Early onset externalizing behaviors among forensic psychiatric patients: Identification in child and adolescent psychiatric services

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ABSTRACT

Forensic psychiatric patients constitute a heterogeneous patient group, with common comorbidity within the externalizing spectrum. Increased knowledge on early antecedents in the pathway to severe mental illness and criminality is needed. In this study, we investigated early onset externalizing behaviors in three groups of forensic psychiatric patients 1) patients without contact with child and adolescent psychiatry (CAP), 2) patients with CAP contact, and 3) patients with both CAP contact and institutional placement. Participants (N = 98) were consecutively recruited from a cohort of forensic psychiatric patients in Sweden between 2016 and 2020. Data were collected through file information and semi-structured interviews and analyzed with a Bayesian approach. A history of CAP together with an institutional placement during childhood or adolescence was associated with more externalizing disorders, a higher number of convictions over the lifetime, a lower age at first conviction, and a lower age at first self-reported crime. Our findings provide further insight into the importance of early-onset adverse behaviors in the development of later externalizing behaviors, and may be of particular use for practitioners within social services and CAP services.

1. Introduction

Every year, approximately 350 individuals are convicted to forensic psychiatric care, and almost 2000 individuals are treated in forensic psychiatric care in Sweden (Swedish, 2019). Internationally, forensic psychiatric patients present with a wide range of different mental disorders (Chester et al., 2018; Hildebrand and de Ruiter, 2004; Penney et al., 2019) along with several other social vulnerabilities (Andreason et al., 2014; Degl’Innocenti et al., 2014; Lindstedt et al., 2004; Ter Haar-Pomp et al., 2015). In a nationwide, clinical registry, 41% among women and 51% among men within Swedish forensic psychiatry had schizophrenia as primary diagnosis (Swedish, 2019), and disorders within the spectrum of schizophrenia and other psychotic disorders are in general overrepresented in forensic psychiatric patients (Delfin et al., 2020; Janssen-Hart et al., 2011). Comorbitides, especially those incorporating externalizing behaviors, such as antisocial personality disorder (ASPD), attention deficit hyperactivity disorder (ADHD), conduct disorder (CD), and substance use disorders (SUD) are common. These comorbid disorders, sometimes referred to as externalizing disorders (Achenbach et al., 2016; Batum and Yagmurlu, 2007; Bongers et al., 2004; Keil and Price, 2006), are characterized by prominent impulsivity and disruptive conduct as manifested in recklessness, opposition, aggression, property violations, impulsive, and violent and antisocial behaviors which may result in incarceration (Beauchaine et al., 2017; Bongers et al., 2004). Such disorders and behaviors constitute a challenge to society and healthcare institutions, given the demonstrated link between externalizing disorders and criminality (Erskine et al., 2016) and may result in not only personal injury and damage to property, but also reduced quality of life and mental health problems for victims (Tan and Haining, 2016). Also, the economic resources in society are affected; Swedish society alone counts long-term costs of approximately €600 000 following a single assault of “moderate” degree (Nilsson and Wadeskog, 2012). It has repeatedly been demonstrated that a minority of a population accounts for most crimes, including violent crimes, and it has been suggested that timely interventions could cut the overall violent crime rate by more than half (Elonehmo et al., 2009; Falk et al., 2014; Moffitt and Caspi, 2001). It seems crucial to break this vicious circle early since it is well known that individuals with multifaceted problems are unlikely to cease to commit crimes without help (Statton and Magnusson, 1996).

