ASSOCIATION OF CHILDHOOD TRAUMA AND PERSONALITY DIMENSIONS WITH THE DURATION OF UNTREATED PSYCHOSIS

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SUMMARY

Background: *Understanding causes and consequences of untreated psychosis is important since the duration of psychosis prior to the treatment initiation is a potentially modifiable prognostic factor, and comprehending its impact on outcome may enhance therapeutic strategies.*

Subjects and methods: *This cross-sectional study was performed on a consecutive sample of 105 participants, 47 first episode participants and 58 with multiple episodes. Primary outcome was the duration of untreated psychosis (DUP). We observed three independent variables: childhood trauma measured by Childhood Trauma Questionnaire, psychotic symptoms measured by Positive and Negative Syndrome Scale (PANSS) and personality dimensions measured by the Inventory of Personality Organization (IPO) (primitive defences, identity diffusion and reality testing). All outcomes were observed among total sample and subgroups of first and multiple episode participants.*

Results: *Median DUP in total sample was 60.0 (IQR 14.5-285) days. In the subgroup of multiple episode participants, an association between multiple childhood trauma and shorter DUP was found, while no association between DUP and the existence of any specific trauma was found in neither subgroup, or in total sample. With regards to personality dimensions, in the first episode subgroup, significant positive correlations between DUP and primitive defences and reality testing subscales were found, while no correlations in total sample, nor in multiple episode subgroup were observed. Positive symptoms and general psychopathology correlated positively with DUP in total sample, and in first episode subgroup, while in multiple episodes subgroup only a positive correlation with positive symptoms was found. Total PANSS score positively correlated with the DUP only in the first episode subgroup.*

Conclusions: *DUP was not associated with specific type of childhood trauma. First episode participants with longer DUP had predominant primitive defences and severely decreased ability to test reality, while there were no correlations between personality dimensions and DUP in multiple episode subgroup.*

Key words: *duration of untreated psychosis - childhood trauma - personality dimensions – psychopathology - early-course psychosis*

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INTRODUCTION

Psychotic disorders manifest in one of 150 persons during the lifetime (Moreno-Küstner et al. 2018). Prospective study of patients with first episode of psychosis, with the follow up period of 10 years, revealed that only 14% of patients achieve complete recovery (Austin et al. 2013). Therefore, it is of high importance to detect all factors which could have an impact on long-term recovery and illness outcome (Chan et al. 2019). The duration of psychosis prior to the treatment initiation is a potentially modifiable prognostic factor, therefore it is important to understand causes and consequences of untreated psychosis, and comprehending its impact on outcome may enhance therapeutic strategies (Zhang et al. 2018). Duration of untreated psychosis (DUP) is defined as the timeframe

between the appearance of psychotic symptoms and the initiation of adequate treatment (Restek-Petrović & Filipčić 2016). Meta-analysis of 27 studies published from 2000 to 2015 revealed the average length of DUP between 9.3 and 147 weeks, while in most studies DUP lasted between 30 and 90 weeks (Bora et al. 2018). Numerous researches consistently showed that longer DUP predicts worse outcome (Penttila et al. 2014). On the other hand, some authors argue that DUP could be associated with the severity of illness, and thus represent a marker, rather than outcome determinant (McGlashan 1999).

Recent study showed that history of childhood trauma is potential underlying factor behind longer DUP and worse premorbid functioning, and eventually more severe chronic illness (Aas et al. 2016). Persons with psychotic disorders experienced childhood trauma 2.7

times more often than general population (Varese et al. 2012). It is well documented that remembering traumatic experiences is reliable in psychosis (Fisher et al. 2014).

