Impact of lifetime traumatic experiences on suicidality and likelihood of conversion in a cohort of individuals at clinical high-risk for psychosis

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Abstract

Recent research suggests that trauma history (TH) is a strong socio-environmental risk factor for the development of psychosis. While reported rates of childhood trauma are higher among individuals at clinical high-risk (CHR) for psychosis than in the general population, little research has explored the effects of trauma upon the severity of attenuated positive symptoms. We aimed to explore the specific relationships between TH and baseline symptom severity; likelihood of conversion to full-blown psychosis; suicidal ideation (SI); and suicidal behavior (SB) in a cohort of 200 help-seeking CHR individuals. Participants were evaluated every three months for up to two years using the Structured Interview for Psychosis-Risk Syndromes (SIPS).

More trauma history was reported by females and Hispanic/Latino participants, while age and race did not significantly distinguish those with and without TH. Individuals with TH reported higher rates of SI and SB than those without. While TH was positively associated with several SIPS subscales, including Unusual Thought Content, Perceptual Abnormalities/Hallucinations, Bizarre Thinking, Sleep Disturbances, and Dysphoric Mood, and negatively associated with Expressed Emotion, results indicated that TH was not significantly related to conversion to psychosis. Moreover, baseline SI was unrelated to conversion and baseline DSM diagnosis, with the exception of Post-Traumatic Stress Disorder (PTSD). These results suggest that traumatic

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First authors Margaux Grivel and Wei Leong, along with the guidance of senior authors Dr. Ragy Girgis and Dr. Gary Brucato, and the expertise of Dr. Lawrence Yang, designed the current study. Leigh Arndt collected data for this study. Rebecca Altschuler compiled data and formatted it into an SPSS dataset. Michael Masucci undertook the statistical analyses for this study. Margaux Grivel and Wei Leong collaboratively wrote the first draft of the manuscript and tables, with the aid of Samantha Redman who assisted in the literature searches. All authors contributed to editing the manuscript, and have approved the final manuscript.

experiences may significantly impact the severity of attenuated positive symptoms and suicidality in the CHR state, providing new windows for further research and potential intervention.

Keywords

Trauma; Psychosis; Attenuated Psychosis Syndrome; Suicidal Ideation; Suicidal Behavior

Introduction

Recent research strongly suggests that various socio-environmental factors, such as childhood maltreatment, may increase one's risk of developing schizophrenia or other psychotic illness, with an estimated population attributable risk of 33% (Varese et al., 2012). Indeed, trauma history (TH) is one of the most robust socio-environmental risk factors for psychosis (Bendall et al., 2008; Bendall et al., 2013; Harley et al., 2010; Houston et al., 2008; Konings et al., 2012; Read et al., 2005; Trotta et al., 2015; van Os et al., 2008; Varese et al., 2012). A meta-analysis of 18 case-controlled studies yielded that individuals with psychosis are 2.72 times more likely to have reported childhood trauma, including sexual, physical, and emotional abuse, neglect, and bullying, compared to healthy controls; this relationship is further supported across ten prospective and quasi-experimental studies, and eight population-based cross-sectional studies (Varese et al., 2012). Sexual trauma, specifically, has been established as a robust contributor and risk factor for the development of psychosis (Bebbington et al., 2011; Cutajar et al., 2010). Importantly, the association between history of traumatic experience and risk for psychosis appears to remain stable even after controlling for contributing factors, such as family history of psychosis (Janssen et al., 2004).

Despite growing evidence of this association, less is known about how TH affects the severity of attenuated, or "prodromal" positive symptoms; clinical concerns beyond positive symptoms; and rate of conversion to full-blown psychosis among individuals at Clinical High-Risk (CHR) for psychotic illness. Addington and colleagues (2013) have established that CHR individuals report significantly more trauma (i.e. emotional, physical, or sexual trauma), relative to controls. A subsequent meta-analysis supports this finding, suggesting that, across six studies, the prevalence rate of childhood trauma is 86.8%, a significantly higher rate compared to the general population (Kraan et al., 2015b).

