

## Research Article

# Life Course Challenges Faced by Siblings of Individuals with Schizophrenia May Increase Risk for Depressive Symptoms

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## ABSTRACT

**Background:** Research suggests siblings of individuals with schizophrenia are at a heightened risk for depressive symptomatology. Research has not yet examined whether the strains of growing up with a brother or sister with schizophrenia contribute to this risk. This study examined whether early life course burdens associated with an emerging mental illness, and current objective and subjective caregiver burden predicted depressive symptoms in siblings of individuals with schizophrenia.

**Method:** Forty-one siblings of individuals with schizophrenia were recruited from a large study of schizophrenia neurobiology to complete a self-administered questionnaire and a neuropsychological test battery.

**Results:** Early life course burdens and current objective and subjective burdens explained incremental variance in depressive symptoms of siblings of individuals with schizophrenia after accounting for gender and global neurocognitive function.

Higher levels of depressive symptoms among siblings were associated with perceptions of being stigmatized by the community ( $\beta=.37, p<.01$ ), and perceiving that the brother or sister's emerging illness negatively impacted the sibling's social life during childhood and adolescence ( $\beta=.39, p<.01$ ). Taking on adult responsibilities while the sibling was growing up was found to be protective against depressive symptoms in adulthood ( $\beta= -.36, p<.01$ ).

**Conclusions:** Early life course burdens associated with having a sibling with schizophrenia and current subjective burden provide insight into psychosocial factors that may contribute to the risk for depression in this sibling group. Mental health service providers and psychoeducation programs would benefit by considering these factors when developing family-based interventions.

**MeSH Headings/Keywords:** Siblings; Schizophrenia; Depression; Burden

## Introduction

The literature suggests that siblings of individuals with schizophrenia have an increased risk for depressive symptoms [1-3]. A primary risk for this association could be the siblings' increased genetic susceptibility to mental illness given their family history of schizophrenia [4]. Vulnerability may also be conveyed by the attenuated cognitive function that characterizes this sibling group and has been associated with increased risk for depression [5,6]. Sibling gender may convey additional vulnerability to depression as females are more susceptible to depression than males [2].

Although these heritable and trait-based vulnerabilities as well as shared environmental risk factors may increase the risk

for depression among siblings, the chronic strains associated with coping with having a brother or sister with schizophrenia may further heighten their risk of depressive symptoms. Schizophrenia typically occurs during late adolescence, which means that many siblings are in their formative years when their brother or sister develops psychosis. Alternatively, siblings may already be adults when their brother or sister begins showing signs of schizophrenia, which may interfere with current life goals (e.g., attending college, beginning a career, starting a family) [7]. As such, these siblings are faced with the challenge of coping with psychotic symptoms as well as increased familial burdens from childhood to adulthood [7,8]. These experiences can be detrimental to individual core belief systems, and as such, increase risk for depressive symptoms [9]. For instance,

the need to cope with these challenges may interfere with the sibling's social life (e.g., spending less time with friends or taking part in fewer afterschool activities) or may require the sibling to take on parenting responsibilities (i.e., parentification) to help support their family [7,8]. Hence, these early life course burdens associated with coping with a sibling's emerging illness could create additional risk for developing negative mental health outcomes [10,11].

Siblings may also face objective and subjective burdens in their current life that could increase the risk of depression [12]. For example, some studies suggest that providing instrumental care to a relative with schizophrenia (i.e., objective burden) has been associated with greater depressive symptoms in parental caregivers [13,14]. As such, siblings providing care for a brother or sister with schizophrenia may face similar risks and burdens [15]. In addition, siblings may feel their community stigmatizes families with a relative who was diagnosed with a mental illness or who receives mental health services [16-18], which may contribute to poorer mental health outcomes such as depression [16].