In meta-analysis conducted by Marshall and colleagues no correlation between DUP and psychotic symptoms was found at first presentation, however, by 6- and 12- month follow up the positive correlations with total symptoms, as well as with positive and negative symptoms, became statistically significant (Marshall et al. 2005). Participants' age at the time of exposure to traumatic event influences psychopathological profile of early psychosis. Therefore, participants experiencing trauma before the age of 16 showed higher levels of positive, depressive, manic and negative symptoms, while participants with later traumatic experiences showed only more negative symptoms (Alameda et al. 2016). First episode psychosis participants who experienced childhood sexual abuse had more severe hallucinations and delusions than those without sexual abuse in childhood (Bendall et al. 2013). Furthermore, exposure to adverse events in childhood is associated with persistence of psychotic symptoms (Trotta et al. 2015). A recent research revealed the association between childhood trauma and positive and negative psychotic symptoms through the symptoms of general psychopathology (Isvoranu et al. 2017).

Association of personality traits on help seeking is well investigated in other diagnostic entities, but there is a lack of information on the impact of personality on DUP (Ruiz-Veguilla et al. 2012). Compton and colleagues investigated the association of five personality domains (neuroticism, extraversion, openness, agreeableness, conscientiousness) with DUP, and found that all personality traits, except openness, contributed to some extent to the variation of DUP (Compton et al. 2015). Furthermore, there is a limited knowledge on the effect of personality traits on clinical characteristics of first episode psychosis (Compton et al. 2015). Agreeableness showed independent negative association with severity of positive symptoms, while extraversion was independently negatively associated with negative symptom severity (Compton et al. 2015).

Kernberg developed one of the most influential constructs on the personality organisation (Kernberg 1967). This model differentiates between neurotic, borderline, and psychotic levels of personality organization, which develop in a complex interaction of temperament and experienced object relations in the early stages of childhood (Fuchshuber et al. 2018). According to Kernberg, personality organisation mostly reflects through three levels of functioning: a) identity coherence; b) maturity of defence mechanisms; c) ability to test reality (Zimmermann et al. 2015). Constellation of severe identity diffusion, predominance of primitive defences and decreased ability to test reality is a foundation for numerous psychiatric disorders (Lenzenweger et al. 2001). It is assumed that those dysfunctional personality patterns

develop as a consequence of molestation in early childhood (Kernberg 2015). For the purpose of this study we have chosen Kernberg's model particularly because, in contrast the approaches focused on characterization of personality through describing the characteristics of which it is composed (such as the five-factor personality model (McCrae & Costa 1995)), it focuses on the characterisation of personality structure (Kernberg & Caligor 2005).

The aim of this study was to investigate whether there is association between specific childhood trauma and personality dimensions with DUP in participants with early course psychosis. To the best of our knowledge, this is the first study evaluating DUP in relation to personality dimensions using Kernberg's construct in participants with psychotic disorders.

SUBJECTS AND METHODS

Study design

This cross-sectional study was performed between October 2018 and September 2019 in Psychiatric Hospital "Sveti Ivan", Zagreb, Croatia. The study protocol was approved by both Ethics Committee of the Psychiatric Hospital "Sveti Ivan", Zagreb, Croatia, and Ethics Committee of the Faculty of Medicine, Josip Juraj Strossmayer University of Osijek, Croatia. All participants provided a written informed consent for participation, and their identities were concealed by assigning numerical codes. The study was performed in accordance with the World Medical Association Declaration of Helsinki 2013 (World Medical Association 2013).

This study was carried out within inpatient psychotherapeutic unit for people with psychotic disorders which is a part of Referential centre for psychotherapy, psychosocial treatments and early intervention for psychotic disorders (Ministry of Health, Croatia) and part of the early intervention programme implemented in the hospital in 2005. Details about the treatment on the psychotherapeutic ward (Mayer et al. 2017) and early intervention programme (Restek-Petrović et al. 2012) are given elsewhere. In our country, healthcare system is free of charge for all citizens, and provides rather sufficient accessibility. In Psychiatric hospital "Sveti Ivan" treatment for persons with psychotic disorders usually starts as inpatient treatment on an acute ward, and after initial stabilization of mental state is usually continued on a psychotherapeutic and sociotherapeutic ward. It is important to note that it is one of the largest psychiatric hospitals in Croatia, and patients from smaller units across the country are referred here to continue treatment and to provide the opportunity of entering the unique psychotherapeutic programme for psychotic disorders. This information should be taken into account in further elucidating and discussing the results of our study.