Thompson and colleagues (2009) were the first to examine the association between trauma and sub-threshold psychotic symptoms in 30 CHR individuals. Physical and sexual abuse were found to be related to positive symptom severity, as measured by the Structured Interview for Psychosis-Risk Syndromes (SIPS), most notably grandiosity, while physical trauma was associated with disorganization. No associations were established with negative symptom severity (Thompson et al., 2009). More contemporary research supports this trend, indicating that TH in CHR persons is related to SIPS positive symptom severity (Kline et al., 2016; Kraan et al., 2015a).

Given the higher rates of trauma among CHR individuals and early evidence suggesting its impact on symptom severity, some research has begun to explore whether history of

traumatic experiences may be predictive of other clinically-relevant outcomes, including transition to psychosis. While some studies provide evidence to suggest that sexual trauma, in particular, is a predictor of the onset of psychotic illness (Bechdolf et al., 2010; Thompson et al., 2009), others fail to support the association between TH and transition to full-blown psychosis (Kraan et al., 2015a; Stowkowy et al., 2016). Despite the growing focus on trauma in those at CHR for psychosis, to date there have been relatively few studies reporting on trauma in CHR populations, with one review noting only 11 studies assessing these relationships longitudinally with childhood trauma specifically (Mayo et al., 2017).

Two other clinically-relevant outcomes for CHR individuals are suicidal ideation (SI) and suicidal behavior (SB). However, no studies to date have reported on associations of trauma and baseline SI and SB among CHR persons. Given the dearth of research in this area, the methodological inconsistencies, mixed findings, and the possible clinical implications, the present study endeavored to advance this line of research. Specifically, it aimed to (1) explore the relationship between sexual and non-sexual TH and baseline symptom severity, including SI and SB, and (2) to clarify associations between TH and conversion to full-blown psychosis.

Materials and Methods

Subjects and Measures

We recruited 200 help-seeking individuals, aged 13–30, at the Center of Prevention and Evaluation (COPE) at the New York State Psychiatric Institute/Columbia University Medical Center in New York City. All were found to meet psychosis-risk criteria defined by the SIPS (Miller et al., 2003). Participants were referred to COPE from schools, hospitals and clinicians across New York, New Jersey, and Connecticut. All met criteria for the Attenuated Positive Symptom Psychosis-Risk Syndrome (APSS) delineated in the SIPS, defined as having one attenuated positive symptom or more which first appeared or worsened by one point in the past year, and occurs at least once per week, with no history of full-blown psychosis. Participants were included if they reported any lifetime trauma, a diagnosis of PTSD was not considered as basis for exclusion in this study. Participants were followed up with SIPS assessments every three months for up to two years. Conversion is defined by the SIPS as achieving a score of 6 (full-blown psychosis) on a positive symptom for at least one hour per day at an average frequency of four days per week over one month. All subjects provided written informed consent. Individuals under the age of 18provided written informed assent with written informed consent provided by a parent or legal guardian. Approval from the NYSPI Institutional Review Board was obtained before any procedures were taken.

Demographic information, clinical psychiatric history, and information regarding SI, SB, and TH were collected at baseline by psychiatrists and/or psychologists at COPE, using the SIPS, SCID, and associated thorough clinical interview that was used to identify TH and suicidality. In particular, information on TH was obtained through the trauma checklist on the SCID, as well as the accompanying clinical interview, while SI, and SB were obtained via the SIPS (G2: Dysphoric mood), the SCID, and accompanying clinical interview with the patient. Clinical information obtained from the treating research psychiatrist, therapist,

and/or parents were used to confirm or clarify ambiguous information. Individuals who endorsed significant risk for suicide during the interview were evaluated and clinically treated. The Structured Clinical Interview for DSM-IV Disorders (SCID; First et al., 2002), was used to identify Axis I disorders. The Global Functioning: Social (GF: S) scale was used to assess peer conflict, as well as quality of peer relationships, age-appropriate intimate relationships and family relationships (Cornblatt et al., 2007), and the Global Functioning: Role (GF: R) scale was used to assess performance in school, work, and other age-appropriate responsibilities (Cornblatt et al., 2007).