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Following the conclusions above, a significant amount of research aimed at identifying risk and resilience factors to prevent a negative outcome for individuals with externalizing behaviors has been conducted. For example, (Willner et al., 2016) found that kindergarten children with externalizing behaviors demonstrated an increased risk of developing psychiatric comorbidity five years later (Willner et al., 2016). Studies have also shown that children with early onset externalizing behaviors are more likely to experience peer rejection and victimization, which in turn may increase societal marginalization (Harrist et al., 1997; Ladd and Burgess, 1999). When investigating externalizing behaviors and disorders in adult samples, a high comorbidity of ADHD and CD has been demonstrated among incarcerated individuals (Fairchild et al., 2019; Hofvander et al., 2017; Retz et al., 2020). Furthermore, a combination of ADHD and CD has been brought forward as a major risk factor for an early onset of SUD and severe mental disorders, e.g. psychosis, later in life (Carpentier et al., 2012; Dalleg et al., 2014; Young et al., 2015). However, research has failed to demonstrate causal associations as most children with ADHD, even though having distinct functional impairments, do not progress to severe externalizing behaviors (Beauchaine et al., 2017; Lahy et al., 2005).

Currently, the evidence suggests that early onset SUD may be the main driving force in the development of criminal behaviors in children and adolescents with ADHD and CD (Boden et al., 2012; Carpentier et al., 2012; Gustavson et al., 2007; Knop et al., 2009; Marshal and Molina, 2006; Pulay et al., 2008; Roy, 2008), portraying a developmental pathway from preschool ADHD via CD to SUD and ASPD and subsequent incarceration (Beauchaine and McNulty, 2013; Storebø and Simonsen, 2016).

Applying the current knowledge to forensic psychiatric samples, previous findings indicate that many forensic psychiatric patients have had an onset of mental health problems well before their index crime (de Tribuoiot-Hardy and Habermeyer, 2016; Hodgins and Müller-Iserber, 2004; Witt et al., 2013). For instance, 96% of women and 93% of men among forensic psychiatric patients in Sweden had been in contact with a psychiatric clinic before being convicted to forensic psychiatric care (Swedish, 2019), which is somewhat more than international numbers (75–85%) (de Tribuoiot-Hardy and Habermeyer, 2016; Hodgins and Müller-Iserber, 2004; Witt et al., 2013). (Andreason et al., 2014) demonstrated that approximately one out of three in a cohort of forensic psychiatric patients had been in contact with child and adolescent psychiatry (CAP), with CAP contact being more common in patients that were assessed as both severely mentally ill and recidivism prone compared to patients that predominantly were assessed as severely mentally ill (Andreason et al., 2014). The question remains as to how and why some individuals develop severe mental illness and criminality, and increased knowledge on early onset externalizing disorders, and society’s handling thereof, in forensic psychiatric patients would be of great importance for guiding early, preventive interventions.

The current study aimed to first describe the prevalence of previous CAP contacts and institutional placements in a cohort of Swedish forensic psychiatric patients. Secondly, the study aimed to explore differences in externalizing behaviors and disorders between three groups of forensic psychiatric patients: 1) patients without CAP contact, 2) patient with CAP contact, and 3) patients with both CAP contact and institutional placement during childhood or adolescence.

2. Methods

2.1. Subjects

This study was based on a consecutively recruited cohort of forensic psychiatric patients. All patients who met the initial criterion of being cared for under the law of forensic psychiatric care at a high security forensic psychiatric clinic in Sweden during the data collection period, November 2016 to November 2020, were candidates for participation. To be included, the patient had to have an expected stay longer than eight weeks at the clinic and be able to fulfill the tasks in the study without an interpreter. Also, all patients were assessed by their treating psychiatrist prior to participation and, if assessed as not being able to provide informed consent, were excluded from the study.

The aim was to collect 100 subjects, but due to the COVID-19 pandemic during 2020, the inclusion of participants was terminated in November 2020 when 98 patients had participated. Out of a total of 277 patients that were candidates for participation, \( n = 22 \) were excluded because of insufficient length of stay, \( n = 31 \) due to insufficient language skills, and \( n = 40 \) were assessed as unable to form an opinion about an informed consent. Of the remaining 184 patients eligible to participation, 83 declined participation, 3 dropped out after accepting but before participation, and the study was finally based on \( N = 98 \) subjects (53.3% participation rate; see Laporte et al. 2021 for details). The mean age of the subjects was 34.9 years (range 19–62, SD = 10.7) and 86.7% were male (\( n = 85 \)). The current sample represent ~5% of the total forensic psychiatric population in Sweden, with characteristics corresponding to those reported by the (Swedish, 2019; Laporte et al., 2021).

