



ORIGINAL RESEARCH

Protective Effect of Being Born in Autumn Against Schizophrenia or Schizoaffective Disorder

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Abstract

Objective: Birth season, one of the environmental factors in the etiology of schizophrenia, has been considered as a risk factor and various studies have been conducted. Some studies on the relationship between season of birth and schizophrenia have emphasized that, while being born in winter is a risk factor, being born in summer and autumn should be investigated as a protective factor. The aim of our study is to determine whether being born in autumn is a protective factor for being diagnosed with schizophrenia/schizoaffective disorder.

Methods: It was aimed to determine the relationship between the diagnosis of schizophrenia or schizoaffective disorder and the season of birth by comparing the seasons of 832 patients diagnosed with schizophrenia or schizoaffective disorder who were admitted to Trakya University Faculty of Medicine psychiatry outpatient clinics or hospitalized in the psychiatric clinic between 2005 and 2023, with 17.360.594 live births that took place in Turkey since 2009.

Results: Season ($p=0.018$) and gender ($p<0.001$) variables showed a statistically significant difference between the patient and control groups. When being born in autumn is taken as a reference, it has been determined that being born in winter increases the risk of being diagnosed with schizophrenia or schizoaffective disorder by 1.36 times ($p=0.001$), being born in spring by 1.25 times ($p=0.014$), being born in summer by 1.18 times ($p=0.045$) and using being female as a reference, being born as male increases the risk of being diagnosed with schizophrenia or schizoaffective disorder by 1.32 times ($p<0.001$).

Conclusion: According to the results of our study, being born in winter is a risk factor for being diagnosed with schizophrenia-schizoaffective disorder, while being born in autumn is a protective risk factor for being diagnosed with schizophrenia-schizoaffective disorder.

Keywords: Schizophrenia, Psychotic Disorders, Parturition

INTRODUCTION

Birth season, one of the environmental factors in the etiology of schizophrenia, has been considered as a risk factor and various studies have been conducted. The majority of past studies on the relationship between schizophrenia and season of birth have focused more on the risk factor of being born in winter and tried to explain this relationship. Researching the relationship between schizophrenia and season of birth has various obstacles due to the relationship between meteorological variables, epidemics of infection and

many other factors (2). Many hypotheses have been produced while explaining this relationship. Examples of these are the vitamin D hypothesis (1), maternal infections hypothesis (2), climatic exposure hypothesis (3) and chronobiological hypothesis (4).

Some studies on the relationship between season of birth and schizophrenia have emphasized that, while being born in winter is a risk factor, being born in summer and autumn should be investigated as a protective factor (5, 6).

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In a study conducted by Dora et al.(2004) in our country, being born in spring was identified as a risk factor, and although winter births were high, no significant difference was found. In the same study, when births in the winter-spring season were calculated together, it was found that the number of births was 50% higher than the sum of summer-autumn births (7).

The relationship between schizophrenia and season of birth is considered important in researching the etiology of schizophrenia. Therefore, it is useful to investigate this relationship in terms of whether being born in autumn is a protective factor. The aim of our study is to examine the relationship between season of birth and having schizophrenia and to determine whether being born in autumn is a protective factor.

METHODS

Ethical approval was received for the study by the Trakya University Faculty of Medicine Non-Interventional Scientific Research Ethics Committee. (Approval with protocol code 2023/279 dated 28.08.2023.)

Between 2005 and 2023, 1098 patients diagnosed with schizophrenia or schizoaffective disorder who applied to the psychiatry outpatient clinics of Trakya University Faculty of Medicine or were admitted to the psychiatric clinic were identified. Patients were identified through retrospective scanning via Trakya University Faculty of Medicine Hospital Information Management System. Among these patients, those born on January 1st were thought to have been recorded as January 1st, possibly because their date of birth was unknown or with incorrect or incomplete information, and they were not included in the study. The remaining 832 patients were included in the study.

Considering the increase in births in the summer months and the decrease in the winter months in the Northern Hemisphere, the control group of our study was determined as live births in Türkiye since 2009, which we think represent Türkiye's birth trend. It was aimed to determine the relationship between the diagnosis of schizophrenia or schizoaffective disorder and the season of birth by comparing the birth seasons of 832 patients with known birth dates with the seasons of 17,360,594 live births (8) that have occurred in Türkiye since 2009. At the same time, these patients were divided into men and women according to their identity information,

and the relationship between being diagnosed with schizophrenia or schizoaffective disorder and being born male or female was examined.

RESULTS

832 patients diagnosed with schizophrenia or schizoaffective disorder, who were evaluated after inclusion and exclusion criteria, were determined as the patient group. 17,360,594 live births (8) in Türkiye since 2009 were determined as the control group.

The patient group and the control group were compared with the Pearson Chi Square test. Season ($p=0.018$) and gender ($p<0.001$) variables showed a statistically significant difference between the patient and control groups (Table 1).

Table 1. Comparison of the control group and the patient group using the Pearson Chi Square test.