Participants

Targeted population was patients in early-course psychosis (less than 5 years' duration of illness) who were hospitalized in Psychiatric Hospital "Sveti Ivan", Zagreb, Croatia. The research encompassed diagnoses of psychotic disorders (codes from F20 to F29 according to International Classification of Diseases [ICD-10] (World Health Organisation 2016)) made by psychiatrists. A consecutive sample of 105 patients from targeted population was selected according to the start date of the current hospitalization. Eligibility criteria included signed informed consent, first-episode psychosis diagnosed in last five years, both gender, aged between 18 and 45 years (median 27 years, IQR 22.5-33.5) and capable of completing questionnaires independently. Potential participants with severe brain damage, mental retardation, severe drug addiction, acute suicidality, those unable to provide informed consent or incapable of completing questionnaires independently, were considered ineligible. None of the participants discontinued the assessments.

Outcomes

Primary outcome was the duration of untreated psychosis (DUP) defined as the time from onset of psychosis until the start of adequate antipsychotic treatment. Onset of psychosis was equated with the first appearance of one or more positive psychotic symptoms, corresponding to Positive and Negative Syndrome Scale (PANSS) score "4" or more on the following items: positive symptoms subscale items delusions (P1), conceptual disorganisation (P2), hallucinatory behaviour (P3), grandiosity (P5), suspiciousness/persecution (P6), and general psychopathology subscale item unusual thought content (G9) (Solesvik et al. 2016). Symptom must be present for several days or several times a week, and rated at least as moderate (PANSS score "4"-symptom represents a serious problem, either occurs only occasionally or intrudes on daily life only to a moderate extent). Start of adequate treatment was defined as the day of admission to first hospital psychiatric treatment.

Secondary outcomes were to investigate the associations between: childhood trauma and the duration of untreated psychosis; specific personality dimensions and the duration of untreated psychosis; psychotic symptoms and the duration of untreated psychosis; and to determine the prevalence of childhood trauma in total sample. Given that some studies have shown that prior psychiatric treatment can have an effect on participants' personality (Horan et al. 2005), the relations between independent variables and DUP were examined in total sample and subgroups of first episode and multiple episode participants.

Independent variables

Existence and number of childhood trauma was measured by Childhood Trauma Questionnaire (Penne-baker & Susman 1988). The questionnaire measures six traumatic events (death of significant other, parental divorce or separation, sexual abuse, violence, illness or injury and other) experienced prior to the age of 17. It is a self-report questionnaire, publicly available in extenso, and was translated into Croatian. Participants were required to indicate whether they experienced each of the traumatic events (yes or no). In addition to participants' answers, another indicator of multiple trauma was added (participants who experienced more than one traumatic event were given a score of 1, while others were scored 0).

Personality dimensions were measured by the Inventory of Personality Organization (IPO) (Kernberg & Clarkin 1995). This self-report questionnaire consists of 57 items, rated on a 5-point Likert-type scale, ranging from 'never applies to me' (scored 1) to 'always applies to me' (scored 5). The questionnaire assesses three dimensions of the personality: identity coherence (21 items), maturity of defence mechanisms (16 items), and ability to test the reality (20 items). It was translated into Croatian and validated (Ivezić et al. 2018). Good internal consistency and test-retest reliability for the three main subscales were observed in nonclinical (Lenzenweger et al. 2001) and clinical (Vermote et al. 2003) samples. Reliability coefficients Cronbach alpha in our sample were 0.861 for primitive defences subscale; 0.918 for identity diffusion subscale; and 0.906 for reality testing subscale.

Severity and structure of psychotic symptoms at the moment of inclusion were measured by Positive and Negative Syndrome Scale (PANSS) (Kay et al. 1987). The scale consists of 30 items divided into three subscales: positive symptoms (7 items; range 7-49), negative symptoms (7 items; range 7-49), and general psychopathology (16 items; range 16-112). It generally has good reliability, criteria-related validity and construct validity (Larsen et al. 1996). Reliability coefficients Cronbach alpha in our sample were 0.551 for positive symptoms subscale; 0.805 for negative symptoms subscale; and 0.694 for general psychopathology subscale.