During the data collection, approximately one in ten subjects (\( n = 9 \)) chose to terminate their participation before all data had been collected. Data on age at first conviction was missing for one subject, while data on age at first crime were missing for eight subjects. These subjects were omitted from the corresponding analyses.

2.2. Procedures

Information on the study was given to all 184 eligible subjects by one of two data collectors, both with clinical experience from working with forensic psychiatric patients. After receiving oral and written information on the study, those who chose to participate provided written, informed consent. Thereafter, the data collectors took part of all file information, including the forensic psychiatric investigation (FPI), medical records from psychiatric health care facilities, detailed reports on previous living circumstances and criminal history, written court verdicts, and incidents during current incarceration that were available from the medical files. File information included national coverage on all collected data. After data collection had been completed for each subject, all data were reviewed by the data collector and a senior clinician and researcher in the field, making sure all data points were coded as intended and solving possible discrepancies between file and interview data. When data from files and interviews were contradictory, the most reliable data source was chosen. If interview data was considered reliable, this was chosen over file data that was considered unreliable, and vice versa. Every participant received a small monetary compensation (~ €10) for their contribution to the study.

2.3. Measures

2.3.1. Psychosocial and criminal background

Sociodemographic information and information on psychosocial background including schooling and institutionalization during childhood was obtained from files and complemented with interviews with the subjects, with corroborating evidence available from the FPI. See Laporte et al. (2021) for detailed information on subject’s psychosocial and criminal background. Information on institutionalization was divided into two categories: shorter stay (< 4 weeks) and longer stay (>4 weeks). Information on previous criminality was collected through the FPI, and by contacting the local district court and retrieving written court verdicts. Information on age at onset of criminality was collected both through files (age at first conviction) and through a combination of file information and self-reports from interviews (age at first crime).

2.3.2. Mental health

Clinical factors regarding mental health, both lifetime occurrence and current primary and secondary diagnoses of mental disorders, were
collected through medical files and the FPI. In the files, diagnoses were often specified in The Diagnostic and Statistical Manual of Mental Disorders IV (Association, 1994), International classification of diseases-9 (Organization, 1998) or International classification of diseases-10 (Organization, 1992) format and were therefore converted to The Diagnostic and Statistical Manual of Mental Disorders 5 (Association, 2013) by a senior clinician and researcher with considerable experience in the field. Information on CAP contacts was obtained from files, the FPI, and complemented with interviews with the subjects.

Two new variables, representing the number of lifetime externalizing and non-externalizing disorders, respectively, were created for use in analyses. Specifically, the externalizing disorders variable was based on the DSM-5 section Disruptive, Impulse-Control, and Conduct Disorders, and counted lifetime instances of oppositional defiant disorder, conduct disorder, ADHD, intermittent explosive disorder, substance use disorders, antisocial personality disorder, kleptomania as well as both other specified and unspecified disruptive, impulse-control, and conduct disorders (no subject had ever been diagnosed with pyromania, which is also included in this section). The non-externalizing disorders variable counted lifetime instances of intellectual disorders, communication disorders, autism spectrum disorders, learning disorders, motor control disorder, tics, schizophrenia spectrum disorders, bipolar disorders, anxiety disorders, obsessive-compulsive disorder, PTSD, other trauma disorders, dissociative disorder, eating disorders, cognitive disorders and other psychiatric disorders.

