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Childhood interpersonal trauma and premorbid social adjustment as predictors of symptom remission in first episode psychosis

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ABSTRACT

Background: Childhood interpersonal trauma (CIT) and premorbid adjustment are both associated with poor outcome in psychosis. In this study we investigate the relative impact of CIT and premorbid adjustment on symptom remission in first episode psychosis (FEP) over two years.
Method: A total of 232 participants with FEP were recruited through the early detection program of the The early detection and Intervention in Psychosis (TIPS)-2 study and followed up after two years. Symptom remission was according to consensus criteria. CIT was assessed with the semi-structured interview Freyd Goldberg Brief Betrayal Trauma Survey, and premorbid adjustment with the Premorbid Adjustment Scale. Generalized estimating equations and multivariate models were used to analyze the associations between remission, symptom levels over time, CIT and premorbid adjustment; and a path analysis of mediation effects of CIT through premorbid adjustment on remission.
Results: In this sample with 57% males and a mean age of 26.6 years (SD 10.2), a third of participants had experienced CIT. The participants with CIT had poorer premorbid adjustment compared to those without. Statistical analyses found independent effects of CIT and an interaction effect of CIT with premorbid adjustment on remission after two years, suggesting that CIT moderates the effect of premorbid adjustment. However contrary to expectations, premorbid adjustment did not mediate the effect of CIT.
Conclusion: Our findings indicate a complex interplay between effects of interpersonal trauma and premorbid social adjustment on remission in psychosis. CIT appeared to moderate the effect of premorbid adjustment such that individuals with CIT and who had poor social functioning in childhood are at greater risk of non-remission. Findings indicate that better premorbid social relations could provide a buffer for the effects of trauma on symptom course.

1. Introduction

Trauma in childhood is associated with adult mental health, and is prevalent in mood- and anxiety disorders, personality disorders, as well as schizophrenia and psychotic disorders (Carr et al., 2013; Misiak et al., 2017). There are indications that prenatal and early-life stressors primes the stress-response system (HPA axis) (Kuhlman et al., 2018) and the immune system both in the CNS (Calcia et al., 2016) and peripherally (Khandaker et al., 2014) rendering it more vulnerable for later stressors and subsequent mental illness. Studies show that 33% (16% - 47%) of incidence of psychosis may be attributable to trauma (Varese et al., 2012). Childhood abuse and physical and emotional neglect appear particularly potent risk factors (Arseneault et al., 2011; Fisher et al., 2010). In the case of abuse, trauma involves a perpetrator while in the case of neglect, it involves a caregiver. Hence, they can be referred to as childhood *interpersonal* trauma (CIT). The estimated rates of different types of CIT in psychosis are 26% for sexual, 39% for physical and 34% for emotional abuse (Bonoldi et al., 2013). Intent to harm appears to be a key component in the association with psychotic symptoms (van Nierop et al., 2014), and research shows effects on symptom severity (Bailey et al., 2018; Kelleher et al., 2013; Read et al., 2005; Sommer et al., 2010). However, there is still a lack of research on the effects of CIT on course and outcome, including symptom remission.

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Symptom remission refers to a state of clinically significant reduction in active symptom (Andreasen et al., 2005). Its rate over a mean follow-up of 5.5 years in first episode psychosis (FEP) was 58% in a meta-analysis of 60 studies (Lally et al., 2017). Significant predictors included a shorter duration of untreated psychosis (DUP), female gender, having completed tertiary education, and lower baseline symptom intensity (Verma et al., 2012). Further, less time in active psychosis (Hegelstad et al., 2012) and a decrease of or abstinence from substance use are positively associated rates of remission (Weibell et al., 2013), while suicide attempts and non-adherence to medication show the opposite (Conus et al., 2017).

Studies on the association between CIT and outcomes have found associations with poorer treatment response in first episode schizophrenia (Hassan and De Luca, 2015; Misiak and Frydecka, 2016) and psychosis (Thomas et al., 2019), and higher rates of persisting psychotic symptoms (Trotta et al., 2016). A five year follow up of FEP found that any exposure to childhood adversity was associated with lower likelihood of remission (Ajnakina et al., 2018). Still a recent systematic review concludes that the effects of childhood trauma on the prognosis and evolution of FEP is remains somewhat unclear (Vila-Badia et al., 2021). Not only does the field need more outcome studies, it is relevant to examine further the mechanisms driving the association between CIT and outcomes.

