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Different types of childhood adversity and 5-year outcomes in a longitudinal cohort of first-episode psychosis patients

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Abstract

Little is known about the impact of different forms of childhood adversity on outcomes in first-episode psychosis (FEP) patients beyond the first year of treatment. We investigated associations between different types of childhood adversity and outcomes of FEP patients over the 5 years following their first contact with mental health services for psychosis. 237 FEP cases aged 18-65 years were followed on average for 5 years after first presentation to psychiatric services in South-London, UK. Childhood adversity prior to 17 years of age was assessed at baseline using the Childhood Experience of Care and Abuse Questionnaire (CECA.Q). The results showed that exposure to at least one type of childhood adversity was significantly associated with a lower likelihood of achieving symptomatic remission, longer inpatient stays, and compulsory admission over the 5-year follow-up. There was no evidence though of a dose-response effect. Some specificity was evident. Childhood parental separation was associated with significantly greater likelihood of non-compliance with antipsychotic medications, compulsory admission, and substance dependence. Institutional care was significantly associated with longer total length of inpatient stays; and parental death was significantly associated with compulsory admissions. Clinicians should screen FEP patients for childhood adversity and tailor interventions accordingly to improve outcomes.

Key words: child abuse; functioning; inpatient admission; longitudinal; maltreatment; parental separation

1. Introduction

Different types of childhood adversity, such as separation from or death of a parent (Morgan et al., 2007), physical and sexual abuse (Fisher et al., 2009), being taken into care (Bebbington et al., 2004), and disrupted living arrangements (Paksarian et al., 2015), have all been linked to the presence of psychotic disorders. Although the exact mechanisms underlying the relationship between childhood adversity and psychosis are not well understood, evidence suggests that the adverse impact of different types of childhood adversity extends beyond the mere risk for psychosis onset (Read et al., 2012; Sideli et al., 2012; Stilo et al., 2013) to adversely impact on clinical and social outcomes of psychosis patients (Alameda et al., 2015; Conus et al., 2010). Recently, Trotta et al. (2016) have shown that there may be some specificity in the impact of childhood adversity on outcomes, as they found that childhood physical abuse was associated with poorer social functioning, while parental separation was associated with longer admissions and non-compliance with medication among psychosis patients during the first year of treatment. Furthermore, Alameda et al. (2015) reported an association between early physical and/or sexual abuse and impaired social functioning over a 3-year follow-up period. Nonetheless, currently little is known about the impact of different types of childhood adversity on longer-term outcomes of patients with psychosis. This knowledge could help identify those individuals who are at a greater risk for poorer outcomes based on the type of childhood adversity they experienced, and consequently inform treatment strategies to improve prognosis.

The aim of this study was to investigate relationships between six forms of childhood adversity occurring before 17 years of age and first-episode psychosis patients' clinical and social outcomes, service utilisation and self-injurious behaviours during a 5-year follow-up after first contact with mental health services for psychosis. This builds on our previous 1-year follow-up of this sample (Trotta et al., 2016) and extends the follow-up period to 5 years. An association of childhood adversity with psychotic disorders (Trotta et al., 2015; Mondelli et al., 2010) and a degree of specificity between different types of childhood

adversity and symptomatic profile (Ajnakina et al., 2016) have also been demonstrated in this sample. As the evidence suggests that the first 3-5 years after first illness onset constitutes a critical period for intervening to improve treatment response and outcomes in patients with psychosis (Crumlish et al., 2009), we focused on the first five years of illness after first contact with mental health services for psychosis to cover the entirety of this critical period. Knowing what type of childhood adversity has a detrimental impact on psychosis outcomes during this crucial period will allow clinicians to intervene sooner and thus improve longitudinal course of the illness. Considering that childhood physical abuse has been linked to poorer social functioning (Alameda et al., 2015; Trotta et al., 2016) while childhood separation has been linked to worse service-related outcomes (Trotta et al., 2016) we hypothesise that these types of childhood adversity will continue to exert their negative impact at 5-year follow-up. Nonetheless, we will examine all types of childhood adversity in case other types or cumulative exposure are associated with adverse outcomes over this longer follow-up period.

2. Materials and methods

2.1. Participants

Participants for this study were recruited as part of the National Institute for Health Research (NIHR) Biomedical Research Centre (BRC) Genetics and Psychosis (GAP) study conducted in South London, UK. The sample was drawn from adult in-patient and out-patient services of the South London and Maudsley Mental Health NHS Foundation Trust (SLaM). Further details of the sample are available in Di Forti et al. (2014). Briefly, the GAP study comprised individuals aged 18-65 years who were resident within tightly defined catchment areas in South-London, UK, and who presented to mental health services within the Trust between December 2005 and October 2010 with a first episode of psychosis (FEP) (International Classification of Diseases (ICD)-10; F20-F29 and F30-F33) (World Health

Organisation (WHO), 1992a). The baseline diagnoses were further validated by administration of the Schedules for Clinical Assessment in Neuropsychiatry (SCAN) (WHO, 1994). The study exclusion criteria were evidence of: 1) psychotic symptoms precipitated by an organic cause; 2) transient psychotic symptoms resulting from acute intoxication as defined by ICD-10; 3) learning disabilities (IQ<70); or 4) head injury causing clinically significant loss of consciousness. The sample in this study comprised 237 FEP patients who were followed-up for approximately five years after first contact with mental health services for psychosis (Supplementary Table 1). The GAP study was granted ethical approval by the South London and Maudsley and Institute of Psychiatry Local Research Ethics Committee (reference number: 05/Q0706/158). All participants signed a consent form after reading a comprehensive information sheet and having had the opportunity to ask questions about the study.

2.2. Baseline Assessment

2.2.1. Socio-demographic characteristics. Information on socio-demographic characteristics was collected using the Medical Research Council (MRC) Socio-demographic Schedule modified version (Mallett et al., 2002). Ethnicity was self-ascribed from the 16 categories employed by the UK Census in 2001 (www.statistics.gov.uk/census 2001). Information on substance use was collected by administering the Alcohol Use Disorders Identification Test (AUDIT) (Babor et al., 2001) and Cannabis Experience Questionnaire (CEQ) modified version (Di Forti et al., 2009).

2.2.2. Clinical assessments. Duration of untreated psychosis was defined as the time between the date of onset of the first psychotic symptom to the date of treatment with antipsychotic medications (Singh et al., 2005). Age at first contact was defined as the age at which a patient came into contact with mental health services for the first time following

onset of psychotic symptoms. The baseline diagnoses were made from face-to-face interviews and mental health records according to ICD-10 criteria (WHO, 1992) utilising the Operational Criteria Checklists (OPCRIT) (McGuffin et al., 1991) with excellent inter-rater reliability (κ=0.97). Similarly, Global Assessment of Functioning (GAF) symptom and functional disability scales (Endicott et al., 1976) were completed from face-to-face interviews with good inter-rater reliability (κ=0.90). Information on the suicide-related behaviours, which included self-injuries with and without intent to die, before the first contact with mental health services was taken from medical records.