2.4. Statistical analysis

Statistical analysis was carried out using the R statistical language, version 4.1.1 (Team, 2021). A fully Bayesian approach was employed, with all statistical models specified using the R package brms (P.-C. Bürkner, 2017), interfacing R with the Stan probabilistic programming language (Carpenter et al., 2017). Group differences in externalizing behaviors and disorders, in this study conceptualized as diagnoses of mental disorders within the externalizing spectrum, age at first crime, age at first criminal conviction, and the total number of convictions during the subjects’ lifetime, were examined using regression models with different likelihood functions. Specifically, we used a cumulative logit likelihood to model the number of externalizing disorders, and a hurdle gamma likelihood to model the total number of convictions, age at first conviction, and age at first crime. Robust and weakly informative Bayesian priors, that should have negligible impact on obtained estimates yet still provide moderate regularization of potential outliers (Gelman et al., 2017), were used for all models.

In order to control for the potential effect of age and sex as well as the number of non-externalizing diagnoses on group differences, three regression models were specified for each variable of interest: One model with just the group variable (the “minimal model”), one with the group variable as well as age and sex variables (the “medium model”), and one with the group variable as well as age, sex, and number of non-externalizing diagnoses variables (the “full model”). Model fit was quantified and compared using leave-one-out cross-validated expected log predictive density (ELPDLOO) (Vehari et al., 2017). The ELPDLOO is a measure of relative model fit, and provides an estimate of the model’s out-of-sample predictive accuracy compared to another model that is fit on the same data but using a different set of variables. Obtained values were multiplied with −1 so that lower values of ELPDLOO indicate better model fit. In general, differences in ELPDLOO of less than four are considered unreliable and of no clear predictive advantage, thus favoring the least complex model (Gelman et al., 2021). Thus, in those cases where the ELPDLOO value is at least four points lower than that of the minimal model, we present results from the best fitting model.

3. Results

3.1. History of CAP contacts and institutional placements in forensic psychiatric patients

A descriptive overview of the number of lifetime externalizing disorders, the number of lifetime non-externalizing disorders, previous convictions, age at first conviction, and age at first crime for each group is presented in Table 1 and Fig. 1.

Subjects were relatively evenly distributed across the three groups, although the largest group, consisting of 42 (43%) subjects, had neither previous CAP contact nor previous institutional placement during childhood or adolescence. Approximately one in four subjects (n = 26; 27%) had previous CAP contact but no institutional placement, while 30 (31%) subjects had a history of both previous CAP contact and institutional placement.

3.2. Group differences in externalizing disorders and behaviors in forensic psychiatric patients with and/or without CAP contact and institutional placements

Neither age, sex nor the number of non-externalizing diagnoses had a predictive effect on the number of externalizing disorders in each group, with ELPDLOO values of 146.9 (SE = 7.8) for the minimal model, 149.1 (SE = 8.1) for the medium model, and 150.3 (SE = 8.7) for the full model. Thus, without controlling for age and sex or the number of non-externalizing disorders, the most likely predicted number of externalizing disorders was one (40%) followed by zero (33%) among subjects with neither previous CAP contact nor institutional placement, whereas among subjects with previous CAP contact the most likely predicted number of externalizing disorders was one (47%) followed by two (29%). In contrast, the most likely predicted number of externalizing disorders among subjects with both previous CAP contact and institutional placement was two (36%) followed by one (24%). Notably, no subject with a history of both CAP contact and institutional placement had zero externalizing disorders, and they were more likely than the other groups to have three or more externalizing disorders. An overview of the predicted probability of the number of externalizing disorders for each group is presented in Fig. 2.

Regarding group differences in lifetime criminality as measured by number of convictions, including age and sex resulted in increased predictive accuracy, but adding the number of non-externalizing disorders did not improve model fit any further, with ELPDLOO values of 317.7 (SE = 5.7) for the minimal model, 283.9 (SE = 10.4) for the medium model, and 286.7 (SE = 11.9) for the full model, thus favoring the medium model. After controlling for the effect of age and sex, the estimated posterior probability of a subject with neither previous CAP contact nor institutional placement having four or more convictions over the lifetime was 71.5%, whereas the corresponding probability among subjects with just previous CAP contact was 43.0%. For subjects with both previous CAP contact and institutional placement, the probability of having four or more convictions over the lifetime was very high (99.7%). Going further, the probability that a subject with neither CAP contact nor institutional placement had six or more convictions was just 4.1%, with 1.1% for subjects with just previous CAP contact, and 65.1% (that is, more likely than not) for subjects with both previous CAP contact and institutional placement. A histogram showing the posterior distribution of the number of convictions in each group from the best fitting model, along with posterior medians, is shown in Fig. 3A.