One possible mechanism may operate through compromised social robustness and association with premorbid adjustment. Studies indicate that CIT may leave persons who later develop psychosis less resilient to social stressors (Lataster et al., 2012), resulting in poorer social functioning (Hjelseng et al., 2020; Stain et al., 2014). Childhood trauma has been found to have a general negative association with both social and academic premorbid adjustment (Kilian et al., 2017), adaptive functioning across interpersonal, emotional (Gerson and Rappaport, 2013), cognitive (Aas et al., 2011; Aas et al., 2012) and social domains (Stain et al., 2014) and self-esteem, social competence, peer relationships and school performance (Pacheco et al., 2014). Poor premorbid adjustment also predicts a lower likelihood of remission (Chang et al., 2013; Diaz-Caneja et al., 2015), poorer treatment response to long-acting anti-psychotics (Rabinowitz et al., 2011) and increased risk of relapse after initial remission in FEP (Gleeson et al., 2005).

There are thus indications of an association between CIT and premorbid adjustment in FEP, and CIT and premorbid adjustment on outcome. How they may interact remains unclear. The aim of this study is first, to establish the rate of CIT in an epidemiological sample of FEP. Second, to investigate the associations of CIT and premorbid adjustment with course and prognosis in terms of symptoms and symptomatic remission across two years of follow-up. We hypothesize that CIT and poor premorbid adjustment predict poorer chances of remission. Third, to investigate whether CIT affects chances of remission through a mediating effect of premorbid adjustment.

2. Materials and method

2.1. Sample

Participants ($N = 232$) were recruited from the early Treatment and Intervention in Psychosis 2 study (TIPS2) (Joa et al., 2008). TIPS2 is a naturalistic longitudinal cohort of First Episode Psychosis (FEP) study conducted in a mental health care sector (population 267,000 in 2010) in Norway. Inclusion for the study presented here occurred between 2002 and 2011. Participants were recruited through a low-threshold early detection team reachable by telephone by all members of the public both within and outside health care, no referral needed, and with the help of intensive awareness and information campaigns. Participants received treatment according to a two-year standard treatment protocol that included antipsychotic medication, supportive psychotherapy, and multifamily psycho-education. For a more detailed description please consult Hegelstad et al. (2012).

Inclusion criteria included: Living in the catchment area, aged 15–65 years; meeting Diagnostic and Statistical Manual for Mental Disorders, Fourth Edition (DSM-IV) (APA, 1994) criteria for schizophrenia, schizophreniform disorder, schizoaffective disorder, brief psychotic episode, delusional disorder, affective psychosis with mood-congruent delusions, or psychotic disorder not otherwise specified; being actively psychotic, as defined by the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987) score of four or more on at least one of the following PANSS items: P1 (delusions), P3 (hallucinations), P5 (grandiose thinking), P6 (suspiciousness), and A9 (unusual thought content); not previously receiving adequate treatment for psychosis (defined as antipsychotic medication of 3.5 haloperidol equivalents for 12 weeks or until remission of the psychotic symptoms); no neurological or endocrine disorders with relation to psychosis; no contraindications to antipsychotic medication; understands and speaks a Scandinavian language; IQ over 70 (Wechsler Adult Intelligence Scale, Third edition (WAIS-III); subtests Vocabulary, Similarities, Digit Span, Block Design) (Wechsler, 1997); and willing and able to give informed consent (Joa et al., 2008).

Of the 485 eligible participants, 70 were excluded (moved out of the region; low IQ or poor language skills; outside age range of study; lost for contact), and 165 declined participation. Of the remaining 250, 18 participants lacked trauma data, leaving a sample at inclusion of 232. There were 163 participants with complete data sets at the two-year follow-up; this constituted the sample for the statistical analyses. Details of number of participants assessed at each time point are provided in Fig. 1. There were no significant differences for age, gender, diagnostic category, alcohol or substance abuse, premorbid adjustment, symptom levels or reported CIT between those who were lost to follow-up or had missing data, and those who completed the full study (Supplementary Table A). However, those who completed the one-year but not the two-year follow-up had lower levels of negative symptoms at inclusion ($t = -4.1$; df: 115.402; $p < 0.001$; equal variances not assumed $F = 9.9$; $p < 0.02$). Further, regarding those who dropped out of the study versus those who continued, we do not have treatment data for the full follow-up period, as they discontinued their follow-up with us. However, for treatment during the first year, and according to available data, there were no differences between dropouts (participants who dropped out before the two-year follow-up) and completers (the 163 participants who completed) on weeks in psychotherapy (42 vs 47 weeks; df 202; $t = 1.2$; $p < 0.26$); weeks using anti-psychotic medication (33 vs 29 weeks; df 192; $t = -1.1$; $p < 0.25$); or weeks attending multi-family psycho-educational groups (6 vs 8 weeks; df 160; $t = 0.9$; $p < 0.35$). All participants assessed at the two-year follow-up and included in longitudinal analyses had received two years of treatment.