In summary, the existing literature suggests that siblings of individuals with schizophrenia are vulnerable to depressive symptoms. Although this risk may be conveyed by heritability, reduced cognitive function, or gender, the psychosocial factors that may contribute to this risk are largely unknown. Thus, we used an integrated framework of the Stress and Life Course theories [19-21] to investigate whether early life course burdens and current objective and subjective burdens explained significant variation in depressive symptoms among siblings of individuals with schizophrenia after accounting for vulnerabilities to depression (i.e., cognitive impairment and gender).

## Methods

### Sample

Participants included forty-one siblings of individuals with schizophrenia who completed a self-reported survey. The siblings were recruited from a sample of individuals with schizophrenia and their respective siblings as well as healthy controls and their siblings who participated in a larger study using a four group design to examine the neurobiological and cognitive endophenotypic markers of schizophrenia at the Conte Center for the Neuroscience of Mental Disorders at Washington University in St. Louis. As research participants at the Conte Center, the siblings were asked to complete an additional survey that provided data for the current study. Institutional Review Board approval was obtained from Washington University in St. Louis and Northwestern University Feinberg School of Medicine, and all participants provided informed consent.

Participants were assessed for the presence of DSM-IV Axis I disorders using the Structured Clinical Interview for DSM-IV-TR [22] that was administered by Master or PhD-level researchers. Participants were excluded if they had a lifetime history of any Axis I psychotic disorder, but not for other Axis I disorders. Additional exclusion criteria can be found in more detail here [23]. Demographic characteristics of the siblings were obtained during a clinical interview (age, gender, race).

### Measures

Depressive symptoms were measured using the Center for Epidemiological Studies-Depression scale (CES-D) [24]. The CES-D consists of 20 items that rate the frequency of depressive symptoms over the past week ( $\alpha=.85$ ).

Vulnerability factors included global neurocognition and participant gender. Global neurocognition was computed by averaging four standardized domain scores that are characteristic of neuropsychological impairment in schizophrenia, including crystallized IQ, working memory, episodic memory, and executive function. Siblings of individuals with schizophrenia completed individual subtests from a neuropsychological battery used to study neurocognitive impairment in schizophrenia [25]. The global score used in this study was derived from individual domain scores that were previously published [23]. Details on the individual subtests associated with each neurocognitive domain and the methods to standardize them can be found here [23].

The study included two early life course burdens faced by children and adolescents coping with a sibling's emerging mental illness. One was a measure of the impact on the sibling's social activity during childhood and adolescence resulting from their brother or sister's emerging illness. The second was a measure of the extent to which sibling participants felt parentified during his or her formative years due to the emerging mental illness of their brother or sister. These subscales were created using items from an inventory examining the perceived impact of schizophrenia on sibling development during their formative years. First, all participants were asked to think about "What was it like growing up (9-17 years old) in your family even if your sibling was not diagnosed with schizophrenia at that time." Siblings were asked to reference their brother/sister with schizophrenia who was concurrently enrolled with them in the larger Conte Center study. Then they were asked to complete 9 items examining the frequency with which they perceived impacts on their social life and feelings of being parentified. These items were developed from qualitative research examining siblings of individuals with schizophrenia suggesting that coping with a brother or sister's mental illness during the formative years impacts well-being during adulthood [7,8].

The measure of impact on social activities during the siblings' childhood and adolescence was composed of 5 items ( $\alpha=.79$ ). Sample items included: "I had less time to make friends due to my family responsibilities" and "I felt isolated from afterschool activities such as sports or participating in clubs because of my brother/sister." The parentification scale included 4 items ( $\alpha=.70$ ): "I felt like I took on more family responsibilities than my friends or peers," "I felt like a parent more than a sibling to my brother/sister," "My parents leaned on me a lot to help my brother/sister," and "I was very involved in trying to help my brother/sister." Individual items for each subscale were rated on a 4-point scale (ranging from 0:never to 3:often).

Objective burden was measured as the extent of instrumental support (i.e., current care) provided to the brother or sister with schizophrenia by the sibling participant using an 8-item objective caregiver burden scale rated on a 4-point scale (ranging

from 0: not at all to 3: a lot) (26) ( $\alpha=.75$ ). Subjective burden was operationalized as a measure of stigma using the Devaluation of Consumer Families Scale [17]. This 7-item scale was scored on a 4-point scale (0=strongly disagree to 3=strongly agree) and reflected the extent to which responders perceived that families of relatives with mental illness were being stigmatized or devalued by the community ( $\alpha=.84$ ).