When group differences in age at first conviction were analyzed, there was a clear predictive effect of age and sex, but the inclusion of the number of non-externalizing disorders did not improve predictive accuracy, with ELPDLOO values of 324.8 (SE = 8.9) for the minimal model, 311.8 (SE = 9.0) for the medium model, and 311.7 (SE = 9.1) for the full model, thus favoring the medium model. After controlling for the effect of age and sex, the probability that subjects with neither previous CAP contact nor institutional placement had six or more convictions over the lifetime was very high (99.7%). Going further, the probability that a subject with neither CAP contact nor institutional placement had six or more convictions was just 4.1%, with 1.1% for subjects with just previous CAP contact, and 65.1% (that is, more likely than not) for subjects with both previous CAP contact and institutional placement. A histogram showing the posterior distribution of the number of convictions in each group from the best fitting model, along with posterior medians, is shown in Fig. 3B.

When group differences in age at first conviction were analyzed, there was a clear predictive effect of age and sex, but the inclusion of the number of non-externalizing disorders did not improve predictive accuracy, with ELPDLOO values of 324.8 (SE = 8.9) for the minimal model, 311.8 (SE = 9.0) for the medium model, and 311.7 (SE = 9.1) for the full model, thus favoring the medium model. After controlling for the effect of age and sex, the probability that subjects with neither previous CAP contact nor institutional placement had six or more convictions over the lifetime was very high (99.7%). Going further, the probability that a subject with neither CAP contact nor institutional placement had six or more convictions was just 4.1%, with 1.1% for subjects with just previous CAP contact, and 65.1% (that is, more likely than not) for subjects with both previous CAP contact and institutional placement. A histogram showing the posterior distribution of the number of convictions in each group from the best fitting model, along with posterior medians, is shown in Fig. 3A.

When group differences in age at first conviction were analyzed, there was a clear predictive effect of age and sex, but the inclusion of the number of non-externalizing disorders did not improve predictive accuracy, with ELPDLOO values of 324.8 (SE = 8.9) for the minimal model, 311.8 (SE = 9.0) for the medium model, and 311.7 (SE = 9.1) for the full model, thus favoring the medium model. After controlling for the effect of age and sex, the probability that subjects with neither previous CAP contact nor institutional placement had six or more convictions over the lifetime was very high (99.7%). Going further, the probability that a subject with neither CAP contact nor institutional placement had six or more convictions was just 4.1%, with 1.1% for subjects with just previous CAP contact, and 65.1% (that is, more likely than not) for subjects with both previous CAP contact and institutional placement. A histogram showing the posterior distribution of the number of convictions in each group from the best fitting model, along with posterior medians, is shown in Fig. 3B.
This study investigated the prevalence of CAP contacts and institutional placements during childhood or adolescence in a large and well-characterized cohort of Swedish forensic psychiatric patients, and explored differences in lifetime externalizing behaviors and disorders between subjects with and/or without CAP contact and/or institutional placement during childhood or adolescence. More than half of the subjects had either been institutionalized or had contact with CAP services during childhood or adolescence, and almost one in three subjects had a history of both. Forensic psychiatric patients who had both a history of CAP contacts and childhood/adolescence institutionalization demonstrated more externalizing disorders and earlier onset and higher number of lifetime criminal behaviors than the two other groups.