TIPS-2 was approved by the Regional Committee for Medical Research Ethics Health Region West, Norway (015.03), registration number 2011/1198/REK vest. All participants provided written informed consent.

2.2. Treatment

All participants were offered treatment according to protocol first introduced in the original TIPS-study: psychotherapy at least bi-weekly; family psycho-educational groups bi-weekly; and anti-psychotic medication according to algorithm: second-generation anti-psychotic at optimal dosage 4–6 weeks; if inadequate response, switch to other second-generation anti-psychotic at optimal dose; if inadequate response, switch to Clozapine. However, none of the patients were in fact prescribed Clozapine, and this is a focus of further study (Drosos et al., 2020).

2.3. Assessments

Participants were assessed baseline (start of treatment), three months, one year, and two years. Duration of Untreated Psychosis (DUP) was assessed during clinical interview and using all available information including patient medical files and information from family members. DSM-IV diagnosis was determined by the SCID-I Interview (First et al., 2007). Reliability of assessments ranged from moderate to very good with an interrater reliability of SCID diagnosis of $K = 0.9$

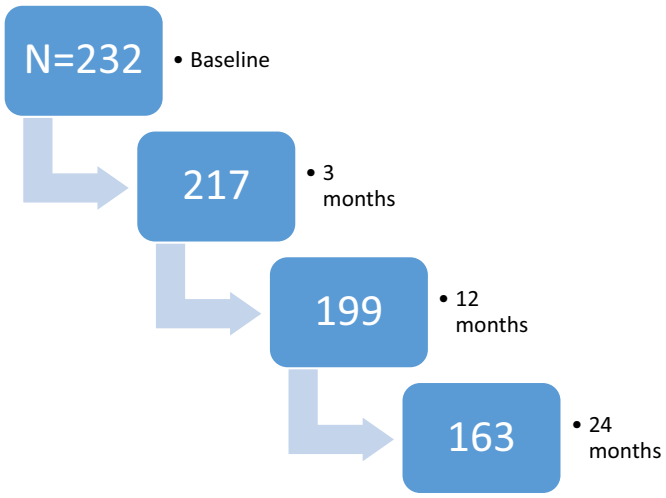

Fig. 1. Number of participants assessed per time point.

(Weibell et al., 2013). SCID interviews were conducted by a senior clinical consultant psychologist, psychologists and one specialized psychiatric nurse (all with PhDs) and a psychiatrist (PhD student).

Substance and alcohol use were rated with the Clinician Alcohol and Drug Use scales (Drake et al., 1990), with scores dichotomized into abuse/no abuse at a score of 3 or higher on the alcohol use scale and 2 or higher on the substance abuse scale.

Symptoms were assessed using the Positive and Negative Syndrome Scale (PANSS) (Kay et al., 1987) using the Emsley five-component model (Emsley et al., 2003), except for the baseline characteristics, where the clinical subscales (positive, negative and general) are reported.

Treatment was operationalized as weeks on anti-psychotic medication as prescribed, weeks in psychotherapy, and weeks in psychoeducational multi-family groups.

2.3.1. Remission

Symptom remission was defined in accordance with standardized criteria (Andreasen et al., 2005). Remission was assessed at three months (for this time point symptoms only, minus the six months criterion), and the one- and two year follow-up time points.

2.3.2. Childhood interpersonal trauma

To assess CIT, the semi-structured interview Brief Betrayal Trauma Survey (Goldberg and Freyd, 2003) was conducted by trained psychiatric nurses. The interview is previously shown to have good construct and test-retest reliability (Goldberg and Freyd, 2006). It covers categories of specific traumatic events before and after the age of 18 years including non-interpersonal trauma (i.e. witnessing or being in an accident, fire, natural disaster) or interpersonal trauma (i.e. violent assault, domestic violence, sexual abuse, either as a direct victim or as a close witness) by someone close, by someone non-close. Close persons are defined as people sharing the same household, first-degree relatives, family, friends, or others with whom the participant had a personal relationship (teachers, coaches, etc.). The frequency of exposure to trauma is also rated. For the purpose of this study, CIT before the age of 18 years was chosen because this age marks the transition from child and adolescent to adult psychiatry, and in most Western cultures, "adulthood" is used as an age category starting at this age.