Statistical analyses

Descriptive statistics were performed to determine significant characteristic differences between groups, which were defined as individuals with or without SI, SB or TH. While multiple forms of trauma were assessed, for the purpose of this study the trauma variable was dichotomized (sexual vs non-sexual trauma) following evidence from several studies identifying sexual trauma, specifically, as a robust contributor and risk factor for the development of psychosis (Bebbington et al., 2011; Cutajar et al., 2010).

Independent samples t-tests were performed with continuous variables (e.g., age), while chi-square tests were used to examine relationships between categorical variables (e.g., presence of SI, SB, and TH). All statistical analyses were performed using SPSS version 23, and p<0.05 was used to determine significance.

Results

Baseline Sample characteristics

As detailed in Tables 1 and 2, 23.5% of the sample reported TH at baseline, with 10.5% reporting sexual trauma and 13% reporting non-sexual trauma. Notably, of those who reported any lifetime trauma, 44.7% reported sexual trauma, 55.3% reported non-sexual trauma, and 8.9% reported both sexual and non-sexual trauma (See Table 2). History of either type of trauma was found to be significantly more frequent among females (χ^2=8.480, p=.004) and individuals of Hispanic/Latino ethnicity (χ^2=5.376, p=.020). Age and race were not significantly different between those with and without TH.

Trauma and baseline Suicidal Ideation(SI) and Suicidal Behavior (SB)

Seven participants (14.9%) with TH, and six participants (3.9%) without TH, reported baseline SI, with 6.4% and 1.3% of these participants reporting baseline SB, respectively. While participants with TH were significantly more likely to report baseline SI compared to those without TH (χ^2=7.122, p=.008), the higher rate of baseline SB among those with trauma approached significance (χ^2=3.8, p=.051) (See Table 2).

Trauma, SIPS, GFS, GAF, Baseline Diagnoses & Conversion Status

History of trauma was positively and significantly related to two SIPS positive symptoms: (1) Unusual Thought Content (P.1.; t[95.273]=2.582, p=.011) and (2) Perceptual Abnormalities/Hallucinations (P.4.; t[114.17]=3.124, p=.002). Positive associations were also observed with Bizarre Thinking (D.2.; t[84.019]=2.267, p=.026), Sleep Disturbance (G.

1.; t[82.952]=2.508, p=.014) and Dysphoric Mood (G.2.; t[193]=2.626, p=.009). Results further indicated a negative association between TH and Expressed Emotion (N.3. t[193]=2.390, p=.018). Groups did not significantly differ across the remaining SIPS symptoms. Additionally, results did not lend evidence to significant group differences in social (GFS: Social) and role (GFS: Role) functioning.

To further explore the relationship between trauma and attenuated psychotic symptoms, we conducted a one-way ANOVA looking at between-groups differences in positive SIPS scores between participants with no reported trauma, with only non-sexual trauma, and with sexual trauma, finding significant variations in P1 (F[2,197]=3.618, p=.029) between conditions (See Table 3). A post-hoc Tukey test showed that the "no reported trauma" and "sexual trauma" groups differed significantly (p=.025), while the "non-sexual trauma" group was not significantly different from the other two groups.

Levene's test indicated unequal variance between groups for P4 (F[2, 197]=11.004, p<.001). Therefore, between-groups differences of P4 were analyzed using a Kruskall-Wallis H Test, yielding a result approaching significance (χ^2=5.791, p=.055). Taken together, these findings may indicate that past sexual abuse may be associated with attenuated positive psychotic symptoms, specifically unusual thought content and perceptual abnormalities.

