard ratio for self-harm.

326   This agrees with a recent large cohort study, which found an association between self-harm and

327   shorter length of stay [21]. However, several recent studies have reported no association with suicide,

328   including a recent comprehensive cohort after hospitalization for depression in Finland [17,21–23].

329   Based on the questionnaire, a significant proportion of the self-harm episodes involved repeated,

330   predominantly non-suicidal self-harm. Therefore, and in light of the previous literature, the findings

331   may not translate to suicide risk.

332   Hospital discharge reduces supervision; shorter stays may reflect unplanned discharge or limit safety

333   planning. While short hospitalizations are desirable for many reasons, risk of self-harm could be an

334   adequate reason to recommend a longer period of treatment. A very short hospitalization could be

335   insufficient for preventing self-harm in the context of acute exacerbation of psychotic disorders.

336

Study strengths and weaknesses

338 The strengths of this study were a large population of participants with different, reliable register-

339 based and clearly defined diagnoses of schizophrenia, SZA, BD, PD, and ONAP, with a large number of

340 self-harm episodes and previous hospitalizations, as well as questionnaire information not usually

341 available in a register-based study, allowing us to compare register-based self-harm with self-reported

342 suicide attempts and account for socioeconomic disadvantage, drug abuse and childhood abuse. We

343 can therefore report reliable comparisons between the disorders and adjust for potentially

344 confounding variables.

345 The main weakness of this study is the sampling strategy, which is a sample of convenience mainly

346 from healthcare settings. Therefore, our results are likely generalizable to the clinical rather than the

347 general population. Regarding suicide prevention, suicidal acts are different from suicides, and we

348 could not evaluate whether any given self-harm episode was a suicide attempt. To participate in the

349 SUPER study, a participant had had to survive their suicide attempt. Therefore, the results reflect

350 history of self-harm over a long period of illness rather than risk of suicide at illness onset. Finally, the

351 cross-sectional and register-based study design did not permit examining any given self-harm episode

352 or contributing factors in detail, such as depressed mood or psychotic symptoms. The relationships

353 between the predictors and response variables therefore represent associations only.

354

Conclusions

356 Register-based self-harm was found for a minority of those with suicide attempts in this population.

357 The disparity has implications for suicide research. The majority of those with SZ, SZA, BD, or PD had

358 suicidal acts or thoughts, with significant between-groups differences. Psychotic disorders with a mood

359 component, including schizoaffective disorder and psychotic depression, are associated with

360   somewhat more suicidal acts than schizophrenia in the clinical population. Hospitalizations less than

361   1 week were associated with subsequent self-harm in schizophrenia, schizoaffective disorder and

362   psychotic mood disorders. Very short hospitalizations could be inadequate for preventing self-harm in

363   these disorders, though adequate in brief psychotic disorders.

Conflict of interest statement

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All authors declare no conflict of interest.

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Data availability statement

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The SUPER-Finland website can be accessed for further information (https://www.superfinland.fi/english). The data from SUPER-Finland participants who gave biobank consent can be acquired from the THL Biobank when released from the original study (https://thl.fi/en/web/thl-biobank).

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Figure 1. Odds ratios for the presence of at least one register-based self-harm episode and for at least one self-reported suicide attempt by diagnostic category.