2.3.3. Premorbid functioning

Premorbid functioning was measured by the Premorbid Adjustment Scale (PAS) (Cannon-Spoor et al., 1982), that assesses school adaptation and socialization over different time periods from childhood to adulthood. Scores range from 1 to 6 with higher scores indicating more impairment, described as worse premorbid functioning in analyses. All available data were used to obtain scores; interviews and information from parents or carers if reported in patient files. The PAS differentiates between three time periods: childhood up to 12 years; early adolescence 12–16 and late adolescence 16–19 years. To avoid a possible overlap between poor adjustment into the time period after illness onset, the latest possible time period for premorbid adjustment was set as early adolescence (up to 16 years).

2.4. Statistical analyses

Analyses were conducted using the Statistical Package for Social Sciences (SPSS) for Macintosh, versions 21 and 22 (IBM and Corp, 2012, 2013). For comparisons of categorical data (remission status, gender, CIT, diagnosis), binomial tests of proportion or chi square statistics were conducted. Odds ratios and 95% confidence intervals were calculated when examining the association between categorical data. For continuous variables, independent *t*-tests were performed for normally distributed variables, and Mann-Whitney tests for those without normal distribution (DUP and premorbid adjustment), two-sided tests with $\alpha = 0.05$. Generalized Estimating Equations (Diggle and Kenward, 1994; Liang and Zeger, 1986) were used to estimate the effect of CIT and premorbid adjustment on remission over the follow-up period (two years; assessed at three, twelve and 24 months). This technique compensates for correlated longitudinal data and enables the analysis of the complete available data even when subjects have missing data at one or more measurement points (Hanley et al., 2003). The GEE analysis was set up as a binary logistic model, with a robust estimator and an unstructured covariance matrix. Predictors were chosen on the basis of both a priori hypotheses, and observed differences between the remission and non-remission groups at baseline: CIT and premorbid social adjustment (hypothesized), PANSS symptom scores (observed). Age, gender and diagnosis (categorized as schizophrenia spectrum; affective mood incongruent psychosis; or brief, unspecified, substance induced or delusional psychosis), as well as interactions between CIT and premorbid adjustment, were included as covariates. An inverse probability-weighted method was used to account for dropout not missing completely at random (MCAR). Multinomial (ordinal) was specified as the distribution, and Cumulative logit as the link function. The Wald statistic was used for analyzing effects. Model fit was estimated using the Corrected Quasi Likelihood under Independence Model Criterion (QICC). It compares models with same working correlation matrix and quasi-likelihood form but different mean specifications (Pan, 2001).

Mediation analysis was performed to test whether CIT affected remission rates through mediation of premorbid social adjustment using the following procedure: We conducted a path analysis on the basis of maximum likelihood estimation by using the PROCESS macro added to SPSS, using bootstrapping to estimate the robustness of the mediation effects (Hayes, 2012). Because the definition of CIT included trauma at all ages before 18, we used adolescent and not childhood social adjustment as a mediator in order to minimize the risk that poor premorbid social adjustment preceded childhood trauma. The mediating effect was quantified as the product of its constituent paths. Inferences about indirect effects were based on tests of the product after bootstrapping (simulated resampling 3 1000 obtained 1000 estimates of the indirect [mediation] effect, with the distribution approaching the sampling distribution in an original population).

For all hypothesis testing, the threshold for statistical significance was set at $\alpha = 0.05$.

3. Results

Sample characteristics at baseline are outlined in Table 1. The sample consisted of 131 (57%) males and 99 (43%) females. The median age was 26.6 years and 23% of the participants were 18 years or younger. Thirty-two percent of participants ($N = 74$) reported one or more experiences of CIT. Further, 15 (6.5%) reported victimization both by close and non-

Table 1
Baseline characteristics of sample.