2.2.3. Childhood adversity. Childhood adversity that occurred before 17 years of age was assessed in face-to-face interviews using the Childhood Experience of Care and Abuse Questionnaire (CECA.Q) (Bifulco et al., 2005). In the current study, the focus was on six forms of childhood adversity that have previously been associated with psychosis: i) physical abuse inflicted by either one or both parent-figures; ii) sexual abuse perpetrated by an individual at least 5 years senior to the recipient; iii) separation from either or both parent-figures for ≥6 months; iv) death of either or both biological parents; v) taken into care by authorities; and vi) number of changes in family arrangements; this variable was recoded into those with 1-2 arrangements as 0 (no/minimal disruption) and those with ≥3 arrangements as 1 (disrupted living arrangements) (Fisher et al., 2010). To ensure that the CECA.Q scores reflected a reasonable level of severity in the analysis, the scales measuring each variable were dichotomized using the most conservative published cut-off points (Bifulco et al., 2005). The "total adversity" score involved summing the dichotomous CECA.Q subscale scores (range 0–6) and then recoding it into an ordinal scale of 0 (none), 1 (single adverse experience), and 2 (multiple adverse experiences).

2.3. Tracing patients at follow-up

As this work is an extension of the previous study on 1-year follow-up of this sample (Trotta et al., 2016), in which the authors followed-up 237 patients, we sought to trace these 237 FEP patients who had given their consent for their clinical records to be accessed for research purposes. The follow-up was conducted approximately 5 years (mean=4.7, SD=1.7; 828 person years) after first contact with mental health services for psychosis. The follow-up data were extracted retrospectively using the electronic clinical records that are the primary clinical records keeping system within the Trust. It enables searching of all clinical information, including correspondence, discharge letters and events, recorded throughout patients' journeys through the Trust (Stewart et al., 2009). All deaths and emigrations up to and including those that occurred during the final year of follow-up were identified by a case-tracing procedure with the Office for National Statistics (ONS) for England and Wales and the General Register Office (GRO) for Scotland.

During the follow-up, of 237 cases, 3 (1.3%) patients had died and 2 (0.8%) were excluded as we did not have information on follow-up and their details were not available at baseline to enable us to trace them via ONS/GRO tracing procedures. We were unable to trace the whereabouts for 60 (25.3%) patients. Cumulatively, we successfully traced 74.7% of the 237 patients and information on outcomes at follow-up was available for 72.6% (N=172/237) of patients. Those patients who were lost during the follow-up period were older ($mean_{years}$=40.9, SD=15.4; t=4.94, df=185, p<0.001), and had lower GAF symptom scores (mean=33.3, SD=13.5; t=-2.16, df=114, p=0.033) at baseline compared to those patients who were successfully followed-up (Supplementary Table 2).

2.4. Follow-up assessment and definition of outcomes

At follow-up, extensive information was extracted across clinical and social domains and about service use from clinical records using the WHO Life Chart Schedule (LCS) extended version (WHO, 1992b). We used this measure at the end of the follow-up period to

obtain standardised retrospective assessments of patients' experiences, clinical and social outcomes for the entire period of illness operationalised as the period from the first contact with mental health services for FEP to the date of the last assessment recorded in electronic notes. The LCS measure has been widely used (Ajnakina et al., 2017; Morgan et al., 2014), and has been shown to be reliable for follow-up assessments and adaptable across cultures (Susser et al., 2000).

2.4.1. Clinical outcomes. Similar to an earlier study conducted in an overlapping geographical region (Morgan et al., 2014) using information extracted from clinical records, remission was operationalised as a continuous period of ≥6 months of a complete absence of a clear record of psychotic symptoms in clinical notes, including no evidence of re-emergence of psychotic symptoms, re-admission to psychiatric wards, and/or having been re-referred to acute home treatment/crisis intervention services during the follow-up period (Ajnakina et al., 2017). This definition did not depend on whether non-psychotic symptoms (e.g. depressed mood, neurotic manifestations) were present, or whether patients were receiving treatment with antipsychotic medications during this period. Time to first remission was defined as the very first period from the date of first contact with mental health services for FEP to the date that the first 6-month period of remission started (Morgan et al., 2014). To be consistent with earlier studies (Morgan et al., 2014), we defined recovery as remission sustained for ≥2 years. Similar to baseline, GAF (Endicott et al., 1976) was used to measure the overall illness severity and functional disability at the end of the follow-up period using the clinical notes. GAF scores extracted from clinical records showed high comparability when compared to GAF scores based on face-to-face interviews (k=0.81).

2.4.2. Service utilisation. Utilising the LCS extended version (WHO, 1992b), and excluding hospital admission on first contact with mental health services for psychosis, we

extracted information on each re-admission including all compulsory admissions (i.e., admissions exercised under mental health act (MHA) legislation) throughout the follow-up period. The total number of re-admissions was dichotomised to represent 0 (none) and 1 (one or more re-admissions). Using the admission and discharge dates for each re-admission, we calculated the total length of inpatient stays in psychiatric wards during the entire follow-up period. Further, using the LCS extended version and based on clinical notes recorded by the treating clinicians, reviews of prescriptions, and the amount consumed by each patient throughout the follow-up, we assessed each patient's adherence to antipsychotic medications over the follow-up period. A patient was deemed as non-compliant when they were estimated to be taking antipsychotic medications as prescribed ≤33% of the time over the course of the entire follow-up period.

2.4.3. Social outcomes. Using the LCS extended version (WHO, 1992b), we extracted information on social outcomes at the end of the follow-up period. Living alone was defined as living on one's own and/or on one's own with children (i.e., single parent) excluding supervised accommodation. Not being in a stable relationship was defined as being single, divorced or widowed. Being unemployed was defined as not having a full-/part-time job or not being involved in a study programme. Moreover, substance dependence, which encompasses cannabis, alcohol and other substances, was defined as maladaptive use of substances throughout the follow-up period ultimately leading to at least 3 of the following: i) increased tolerance; ii) symptoms of withdrawal; iii) persistent desire or unsuccessful attempts to cut down; iv) large amount of time spent on obtaining the substance or recovering from its effects; v) impairment of social, occupational or recreational activities due to the substance; and vi) persistent use despite harmful physical or psychological effects of the substance.

2.4.4. Self-injurious behaviours. Using the LCS extended version (WHO, 1992b), we extracted from the clinical notes information on the number of times each patient engaged in self-injurious behaviours since the index episode and throughout the follow-up period. This included any behaviours of a deliberate destruction of body tissue with or without conscious suicidal intent and overdoses. We dichotomised this variable to represent 0 (no instances) and 1 (one or more instances).