Procedure

After explaining the purpose and objectives of the study and obtaining signed informed consent, all participants were subjected to a clinical interview and answered the questions from self-report questionnaires and measurement scales. In the clinical interview, the researcher focused on exact determination of the duration of untreated psychosis. The measurements were conducted after the initial stabilization of mental state, meaning after transferring the patient from acute to psychotherapeutic ward.

Statistical analysis

We performed statistical analysis using the IBM Corp. Released 2011. IBM SPSS Statistics for Win-

dows, Version 20.0. Armonk, NY: IBM Corp. Descriptive statistics were used in order to present the socio-demographic, clinical and other characteristics of the participants (group means, standard deviations, medians, interquartile ranges, frequencies, percentages). Mann-Whitney U test, correlation coefficients and t-test for independent samples were used to determine the associations between examined variables. The statistical significance was set at p<0.05.

RESULTS

Participants' sociodemographic and clinical characteristics are presented in Table 1. Prior to entering the study participants were treated at the acute ward for a median of 16 days (IQR 9.5-24), and 14 days (IQR 10-20) at the psychotherapeutic ward.

Median DUP in our sample was 60.0 (IQR 14.5-285) days, while the mean was 157.99 (SD 184.94) days. Minimum was 2 days and maximum was 735 days. As expected, our data was highly skewed, which gave rise to large standard deviations and a discrepancy between means and medians. Therefore, we refer to the median value of DUP in further text.

No associations between DUP and participants socio-demographic characteristics have been found, neither with gender (Mann-Whitney U test=1.196.00; p=0.404); age (Spearman's correlations coefficient $\rho=0.028$; p=0.773); education level (Spearman's correlations coefficient $\rho=-0.124$; p=0.209); work status (Kruskal-Wallis test $\chi^2=5.398$, p=0.067); partnership status (Kruskal-Wallis test, $\chi^2=1.980$, p=0.372); nor with having children (Spearman's correlations coefficient $\rho=-0.091$; p=0.357). Furthermore, no association between DUP and age at illness onset was found (Spearman's correlations coefficient $\rho=0.002$; p=0.981). Likewise, there was no differences between participants who experienced childhood trauma and those who did not in medians of age at illness onset (Mann-Whitney U test= 874.500, p=0.270).

Out of the total sample, 58 participants had one or more psychotic episodes in their life span, while for 47 participants observed episode was the first one. No statistically significant differences were found between these subgroups concerning their sociodemographic characteristics, except for their age: participants with first episode were significantly younger compared to participants with multiple episodes ($M_1=25.52$ years (SD=76.73), $M_2=30.86$ years (SD=7.15); t=3.879, p=0.000). Also, no significant difference was found on DUP (median$_1$=60.00 days (IQR 15-180); median$_2$=90.00 days (IQR 13-365); Mann-Whitney U test=1.190,500; p=0.345).

Table 2 shows the representation of particular traumatic event and the mean age at the time of traumatic event on total sample, and differences in DUP among total sample as well as subgroups of first and multiple episodes' participants. In the subgroup of multiple episode participants, a difference in DUP was found,

Table 1. Participants' sociodemographic and clinical characteristics (N=105)

	N	%
Gender		
men	63	60.0
women	42	40.0
Age (years), median (IQR)	27	22.5-33.5
Education		
primary	7	6.7
secondary	74	70.4
university	24	22.9
Partnership		
single	67	63.8
in a relationship	24	22.9
married	14	13.3
Having children		
yes	14	13.3
no	91	86.7
Living arrangement		
alone	18	17.1
with primary family	74	70.5
with secondary family	13	12.4
Residence		
urban (capital city)	50	47.6
urban (other city)	37	35.2
rural	18	17.1
Work status		
employed	33	31.4
student	30	28.6
unemployed	42	40.0
Age (years) at illness onset, median (IQR)	25	22-31
Previous psychiatric hospitalizations		
none	47	44.8
one	28	26.7
two or more	30	28.6
Psychiatric diagnosis (ICD-10)		
schizophrenia	17	16.2
persistent delusional disorder	2	1.9
acute and transient psychotic disorders	64	61.0
schizoaffective disorders	2	1.9
other nonorganic psychotic disorder	1	1.0
unspecified nonorganic psychosis	19	18.1