Total sample	N = 232	
	Mean	SD
Age at baseline	26.6	10.2
PANSS sum score		
Positive symptoms*	18.4	5.2
Negative symptoms	14.6	6.2
General symptoms**	32.0	7.0
Global assessment of functioning§		
GAF symptom score	31	7
GAF function score	40	10
	N	%
Childhood interpersonal trauma	74	32
Male gender	131	57
Female gender	99	43
Baseline diagnosis		
Schizophrenia spectrum	90	39
Affective psychosis[a]	49	21
Brief psychosis, psychosis NOS, substance induced psychosis, or delusional disorder	92	40
Alcohol and/or substance abuse	53	23
	Median (weeks)	Range
Duration of untreated psychosis	15	0–2080
Premorbid adjustment (N = 216)		
Childhood social	0.5	0–6
Childhood academic	1.5	0–6
Early adolescence social	1.0	0–5
Early adolescence academic	2.25	0–6

[a] Mood incongruent psychosis.
* Minimum score 7; maximum score 49.
** Minimum score 16; maximum score 112.
§ Score < 50 indicative of severe symptoms, moderate to major impairment.

close persons, while the remaining 59 (25.6%) only reported having experienced close interpersonal trauma. Twenty-four percent of the total sample, equaling 74% of those having experienced CIT, reported multiple instances of trauma. Childhood sexual assault, sexual violence or sexual abuse was reported by 10 (4.3%) participants, of whom seven were females. Regarding CIT all types, females had been victimized slightly more often than males, however there was no statistical difference between the genders (34.3% vs 29.8%; chi square 0.54; $p < 0.46$).

Participants reporting any type of CIT had worse premorbid social adjustment both in childhood ($Z = -2.3$; $p < 0.02$), and early adolescence ($Z = -2.1$; $p < 0.04$) but there was no difference in premorbid academic functioning. There were no differences in diagnoses or symptom levels in those with- and without CIT, except for higher levels of depressive symptoms in those with CIT ($t = -1.9$; $p < 0.05$; df 199) at baseline. There were no differences in any symptom levels at the one or two year follow-up.

Table 2 details characteristics across remission status at the two year follow-up. There was complete data on CIT, premorbid adjustment and remission for 163 participants. Fifty-four percent of these participants fulfilled remission criteria. There were no diagnostic differences in rates of remission. Non-remitters had significantly higher symptom levels at baseline, but reported neither higher rates of CIT, nor poorer premorbid functioning. There was no difference between those who were not in remission and those who were at two years in mean number of weeks in psychotherapy (year 1: 41 vs 44 weeks; $t = -1.03$; df 149; $p < 0.31$ and year 2: 41 vs 41 weeks; $t = 0.08$; df 135; $p < 0.94$). There was also no difference in mean number of weeks taking medications as prescribed (year 1: 33 vs 33 weeks; df 139; $t = 0.01$; $p < 0.99$ and year 2: 37 vs 34 weeks; df 131; $t = 0.80$; $p < 0.46$). There was however a statistically significant difference in mean number of weeks attending multi-family psycho-educational groups during the first year (2.2 vs 8.6 weeks; df 112; $t = -2.4$; $p < 0.02$), participants with CIT attending less, but not the second year (17 vs 22 weeks; df 68; $t = -0.8$; $p < 0.43$).

The GEE basic model (QICC 225.2) showed that a younger age, not having experienced CIT, better premorbid social adjustment, and having less severe positive and depressive symptoms at baseline were significantly associated with remission at two year follow-up. The GEE model with the better fit (QICC 220.8) included a significant interaction effect

Table 2
Baseline characteristics across remission at two years.