2.5. Statistical Analysis

All analyses were conducted in RStudio version 3.31 (Integrated Development for R. RStudio, Inc., Boston, MA).

2.5.1. Multiple imputation. In the present study some of the variables of interest had missing values (Supplementary Table 3); as analysis on complete cases (i.e., subset with no missing data in any of variables included for analysis) can result in biased estimates, and reduced power and precision of estimates (Moons et al., 2006; Zhao et al., 2016), we conducted multiple imputations to handle the missing data. We assumed that the missing variables were missing at random (MAR) implying that missingness did not depend on the unobserved data. We imputed the missing values using multiple imputations by chained equations (MICE). MICE has been shown to be a robust method for dealing with missing data across empirical and longitudinal studies (Zhao et al., 2016). Of note, it has been established that excluding outcomes from imputation of missing values disregards the important association between the predictors and the outcomes (Moons et al., 2006; Little, 1992; Schafer, 2002; Rubin, 1987), which in turn generates bias (Little, 1992; Moons et al., 2006). Therefore, in the present study we carried out imputation of missing values in predictors and outcomes. A more detailed description of the employed methods of multiple imputation is provided in the Supplementary Materials.

2.5.2. Descriptive and association analyses. Between group comparisons were made using chi-square tests for categorical variables and t-tests for continuous variables (Mann-Whitney U tests if the variables were non-normally distributed). Logistic and linear regressions were used to analyse the relationship of each type of childhood adversity with the follow-up dichotomous and continuous variables, respectively. Time to first remission and length of inpatient stay were analysed using Poisson models.

3. Results

3.1. Sample characteristics and prevalence of childhood adversity

Imputed data was not different from the complete cases (Supplementary Table 4); thus all results presented here are based on the imputed data. Our analytic sample comprised 237 FEP patients with an average follow-up length of almost 5 years (SD=1.8) after first contact with mental health services for psychosis. The mean age at first contact was 30.1 years (SD=10.3); 62.9% of the sample were men (N=149/237), and 54.0% (N=128/237) were diagnosed with schizophrenia-spectrum disorders. The most common type of childhood adversity reported was parental separation (57.8%), followed by physical abuse (24.5%), disrupted family arrangements (21.9%), and sexual abuse (15.6%). Death of a biological parent (11.4%) and being placed into care by authorities (5.1%) before age 17 years were the least prevalent types of childhood adversity in our sample.

3.2. Childhood adversity and clinical course

Over the 5-year follow-up, 45.1% (N=107/237) of our patients met criteria for recovery and 54.4% (N=129/237) achieved remission at least once during the follow-up, with a

median time to first remission of 12 weeks (IQR=8-20 weeks). Having reported at least one type of childhood adversity was associated with a decreased likelihood of achieving remission during the follow-up (Table 1). There were no significant associations between types of childhood adversity and time to first remission or recovery measured during the follow-up (Table 1), and GAF symptoms and disability scores measured at the end of the follow-up (Table 2).

3.3. Childhood adversity and service use

Parental separation was significantly associated with non-compliance with antipsychotic medications during the follow-up period (Table 2). During the first five years after first contact with mental health services for psychosis, 62.9% (N=149/237) of patients were re-admitted at least once with a median total length of inpatient stay of 77 days (IQR=28-221). There was a significant association between institutional care in childhood and longer inpatient stays during the follow-up, while death of a biological parent and parental separation were associated with an increase in odds of being compulsorily re-admitted at least once during the follow-up period (Table 3). Further, there were significant associations between one type (OR=3.94, 95% CI=1.63-9.54) and two or more types (OR=2.93, 95% CI=1.27-6.74) of childhood adversity and compulsory re-admission during the follow-up. Since the confidence intervals for these associations overlapped, there was no evidence of a dose-response relationship.

3.4. Childhood adversity, self-injurious behaviours and substance dependence

During the 5-year follow-up period, 32.9% (N=78/237) of all patients participated in self-injurious behaviours at least once. No significant associations were found between any form of childhood adversity and self-injurious behaviours. However, parental separation and

exposure to two or more types of childhood adversity were significantly associated with substance dependence during the 5-year follow-up (Table 4), with the association for physical abuse just falling short of statistical significance (p=0.06).

3.5. Childhood adversity and social outcomes

At the end of the 5-year follow-up, 54.4% (N=129/237) of the patients were living alone, 59.5% (N=141/237) were not in a stable relationship, and 68.8% (N=163/237) were unemployed. No significant associations were evident between any type of childhood adversity and social outcomes (Supplementary Table 5), though there was a non-significant trend between parental separation and being more likely to live alone at the end of the 5-year follow-up (p=0.07).

4. Discussion

To our knowledge, this is the first exploratory study that has systematically examined the impact of six different types of childhood adversity on a range of outcomes over a 5-year follow-up in patients with FEP. By extending the follow-up period of our previous research (Trotta et al., 2016) from 1 year to 5 years using the same sample, we have illustrated continuation of the effects of specific types of childhood adversity on longitudinal outcomes of FEP at different time points of the illness progression. In the present study 72.1% of the sample had reported at least one form of childhood adversity compared with 49% of geographically-matched controls (Trotta et al., 2015), reiterating once again that a substantial proportion of individuals with psychotic disorders have been exposed to traumatic experiences in their childhoods. Furthermore, the results of the present study demonstrate specific associations between institutional care, death of a biological parent, and parental

separation during childhood and service utilisation and substance dependence over the first 5 years following first contact with mental health services.

4.1. Limitations

Follow-up studies tend to suffer from systematic bias due to non-random attrition during the follow-up period. Nonetheless, in the present study considerable efforts were made to minimise this potential bias by establishing the whereabouts for 75% of our sample. The quality and completeness of information reported in the clinical notes for each patient inevitably varies which may have increased noise and introduced bias. Similarly, in some cases inaccuracies in classification may have occurred as clinical notes might not always have contained information on patients' well-being for periods when they were not in contact with mental health services. Nonetheless, it has been shown that using routine data from clinical notes it is possible to reliably quantify the course of disorder (Bebbington et al., 2006; Lally et al., 2017). Moreover, our thorough approach to data extraction from clinical notes has ensured the distribution of all outcomes reported in the present study is consistent with previous research which collected data from face-to-face interviews (Lally et al., 2017). Although retrospective accounts of childhood adversity could be biased due to forgetting over time and the reality distortions experienced by many patients with psychosis, it has been shown that reports of childhood adversity obtained retrospectively from individuals with psychotic disorders are stable over time and unaffected by severity of psychotic symptoms (Fisher et al., 2011). Other forms of childhood adversity, such as bullying and domestic violence which have been linked to psychosis, were not investigated in the present study and might have demonstrated stronger associations with psychosis outcomes. The number of statistical tests carried out was reasonably large; thus we cannot confidently rule out the possibility that some of the associations found might have been due to Type I errors arguably highlighting a need for multiple testing adjustments. However, it has been argued

that in exploratory studies multiple test adjustments are not required (Bender and Lange, 2001). In fact, not adjusting for multiple comparisons is preferable because it will lead to fewer errors of interpretation (Rothman, 1990; Perneger, 1998; Rothman, 1990; Savitz & Olshan, 1995). Due to the relatively small sample size available for the analyses, we were also unable to investigate how different age cut-offs, baseline diagnoses, and gender may mediate or moderate the effect of childhood adversity on longitudinal outcomes in patients with FEP. Similarly, we were unable to conduct more complex analysis such as structural equation modelling (Matthew and MacKinnon, 2007; Westland, 2010), which would have enabled us to simultaneously take into account associations between all variables and potential mediators and moderators.