History of trauma was unrelated to baseline diagnoses, with the exception of PTSD (χ^2=14.723, p<.001), as expected. No significant difference in the rate of conversion to psychosis was found between individuals with (31.9%) and without (28.8%) TH (χ^2=.172, p=.678).

SI, SB, Baseline Diagnoses & Conversion Status

Congruent with current research, results indicated that baseline SI was associated with SB at follow-up (χ^2=73.767, p<.001; Rudd, 2006; Simon et al., 2013). Baseline SI was not significantly related to baseline diagnoses or conversion to psychosis.

Discussion

CHR individuals with and without TH were evaluated at baseline and followed up every three months for up to two years to identify potential associations between TH and other clinical factors, such as SI and SB. Reports of baseline SI were significantly different between participants with and without TH, suggesting that participants with a TH are more likely to report SI at baseline. This finding is consistent with previous reports of an increased risk of SI with early life trauma (Park et al., 2015). A similar relationship was observed for baseline SB, although at a strong trend level (p=0.051). These results continue to emphasize the need for adequately assessing and treating clinical cases of trauma.

Previous studies have found an increased prevalence of trauma in CHR populations, and that the accumulation of traumatic events affects the development of psychotic symptoms, which has been attributed to the possibility that traumatic events and other life stressors can increase vulnerability for the development of psychiatric conditions (Park et al., 2015). Others have reported correlations between the SIPS APSS and suicidality, implicating a

positive relationship between suicidality and CHR status (Gerstenberg et al., 2016). Prevalence of lifetime SI among CHR individuals has been reported to be as high as 76.7%, and has been related to negative symptoms (Gill et al., 2015) and positive symptoms (Taylor et al., 2010). Although TH has been found to be unrelated to conversion status, we found significant relationships between TH and several SIPS symptoms, including Unusual Thought Content (P.1.), Perceptual Abnormalities/Hallucinations (P.4.), Bizarre Thinking (D.2.), Sleep Disturbance (G.1.), Dysphoric Mood (G.2.), and Expressed Emotion (N.3.). These significant associations may be indicative of an important correlation between TH and onset of certain symptoms associated with attenuated psychotic illness, and may play a role in the development of SI and SB in patients with TH. In general, there were no significant associations with baseline diagnoses, except PTSD, which was positively associated with TH.

Consistent with previous research, baseline SI was a predictor of SB at follow-up, but was not related to baseline diagnoses or conversion to psychosis (Rudd, 2006; Simon et al., 2013). These results support the idea that SI should be addressed as an ongoing risk in CHR patients, rather than being addressed only as a level of immediate crisis. Implementing these findings into clinical practice may help to mitigate the harmful development of SB, especially in those with a TH. Others have found that suicidality during the CHR period is related to an increased risk in SB and suicidality after the onset of psychosis, which is another reason to take particular precautions when treating to CHR individuals with SI and SB (Andriopoulos et al., 2011).

Our results also offer insight into the resiliency of individuals who are at CHR for psychosis. Out of the 47 individuals reporting any lifetime trauma in our sample, only 8 (17%) met SCID criteria for Post Traumatic Stress Disorder (PTSD). This trend is echoed in several other samples (reviewed by Mayo et al., 2017). These findings indicate that there may be clinically-relevant resiliency factors that protect CHR individuals from developing more severe trauma symptoms. Given the lack of inquiry in this area, it is suggested that future research examine potential protective factors in this population and explore the ways in which these factors can be capitalized on in treatment.