ICD-10 = International Classification of Diseases, 10th revision; IQR = interquartile range; Data are presented as number (percentage) of participants if not stated otherwise

particularly, when participants experienced multiple childhood traumatic events, they had shorter DUP, while there were no differences in DUP when the existence of any specific trauma was found in either subgroup, or in total sample.

Personality dimensions and psychopathology are presented for total sample, first and multiple episodes' participants in Table 3. No significant differences between first and multiple episode subgroups were found neither in means of personality dimensions, nor in psychopathology.

Table 2. Representation of specific childhood traumatic events and results of Mann-Whitney U test

Traumatic event	Trauma, N (%)	Age at the time of trauma, mean (SD)	DUP total sample N=105, Mann-Whitney U (p)	DUP first episode N=47, Mann-Whitney U (p)	DUP multiple episodes N=58, Mann-Whitney U (p)
Any trauma	88 (83.8)	NA	746.500 (0.990)	130.000 (0.352)	240.500 (0.491)
Multiple trauma	59 (67.0)	NA	1075.000 (0.050)	162.500 (0.745)	349.000 (*0.011*)
Death of significant other	58 (55.2)	11.12 (4.138)	1341.500 (0.889)	237.500 (0.671)	427.000 (0.912)
Parental divorce or separation	32 (30.5)	9.25 (5.131)	1328.000 (0.263)	275.000 (0.604)	354.500 (0.393)
Sexual abuse	17 (16.2)	10.53 (4.033)	747.000 (0.993)	155.000 (0.943)	221.000 (0.991)
Violence	34 (32.4)	9.15 (4.300)	1277.000 (0.630)	188.000 (0.296)	421.500 (0.175)
Illness or injury	26 (24.8)	9.73 (5.212)	1014.000 (0.923)	165.000 (0.478)	344.000 (0.700)
Other traumatic event	31 (29.5)	12.68 (4.102)	1123.000 (0.866)	196.000 (0.309)	350.000 (0.622)

Abbreviations: SD= standard deviation; NA= not applicable

Table 3. Description of personality dimensions and psychopathology, and comparison of the two subgroups (first and multiple episodes' participants)

	Total sample N=105 Mean (SD)	Min-max	First episode N=47 Mean (SD)	Min-max	Multiple episodes N=58 Mean (SD)	Min-max	t-test (p) (df=102)
Personality dimension							
Primitive defences	40.60 (10.32)	16-73	40.74 (10.97)	16-67	40.69 (9.85)	19-73	0.02 (0.982)
Identity diffusion	50.68 (14.66)	21-90	51.91 (15.40)	21-90	50.01 (14.05)	21-86	0.66 (0.513)
Reality testing	38.85 (13.09)	20-79	39.04 (12.73)	20-78	38.97 (13.42)	20-79	0.03 (0.976)
Psychopathology							
Positive and negative syndrome scale- total	68.59 (14.35)	36-110	67.07 (13.93)	36-109	69.71 (14.80)	36-110	0.93 (0.365)
Positive symptom subscale	14.07 (4.26)	7-32	14.09 (4.55)	7-32	14.07 (4.10)	7-25	0.02 (0.983)
Negative symptoms subscale	17.10 (5.37)	7-33	15.93 (4.86)	7-28	17.93 (5.36)	7-33	1.91 (0.060)
General psychopathology subscale	37.43 (7.77)	19-59	37.04 (7.33)	19-56	37.71 (8.22)	20-59	0.43 (0.669)

Abbreviations: SD= standard deviation; min= minimum; max= maximum; df= degrees of freedom