4.2. Childhood adversity and 5-year outcomes

Remission is one of the most commonly used indicators of treatment efficacy and response in psychosis. Previous studies conducted on patients with FEP showed that childhood adversity was not associated with lack of remission during the very first treatment of FEP (Conus et al., 2010) nor at 1-year follow-up (Trotta et al., 2016). Nonetheless, our results showed that having reported at least one type of CA was associated with about 59% decreased likelihood of achieving remission during the 5-year follow-up compared with those patients who did not report this form of childhood adversity. This relationship may be due to lack of compliance with treatment among sufferers of CA (Conus et al., 2010). As it was observed at the 1-year follow-up point (Trotta et al., 2016), our results again showed a significant association between parental separation and lack of compliance with antipsychotic medications during the entire follow-up period. This highlights that the association between this form of childhood adversity and non-compliance with antipsychotic medications is continuous over the first few years of illness, and thus should be considered by health professionals from the start of treatment. It has been shown that individuals without

social support are less likely to be compliant with their treatment compared with those living with their family (DiMatteo, 2004). Indeed, we observed that a higher proportion of patients with a history of parental separation reported living alone at the end of the follow-up period compared to those patients who did not report this form of childhood adversity. Living alone may signify lack of support from friends and family in prompting a patient's compliance by encouraging taking medications (DiMatteo, 2004).

Furthermore, parental death and separation were associated with over two-fold greater odds of having a compulsory admission during the 5-year follow-up period. It has been suggested that the risk for compulsory detentions is amplified by a reluctance to seek help during a mental health crisis and non-compliance with treatment could potentially make a compulsory admission inevitable (Perkins et al., 1993). The alleged unwillingness to utilise available services at the time of mental health crisis has been linked to factors such as distrust of psychiatric services (McGovern et al., 1994) and lack of insight into mental health difficulties (Lecomte et al., 2008). Therefore, these results may suggest that individuals who have experienced parental separation or death before the age of 17 years may have more difficulties in trusting health professionals and thus be less likely to seek help. It is also possible that individuals who experienced either of these two types of childhood adversity in childhood may not have the necessary ongoing parental support at the time of illness onset and progression to ensure their compliance with treatment, thus increasing the likelihood of compulsory admission.

Moreover, our results highlighted that being taken into care during childhood was associated with longer inpatient stays during the 5-year follow-up. Previous research has shown that those individuals with FEP who experienced this form of childhood adversity tend to exhibit disruptive behavioural traits such as hostility, lack of impulse control and uncooperativeness (Ajnakina et al., 2016), perhaps as a result of being brought up in a less structured, abusive, or neglectful family environment. It is possible therefore that it was necessary to keep these individuals on psychiatric wards for longer periods of time to

manage their behaviours, or it may simply be that they did not have caring relatives to whom they could be discharged.

Furthermore, childhood parental separation was associated with over two-fold greater risk of developing substance dependence by the end of the 5-year follow-up period. It may be that those individuals who experience this type of childhood adversity may use substances as an avenue to escape or dissociate themselves from the emotional pain, anxiety, anger, or helplessness this form of childhood adversity may have left them with (Lebling et al., 1986).

4.3. Conclusion

The results of the present exploratory study confirm that there is a degree of specificity in the associations between different forms of childhood adversity and adverse service use and substance dependence over the 5 years following first contact with mental health services for psychosis. Once these findings are replicated, and given the high prevalence of childhood adversity reported by patients with FEP, routine assessment of a history of adverse childhood experiences should be considered by psychosis services to identify those patients who are most vulnerable to poorer outcomes from the start of treatment and warrant more tailored interventions, such as trauma-focused therapy; though randomised-controlled studies are needed in order to identify the right interventions for this group of patients. This in turn should help improve illness course over the initial five years after the first contact with mental health services for psychosis and potentially reduce service costs.

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Conflict of interest

R.M.M. has received honoraria from Janssen, Astra-Zeneca, Lilly, and BMS. A.S.D. has received honoraria from Janssen and Roche Pharmaceuticals. F.G. has received honoraria for advisory work and lectures from Roche, BMS, Lundbeck, Otsuka and Sunovion, and has a family member with professional links to Lilly and GSK. All other authors declare they have no conflicts of interest.

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Table 1. Adjusted associations between different types of childhood adversity and clinical outcomes during the 5-year follow-up period