N = 163 (participants with two-year data on remission)	Not in remission		In remission		Analysis		p
	75 (46%)		88 (54%)				
	N	%	N	%	OR	95% confidence interval	
Male gender	44	48.4	47	51.6	0.9	0.7–1.2	
Female gender	29	43.3	38	56.7	1.2	0.7–2.3	0.63
Childhood interpersonal trauma[a]							
No	47	44.3	59	55.7			
Yes	24	47.1	27	52.9	0.9	0.5–1.7	0.86
Diagnostic category							
Schizophrenia spectrum	34	53.1	30	46.9	0.6	0.6–1.1	0.15
Affective psychosis[b]	18	48.6	19	51.4	1.2	0.6–2.4	0.71
Brief psychosis, psychosis NOS, substance induced psychosis, or delusional disorder	22	36.1	39	63.9	1.9	0.9–3.6	0.07
Alcohol or substance abuse	24	55.8	19	44.2	0.6	0.3–1.1	0.11
	Mean	SD	Mean	SD	t	df	
Age	27.4	10.8	25.5	8.8	1.2	156	0.24
PANSS component scores							
Positive	15.1	5.3	12.3	5.1	3.3	146	0.001
Negative	16.1	5.2	12.7	5.8	3.7	145	0.000
Cognitive	10.5	3.8	9.5	3.9	1.5	145	0.128
Depressive	11.0	3.7	10.0	3.8	1.6	145	0.120
Excited	5.5	2.1	4.5	1.2	3.6	145	0.000
	Median	Range	Median	Range	U	Z	
Premorbid adjustment							
Childhood social	0	6	0.8	0–6	2353.0	−0.5	0.60
Childhood academic	1.5	6	1.5	0–4.5	2463.0	−0,3	0.98
Early adolescence social	1	5.3	1	0–4	2435.5	−0.1	0.89
Early adolescence academic	2	6	2.5	0–5	2269.0	−0.84	0.40
Duration of untreated psychosis	20.0	0–2080	14.0	0–520	2252.5	−1.3	0.20

[a] Missing trauma data: N = 4 of non-remitted and N = 3 of remitted participants.
[b] Mood incongruent psychosis.

Table 3
GEE model of remission over two years[a].

Predictor	Wald statistic	B	95% Wald confidence interval		Df	p
(Intercept)	280.04	10.52	9.29	11.76	1	0.000
Time	2.42	0.18	−0.43	0.79	1	0.120
Gender	2.42	0.33	−0.85	0.73	1	0.120
Diagnosis	2.56	−0.26	−0.58	0.06	1	0.111
Childhood interpersonal trauma	9.69	0.51	0.19	0.83	1	**0.002**
Childhood social premorbid adjustment	29.10	0.53	0.33	0.71	1	**0.000**
Adolescence social premorbid adjustment	2.43	−0.18	−0.41	0.05	1	0.119
Childhood social adjustment*childhood interpersonal trauma (interaction)	46.13	−1.03	−1.32	−0.73		**0.000**
Positive symptoms[b]	79.16	−0.64	−0.78	0.50	1	**0.000**
Negative symptoms	2.04	−0.41	−0.97	0.15	1	0.153
Depressive symptoms	222.90	−1.56	−0.18	−0.13	1	**0.000**
Cognitive symptoms	0.31	−0.07	−0.29	0.16	1	0.576
Excitative symptoms	1.81	0.38	−0.17	0.09	1	0.178
Age	7.97	−0.01	−0.21	−0.03	1	**0.007**

Bold indicates level og statistical significance.
[a] Dependent variable: remission (0/1), measured at three, twelve and 24 months. Computed using the full log quasi-likelihood function. Corrected Quasi Likelihood under Independence Model Criterion (QICC): 220.81.
[b] Baseline symptom levels.

between CIT and childhood premorbid social adjustment on symptom remission: The effect of CIT moderated the effect of poorer premorbid adjustment on remission such that the negative effect of poor premorbid adjustment was stronger in individuals with CIT (Table 3) (Fig. 2). Follow-up multivariate analyses were conducted as repeated measures general linear model with symptom levels over time as dependent variables and treatment (medication, psychotherapy, multi-family groups), childhood premorbid adjustment and CIT as predictors, and with age and gender also in the model as independents. In this model, CIT (absence) ($F = 3.94$), female gender ($F = 6.23$), time ($F = 4.09$), weeks using medication ($F = 8.8$) and weeks attending multi-family psychoeducational groups ($F = 2.69$) predicted declining symptom levels (all df's = 5; p values <0.05). The univariate analysis showed was a stronger positive association between family group attendance and lower positive symptom levels in participants with CIT (interaction effect $F = 17.69$; $p < 0.001$).

A mediation analysis estimated a direct effect of CIT on adolescent premorbid social adjustment (coefficient 0.47; $p < 0.001$), as well as on remission (coefficient −0.49; $p < 0.02$) (Fig. 3). However, premorbid adjustment was not a statistically significant mediator of the effect of CIT on symptom remission coefficient 0.008 ($p < 0.072$) (Supplementary Table B). The procedure was repeated with DUP as a mediator, as DUP can be hypothesized to overlap with premorbid social adjustment in adolescence. This analysis did also not indicate any significant mediation.