Table 4. Correlations between DUP and personality dimensions and actual psychopathological symptoms (Spearman's correlations coefficient)

	Total sample N=105 DUP	p	First episode N=47 DUP	p	Multiple episodes N=58 DUP	p
Personality dimension						
Primitive defences	0.17	0.089	0.33	*0.025*	0.05	0.723
Identity diffusion	0.09	0.373	0.28	0.060	-0.01	0.914
Reality testing	0.15	0.135	0.32	*0.032*	0.07	0.610
Psychopathology						
Positive and negative syndrome scale- total	0.19	0.050	0.30	*0.046*	0.12	0.358
Positive symptom subscale	0.36	*0.000*	0.39	*0.008*	0.33	*0.011*
Negative symptoms subscale	0.02	0.822	0.04	0.811	-0.03	0.816
General psychopathology subscale	0.20	*0.043*	0.37	*0.013*	0.10	0.464

Table 4 represents correlation coefficients between personality dimensions and actual psychopathological symptoms, and DUP for total sample, as well as for the observed two subgroups. Primitive defences and reality testing correlated positively with DUP only in first episode subgroup, while no correlations in total sample, nor in multiple episode subgroup were observed. Positive symptoms and general psychopathology positively correlated with the DUP in total sample, and in first episode subgroup, while in multiple episode subgroup only correlation with positive symptoms was found. Total PANSS score positively correlated with the DUP only in the first episode subgroup.

DISCUSSION

Sociodemographic characteristics of our sample are in accordance with literature (Restek-Petrović et al. 2017, Ostojić 2015, Šago et al. 2019). Demographic characteristics including age, gender, educational level, partnership status, having children, work status and age at illness onset were not associated with the length of DUP. Similar results were found in recent study by Souaiby and colleagues (Souaiby et al. 2019). Although, being single and unemployed, which was the majority of our sample, has been found in the literature to predict longer DUP (Pek et al. 2006), this was not the case in our study, perhaps due to the fact that the majority of participants still live with their primary families who provide support and care (Goulding et al. 2008) and often initiate contact with mental health services (Addington et al. 2002).

The median DUP in our sample is very similar to two recent studies (Fowler et al. 2018, Qiu et al. 2017). There is a great discrepancy in the literature concerning the length of DUP, even in areas with early intervention programmes implemented, rather short DUP medians of 52 days (McGorry et al. 1996), and significantly longer up to 518 days (Kane et al. 2016) are reported. There are very few previous researches on the DUP in Croatia. In the recent study in Psychiatric Hospital "Sveti Ivan", a sample of 245 inpatients treated at psychotherapeutic ward reported a median DUP of 30 days, which is significantly lower than the result obtained in present study (Restek-Petrović et al. 2017). Ostojić and colleagues conducted a research on 180 patients with first episode of schizophrenia treated in University Psychiatric Hospital Vrapče, Zagreb, Croatia, and found median DUP of 7 months (210 days) (Ostojić 2015). In our sample small number of participants met the criteria for diagnosis of schizophrenia, which could be one of the reasons for this discrepancy between results. Marić and her research team in neighbouring Serbia found median DUP of 25 weeks (175 days) in 57 participants with illness duration up to ten years (Marić et al. 2018). It is of great importance to note that our participants represent highly specific sample of persons with psychotic disorders, due to the fact that they were assessed by psychiatrists to have the capacity and motivation for psychotherapeutic work. Therefore, it is rather difficult to compare our results with others. Another important characteristic of our sample must be noted. The vast majority of participants live in urban areas, which on the one hand could be environmental risk factor for psychotic disorder, but on the other hand, it might be associated with better health care access and therefore shorter DUP (Fond et al. 2018).