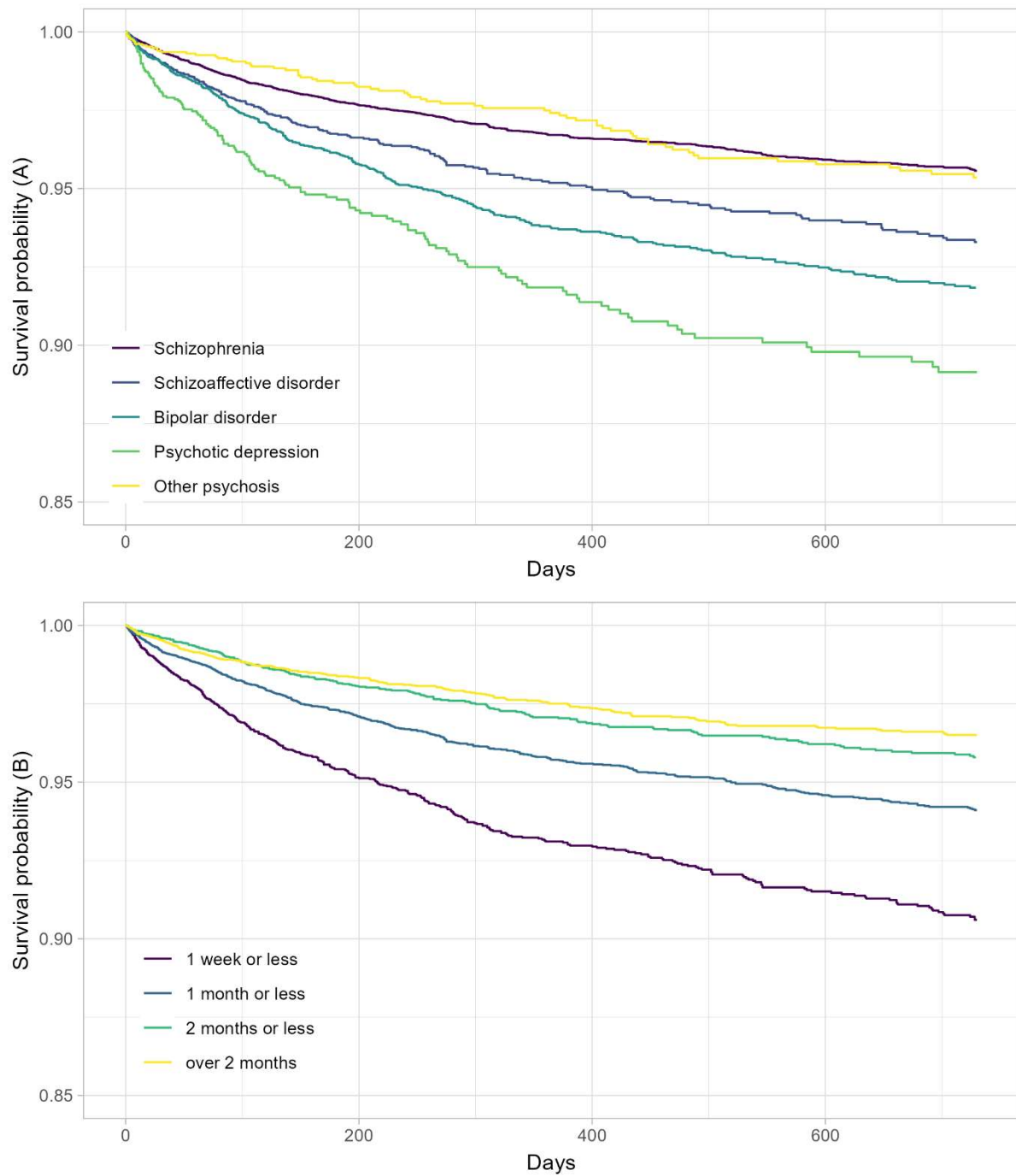493
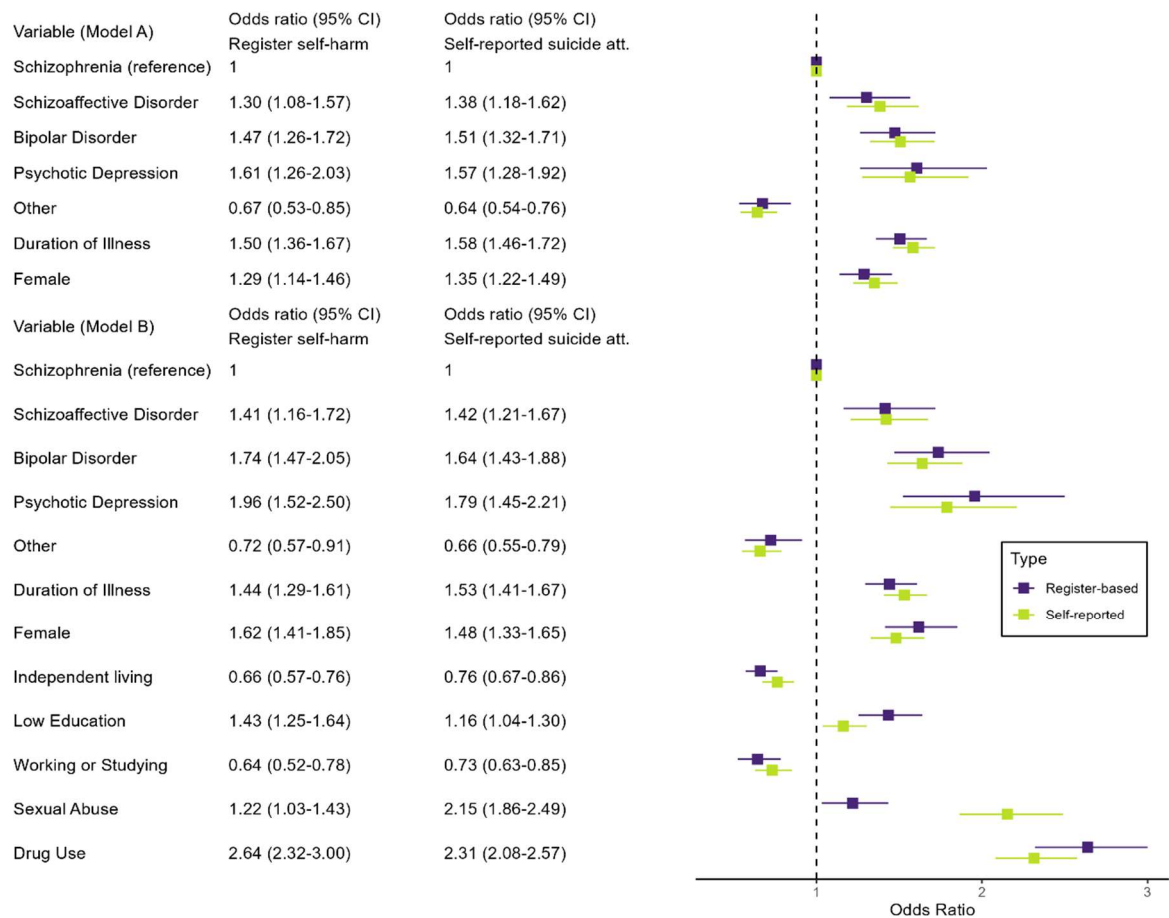
Note: The reference category for diagnosis is schizophrenia. Model A is adjusted for duration of illness and sex, while model B is additionally adjusted for the other background factors.

