



Research Article

## Environmental Risk Factors and Schizophrenia Development

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### ABSTRACT

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**Objective:** To study the relationship between environmental risk factors and schizophrenia among the study subjects.

**Methodology:** A cross-sectional comparative study was conducted in 150 participants: 75 participants were diagnosed with schizophrenia and 75 levels of control. Participants were recruited through psychiatric outpatient departments of tertiary care hospitals. Researchers used a structured questionnaire to estimate environmental exposures, such as being raised in an urban area, childhood trauma, cannabis use and socioeconomic status. Data were analysed using the software package of statistical package and its version 25 by using chi square tests and logistic regression. A p value less than 0.05 was regarded as statistically significant.

**Results:** The result of the study was that the environmental risk factors were significantly more common among the schizophrenia patients than the controls. Childhood trauma was the strongest association (OR = 3.8, p of = 0.001), followed by urban upbringing (OR = 2.5, p = 0.002), cannabis use (OR = 2.3, p = 0.01) and low socioeconomic status (OR = 1.9, p = 0.04). These results show an unambiguous association between environmental exposures and the development of schizophrenia.

**Conclusion:** Environmental factors, especially traumatic events in early life, are a significant factor in the development of schizophrenia. The study highlights the need for preventive measures that can help to reduce the risk of exposure to modifiable risk factors and promote mental health awareness.

**Keywords:** Schizophrenia, Environmental Risk Factors, Childhood Trauma, Urbanization, Cannabis Use, Socioeconomic Status.

### INTRODUCTION

Schizophrenia is a severe and long-lasting mental side effect. It interferes with the perception, thought process, feelings and social interaction. About 1 % of people worldwide have it, and it is a major cause of disability(1). While genetics lend themselves to the disease, there is now increasing evidence that there is also a role for environmental factors in its onset and worsening(2). The neurodevelopmental hypothesis states that schizophrenia originates from problems with brain development, which is caused by a combination of genetic risk and environmental exposures. These exposures may occur before birth, during or around birth, or after birth and can alter pathways in the brain, which predispose a person to psychosis later on. Examples of such factors are maternal infections, complications during delivery and stress in the early stages of life(3,4).

Living in a city is one of the most consistent risks for schizophrenia from an environmental point of view. Studies find people brought up under urban areas are more likely to get schizophrenia than those brought up under rural areas(5). Suggestive explanations include increased social stress, pollution, diminished support of the community and increased density of the population(6,7). Childhood trauma like physical abuse, emotional neglect or witnessing violence is also strongly correlated with schizophrenia. Different sources Site Psychosis 17 Early trauma can disrupt the hypothalamic-pituitary-adrenal (HPA) axis and is associated with long-term stress sensitivity and increased risk of psychosis. These experiences may likewise change the thinking and feelings, leading to hallucinations and delusions(8,9).

Usage of substances, particularly cannabis, is a major risk of environmental side-effects. Many studies prove that the use of cannabis, especially during adolescence, increases the risk of going insane with schizophrenia and other psychotic disorders. The risk appears to be greater in persons who have a genetic susceptibility(10). Cannabis may influence the signalling of dopamine, which plays a major role in schizophrenia. Socioeconomic status (SES) is also important. People

from lower SES can also often face chronic stress, lack of healthcare and poor living conditions, all of which can contribute to mental illness(11). The social drift hypothesis proposes that early symptoms of schizophrenia can cause one to become socially mobile downward making the relationship between SES and schizophrenia more difficult(12).

Risk factors such as migration and social isolation are also contributing factors for risk of schizophrenia. Migrants, possibly from ethnic minority groups, are higher in rate of schizophrenia. This may be because of discrimination, cultural displacement and social exclusion(13). These factors add up to psychological stress, and can elicit psychotic symptoms. Although much research exists in the world, more context specific research is required in the developing countries. Environmental exposures there are different because of cultural, economic, and healthcare differences. Understanding these local factors is critical in developing such specific prevention and intervention strategies.

### AIM OF THE STUDY

To determine the correlation of a relationship between environmental risk factors and risk factors related to the onset of schizophrenia.

### OBJECTIVE

To study the relationship between environmental risk factors and schizophrenia among the study subjects.

### METHODOLOGY

This cross-sectional comparative research study investigated the association between risk factors in the environment and schizophrenia. The design allowed for the comparison of environmental exposures of an exposed group with a control group of healthy individuals over a given period of time. Participants were adults 18-45 years old, who were recruited from psychiatric outpatient departments at tertiary care hospitals. The study included 150 participants: 75 patients with schizophrenia and 75 healthy controls recruited from the generic societal population. Participants were recruited with the use of non probability convenient sampling in order to meet the inclusion criteria.

### Inclusion Criteria

Participation of the study was people between the ages of 18 and 45 years old, regardless of their gender. They needed to meet the diagnostic criteria for schizophrenia outlined in DSM-IV according to DSM-5. Control participants had no psychiatric illness history. All the study participants provided informed consent before enrolment in the study.