The vast majority of participants in our study stated that they had experienced a traumatic event before the age of 17; moreover, they mostly experienced two or more traumatic events. A recent meta-analysis of six studies on clinical high risk participants showed similar results and calculated a mean childhood trauma prevalence rate of 87% (Kraan et al. 2015), while in general population prevalence of childhood trauma does not exceed 28% (Devi et al. 2019). In another study, of the 178 patients with psychotic disorders who reported childhood trauma, 118 (66%) had experienced multiple forms (Reeder et al. 2017). Most frequent childhood traumatic event within our sample was death of significant other, which is in accordance with previous findings (Scheller-Gilkey et al. 2004). Among our participants, reports on sexual abuse are somewhat lower compared to the literature (Bonoldi et al. 2013). This discrepancy could be subjected to underreporting of trauma (Della Femina et al. 1990).

In a recent study, authors report that high levels of childhood trauma are associated with longer DUP (Aas et al. 2016). Our results in general showed no association of childhood trauma with the length of DUP. However, we did not measure premorbid adjustment, therefore we cannot exclude the possibility of childhood trauma as potential underlying factor for longer DUP. Especially, knowing that patients with psychotic disorders who report history of childhood trauma score lower on premorbid adjustment compared to the ones without early traumatic experience (Tikka et al. 2013). Above mentioned authors, found that in a multivariate analysis childhood trauma had an independent contribution to a reduced functional improvement over time, whereas premorbid adjustment and DUP no longer had a significant association to change over time (Aas et al. 2016). We believe this finding highlights the importance of regular inquiring in clinical practice about childhood traumatic experiences and applying trauma-related interventions early in treatment of psychotic disorders (Akbey et al. 2019).

Our findings revealed significant negative association between DUP and multiple trauma among participants with multiple psychotic episodes, while this significance on the total sample was borderline. This finding is somewhat confusing, especially observing the fact that it does not refer to first episode participants. It is proposed that persons with multiple childhood traumatic events have increased emotional reactivity to daily stressors, which leads to deterioration in mental health (Lardinois et al. 2011). This could be one of the reasons behind earlier help seeking. One could argue that even though multiple childhood trauma shortens the DUP, they could be the marker of more severe chronic illness and multiple relapses. However, further research on a greater sample is needed to elucidate this result.

Perkins and colleagues found that at first presentation longer DUP was associated with more severe negative but not positive symptoms (Perkins et al. 2005). On the contrary, in our total sample, longer DUP was associated with more prominent positive symptoms and general psychopathology. This applies as well to the subgroup of first episode participants, but in the subgroup of participants with multiple episodes, longer DUP was associated only with more severe positive symptoms. It is known in the literature that childhood traumatic experiences are associated with positive psychotic symptoms

(Gallagher & Jones 2013), and there is a high prevalence of childhood trauma among our participants. A recent meta-analysis suggested the association of childhood trauma with a symptom picture characterized by more positive symptoms, rather than with greater symptom severity in all domains (Bailey et al. 2018).

In present study the mean scores on three subscales of the IPO (Kernberg & Clarkin 1995), primitive defences, identity diffusion and reality testing were similar to those found in a research from Restek-Petrović and colleagues conducted on 48 adult outpatients diagnosed with non-affective psychosis (Restek-Petrović et al. 2015). In a study from Netherlands on 181 nonclinical and 371 clinical (non-psychotic) participants, the clinical group scored consistently higher on all IPO scales (Berghuis et al. 2009), and our participants scored quite similar to their clinical group. Those results suggest that our participants were in a rather solid remission of psychotic symptoms at the moment of interviewing. We conducted our research after initial stabilization of participant's psychotic symptoms, in order to avoid the potential confounding influence of the psychotic state on the personality parameters (Keshavan et al. 2005). Furthermore, our participants scored relatively low on PANSS, meaning they were mildly to moderately ill during the assessment procedure (Leucht et al. 2005). Moreover, Berghuis and associates suggested that the IPO is more strongly related to personality pathology than to symptomatology of any other psychiatric disorder a part from personality disorders (Berghuis et al. 2009).