Childhood adversities	Time to remission, w				Symptomatic remission, ever					Symptomatic recovery, ever				
		Adjusted			No	Yes	Adjusted			No	Yes	Adjusted		
	Median (IQR)	IRR	95% CI		N (%)	N (%)	OR	95% CI		N (%)	N (%)	OR	95% CI	
Sexual abuse														
No (N=200)	12 (8-20)	-	-	-	90 (44.9)	110 (55.1)	-	-	-	107 (53.4)	93 (46.6)	-	-	-
Yes (N=37)	12 (8-68)	1.07	0.76	1.49	18 (48.2)	19 (51.8)	0.83	0.36	1.94	23 (62.4)	14(37.6)	0.59	0.24	1.42
Physical abuse														
No (N=179)	12 (6-20)	-	-	-	81 (45.3)	98 (54.8)	-	-	-	127 (59.8)	72 (40.2)	-	-	-
Yes (N=58)	12 (8-24)	1.07	0.84	1.36	37 (63.8)	21 (36.2)	0.47	0.22	1.01	46 (79.3)	12 (20.7)	0.50	0.22	1.13
Parental separation														
No (N=101)	12 (5-20)	-	-	-	47 (47.0)	53 (53.0)	-	-	-	63 (63.0)	37 (37.0)	-	-	-
Yes (N=136)	12 (8-24)	1.10	0.89	1.36	71 (51.8)	66 (48.2)	0.78	0.38	1.60	90 (65.7)	47 (34.3)	0.92	0.48	1.76
Parental loss														
No (N=210)	12 (8-24)	-	-	-	108 (51.4)	102 (48.6)	-	-	-	137 (65.2)	73 (34.8)	-	-	-
Yes (N=27)	8 (4-20)	0.84	0.59	1.18	10 (37.0)	17 (63.0)	1.66	0.55	5.02	16 (59.3)	11 (40.7)	1.21	0.45	3.23
Institutional care														
No (N=225)	12(8-20)	-	-	-	101 (44.7)	124 (55.3)	-	-	-	122 (54.4)	103 (45.6)	-	-	-
Yes (N=12)	16 (10-24)	1.13	0.66	1.92	7 (57.9)	5 (42.1)	0.77	0.19	2.88	8 (56.5)	4 (43.5)	0.75	0.19	2.99
Family arrangements														
Up to 2 (N=185)	12 (8-24)	-	-	-	83 (44.8)	102 (55.2)	-	-	-	101 (54.4)	84 (45.6)	-	-	-
3 or more (N=52)	12 (8-20)	0.97	0.73	1.29	25 (47.5)	27 (52.5)	1.02	0.45	2.32	29 (56.5)	23 (43.5)	0.99	0.45	2.16
Total adversity														
0 (N=66)	12 (6-20)	-	-	-	26 (39.4)	40 (60.6)	-	-	-	39 (59.1)	27 (40.9)	-	-	-
1 (N=95)	12 (8-20)	1.14	0.87	1.49	55 (57.9)	40 (42.1)	**0.41***	**0.18**	**0.94**	62 (65.3)	33 (34.7)	0.93	0.44	1.95
2 or more (N=76)	12 (8-24)	1.10	0.83	1.45	37 (48.7)	39 (51.3)	0.59	0.25	1.39	52 (68.4)	24 (31.6)	0.58	0.25	1.33

w, weeks; CI, confidence intervals; OR, odds ratio; IRR, incidence rate ratio.
Adjusted for duration of untreated psychosis, baseline Global Assessment of Functioning symptom score and baseline substance use.
Bold text indicates statistically significant associations. *p<0.05, **p<0.01, ***p<0.001

Table 2. Adjusted associations between different types of childhood adversity and overall clinical presentation, social functioning, and treatment compliance during the 5-year follow-up

Childhood adversities	GAF symptoms at follow-up				GAF disability at follow-up				Non-compliance during follow-up				
		Adjusted [a]				Adjusted [b]			No	Yes	Adjusted [c]		
	Mean (s.d.)	β	95% CI		Mean (s.d.)	β	95% CI		N (%)	N (%)	OR	95% CI	
Sexual abuse													
No (N=200)	64.4 (20.5)	-	-	-	66.5 (17.0)	-	-	-	158 (79.0)	42 (21.0)	-	-	-
Yes (N=37)	57.2 (21.2)	-4.61	-13.3	4.08	60.6 (15.9)	-2.77	-9.88	4.33	22 (59.5)	15 (40.5)	1.72	0.72	4.09
Physical abuse													
No (N=179)	64.9 (20.3)	-	-	-	67.1 (17.1)	-	-	-	135 (75.4)	44 (24.6)	-	-	-
Yes (N=58)	58.4 (21.6)	-5.30	-12.9	2.34	60.7 (15.7)	-5.49	-12.2	1.20	45 (77.6)	13 (22.4)	0.86	0.39	1.86
Parental separation													
No (N=101)	64.3 (21.0)				66.6 (17.8)	-	-	-	76 (75.2)	25 (24.8)	-	-	-
Yes (N=136)	62.6 (20.6)	-1.53	-8.11	5.04	64.8 (16.3)	-0.85	-6.41	4.70	75 (55.0)	61 (45.0)	**2.62****	**1.22**	**5.60**
Parental loss													
No (N=210)	62.7 (20.8)	-	-	-	65.3 (17.0)	-	-	-	160 (76.2)	50 (23.8)	-	-	-
Yes (N=27)	68.3 (20.0)	1.29	-8.21	10.8	67.1 (16.8)	-1.29	-8.21	10.8	20 (74.1)	7 (25.9)	1.55	0.59	4.09
Institutional care													
No (N=225)	63.9 (20.2)	-	-	-	66.0 (16.7)	-	-	-	143(63.4)	82 (36.6)	-	-	-
Yes (N=12)	52.2 (28.2)	-5.83	-19.4	7.70	56.8 (20.3)	-5.83	-19.4	7.70	8 (67.9)	4 (32.1)	0.69	0.15	3.11
Family arrangements													
Up to 2 (N=185)	64.9 (20.4)	-	-	-	67.1 (16.5)	-	-	-	123 (65.5)	62 (33.5)	-	-	-
3 or more (N=52)	57.7 (21.1)	-4.58	-12.91	3.76	60.1 (17.5)	-5.09	-11.22	1.05	28 (53.4)	24 (46.6)	1.67	0.71	3.93
Total adversity													
0 (N=66)	67.3 (19.4)	-	-	-	68.6 (18.1)	-	-	-	53 (80.3)	13 (19.7)	-	-	-
1 (N=95)	62.0 (20.9)	-1.59	-9.67	6.50	65.5 (16.2)	-1.05	-7.38	5.28	72 (75.8)	23 (24.2)	1.36	0.51	3.59
2 or more (N=76)	61.4 (21.6)	-3.95	-12.2	4.28	63.0 (16.5)	-4.15	-10.78	2.48	55 (72.4)	21 (27.6)	1.99	0.73	5.42

GAF, Global Assessment of Functioning; CI, confidence intervals; OR, odds ratio; β, beta coefficient.
[a] Adjusted for duration of untreated psychosis, baseline GAF symptom score and baseline substance use
[b] Adjusted for duration of untreated psychosis, baseline GAF disability score and baseline substance use
[c] Adjusted for duration of untreated psychosis, baseline compliance and baseline substance use
Bold text indicates statistically significant associations. *$p<0.05$, **$p<0.01$, ***$p<0.001$

Table 3. Adjusted associations between different types of childhood adversity and service utilisation during the 5-year follow-up

