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Gender differences in the relationship of childhood trauma and the course of illness in schizophrenia

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ABSTRACT

Introduction: Different types of childhood trauma have been repeatedly shown to contribute to psychotic symptoms. Gender differences in schizophrenia are well known. Some studies argue that trauma history means a significantly higher risk of psychosis for women than men. However, there is evidence of early adverse life events to be associated with higher stress-sensitivity in men. Little is known about the connection of specific type of trauma and specific psychotic symptoms as well as the course of illness with explicit regard to gender differences.
Methods: 102 men and women with schizophrenia spectrum disorder were tested using Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Scale for Assessing Positive Symptoms, Early Trauma Inventory-SR.
Results: Although, women had a later age at onset without regarding trauma history ($d = 0.74$), this difference became non-significant when introducing trauma variables. Patients reporting physical abuse had a significantly earlier age at onset, regardless of their sex ($V = 0.13$, $F = 3.11$, $p = 0.03$. Physical abuse predicted an earlier age at onset only in women ($R^2 = 0.23$). History of general trauma predicted more frequent hospitalizations only in men ($R^2 = 0.55$).
Conclusions: Although women generally tend to have a more favorable course of illness including a later age at onset men, women with CPA seem to lose this "advantage". It is necessary to investigate the contribution of gender interacting with adverse life events in contribution to the phenomenology and etiology of schizophrenia.

1. Introduction

There is continuously growing evidence of cross-sectional [1,2] as well as longitudinal studies using large community samples [3–6] for childhood trauma being a risk factor for later psychotic symptoms [7]. Read's traumagenic model [8,9] suggests that traumatic experiences play a significant causative role in the etiology of schizophrenia via biochemical and structural alteration of the brain. A bidirectional causal relationship between childhood physical abuse (CPA)/bullying and psychotic experiences has been demonstrated by Kelleher et al. [10].

Events with the intent to harm have been consistently found to have stronger connections to positive psychotic symptoms than events without such an intent, although general traumatic experiences (e. g. loss of one or both parents through death or separation) have also been shown to represent a greater risk for psychosis compared to the lack of these events [4,11]. Previous results suggest that early traumas were more linked to positive than to negative psychotic symptoms [8,12,13], however the exact nature of traumatic events and their connection to specific symptoms show a wide diversity. Evidence supporting the connection of childhood physical (CPA), emotional (CEA) and sexual (CSA) abuse and psychotic state or different psychotic symptoms have been found [7,14] and CPA has been repeatedly shown to be the most persistent type of abuse to predict psychosis after adjusting for possible confounders [14]. A possible interpretation of the somewhat inconsistent results may be that childhood abuse possibly represents a non-specific risk factor for psychotic symptoms [7,15]. Some recent results of network analyses offer the explanation that childhood traumas are probably not directly connected to psychotic symptoms, but general psychopathology symptom seem to mediate these relationships [16]. It is also possible that different forms of childhood trauma increase risk of co-occurrence of hallucinations and delusions, rather than that of isolated symptom dimensions [11].

There is evidence that the course of illness is less favorable in schizophrenia patients with trauma history. A tendency of patients with a history of childhood abuse having an earlier age at onset [17] and more frequent contact with psychiatric services [3] or psychiatric admissions [18,19] has been repeatedly found, although there are some contradictory results regarding relapse hospital admissions [20]. These findings can be explained by various models of childhood trauma having a detrimental effect on the developing nervous system, such as the Mc Glashan and Hoffman's [21] Developmental Reduced Synaptic Connectivity Model (claiming that disturbances of the synaptogenesis before birth

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or in the early childhood which may lead to schizophrenia) or Read's [9] traumagenic neurodevelopmental model (claiming that early traumas result a change in the HPA axis which in turn may lead to an overactitvity of the dopamine system and consequently to psychotic symptoms).

Gender differences in schizophrenia (generally higher incidence, earlier age at onset, more negative symptoms, more cognitive deficits and consequently a more unfavorable course of illness in men [22,23, see 24 for a meta-analysis] are well known and have been connected to protective role of estrogen [25,26] and oxytocin [27] in women.

According to some studies systematically addressing gender differences regarding the connection of trauma history and symptom severity, childhood abuse has been shown to be stronger associated with the psychotic symptoms in women than men, although some other studies failed to find any gender differences [3,28]. In two large case-control studies female schizophrenia patients were twice as likely to have suffered either physical or sexual abuse compared to healthy women, whereas no such difference was found in men [29,30]. A further study [31] addressing positive, negative and depressive symptoms in schizophrenia patients reported a significant interaction of gender and CPA and argued that physically abused women tend to have significantly more severe psychotic symptoms than non-abused women or men with or without abuse history. As an interpretation of some of these findings, Fisher et al. [29] argued that abused girls tend to internalize their problems, therefore stand more chance to develop psychiatric symptoms, abused boys in turn tend to externalize, therefore more likely to commit aggressive or criminal actions. Contrary to this interpretation, there is evidence that childhood trauma may be associated with poorer physical health, more chronic pain and less insight in men, whereas no such association was found in women [32]. At the same time, there is evidence that excess testosterone in the developing brain may lead to a greater stress-vulnerability [33] and adult males with early loss of a parent may show greater adrenal sensitivity to stress hormone release than females [34] which may mean a greater vulnerability to psychosis according to the traumagenic model.