### Data Analysis

Descriptive statistics were used to characterize the siblings' depressive symptom scores, vulnerability factors, early life course burdens, and current objective and subjective burdens. We used a hierarchical regression to analyze whether early life course burdens and current levels of objective and subjective burden explained unique variance in depressive symptoms after accounting for the variance explained by global neurocognitive function and gender. Individual beta values were examined to determine whether each construct independently predicted depressive symptoms.

### Results

We found that siblings of individuals with schizophrenia were young adults (mean age=23.5 years,  $sd=4.6$ ), and their brother or sister began experiencing psychotic symptoms during mid-adolescence (mean age=16.8 years,  $sd=4.5$ ). The majority of the siblings (61.5%) were younger than their brother or sister with schizophrenia at the time of illness onset. Siblings who were younger at the age of onset ( $n=24$ ) and siblings who were older at the age of onset ( $n=17$ ) had similar durations of exposure to their siblings' symptoms ( $m=6.6$  years,  $sd=2.7$  and  $m=6.7$  years,  $sd=4.2$ , respectively). The majority of siblings were female (53.7%) and Caucasian (58.5%).

Overall, the siblings of individuals with schizophrenia scored below the clinical high-risk cutoff of 16 for the CES-D (mean=12.2,  $sd=9.0$ ), however, 36.6% of the siblings scored higher than the cutoff of 16 ( $n=15$ ). The siblings demonstrated an attenuated standardized global neurocognitive function score (mean= -0.10,  $sd=0.5$ ) when compared to a sample of control subjects from the main study [23]. Means and standard deviations for early life course, objective, and subjective burdens can be found in Table 1.

For the hierarchical regression, gender and global neurocognition were entered into the Block 1, which explained 38.5% of the variance in depressive symptoms ( $F_{2,35}=10.9$ ,  $p<0.001$ ). In Block 2, the inclusion of the early life course burdens, and current objective and subjective burdens explained an additional 29.2% of the variance in depressive symptoms ( $F_{4,31}=7.0$ ,  $p<0.001$ ). Among the individual predictors in Block 2, we found that lower global neurocognitive functioning ( $\beta= -0.67$ ,  $p<0.001$ ), greater impact on social activity during childhood and adolescence ( $\beta=0.39$ ,  $p=0.003$ ), and stronger perceptions of stigma ( $\beta=0.37$ ,  $p<0.001$ ) predicted higher levels of depressive symptoms in siblings of individuals with schizophrenia. However, higher levels of parentification predicted fewer depressive symptoms ( $\beta= -0.36$ ,  $p=0.006$ ), while being female ( $\beta= -0.12$ ,  $p=0.31$ ) and the provision of instrumental support (e.g., hands on care) ( $\beta= -0.15$ ,  $p=0.19$ ) did not significantly predict depressive symptoms (Table 2).

**Table 1:** Mean (SD) of Family Burden Measures.

	(n=41)
<b>Early Life Course Burden</b>	
Impact on social activities	3.2 (3.4)
Parentification	5.5 (3.1)
<b>Objective Burden</b>	
Instrumental support	8.8 (4.8)
<b>Subjective Burden</b>	
Stigma (completed by n=39)	7.3 (3.9)

**Table 2:** Hierarchical regression with standardized beta coefficients predicting depressive symptoms.

	Block 1	Block 2
<b>Vulnerability Factors</b>		
Gender	-0.14	-0.12
Global neurocognition	-0.57***	-0.67***
<b>Early Life Course Burdens</b>		
Impact on social activities		0.39**
Parentification		-0.36**
<b>Objective Burden</b>		
Instrumental support		-0.15
<b>Subjective Burden</b>		
Stigma		0.37***
R <sup>2</sup>	0.385***	0.677***