Childhood adversities	One or more total re-admissions					Length of inpatient stay (days)				Compulsory admission				
	No	Yes	Adjusted				Adjusted			No	Yes	Adjusted		
	N (%)	N (%)	OR	95% CI		Median (IQR)	IRR	95% CI		N (%)	N (%)	OR	95% CI	
Sexual abuse														
No (N=200)	77 (38.5)	123 (61.5)	-	-	-	73 (28-230)	-	-	-	119 (59.5)	81 (40.5)	-	-	-
Yes (N=37)	18 (48.7)	19 (51.3)	0.67	0.29	1.55	122 (15-221)	0.79	0.57	- 1.09	27 (73.0)	10 (27.0)	0.75	0.31	1.81
Physical abuse														
No (N=179)	69 (38.6)	110 (61.4)	-	-	-	77 (28-234)	-	-	-	109 (60.9)	70 (39.1)	-	-	-
Yes (N=58)	26 (44.8)	32 (55.2)	0.83	0.37	1.85	70.5 (28.5-186)	0.96	0.77	1.19	37 (63.8)	21 (36.2)	1.01	0.49	2.10
Parental separation														
No (N=101)	37 (36.6)	64 (63.4)	-	-	-	73 (23-205)	-	-	-	65 (64.2)	36 (35.8)	-	-	-
Yes (N=136)	51 (37.4)	85 (62.6)	0.92	0.49	1.72	77 (37-234)	1.00	0.91	1.36	58 (42.4)	78 (57.6)	**2.44*** **	**1.31**	**4.52**
Parental loss														
No (N=210)	88 (41.9)	122 (58.1)	-	-	-	72.5 (26-210)	-	-	-	138 (65.7)	72 (34.3)	-	-	-
Yes (N=27)	7 (25.9)	20 (74.1)	1.73	0.56	5.33	130.5 (47.5-2375)	1.00	0.92	1.50	8 (29.6)	19 (70.4)	**3.00***	**1.03**	**8.72**
Institutional care														
No (N=225)	92 (40.9)	133 (59.1)	-	-	-	77 (27-210)	-	-	-	139 (61.8)	86 (38.2)	-	-	-
Yes (N=12)	3 (25.0)	9 (75.0)	3.17	0.59	16.90	59 (41-253)	**1.80*** **	**1.27**	**2.55**	7 (58.3)	5 (41.7)	1.11	0.30	4.15
Family arrangements														
Up to 2 (N=185)	71 (38.3)	114 (61.7)	-	-	-	88 (28-210)	-	-	-	110 (54.2)	85 (45.8)	-	-	-
3 or more (N=52)	17 (32.8)	35 (67.2)	1.43	0.58	3.56	54 (21-253)	1.07	0.76	1.50	22 (42.8)	30 (57.2)	1.79	0.80	3.98
Total adversity														
0 (N=66)	28 (42.4)	38 (57.6)	-	-	-	48.5 (15-130)	-	-	-	49 (74.2)	17 (25.8)	-	-	-
1 (N=95)	35 (36.8)	60 (63.2)	1.21	0.52	2.82	84.5 (39-234)	**1.35*** **	**1.10**	**1.67**	51 (53.7)	44 (46.3)	**3.94*** **	**1.63**	**9.54**
2 or more (N=76)	32 (42.1)	44 (57.9)	0.93	0.40	2.18	87.5 (32.5-213.5)	1.26	0.97	1.64	46 (60.5)	30 (39.5)	**2.93** **	**1.27**	**6.74**

CI, confidence intervals; OR, odds ratio; IRR, incidence rate ratio.
Adjusted for duration of untreated psychosis, baseline Global Assessment of Functioning (GAF) symptom score and baseline substance use.
Bold text indicates statistically significant associations. *p<0.05, **p<0.01, ***p<0.001

Table 4. Adjusted associations between different types of childhood adversity and self-injurious behaviours during the 5-year follow-up, and substance dependence measured at the end of the 5-year follow-up

Childhood adversities	Self-injurious behaviours					Substance dependence				
	No	Yes	Adjusted [a]			No	Yes	Adjusted [b]		
	N (%)	N (%)	OR	95% CI		N (%)	N (%)	OR	95% CI	
Sexual abuse										
No (N=200)	135 (67.7)	65 (32.3)	-	-	-	132 (65.8)	68 (34.2)	-	-	-
Yes (N=37)	24 (64.3)	13 (35.7)	1.01	0.37	2.97	18 (47.7)	19 (52.3)	0.77	0.30	2.00
Physical abuse										
No (N=179)	126 (70.4)	53 (29.6)	-	-	-	119 (66.5)	60 (33.5)	-	-	-
Yes (N=58)	33 (57.4)	25 (42.6)	1.20	0.43	3.38	30 (52.1)	28 (47.9)	2.00	0.98	4.07
Parental separation										
No (N=101)	73 (72.5)	28 (27.5)	-	-	-	64 (63.2)	37 (36.8)	-	-	-
Yes (N=136)	86 (63.2)	50 (36.8)	1.13	0.47	2.71	86 (62.9)	50 (37.1)	**2.37****	**1.27**	**4.44**
Parental loss										
No (N=210)	139 (69.3)	62 (30.7)	-	-	-	132 (63.0)	78 (37.0)	-	-	-
Yes (N=27)	14 (50.2)	13 (49.8)	2.03	0.63	6.56	17 (62.8)	10 (37.2)	1.04	0.38	2.80
Institutional care										
No (N=225)	151 (67.0)	74 (33.0)	-	-	-	143 (63.5)	82 (36.5)	-	-	-
Yes (N=12)	9 (71.3)	3 (28.7)	0.54	0.10	2.93	6 (53.3)	6 (46.7)	0.90	0.20	4.14
Family arrangements										
Up to 2 (N=185)	117 (63.2)	68 (36.8)	-	-	-	106 (57.3)	79 (42.7)	-	-	-
3 or more (N=52)	42 (81.6)	10 (18.4)	0.51	0.18	1.51	28 (53.0)	24 (47.0)	1.10	0.47	2.58
Total adversity										
0 (N=66)	50 (76.0)	16 (24.0)	-	-	-	43 (64.6)	23 (35.4)	-	-	-
1 (N=95)	65 (68.5)	30 (31.5)	1.34	0.49	3.68	64 (67.3)	31 (32.7)	1.54	0.65	3.62
2 or more (N=76)	44 (57.9)	32 (42.1)	1.37	0.45	4.18	43 (56.3)	33 (43.7)	**2.41***	**1.05**	**3.33**

n, number; CI, confidence intervals; OR, odds ratio.
[a] Adjusted for baseline self-injurious behaviours and baseline substance use.
[b] Adjusted for baseline substance use.
Bold text indicates statistically significant associations. *p<0.05, **p<0.01, ***p<0.001

Supplementary Materials

Statistical Analysis

Multiple imputation. In the present study some of the variables of interest had up to 62% missing values (Supplementary Table 3); as analysis on complete cases (i.e., subset with no missing data in any of variables included for analysis) can result in biased estimates, and reduced power and precision of estimates (Moons et al., 2006; White et al., 2011; Zhao et al., 2016), we conducted multiple imputations to handle the missing data. We assumed that the missing variables were missing at random (MAR) implying that missingness did not depend on the unobserved data (Sterne et al., 2009). We imputed the missing values using multiple imputations by chained equations (MICE) (Deng et al., 2016). MICE has been shown to be a robust method for dealing with missing data across empirical and longitudinal studies (Zhao et al., 2016; He et al, 2011). In the MICE procedure a series of regression models are run whereby each variable with missing data is modelled according to its distribution (Azur et al., 2011); for example, for continuous variables, this would be a multivariable linear regression; and for binary variables, a logistic regression. The time to remission and total length of inpatient stay were over-dispersed; that is these count variables had a larger variance in comparison to their mean. To address this, we first transformed these variables to approximate normality before imputations (Sterne et al., 2009) and then to ensure interpretability of the results we transformed the imputed values back to the original scale. We conducted multiple imputations using an R MICE package (Van Buuren et al., 2011). We imputed all variables of interest such as outcomes and confounding variables. To improve the quality of the imputed missing values we additionally included auxiliary variables (Collins et al., 2001) such as age at first contact with mental health services, baseline diagnoses, ethnicity and gender. We used 25 sets of imputations (White et al., 2011); each imputed dataset was then analysed separately using standard complete-data analysis methods and the results were combined across all imputed datasets using Rubin's rule (Rubin, 1996).