While these findings are promising, they should be considered within the context of several methodological limitations, one of which is the relatively low rates of TH and SI/SB in our sample. Overall, 23.5% of our sample reported any lifetime history of trauma, with 10.5% of the sample reporting sexual trauma, specifically, and 13% reporting non-sexual trauma. Given the variety in the definition, operationalization and method of assessment used to identify trauma, there is great variability in observed prevalence from sample to sample. A recent review notes much higher rates of trauma, a discrepancy likely attributable to construct definition and method of assessment (Mayo et al., 2017). Given the wide range of observed rates of trauma in this population, it is difficult to determine the degree to which our sample is representative of the CHR population as a whole. As such, it is possible that our sample is atypical and thus not generalizable to the wider CHR population. Furthermore, given that TH data was derived from the SIPS, SCID, and accompanying clinical interview, rather than a specific measure, it is expected that some TH cases may have been misclassified. It is further possible that the higher rates of trauma observed in other samples

is partially attributable to the great overlap between psychosis-like symptoms and PTSD symptoms (Mayo et al., 2017), making it difficult to determine the true prevalence of trauma in this group, and opening a cause of concern for the correct identification of CHR individuals overall. An additional concern with respect to TH is that, given the scope of this study, the trauma variable was dichotomized (sexual vs non-sexual trauma), and thus associations with specific types of trauma, such as parental separation and loss, abuse, neglect, and crime victimization, which may have differential impact on clinical outcomes, were not explored. Future studies should aim to assess TH both qualitatively and quantitatively, and to assess across a wider range of trauma categories, to obtain a clearer and more nuanced understanding of the true prevalence and impact of trauma in this group. Additionally, our sample reported lower levels of SI and SB, compared to other studies, with our sample ranging from 6–7% and 2–3%, respectively, and other samples reporting upwards of 60% and 50%, respectively (Hutton et al., 2011). Similarly, this may indicate that our sample is atypical for the population of interest. The discrepancy between SI and SB rates may be attributable to the fact that our sample is help-seeking, and thus, may not be representative of the CHR population as a whole. It is additionally plausible that the methods used to elicit this construct resulted in lower rates of reported SI and SB, suggesting, perhaps, that utilizing more established measures for SI and SB may impact the reposted prevalence. Thus, the methods used to assess TH, SI and SB (SIPS, SCID, and clinical interview), potentially impacted the rates observed in this study. Lastly, while long-term trajectories and associations are a crucial and necessary line of research in this area, longitudinal outcome data for the current study were not available. Future research should aim to examine longitudinal trends and identify the ways in which trauma may impact future clinical outcomes.

In summary, our results echo the recent growing reports about suicidality in a CHR population, but also present new findings on the role that trauma plays in the development of SI/SB, and its relationship to the progression of attenuated psychotic symptoms. Given the significant relationships found between TH and SI, and TH and certain SIPS symptoms, these results suggest that those with a TH should be more carefully assessed to determine their true suicide risk and treated accordingly. They also highlight the need to accurately distinguish effects of trauma from the development of attenuated positive symptoms in CHR patients. More research should be done to further determine how TH may affect the presentation and progression of symptoms in CHR persons, which could help mitigate the development of more severe clinical states by aiding the assessment and treatment of specific symptoms.

Acknowledgments

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Table 1

Demographic characteristics of the sample *N*=200.

	No Trauma (*n*=153)	**Any Lifetime Trauma (n=47)**
	Mean (SD)	Mean (SD)
Age in years at baseline	20.10 (3.83)	20.22 (3.99)
	Frequency (%)	Frequency (%)
Birth Sex		
Female	35 (22.9)	21 (44.7)
Male	118 (77.1)	26 (55.3)
Race		
Asian /Pacific Islander	12 (07.8)	3 (06.4)
Black	31 (20.3)	13 (27.7)
White	75 (49.0)	16 (34.0)
Multi-racial	35 (22.9)	15 (31.9)
Ethnicity		
Hispanic/Latino(a)	41 (26.8)	21 (44.7)
Non-Hispanic/Latino(a)	112 (73.2)	26 (55.3)

Table 2

Clinical Characteristics of the sample *N*=200.