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497   **Figure 2**. *Survival without self-harm after hospitalization, by (A) hospitalization duration and (B)*
498   *diagnostic category (to 2 years).*

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501 **Table 1.** *Suicidal acts and demographic and clinical variables in the study population (n=7067).*

Variable (n, % or median, IQR)	Schizophrenia n=3441	SZA n=824	BD n=1439	PD n=464	ONAP N=899	p-value*
Reported suicide attempt	1291 (37.5%)	382 (46.4%)	665 (46.2%)	208 (44.8%)	217 (24.1%)	<0.0001
...also has register SH	487 (37.7%)	165 (43.2%)	295 (44.4%)	102 (49%)	71 (32.7%)	0.00030
Register self-harm	622 (18.1%)	189 (22.9%)	342 (23.8%)	111 (23.9%)	100 (11.1%)	<0.0001
...also reports SA	487 (78.3%)	165 (87.3%)	295 (86.3%)	102 (91.9%)	71 (71%)	<0.0001
Suicidal act**	1426 (41.4%)	406 (49.3 %)	712 (49.5 %)	217 (46.8%)	246 (27.4 %)	<0.0001
Reported multiple SA	639 (18.6%)	200 (24.3%)	392 (27.2%)	118 (25.4%)	93 (10.3%)	<0.0001
...also multiple SH ep.	145 (22.7%)	57 (28.5%)	121 (30.9%)	35 (29.7%)	20 (21.5%)	0.029
no. reported SA	3 (3)	3 (3)	3 (3)	3 (3)	3 (2)	—
no. SH episodes	1 (1)	1 (2)	2 (2)	1 (2)	1.5 (2)	—
Multiple SH episodes	205 (6%)	71 (8.6%)	152 (10.6%)	48 (10.3%)	36 (4%)	<0.0001
...also reports multiple SA	145 (70.7%)	57 (80.3%)	121 (79.6%)	35 (72.9%)	20 (55.6%)	0.022
Violent SH episodes	135 (3.9%)	39 (4.7%)	54 (3.8%)	33 (7.1%)	21 (2.3%)	0.00058
...also reports SA	102 (75.6%)	34 (87.2%)	47 (87%)	32 (97%)	16 (76.2%)	0.028
Suicidal thoughts past 12 mo.	919 (26.7%)	309 (37.5%)	597 (41.5%)	234 (50.4%)	278 (30.9%)	<0.0001
Suicidal thoughts lifetime	2094 (60.9%)	611 (74.2%)	1125 (78.2%)	366 (78.9%)	523 (58.2%)	<0.0001
...also has suicidal acts	1239 (59.2 %)	374 (61.2%)	667 (59.3 %)	205 (56 %)	217 (41.5 %)	<0.0001
Never suicidal acts or thoughts	1160 (33.7%)	181 (22%)	269 (18.7%)	86 (18.5%)	347 (38.6%)	<0.0001