Table 1
Descriptive overview of each group.

|               | N     | C     | C + I  |
|---------------|-------|-------|--------|
| Age           | 38.48 ± 10.90 | 32.62 ± 10.67 | 31.97 ± 9.07 |
| Age at first sentence | 24.51 ± 8.84 | 22.92 ± 8.53 | 18.63 ± 4.71 |
| Age at first crime    | 16.50 ± 7.59 | 15.00 ± 8.21 | 11.71 ± 3.80 |
| Number of sentences  | 7.79 ± 9.14  | 5.00 ± 4.72  | 8.97 ± 8.02  |
| Number of non-externalizing dxes  | 1.98 ± 1.26 | 2.81 ± 1.3 | 2.73 ± 1.57 |

Note: N, no previous contact with child and adolescent psychiatric services and no previous institutional placement; C, previous contact with child and adolescent psychiatric services but no previous institutional placement; C + I, previous contact with child and adolescent psychiatric services and previous institutional placement.

For age at first crime, there was no clear predictive effect of neither age and sex nor of the number of non-externalizing disorders, with ELDPGo values of 284.2 (SE = 11.2) for the minimal model, 283.7 (SE = 10.8) for the medium model, and 284.7 (SE = 11) for the full model. Thus, without controlling for age and sex or the number of non-externalizing disorders, the probability of a subject reporting their first crime before the age of 15 (i.e., the age of legal responsibility in Sweden) was just 6.9% among subjects with neither CAP contact nor institutional placement. Among subjects with just previous CAP contact, the probability of onset of criminality before the age of 15 was 32.5%, and almost certain - 99.9% - among subjects with both CAP contact and institutional placement. In addition, the probability of a subject reporting their first crime before the age of 13 was practically non-existent both among subjects with neither CAP contact nor institutional placement and among subjects with both CAP contact and institutional placement. However, subjects with both CAP contact and institutional placement were very likely - 91.4% - to report an onset of criminality before the age of 13. A histogram showing the posterior distribution of the age at first crime for each group from the best fitting model, along with posterior medians, is presented in Fig. 3C. Note that this analysis is based on n = 97 subjects due to missing data.

4. Discussion

This study investigated the prevalence of CAP contacts and institutional placements during childhood or adolescence in a large and well-characterized cohort of Swedish forensic psychiatric patients, and explored differences in lifetime externalizing behaviors and disorders between subjects with and/or without CAP contact and/or institutional placement during childhood or adolescence. More than half of the subjects had either been institutionalized or had contact with CAP services during childhood or adolescence, and almost one in three subjects had a history of both. Forensic psychiatric patients who had both a history of CAP contacts and childhood/adolescence institutionalization demonstrated more externalizing disorders and earlier onset and higher number of lifetime criminal behaviors than the two other groups.
4.1. History of CAP contacts and institutional placements in forensic psychiatric patients

In our study, subjects were relatively evenly distributed across the three groups regarding previous contact with CAP services and/or institutional placements. However, the majority of the subjects (n = 56; 57%) had a history of either CAP contact or as having been institutionalized during childhood or adolescence. This is in line with previous research stating that forensic psychiatric patients constitute a vulnerable group with an early onset of disruptive circumstances and/or disorders (Chester et al., 2018; Hildebrand and de Ruiter, 2004; Penney et al., 2019). Deković et al., (2011) presented a meta-analysis showing that early prevention programs can help towards a positive developmental trajectory for children at risk of antisocial behavior (Deković et al., 2011). Unfortunately, the current study does not provide possibilities to analyze early interventions that might be preventive for individuals in the risk zone of developing severe mental disorders and criminality. In-depth, longitudinal studies of children that come in contact with CAP services and residential youth homes, seem crucial to increase the knowledge on pathways to resilience.