\*\* $p<0.01$ , \*\*\* $p<0.001$

### Discussion

Our results are consistent with prior research suggesting that siblings of individuals with schizophrenia may have elevated depressive symptoms as compared to their age peers [1-3] as 36.6% of participants in the current study scored in a range that is at high risk for clinical depression [24]. To some extent this finding is not surprising given that siblings of individuals with schizophrenia are typically characterized by global neurocognitive deficits (5), which are associated with a greater vulnerability to depression [4]. Our findings extend prior work suggesting that siblings are at elevated risk for depression [1-3], by identifying that early life course burdens and societal stigma towards families coping with mental illness explain unique variance in a measure of depressive symptoms, while accounting for the influence of global neurocognitive impairment and gender. Specifically, we found that having a brother or sister with schizophrenia was negatively associated with siblings' social lives during childhood and adolescence. Specifically, the siblings reported their brother or sister's emerging mental health problems limited their ability to participate in extracurricular activities and to make friends during their formative years. These early life course experiences coping with their sibling's emerging illness were related to more depressive symptoms in adulthood. As such, service providers can use this evidence as a means to increase familial awareness of the ripple effect that schizophrenia may have on siblings during their formative years.

We also found that siblings of individuals with schizophrenia felt parentified during their formative years. The clinical literature suggests that parentification contributes to negative

outcomes as parentified children and adolescents face greater role strain and responsibilities than their peers [10]. However, we found that a self-perception of being parentified in siblings of individuals with schizophrenia was a protective factor against depressive symptoms. In our study, we may have measured a milder form of parentification in which the siblings had additional caregiving responsibilities but did not take on the full role responsibilities of the parent. This may have instilled the siblings with a sense of responsibility or purpose that enhanced self-esteem and equipped the siblings with effective coping strategies and other life skills that made them less vulnerable to depressive symptoms later in life. Future research is needed to examine these relationships more carefully before we can draw implications for clinical practice based on the current results.

We also examined whether subjective burden contributed to depressive symptoms, and found that perceptions of being stigmatized or feeling devalued by society was a significant predictor of depressive symptoms for siblings of individuals with schizophrenia. This finding is consistent with prior research suggesting perceived stigma is a contributing factor to depression in parental caregivers of individuals with bipolar disorder [26,27]. Moreover, a large body of literature suggests that relatives internalize stigma [18], which generates guilt and blame [28] and has been linked to depressive symptoms [16] in families coping with mental illness and developmental disabilities. Thus, it is not surprising that the link between stigma and depression extends to this sibling population. Although several programs have been designed to reduce stigma among consumers of mental health services, interventions targeting self-stigma and devaluation in family members are just emerging, with promising results [28]. Hence, findings from the current study reinforce the value that these newer programs may have for siblings.

There were some limitations that need to be considered when interpreting the results of this study. The sample is relatively small and cannot answer questions of an epidemiological nature (e.g., the rate of depression in siblings). Our results require replication by a larger cohort of siblings of individuals with schizophrenia to increase the explanatory power of the data. Also, this study analyzed cross-sectional data, and as such, longitudinal analyses are needed to validate the direction of these relationships and whether the observed depressive symptoms might result in a debilitating mood disorder. Lastly, the stigma measure used in this study may not directly reflect the extent to which siblings feel stigmatized. However, the perception of whether society stigmatizes family members still reflects the siblings' subjective experience of how the community may view their family and possibly influence whether they seek community-based support.

## Conclusions

The current study provides additional evidence that siblings of individual with schizophrenia may be at risk for elevated depressive symptoms. The findings also suggest that in order to understand the experience of siblings of individuals with schizophrenia, we need to assess how their brother or sister's emerging illness may have affected their early life course in addition to assessing current levels of burden. These findings help to inform the development of interventions needed to educate younger families coping with schizophrenia as to

the novel factors that may contribute to increased depressive symptoms among siblings. The results also emphasize the importance of including all family members in care plans that identify and incorporate psychoeducation regarding healthy strategies for coping with the stressors related to schizophrenia.

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