### Exclusion Criteria

- Participants were excluded if they had other major psychiatric disorders.
- Individuals who had neurological illnesses were excluded.
- Participants who were severely mentally impaired and interfered with data collection were excluded.
- Individuals with a history of dependence on other substances other than cannabis were excluded.
- Participants with chronic medical conditions that impacted on mental health were excluded.
- Individuals who were unable to reliably provide information were excluded in an attempt to reduce confounding.

### DATA COLLECTION

Information pertaining to demographics of the participants, urban or rural origin, childhood trauma, cannabis use and the socioeconomic status was collected from structured, pre-tested questionnaires and face-to-face interviews. Where possible, clinical data for schizophrenia patients were confirmed by the review of medical records.

### DATA ANALYSIS

The data were entered in to the statistical package, which is SPSS version 25 and summarised using descriptive statistics: frequencies, percentages, means and standard deviations. The relationship between environmental risk factors and schizophrenia was investigated using chi-square tests and by means of logistic regression. Results were accepted as significant if  $p < 0.05$ .

### RESULTS

**Table 1: Demographic Characteristics of Participants**

Variable	Schizophrenia Patients (n=75)	Controls (n=75)	p-value
Age (Mean ± SD)	28.4 ± 6.2	27.9 ± 5.8	0.62
Male	45 (60%)	41 (54.7%)	0.51
Female	30 (40%)	34 (45.3%)	—
Married	32 (42.7%)	40 (53.3%)	0.18
Unmarried	43 (57.3%)	35 (46.7%)	—

**Table 1** summarizes the demographic issues of study participants. The average age of patients with schizophrenia was  $28.4 \pm 6.2$  years, while the control group averaged  $27.9 \pm 5.8$  years, a difference that was not statistically significant

( $p = 0.62$ ). The distribution of genders was similar between groups. Males represented 60 % of the patient cohort and 54.7 % of the controls, whereas females comprised 40 % and 45.3 %, respectively; these differences were not significant ( $p = 0.51$ ). Marital status also showed no meaningful difference, although 53.3 % of controls were married compared to 42.7 % of patients. On short, both groups were similar with respect to baseline demographic characteristics.

**Table 2: Distribution of Environmental Risk Factors**

Risk Factor	Patients (n=75)	Controls (n=75)	p-value
Urban upbringing	51 (68%)	32 (42.7%)	0.002
Childhood trauma	41 (54.7%)	15 (20%)	0.000
Cannabis use	29 (38.7%)	11 (14.7%)	0.001
Low socioeconomic status	45 (60%)	26 (34.7%)	0.003

Distribution of environmental risk factors of patients with schizophrenia and control subjects are depicted in table 2. A significantly larger share of patients (68%) grew up in urban areas compared with controls (42.7%) ( $p = 0.002$ ). Childhood trauma was reported by 54.7% of patients, a striking difference from the 20% of controls; this difference is highly significant ( $p < 0.001$ ). Cannabis use was also more common among patients (38.7%) than controls (14.7%) ( $p = 0.001$ ). Moreover, 60% of patients had low socioeconomic status, compared with 34.7% of controls ( $p = 0.003$ ). Overall, exposures to the environment were much more common among schizophrenics.

**Table 3: Logistic Regression Analysis of Risk Factors**

Variable	Odds Ratio (OR)	95% Confidence Interval	p-value
Childhood trauma	3.8	2.1 – 6.9	0.000
Urban upbringing	2.5	1.4 – 4.3	0.002
Cannabis use	2.3	1.2 – 4.4	0.01
Low socioeconomic status	1.9	1.0 – 3.5	0.04

Table 3 presents the findings of a logistic regression, done to examine the strength of the association of various environmental risk factors with schizophrenia. Childhood trauma was the strongest predictor, with an odds ratio of 3.8 (95 % CI: 2.1–6.9,  $p < 0.001$ ); this means people with a history of trauma were nearly four times more likely to develop schizophrenia. Urban upbringing was also associated significantly (OR=2.5,  $p=0.002$ ), as was cannabis use (OR=2.3,  $p=0.01$ ). Socioeconomic status (low) had a moderate association with risk (OR 1.9,  $p 0.04$ ). These findings amplify the value of environmental factors on risk of schizophrenia.

**Table 4: Frequency of Exposure to Environmental Risk Factors (Patients Only)**

Risk Factor	Frequency (n=75)	Percentage (%)
Urban upbringing	51	68%
Childhood trauma	41	54.7%
Cannabis use	29	38.7%
Low SES	45	60%

Table 4 displays the frequency of exposure of schizophrenia patients to the risk factors in their environment. The most frequent factor was urban upbringing (68%), followed by low socioeconomic status (60%). More than half of the patients (54.7%) reported childhood trauma, while cannabis use was found in 38.7% of cases. These findings suggest that a number of environmental risk factors often co-occur among people with schizophrenia.