CEA was not addressed in the above cited studies of gender differences and the possible connections between different types of abuse and specific symptom dimensions were not explored in detail in a sex-stratified analysis. According to our knowledge, the study of Garcia et al. [35] is the only attempt to have done so and their results show significant connections between different forms of childhood trauma, especially emotional neglect and psychotic as well as depressive symptoms and low functionality in the group of women, but only the connection of physical abuse and the sum of positive and negative symptoms in men [35]. The reasons for CEA not to be involved in previous studies may be on the one hand that emotional abuse is usually present when other types of abuse are too. On the other hand, this type of abuse is considered to be less memorable and objective than other types of abuse [36]. Additionally, reports of CEA have been found biased in the way that it is regarded as less abusive by the victim than other types of abuse [37] and therefore may be less likely to be reported, but on the other hand women tend to report CEA more than men, whereas no such effect of gender has been found for the other types of abuse [38].

Although some other important aspects have been addressed in the above studies, there is no information about the gender differences in the course of illness (age at onset and number of psychiatric admissions) which may be an important issue for a gender-sensitive psychiatric care in schizophrenia. It is a vital etiological question, whether the assumed greater stress-sensitivity in women might outweigh the protective effect of estrogen and contribute to an earlier onset of schizophrenia. At the same time, it would be important to know, if childhood trauma is associated with an even earlier age of onset in men.

Bearing all this in mind, the primary aim of this study was to see, how gender differences, general childhood trauma as well as childhood physical and sexual abuse or the interaction of these contribute to positive symptoms as well as the age at onset and the number of psychiatric admissions in schizophrenia patients. We hypothesized that patients with childhood trauma, physical or sexual abuse are more frequently hospitalized, have an earlier age at onset and suffer from more severe positive symptoms. At the same time, being aware of the general tendency of later age at onset in women (as described above) and less frequent utilization of mental health services in men [39], we hypothesized a possible interaction of gender and trauma as well as abuse history on these variables. Our additional aim was to systematically explore how general childhood trauma, childhood physical and sexual abuse are connected to adult psychotic symptom groups and to the age at onset or the number of psychiatric admissions in men and women separately, with the expectation of finding out if different traumatic and abuse experiences contribute to positive symptoms and course of illness differently in the two gender groups. Based on previous results, we expected the history of childhood physical and/or sexual abuse to be stronger predictors of positive symptoms, an earlier age at onset and more frequent hospitalizations than history of general childhood trauma, regardless of the effect of gender.

2. Materials and methods

2.1. Ethics

Ethical permission (151-4/2011) was obtained from the responsible scientific ethical commission. All participants provided an informed consent.

2.2. Study sample

102 patients (52% women, $M = 46.68$ years, $SD = 11.79$) with the diagnosis of schizophrenia (85%) and schizoaffective disorder (15%) were recruited in 7 different psychiatric institutions (4 inpatient and 3 outpatient units). Our final sample consisted of in-patients (63%) and out-patients (37%). Descriptive values are shown in Table 1.

Exclusion criteria were: acute psychotic state, history of regular alcohol or drug consume (based on information collected as part of the sociodemographic data), borderline personality disorder and trauma history (based on hospital documentation). Subgroups diagnosed with schizophrenia and schizoaffective disorders and subgroups of inpatients and outpatients were compared along all the measured variables and because no significant differences were found, they were all allocated into one common study sample.

Table 1
Socio-demographic and clinical characteristics of the sample. Abbreviations: SAPS: Scales for Assessing Positive Symptoms, ETI: Early Trauma Inventory, CPA: childhood physical abuse.

	Minimum	Maximum	M (SD)
Education	7 years	18 years	12.05 (2.83) years
Age	18 years	69 years	46.68 (11.79) years
Duration of illness	6 months	468 months ≈ 39 years	199.96 months ≈ 16.66 years (122.67 months ≈ 10 years)
Number of hospitalisations	0	30	8.54 (8.03)
PSYCHOTIC SYMPTOMS			
SAPS total mean	0.1	2.67	0.98 (0.51)
SAPS hallucinations mean	0	4.17	1.41 (1.12)
SAPS delusions mean	0	2.92	0.99 (0.63)
SAPS disorganized thought mean	0	2.88	0.71 (0.75)
TRAUMA			
ETI general trauma	0	23	4.09 (4.76)
ETI physical abuse (CPA)	0	6	1.47 (1.48)