4.2. Group differences in externalizing disorders and behaviors in forensic psychiatric patients with and/or without CAP contact and institutional placements

The subjects who had both CAP contact and an institutional placement during childhood or adolescence demonstrated the highest number of externalizing disorders among the groups; two (37%) followed by one (25%). No subject with a history of both CAP contact and institutional placement had zero externalizing disorders, and these subjects were more likely than the other groups to have three or more externalizing disorders. Given these findings, a combination of early onset mental health problems and early and multimodal interventions by social services seem characteristic for forensic psychiatric patients with the most multifaceted externalizing disorders. The most common cause for Swedish children and adolescents to be institutionalized are adverse housing conditions among the younger children and externalizing behaviors like opposition, aggression, property violations, impulsive, violent and antisocial tendencies among adolescents (Khoo et al., 2012, 2003; Westerberg, 2011). Previous research has showed that adverse housing conditions such as violence or abuse of different kinds is related to early onset delinquency (Jackson et al., 2017). Mental health problems have been demonstrated as substantial in adolescents incarcerated in residential youth care, with a prevalence up to 96% of any kind of mental disorder, and a high rate of comorbidity (Jozefiak et al., 2016; McCann et al., 1996). In follow-up studies, the consumption of psychiatric inpatient care in previously institutionalized youths compared to the general population is astonishingly high (Franzén et al., 2008; Vinnerljung et al., 2018). Simultaneously, the availability of specialized psychiatric care for this group is very scarce and historically the collaboration between institutions and CAP services has been cumbersome. Our findings point at the uttermost importance of establishing well-functioning collaborations taking in both the psychiatric and the social perspective in these youngsters’ lives. This group needs a multimodal care to prevent a negative trajectory leading to behaviors that may result in forensic psychiatric care.

Another prominent finding in our study was that having had both CAP contact and institutional placement during childhood or adolescence predicted a higher number of convictions over the lifetime. The absolute majority of this group, 99.7%, demonstrated a probability of having four or more convictions over the lifetime. Notably, a CAP contact but no institutional placement seemed to somewhat protect against lifetime convictions as this group evidenced a probability of more than four sentences at 43.0%, to be compared with a probability of 71.5% in the group with neither CAP nor institutional placement. Characteristics of early onset antisocial behavior patterns have been studied before, revealing a relationship between ADHD, CD, early onset of SUD and adulthood criminality(Boden et al., 2012; Gustavson et al., 2007; Hildebrand and de Ruiter, 2004; Moffitt and Caspi, 2001; Pulya et al., 2008). One could speculate that children in contact with CAP services get help for behaviors that could contribute to a higher likelihood of future criminal behaviors, and therefore do not commit the same amount of crimes as if they had not received this help. In relation to the externalizing disorders that have been investigated in the current study, ADHD or symptoms thereof, e.g. hyperactivity or attention problems, are a common cause of CAP contact. Receiving early and adequate help for ADHD would not only lead to the benefits of a life without or with less prominent externalizing behaviors, but would also protect from, e.g. early SUD hence lowering the risk of criminal behavior (Dalneg et al., 2014; Stattin and Magnusson, 1996). Furthermore, the group of forensic psychiatric patients in this study who demonstrated only CAP contact and no institutional placement, were probably more likely to have some kind of protection resulting from a functioning family system compared to the group which had been institutionalized. When comparing this to the lifetime criminal behaviors of the group with neither CAP contact nor institutional placement, it seems reasonable to speculate that the latter could constitute a group with undiagnosed mental disorders that may increase the risk of externalizing behaviors. In line with this, previous research on prison inmates who reported of ADHD symptoms in childhood but were not diagnosed were more likely to commit violent crimes than other prisoners (Young et al., 2015; Young and Thome, 2011). Some researchers state that diagnosing and medicating ADHD reduce the risk of criminality in a young population (Lichtenstein et al., 2012) but also note that a risk reduction only persist during ongoing medication (Arnold et al., 2015).