4. Discussion

The main findings of this study were first, that a third of participants had experienced CIT, and a quarter reported multiple CIT and that it was associated with poorer premorbid social adjustment. Second, in GEE analyses, both CIT and premorbid adjustment independently, and in interaction with one another, predicted remission at two years. Third, the effect of CIT appeared to moderate, but not to mediate, the effect of premorbid functioning on remission.

Our finding of a 32% rate of reported CIT in FEP is consistent with a meta-analyses of 23 studies of rates of CIT in all psychotic disorders (Bonoldi et al., 2013), and with a study of FEP (14–40% dependent on type of trauma) (Üçok and Bıkmaz, 2007). A previous Norwegian study of a mixed psychosis sample found a higher prevalence (Larsson et al., 2013) with up to 85% of patients. That study however used a low to moderate cut-off and included multi-episode individuals. Since CIT may increase the risk of severe outcomes multi-episode samples are likely enriched for trauma exposure.

Poor premorbid social adjustment was a prognostic factor for poor outcome in all participants, but this effect was stronger in those with CIT. However, the precise mechanisms involved in the influence of premorbid adjustment and CIT on remission are not fully understood,

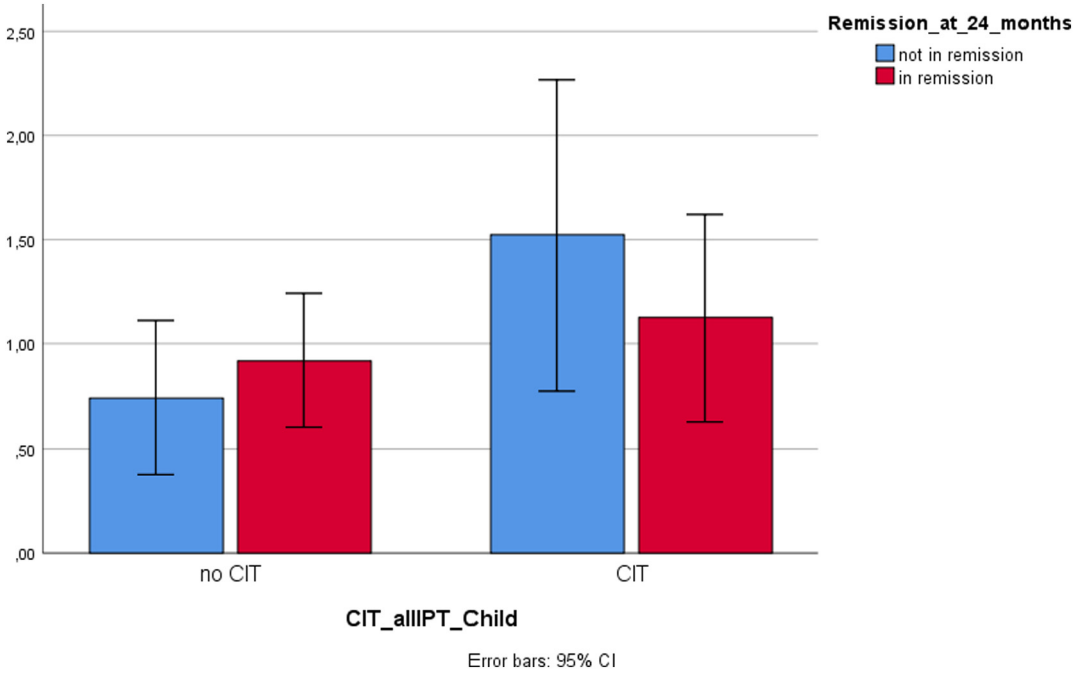

Fig. 2. Illustration of interaction effect between CIT and premorbid social adjustment on rates of remission after two years. Note: higher score on the Y-axis means worse premorbid adjustment. X-axis: CIT yes/no. Y-axis: premorbid adjustment (PAS) mean scores (as used in the GEE analysis); higher is worse. Lighter bars: not being in remission after two years; darker bars: being in remission after two years. 95% error bars indicated.