There were no differences between our subgroups of first and multiple episode participants in means of personality dimensions. There was also no correlation between DUP and personality dimensions for total sample, nor for multiple episode participants. However, when observing the subgroup of first episode participants, a significant correlation of primitive defences and reality testing was found, while for identity diffusion a correlation showed a trend toward significance. In other words, first episode participants with longer DUP had predominant primitive defences and severely decreased ability to test reality. This finding possibly refers only to this subgroup because the majority of multiple episode participants were previously engaged in psychotherapeutic treatment (either group-oriented psychodynamic psychotherapy, or cognitive behavioural therapy, or metacognitive training etc.) and thus this could artefact the result (Šago et al. 2018). Since the IPO appeared to be sensitive to changes in aspects of personality organization following psychotherapeutic treatment (Arntz & Bernstein 2006), it could be used for evaluation and monitoring of participants' progress in psychotherapy.

Limitations

Results of the current study should be interpreted with the consideration of its limitations. Due to the cross-sectional design, no causal inference can be definitively concluded. High specificity of our sample, discussed above, limits generalisability of our results to the population of all persons with psychotic disorders. Another limitation is retrospective assessment of DUP and the possibility of recall bias. To minimise that bias a detailed clinical interview (according to the specific PANSS items, described in Methods) with participants was performed. We used restrictive DUP definition and criteria (Polari et al. 2011). DUP has proven to be a difficult construct to define, measure, and operationalize (Compton et al. 2007), and there is often a great deal of inconsistency across studies. In addition, we did not assess the premorbid adjustment of the participants, neither the mode of psychosis onset, which are potential confounding factors of the DUP.

Childhood trauma was assessed retrospectively, and may have been subject to recall bias. However, in a study involving patients with first episode psychosis, self-report measures had good concurrent validity, reasonable convergent validity with case reports, and high levels of stability over a seven year period (Fisher et al. 2011).

Moreover, we had no records of premorbid personality dimensions. In our study, personality dimensions were measured by the IPO, which is a self-report questionnaire. Self-assessments are prone to subjectivity, so the results should be interpreted with caution.

The main limitation of the study was modest sample size, and therefore larger independent study samples are needed. Concerning data collection, some methodological differences between evaluations were avoided since the same researcher evaluated all participants.

CONCLUSIONS

Despite the limitations stated, the current study highlighted the importance of understanding the mechanism of psychotic disorders and the interdependence of factors affecting the length of duration of untreated psychosis. It is encouraging to descry that more than half of our participants had DUP well below three months, which is considered a good prognostic factor according to World Health Organization (Bertolote & McGorry 2005). On the other hand, we cannot neglect the fact that there are still numerous patients with remarkably long DUP (up to 2 years). The benefit of shortening the DUP seems to be much greater if intervened very early (i.e. shortening from 3 to 2 months) than later (shortening from 2 to 1 year) (Norman et al. 2005). These results should be used as a starting point for the development of systematic early intervention services in our community.

There was a high prevalence of childhood trauma in our sample, but no association between any specific traumatic event and the length of DUP was found. However, exposure and responses to traumatic events are potentially modifiable and a better understanding of how they impact on risk of psychosis may inform strategies for prevention and early intervention (Beards et al. 2013).

In our study, first episode participants with longer DUP had higher scores on total PANSS, as well as on positive symptoms and general psychopathology sub-scales. Furthermore, they had predominant primitive defences and severely decreased ability to test reality. Previous studies showed that IPO could be used to investigate the relationship between personality organisation and psychopathology, along with the measurement of structural change as outcome of psychotherapy (Ellison & Levy 2012). Additionally, its structural approach may help in uncovering different meanings in common symptoms according to diverse underlying levels of personality organisation (Kernberg 2004).

Contribution of individual authors:

Vanja Lovretić was involved with study design, data collection, literature searches and analyses, data interpretation, writing and multiple edits of the manuscript drafts.

Ana Kurtović was involved with study design, statistical analysis, data interpretation, and manuscript review.

Ena Ivezić was involved with study design, statistical analysis, and data interpretation.

Daniela Šago was involved with study design, data collection, literature searches, and manuscript review.

Sanja Jandrić participated in statistical analysis, data interpretation and manuscript review.

Igor Filipčić was involved with study design and manuscript review.

Branka Restek-Petrović was involved with study design, data interpretation, and manuscript review.

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