Variable (n, % or median, IQR)	Schizophrenia n=3441	SZA n=824	BD n=1439	PD n=464	ONAP N=899	p-value*
Age	41 (18)	41 (21)	44 (22)	45 (30)	36 (24.5)	—
No. hospitalizations	5 (9)	5 (7)	3 (6)	3 (5)	2 (2)	—
Female	1429 (41.5%)	517 (62.7%)	906 (63%)	288 (62.1%)	438 (48.7%)	<0.0001
Working or studying	360 (10.5%)	124 (15%)	311 (21.6%)	77 (16.6%)	224 (24.9%)	<0.0001
Low education level	1223 (35.5%)	190 (23.1%)	282 (19.6%)	130 (28%)	283 (31.5%)	<0.0001
Living independently	2281 (66.3%)	682 (82.8%)	1309 (91%)	383 (82.5%)	734 (81.6%)	<0.0001
Has children	847 (24.6 %)	351 (42.6 %)	845 (58.7 %)	210 (45.3 %)	278 (30.9 %)	<0.0001
Reports bullying	1917 (55.7%)	478 (58%)	805 (55.9%)	251 (54.1%)	501 (55.7%)	0.71
Reports physical abuse	863 (25.1%)	204 (24.8%)	398 (27.7%)	125 (26.9%)	205 (22.8%)	0.091
Reports sexual abuse	439 (12.8%)	153 (18.6%)	252 (17.5%)	86 (18.5%)	111 (12.3%)	<0.0001
Used cannabis	1252 (36.4%)	303 (36.8%)	508 (35.3%)	102 (22%)	349 (38.8%)	<0.0001
Used other drugs	1160 (33.7%)	266 (32.3%)	441 (30.6%)	95 (20.5%)	280 (31.1%)	<0.0001

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503 *Note: SA: suicide attempt, SH: self-harm, *chi-square test of independence, **either reports suicide*
504 *attempt or has register self-harm*

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509 **Table 2.** *Pairwise associations between background variables, suicide attempts and self-harm.*

Participants	Suicide attempts				Register self-harm			
	Factor present	Factor absent	χ^2	p-value	Factor present	Factor absent	χ^2	p-value
All (n=7067)	2763 (39.1%)	—	—	—	1364 (19.3%)	—	—	—
Female (n=3578)	1551 (43.3%)	1212 (34.7%)	54.64	<0.0001	778 (21.7%)	586 (16.8%)	27.45	<0.0001
Not working or studying (n=5971)	2431 (40.7%)	332 (30.3%)	41.8	<0.0001	1226 (20.5%)	138 (12.6%)	36.99	<0.0001
No children (n=4536)	1729 (38.1%)	1034 (40.9%)	4.993	0.025	846 (18.7%)	518 (20.5%)	3.322	0.068
Low education level (n=2108)	926 (43.9%)	1837 (37%)	29.15	<0.0001	529 (25.1%)	835 (16.8%)	64.22	<0.0001
Not living independently (n=1678)	761 (45.4%)	2002 (37.1%)	35.81	<0.0001	430 (25.6%)	934 (17.3%)	55.98	<0.0001
Bullied (n=3952)	1742 (44.1%)	1021 (32.8%)	92.97	<0.0001	821 (20.8%)	543 (17.4%)	12.28	<0.0001
Physical abuse (n=1795)	943 (52.5%)	1820 (34.5%)	181.7	<0.0001	415 (23.1%)	949 (18%)	22.2	<0.0001
Sexual abuse (n=1041)	629 (60.4%)	2134 (35.4%)	232.1	<0.0001	285 (27.4%)	1079 (17.9%)	50.52	<0.0001
Cannabis use (n=2514)	1203 (47.9%)	1560 (34.3%)	125	<0.0001	670 (26.7%)	694 (15.2%)	134.6	<0.0001
Use of other drugs (n=2242)	1174 (52.4%)	1589 (32.9%)	241.9	<0.0001	679 (30.3%)	685 (14.2%)	253.3	<0.0001
Hospitalizations over median (n=3266)	1717 (52.6%)	1046 (27.5%)	462	<0.0001	1029 (31.5%)	335 (8.8%)	579.3	<0.0001

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512 ***Table 3***. *Cox proportional hazards model of self-harm after discharge from psychiatric hospitalization,*
513 *up to 720 days of follow-up.*

Variable	Hazard ratio	95% CI			p-value
Diagnosis					
Schizophrenia (reference)	1				–
Schizoaffective disorder	1.43	1.15	–	1.76	0.0010
Bipolar disorder	1.79	1.48	–	2.16	<0.0001
Psychotic depression	2.83	2.16	–	3.70	<0.0001
Other psychosis	0.85	0.63	–	1.14	0.28
Hospitalization duration					
Over 2 months (reference)	1				–
2 months or less	1.18	0.96	–	1.45	0.13
1 month or less	1.59	1.33	–	1.89	<0.0001
1 week or less	2.24	1.88	–	2.67	<0.0001
Covariates					
Female sex	1.78	1.53	–	2.08	<0.0001
Low education	1.53	1.32	–	1.78	<0.0001
Age at discharge	0.97	0.96	–	0.97	<0.0001
Sexual abuse	1.19	1.00	–	1.42	0.052

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