**Table 5: Subgroup Analysis by Gender (Patients Only)**

Risk Factor	Male (n=45)	Female (n=30)	p-value
Urban upbringing	32 (71.1%)	19 (63.3%)	0.48
Childhood trauma	26 (57.8%)	15 (50%)	0.52
Cannabis use	22 (48.9%)	7 (23.3%)	0.02
Low SES	28 (62.2%)	17 (56.7%)	0.64

Table 5 presents a gender stratified analyses of environmental risk factors in the psychosis patients with schizophrenia. Urban upbringing and low socioeconomic status were slightly more common in males i.e., 71.1 % and 62.2 %, than in females i.e., 63.3 % and 56.7 %. Compared to no estimates of the differ between the two patterns are not statistically significant but are notable patterns. Childhood trauma was marginally higher in males (57.8 %) than in females (50 %), with no significant association ( $p = 0.52$ ). In contrast, cannabis use was significantly more frequent in male patients

(48.9%) compared to female patients (23.3%) ( $p=0.02$ ). These results imply that gender differences may influence particular exposures to the environment, and in particular substance use.

## DISCUSSION

The purpose of the present study was to assess the effect of environmental risk factors on the development of schizophrenia. Results revealed that there is significant association between childhood trauma, growing up in an urban environment, Cannabis use and low socioeconomic status in schizophrenia are findings that support the growing evidence that environmental exposures are important in the onset of the disorder. Childhood trauma turned out to be the greatest predictor of schizophrenia. People who experienced early adverse events were far at increased risk. This aligned with previous studies, such as a meta-analysis by Robinson & Bergen that found a strong link between childhood adversity and psychosis(14). Bany Muhammad et al., also noted that traumatic experiences can long term dysregulate stress response systems, especially the hypothalamic-pituitary-adrenal axis, increasing one's vulnerability to psychotic symptoms. Together, these data support a neurodevelopmental model of early-life stress in which it interferes with normal brain growth and promotes a vulnerability to developing psychiatric illness(15).

Urban upbringing was also considerably linked to schizophrenia. People who grew up in cities were even more prone to developing the disorder than people from rural areas. This is consistent with the findings of Pedersen et al., who found urbanicity to be a consistent risk factor(16). The increased risk could be due to social stress, environmental pollution, overcrowding and a lack of social support. Such stressors can interact with genetic predisposition and increase the probability to psychosis. Another important factor was cannabis use. The study found that the cannabis users, especially the males, had a higher risk of getting schizophrenia moreover. This is similar to the work of Beyer et al., which showed a strong link between cannabis and psychosis especially for those who start using it as adolescents(17). Cannabis is believed to have an effect on the dopamine pathways in the brain, which are important in the pathophysiology of schizophrenia. The observed gender difference could be due to higher rates of substance use among men in many societies.

Low socioeconomic status was also among the strong links with schizophrenia. Individuals from poorer backgrounds were more likely to have the disorder, presumably from chronic stress, low access to health care and poor living conditions. Fond et al., made an important point regarding the role of socioeconomic disadvantages in mental illness. The hypothesis of social drift states that early schizophrenia symptoms can cause downward social mobility, complicating the socioeconomic and mental health correlation further(18). These results are consistent with wider research underlining the role of environmental exposures in schizophrenia. Wahbeh & Avramopoulos stressed that stress in the womb, infections, and social adversity have a major influence of risk for schizophrenia, with individuals with genetic vulnerability being at most risk. This supports the hypothesis that schizophrenia is a multifactorial disease that is caused by complex interactions between gene and environment rather than genetics alone(19).

Overall, the results of this study are in line with current literature and support the hypothesis that environmental factors play a crucial role in the development of schizophrenia. The abundance of risk factors found in most patients implies a cumulative effect that each of these adverse conditions added increases the likelihood of onset of the disease. However, there are a few limitations that should be mentioned when interpreting these results. The cross-sectional format restricts the ability to draw cause and effect inferences and an excessive use of self-reported data may cause recall bias. Despite these limitations, the study provides valuable information about risk factors for schizophrenia that are linked to the environment in this local context.

## CONCLUSION

The current study showed that the environmental risk factors, namely childhood trauma, growing up in an urban environment, cannabis use, and socioeconomic status, were closely associated with the development of schizophrenia. Among these, childhood trauma was the most powerful predictor, highlighting the critical impact of experiences in early life on mental health outcomes. The results strengthen the neurodevelopmental model showing how schizophrenia emerges out of a complex interaction of environmental exposures and individual vulnerability. These findings emphasize the need for early identification and specific intervention strategies to alter environmental risk factors. Improving social conditions, increasing awareness about substance use, and providing psychological support to those who have been traumatized by the condition, can help alleviate the burden of schizophrenia. Additional longitudinal research is necessary to establish causation as well as gain a better understanding of the mechanisms of these associations.

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