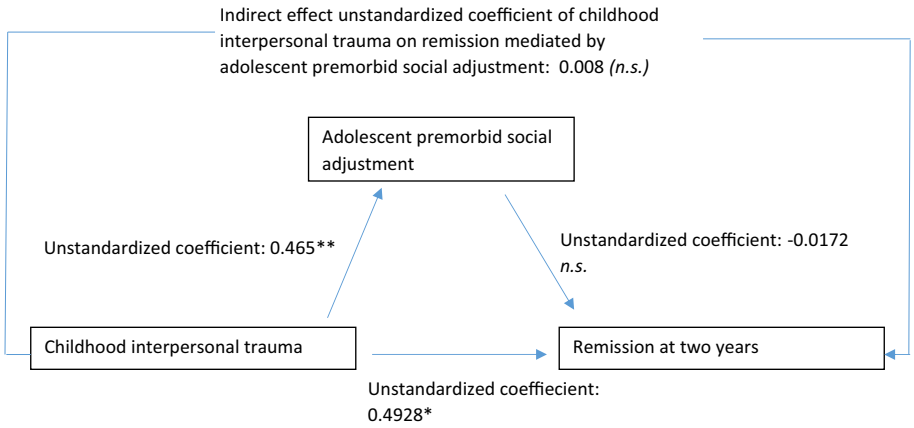

Fig. 3. Mediation model diagram with unstandardized coefficients of direct and indirect effects.

and we failed to demonstrate any clear mediating association. Trauelsen et al. (2016) found that lack of peer support predicted psychosis after adjusting for childhood adversities. They concluded that those with more adversities may need extra assistance in increasing and maintaining supportive networks. However, the fact that the definition of CIT was trauma up to and including 18 years, and did not specify exact age, means we cannot rule out the possibility that difficulties in premorbid social adjustment preceded trauma. It could be speculated that poorer premorbid adjustment may create added vulnerability to being victimized through interpersonal trauma, such that causality on a group level could operate both ways. This might contribute to an explanation why analyses did not reveal any mediating effect of this factor between trauma and poorer chances of remission.

Still, regardless of causality and chronology, interventions aimed at social premorbid adjustment could be clinically useful and testable, and perhaps reduce the risk of adverse outcomes. For youth exposed to traumatic stress and showing poor social adjustment one could imagine a targeted intervention, such as combined social skill training and trauma therapy. For example, supported socialization has shown positive effects in certain vulnerable populations (Davidson et al., 2004). Interestingly, participants with CIT appeared to benefit more from the multi-famliy groups. We suggest that more focus on psychosocial interventions in the relational realm when dealing with psychosis and interpersonal trauma is warranted.

Another possibility concerns poor social adjustment in childhood as a marker of susceptibility to psychosis, and CIT as a trigger for symptom development or exacerbation. Fusar-Poli et al. (2020) in a recent umbrella review of 42 meta-analyses found impairments in social and educational adaptation in Clinical High Risk for Psychosis (CHR-P). Those with a history of trauma in our study may have been less likely to overcome childhood difficulties in social functioning. Indeed earlier studies have demonstrated poorer social functioning in adulthood in persons with psychosis who have experienced trauma (Hjelseng et al., 2020; Stain et al., 2014), potentially through higher levels of depression (Palmier-Claus et al., 2016), which was also found in this sample.

In conclusion, our findings that CIT and premorbid social adjustment both appear to have consequences for chances of remission in psychosis are in line with previous research. Their temporal and causal relation are still not fully clear, but findings indicate better premorbid social relations could provide a buffer for the effects of trauma on symptom course. Clinical as well as research work could benefit from improving focus on significant social relations and their effect on outcome.

4.1. Strengths and limitations

The two-year longitudinal design recruiting from one catchment area, using a standardized definition of remission, provides good and valid data on stable remission. An additional concerns recruitment from an early detection program within a specialized health service which provides equal service to all patients.

One limitation concerns retrospective assessment of childhood trauma. This does not yield the exact timing, frequency and severity of abuse. Trauma experienced at a very young age may not have been reported, leading to a possible underestimation, (Murphy et al., 2010; Roy and Perry, 2004). Further, because of limited sample size, analyzing type, frequency and age at CIT was not feasible.

Premorbid adjustment is also reported retrospectively, and prone to bias. However, it was rated using all available data, in many cases patient file reports of information from parents or carers, limiting the risk somewhat.

The definition of CIT was data up to and including 18 years. There are probably cases where the premorbid social adjustment measure preceded the trauma. Unfortunately, our data do not yield information about age at trauma and hence, this possibility could not be ruled out. Future studies would be strengthened by including exact age of trauma experiences.

Finally, a drop-out rate of 30% may threaten generalizability, however, there were no differences in baseline characteristics or treatment.

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Declaration of competing interest

None.

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