	No Trauma (*n*=153)	Any Lifetime Trauma (*n*=47)	Difference b/w group means (p-value)
	Frequency(%)	Frequency(%)	
Conversion	44 (28.8)	15 (31.9)	.678
Trauma			
Any lifetime trauma		47 (23.5)	
Sexual	-	21 (44.7)	-
Non-sexual	-	26 (55.3)	-
Both	-	4 (8.9)	-
Baseline Suicidal Ideation	6 (3.9)	7 (14.9)	**.008**
Baseline Suicidal Behavior	2 (1.3)	3 (6.4)	.051
	Mean(SD)	Mean(SD)	
Positive Symptoms			
P.1. Unusual Thought content	3.44 (1.117)	3.85 (0.884)	**.011**
P.2. Suspiciousness	3.29 (1.235)	3.49 (1.196)	.341
P.3. Grandiosity	2.10 (1.601)	2.02 (1.700)	.777
P.4. Perceptual Abnormalities	2.63 (1.530)	3.23 (1.026)	**.002**
P.5. Disorganized Communication	2.75 (1.300)	2.70 (1.397)	.846
Total Positive Sx Score	14.18 (4.248)	15.30 (3.526)	.075
Negative Symptoms			
N.1. Social Anhedonia	3.62 (1.513)	3.33 (1.564)	.248
N.2. Avolition	3.43 (1.624)	3.15 (1.619)	.312
N.3. Expressed Emotion	2.30 (1.730)	1.61 (1.612)	**.018**
N.4. Experience of Emotions & Self	2.45 (1.821)	2.70 (1.884)	.428
N.5. Ideational Richness	1.90 (1.437)	1.85 (1.398)	.831
N.6. Occupational Functioning	3.77 (1.752)	3.78 (1.618)	.970
Total Negative Sx Score	17.44 (6.511)	16.41 (6.602)	.351
Disorganized Symptoms			
D.1. Odd Behavior or Appearance	2.57 (1.352)	2.67 (1.334)	.650
D.2. Bizarre Thinking	2.44 (1.477)	2.96 (1.299)	**.026**
D.3. Trouble with Focus/Attention	3.09 (1.202)	3.37 (1.218)	.167
D.4. Personal Hygiene	1.63 (1.690)	1.76 (1.448)	.638
Total Disorganized Sx Score	9.73 (3.775)	10.80 (3.625)	.091
General Symptoms			
G.1. Sleep Disturbance	2.50 (1.727)	3.17 (1.539)	**.014**
G.2. Dysphoric Mood	3.05 (1.548)	3.72 (1.393)	**.009**
G.3. Motor Disturbance	1.92 (1.579)	1.98 (1.570)	.825
G.4. Impaired Tolerance to stress	3.91 (1.843)	3.91 (1.749)	.982
Total General Sx Score	11.38 (4.211)	12.78 (3.949)	**.046**
Global Functioning Scale (GFS): Social	5.40 (1.738)	5.55 (1.671)	.671
Global Functioning Scale (GFS): Role	5.27 (2.403)	5.96 (1.850)	.117

Note: Scores for individual SIPS symptoms range from [0–6]; Total Positive score = [0–30]; Total Negative score = [0–36]; Total Disorganized score = [0–24]; Total General score = [0–24]; GFS: Social & Role = [1–10]; GAF = [0–100]

Table 3

Difference in Positive Symptoms by Trauma Category *N*=200

	No Trauma (*n*=153)	Non-sexual Trauma (*n*=26)	Sexual Trauma (*n*=21)	Difference b/w group means (p-value)
Positive Symptoms	Mean(SD)	Mean(SD)	Mean(SD)	
P.1. Unusual Thought content	3.44 (1.12)	3.65 (0.85)	4.10 (0.89)	**0.029**
P.2. Suspiciousness	3.29 (1.23)	3.19 (1.39)	3.86 (0.79)	0.114
P.3. Grandiosity	2.10 (1.60)	1.65 (1.67)	2.48 (1.66)	0.22
P.4. Perceptual Abnormalities	2.63 (1.53)	3.00 (1.13)	3.52 (0.81)	**0.019**
P.5. Disorganized Communication	2.75 (1.30)	2.58 (1.58)	2.86 (1.15)	0.76

Note: Scores for individual SIPS symptoms range from [0–6]