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Supplementary Table 1. Baseline sociodemographic and clinical characteristics of first-presentation psychosis patients

Demographic and clinical characteristics	Total (N=237)	Any childhood adversity		Test statistics		
		No (N=66)	Yes (N=171)			
	N (%) / mean (SD)	N (%) / mean (SD)	N (%) / mean (SD)	t/x^2	df	*p*-value
Age years	N=187 29.3 (9.9)	N =59 30.1 (10.8)	N=128 29.1 (9.5)	0.65	185	0.519
Gender	N=237	N=66	N=171	0.20	1	0.654
Women	88 (27.1)	26 (39.4)	62 (36.3)			
Men	149 (62.9)	40 (60.6)	109 (63.7)			
Ethnicity	N=189	N=60	N=129	8.77	2	0.012
White (all categories)	67 (35.5)	29 (48.3)	38 (29.4)			
Black (all categories)	78 (41.3)	16 (26.7)	62 (48.1)			
Other	44 (23.3)	15 (25.0)	29 (22.5)			
Level of education	N=179	N=56	N=123	10.00	2	0.007
None	28 (15.6)	6 (10.7)	22 (17.9)			
Basic	115 (64.3)	31 (55.4)	84 (68.3)			
Higher	36 (20.1)	19 (33.9)	17 (13.8)			
Diagnosis	N=180	N=59	N=121	2.99	2	0.225
Schizophrenia spectrum disorders	128 (71.1)	39 (66.1)	89 (73.6)			
Affective psychosis	42 (23.3)	18 (30.5)	24 (19.8)			
Other psychosis	10 (5.6)	2 (3.4)	8 (6.6)			
Duration of untreated psychosis days	N=169 32.1 (116.6)	N=52 21.8 (80.9)	N=117 36.7 (129.3)	-0.76	167	0.446
GAF symptoms	N=116 47.3 (20.5)	N=37 51.8 (22.8)	N=79 45.2 (19.1)	1.61	114	0.109
GAF disability	N=116 55.5 (18.0)	N=37 59.4 (22.2)	N=79 53.7 (15.4)	1.61	114	0.110

SD, standard deviation; df, degrees of freedom, GAF, Global Assessment of Functioning scale.

Supplementary Table 2. Baseline demographic characteristics for those who were lost to follow-up compared to individuals with full follow-up data

Baseline sample characteristics	Lost to follow-up (N=65; 27.4%)	Followed up (N=172; 72.6%)	Test statistics		
	N (%) / mean (SD)	N (%) / mean (SD)	t/x^2	df	*p*-value
Age $_{years}$	N=15 40.9 (15.4)	N=172 28.4 (8.7)	4.94	185	<0.001
Gender	N=65	N=172	0.41	1	0.520
Women	22 (33.8)	66 (38.4)			
Men	43 (66.2)	106 (61.6)			
Ethnicity	N=17	N=172	1.39	2	0.499
White (all categories)	7 (41.2)	60 (34.9)			
Black (all categories)	8 (47.1)	70 (40.7)			
Other	2 (11.8)	42 (24.4)			
Living arrangements	N=14	N=166	1.16	1	0.282
Alone	4 (28.6)	72 (43.4)			
With partner or parents	10 (71.4)	94 (56.6)			
Relationship status	N=14	N=166	0.73	1	0.394
Single	9 (64.3)	124 (74.7)			
Stable relationship	5 (35.7)	42 (25.3)			
Baseline Diagnosis	N=13	N=167	1.52	2	0.468
Schizophrenia spectrum disorders	11 (84.6)	117 (70.1)			
Affective psychosis	2 (15.4)	40 (23.9)			
Other psychosis	-	10 (6.0)			
GAF symptoms	N=9 33.3 (13.5)	N=107 48.5 (20.6)	-2.16	114	0.033
GAF disability	N=9 53.3 (17.0)	N=107 55.7 (18.1)	-0.38	114	0.704

SD, standard deviation; df, degrees of freedom; GAF, Global Assessment of Functioning scale.

Supplementary Table 3. Distribution of missing and observed variables at baseline and the 5-year follow-up

Variable at baseline and follow-up	N observed	% observed	N missing	% missing
Baseline variables				
Age $_{years}$	187	78.9	50	21.1
Childhood physical abuse	237	100	0	0
Childhood sexual abuse	237	100	0	0
Death of a biological parent	234	98.7	3	1.3
Disrupted family arrangements	227	95.8	10	4.2
Duration of untreated psychosis $_{days}$	169	71.3	68	28.7
Ethnicity	189	79.8	48	20.3
GAF disability	116	49.0	121	51.1
GAF symptoms	116	49.0	121	51.1
Gender	237	100	0	0
Institutional care	237	100	0	0
Living alone	180	76.0	57	24.1
Not compliant with antipsychotic medications	154	65.0	83	35.0
Not in stable relationship	180	76.0	57	24.1
Number of childhood adversities	237	100	0	0
Parental separation	235	99.2	2	0.8
Self-harming & suicide attempts	89	37.6	148	62.5
Substance dependence	165	74.3	72	25.7
Unemployed	180	75.6	57	24.1
Variables at follow-up				
GAF Disability	169	71.3	68	28.7
GAF Symptoms	168	70.9	69	29.1
Living alone	169	71.3	68	28.7
MHA implemented at least once	172	72.6	65	27.4
Not compliant with antipsychotic medications	156	65.8	81	34.2
Not in stable relationship	169	71.3	68	28.7
One or more hospital readmissions	169	71.3	68	28.7
Recovered	160	67.5	77	32.5
Remitted	166	70.0	71	30.0
Substance dependence	173	73.0	64	23.0
Self-injurious behaviours	165	69.6	72	30.4
Time to remission $_{weeks}$	116	49.0	121	51.1
Total days spent in psychiatric hospitals	169	71.3	68	28.7
Unemployed	165	69.6	72	30.4

GAF, Global Assessment of Functioning scale; MHA, Mental Health Act (compulsory detention).