When we investigated age at first conviction and the self-reported age at first crime, similar tendencies as those previously described were evident; subjects with both CAP contact and institutional placement had a higher probability of committing a crime before the age of 15 (99.9%), and of receiving a first conviction before the age of 25 (99.5%) than the
other two groups. Taken together, this is well in line with earlier research demonstrating a trajectory from childhood-onset mental disorders, e.g. ADHD, towards criminality (Beauchaine and McNulty, 2013; Beauchaine et al., 2017; Moffitt and Caspi, 2001; Stattin and Magnusson, 1996; Storebro and Simonsen, 2016). Earlier research have shown that complex comorbidity is associated with higher level of aggression and a more violent criminal history (Hofvander et al., 2017; Moffitt and Caspi, 2001; Stattin and Magnusson, 1996). Our findings suggest that forensic psychiatric patients with both previous CAP contact and institutional placement have a higher frequency of comorbidity; not only are they vulnerable due to their mental health but also due to their behavior and/or dysfunctional home situation which has led them to an institutional placement. These are important facts to bear in mind for forensic psychiatric care, as the patients are more likely to have had a turbulent upbringing with institutional placements and might not have a protective social network to fall back on.

4.3. Strengths and limitations

This study has some notable strengths and several limitations that need to be addressed. First, given the difficulties in obtaining data in forensic psychiatric populations (see Bergman et al., 2020), the current study boasts a comparatively large and well-characterized sample of forensic psychiatric patients. Second, the fully Bayesian approach allowed us to make genuine probabilistic statements, and also alleviates some of the concerns with a traditional frequentist approach, such as reliance on arbitrary cut-offs for p-values (Wasserstein and Lazar, 2016). An added benefit is also that Bayesian inferences remain valid regardless of sample size (Wagenmakers et al., 2018). Nevertheless, the cross-sectional design prohibits us from drawing strong causal conclusions, although it should be noted that the retrospective follow-up data is highly reliable, since we used information from the subjects FPI (Degl’Innocenti et al., 2014). Several researchers have suggested that early onset of SUD is the major factor predicting negative outcomes. Unfortunately, we had no data on SUD onset, which would have added to our understanding. Another limitation is the lack of possible confounding variables, such as socioeconomic status and temporal length since the initial diagnosis, in the models. Although the sample size may be considered relatively large in the context of forensic psychiatry, statistically speaking, the sample size must be considered relatively small. Thus, striving for parsimony in our models, we restricted the number of confounding variables to three (i.e., age, sex, and the number of lifetime non-externalizing disorders). Future studies on this topic should consider recruiting even larger samples, thus allowing for even more detailed modeling. Finally, the current sample was recruited from a high-security forensic psychiatric setting, why the findings should not be generalized to all forensic settings without careful consideration. To the study’s advantage, however, the sample’s characteristics correspond well with those of the general forensic psychiatric population in Sweden (Swedish, 2019).

5. Conclusions

In summary, having had both a CAP contact and an institutional placement during childhood seems to constitute risk factors for development of a diversity of externalizing disorders and, following that, early-onset and extensive criminal behaviors. The results from this study points to the need for a multimodal care in this group. It is very important that social services - responsible for institutional care - and CAP services - responsible for the psychiatric care - develop a close cooperation in order to prevent and/or limit a destructive trajectory for these individuals. This is important not only for them as individuals, but also from a societal and socioeconomic perspective.

CRediT authorship contribution statement

Emma Claesdotter-Knutsson: Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Funding acquisition.
Carl Delfin: Data curation, Software, Writing – original draft, Writing – review & editing, Formal analysis, Visualization.
Natalie Laporte: Visualization, Investigation, Writing – original draft, Writing – review & editing.
Mårta Wallinius: Supervision, Validation, Project administration, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

None of the authors declare any conflict of interest

Ethical considerations

Due to the vulnerabilities of the studied population, ethical considerations are of special importance. For all candidates for participation, the treating forensic psychiatrist was consulted and candidates considered as not being currently suitable for the study due to psychiatric status (e.g., acute psychosis or imminent violence risk) or not being able to provide an informed consent were excluded from the study. All subjects provided voluntary, informed written consent before participation and were informed of their possibility to terminate participation at any time without a reason being given. The study, including the monetary reward (which was low in order not to give an incentive that would compromise the free consent), was approved by the Research Ethics Committee at Lindköping University, Dnr 2016/213–31 and 2017/252–32.

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Declaration of Competing Interest

None of the authors declare any conflict of interest

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