Supplementary Table 4. Distributions of the variables at baseline and the 5-year follow-up before and after multiple imputation

Variables	Distribution of the variables before MI	Distribution of the variables after MI
Baseline variables	N (%) / mean (SD) / Median (IQR)	N (%) / mean (SD) / Median (IQR)
Age $_{years}$	29.9 (9.9)	30.1 (10.3)
Black ethnicity	94 (41.8)	106 (44.7)
Childhood physical abuse	65 (22.8)	no missing values-not imputed
Childhood sexual abuse	41 (14.4)	no missing values-not imputed
Death of a biological parent	26 (11.1)	27 (11.4)
Duration of untreated psychosis $_{days}$	32.1 (116.6)	30.7 (109.7)
GAF disability	55.5 (18.0)	54.0 (18.7)
GAF symptoms	47.3 (20.5)	42.8 (19.8)
Gender, male	173 (60.7)	no missing values-not imputed
Institutional care	14 (4.9)	no missing values-not imputed
Living alone	76 (42.2)	95 (40.1)
Not compliant with antipsychotic medications	22 (14.3)	39 (16.5)
Not in stable relationship	133 (73.9)	183 (77.2)
Other ethnicity	53 (23.6)	50 (34.2)
Parental separation	136 (57.4)	137 (57.8)
Self-harming & suicide attempts	17 (19.1)	101 (42.6)
Substance dependence	91 (51.7)	130 (54.9)
Three or more family arrangements	48 (21.2)	53 (22.4)
Two or more childhood adversities	76 (32.1)	no missing values-not imputed
Unemployed	120 (66.7)	155 (65.4)
White ethnicity	78 (34.7)	81 (34.2)
Variables at Follow up		
GAF disability	66.0 (17.3)	65.5 (16.9)
GAF Symptoms	61.6 (21.1)	63.3 (20.8)
Living alone	99 (58.6)	129 (54.4)
MHA implemented at least once	73 (42.4)	115 (48.5)
Not compliant with antipsychotic medications	44 (28.2)	86 (36.2)
Not in stable relationship	123 (72.8)	141 (59.4)
One or more hospital readmissions	127 (71.0)	149 (62.9)
Recovered	73 (45.6)	107 (45.1)
Remitted at least once	105 (63.3)	129 (54.4)
Substance dependence	63 (36.4)	88 (37.1)
Self-injurious behaviours	43 (26.1)	78 (32.9)
Time to remission $_{weeks}$	12 (4.5-20)	12 (8-20)
Total days spent in psychiatric hospitals	87.5 (28-226)	77 (28-221)
Unemployed	133 (80.6)	163 (68.8)

GAF, Global Assessment of Functioning scale; IQR, inter-quartile range; MHA, Mental Health Act (compulsory detention); MI, multiple imputations; SD, standard deviation.

Supplementary Table 5. Adjusted associations between different types of childhood adversity and social outcomes at the 5-year follow-up

Childhood adversities	Living alone					No stable relationship					Unemployed				
	No	Yes	Adjusted [a]			No	Yes	Adjusted [b]			No	Yes	Adjusted [c]		
	N (%)	N (%)	OR	95% CI		N (%)	N (%)	OR	95% CI		N (%)	N (%)	OR	95% CI	
Sexual abuse															
No (N=200)	92 (46.1)	108 (53.9)	-	-	-	79 (39.4)	121 (60.6)	-	-	-	61 (30.5)	139 (69.5)	-	-	-
Yes (N=37)	16 (42.7)	21 (57.3)	0.85	0.36	2.01	17 (47.0)	20 (53.0)	0.46	0.18	1.21	13 (33.9)	24 (66.1)	0.93	0.40	2.17
Physical abuse															
No (N=179)	84 (46.9)	95 (53.1)	-	-	-	72 (40.3)	107 (59.7)	-	-	-	55 (30.7)	124 (69.3)	-	-	-
Yes (N=58)	24 (41.3)	34 (58.1)	1.27	0.62	2.59	24 (41.6)	34 (58.4)	0.92	0.38	2.24	19 (32.2)	39 (67.8)	1.01	0.43	2.40
Parental separation															
No (N=101)	57 (56.7)	44 (43.3)	-	-	-	46 (45.1)	55 (54.9)	-	-	-	27 (27.2)	74 (72.8)	-	-	-
Yes (N=136)	51 (37.3)	85 (62.7)	1.86	0.95	3.67	51 (37.2)	85 (62.8)	1.79	0.82	3.90	46 (33.9)	90 (66.1)	0.65	0.31	1.35
Parental loss															
No (N=210)	98 (46.5)	112 (53.5)	-	-	-	87 (41.2)	123 (58.8)	-	-	-	65 (30.9)	145 (69.1)	-	-	-
Yes (N=27)	10 (37.9)	17 (62.1)	1.23	0.42	3.60	10 (35.7)	17 (64.3)	0.60	0.20	1.84	9 (32.1)	18 (67.9)	1.08	0.40	2.92
Institutional care															
No (N=225)	103 (54.9)	122 (54.1)	-	-	-	92 (41.0)	133 (59.0)	-	-	-	71 (31.5)	154 (68.5)	-	-	-
Yes (N=12)	5 (39.6)	7 (60.4)	0.70	0.18	2.77	4 (32.9)	8 (67.1)	0.83	0.18	3.81	3 (22.9)	9 (77.1)	1.75	0.37	8.43
Family arrangements															
Up to 2 (N=185)	86 (46.4)	99 (53.6)	-	-	-	76 (41.2)	109 (58.8)	-	-	-	57 (30.6)	128 (69.4)	-	-	-
3 or more (N=52)	22 (42.5)	30 (7.5)	1.08	0.46	2.54	20 (38.5)	32 (61.5)	1.31	0.48	3.53	17 (32.5)	35 (67.5)	0.98	0.38	2.50
Total adversity															
0 (N=66)	38 (57.6)	28 (42.4)	-	-	-	30 (45.0)	36 (55.0)	-	-	-	15 (23.3)	51 (76.7)	-	-	-
1 (N=95)	43 (45.3)	52 (54.7)	1.26	0.55	2.91	36 (37.5)	59 (62.5)	1.94	0.76	5.00	35 (36.7)	60 (63.3)	0.45	0.17	1.18
2 or more (N=76)	28 (36.8)	48 (63.2)	1.58	0.71	3.52	31 (40.6)	45 (59.4)	0.95	0.37	2.44	23 (30.7)	53 (69.3)	0.74	0.28	1.94

CI, confidence intervals; OR, odds ratio.
[a] Adjusted for baseline living arrangements and baseline substance use.
[b] Adjusted for baseline relationship status and baseline substance use.
[c] Adjusted for baseline employment status and baseline substance use.