	Patients	Controls	p
Season,	n (%)	n (%)	
Winter	225 (27,1)	4119203 (23,7)	0.018
Spring	208 (25,0)	4149017 (23,8)	
Summer	225 (27,1)	4742571 (27,3)	
Autumn	174 (20,8)	4349803 (25,2)	
Gender	n (%)	n (%)	
Male	485 (58,3)	8913087 (51,4)	<0.001
Female	347 (41,7)	8447507 (48,6)	

While the percentage of winter births was 27.1% in the patient group, it was 23.7% in the control group. It was determined that 20.8% of the patients were born in autumn, while 25.2% of the control group was born in autumn. Patients were also compared according to gender variable. It has been determined that being male is a risk factor for the diagnosis of schizophrenia or schizoaffective disorder ($p<0.001$). When being born in autumn is taken as a reference, it has been determined that being born in winter increases the risk of being diagnosed with schizophrenia or schizoaffective disorder by 1.36 times (OR:1.36 %95 CI:1.12-1.66, $p=0.001$), being born in spring by 1.25 times (OR:1.25 %95 CI:1.02-1.53, $p=0.014$), being born in summer by 1.18 times (OR:1.18 %95 CI:0.97-1.44, $p=0.045$), and using being female as a reference, being born as male increases the risk of being diagnosed with schizophrenia or schizoaffective disorder by 1.32 times (OR:1.32 %95 CI:1.15-1.52, $p<0.001$) (Table 2).

Table 2. Risk rates of being born in other seasons when autumn is taken as a reference, and risk rates of being born male when being born female is taken as a reference.

	OR (%95CI)	p
Season		
Winter	1.36 (1.12-1.66)	0.001
Spring	1.25 (1.02-1.53)	0.014
Summer	1.18 (0.97-1.44)	0.045
Autumn	ref	
Gender		
Male	1.32 (1.15-1.52)	<0.001
Female	ref	

DISCUSSION

In the light of previous studies conducted on the relationship between the season of birth and schizophrenia (5,6) it is important whether being born in winter is a risk factor, as well as being born in summer and autumn is a protective factor.

In a study examining the relationship between the birth season and schizophrenia in the northern hemisphere, it is noteworthy that spring winter births are significantly more than autumn summer births, and this relationship has a small but significant increase with the increase in latitude (9).

A recent meta-analysis study involving 43 studies identified being born in winter as a risk factor and found that the risk of schizophrenia in the northern hemisphere decreases with being born in summer and autumn (10).

In our study, we found that being born in autumn is a protective factor for receiving a diagnosis of schizophrenia-schizoaffective disorder, and being born in winter is a risk factor for receiving a diagnosis of schizophrenia-schizoaffective disorder.

Being born in the male gender is a well-known schizophrenia risk factor. It has been emphasized that this difference may be a result of structural abnormalities of the brain that occur during gender differentiation or later (11). A meta-analysis conducted in 2003 stated that being born male increased the risk of schizophrenia, with a risk ratio similar to that in our study. (12). In our study, we also found that being born in the male gender increases by 1.32 times for the diagnosis of schizophrenia-schizoaffective disorder, in accordance with the literature.

Considering the increase in births in the summer months and the decrease in winter months in the Northern Hemisphere, we thought it would be important to

determine a control group for our study that we thought would represent Türkiye's birth trend. The possibility of including schizophrenia patients in the control group of our study is a limitation of our study, but it is not possible to identify these people with the data we have. Although there are significant differences between the places where studies were conducted, it is stated that the prevalence of schizophrenia varies between four and seven per 1000 people (13). Therefore, this risk in the control group is negligible. Even if the birth data of our study were taken from the Trakya University Faculty of Medicine Hospital Information Management System, which depends on the identity declaration, errors that may occur during the population registration of individuals or incomplete or incorrect records that may be made during hospital registration can also be seen as a limitation of our study. In addition, those born on January 1st were thought to have been recorded as January 1st on their identity cards, possibly because their date of birth was unknown or with incorrect or incomplete information, and they were not included in the study. Despite this exclusion, it is important that being born in winter is a statistically significant risk factor for the diagnosis of schizophrenia.

Being born in winter is a risk factor for being diagnosed with schizophrenia and the contribution of this relationship to the etiology of schizophrenia has been examined in many studies. Studies on the effect of season of birth on schizophrenia have not fully elucidated the relationship. The fact that winter birth is a risk factor for schizophrenia has been tried to be explained by latitude, low newborn vitamin D levels (1) and the peak of infections such as influenza in winter months. It has been suggested that cold climate, along with increasing latitude, is associated with an increase in the risk of schizophrenia. It has been stated that this effect can be shown as both cold climate exposure and decreased exposure to sunlight with increasing latitude, and an increase in vitamin D deficiency with other environmental effects (wearing thicker clothing, reducing sun exposure because of clothing, etc.) (14).

It has not been clarified whether environmental factors are a greater risk factor for this effect, after birth or during one of the trimesters of pregnancy, and further studies are needed. Recent studies show that maternal infections during the 2nd trimester of pregnancy increase the risk (15). It is important to show in a meta-analysis study the association of increased Enterovirus infection in the summer months, which coincides with

the 2nd trimester of winter-born pregnancy (16).

The risk factor relationship may also be related to the reproductive habits of individuals at risk of schizophrenia. A study showed that both schizophrenia patients and non-patient siblings were more likely to be born in winter or spring. This situation has been associated with deficiencies in family planning of parents of schizophrenia patients. Because giving care to a newborn baby in the summer months is a seasonally appropriate time. This situation has also been associated with the possibility that genetic factors in individuals at risk of schizophrenia provide greater endurance to winter months. The third possibility is that these pregnancies are associated with more premature births (17).

More studies are needed to elucidate the relationship between season of birth and schizophrenia. Considering the protective effect of being born in autumn in future studies on the relationship between birth season and schizophrenia may contribute to the elucidation of the relationship.

CONCLUSION

According to the results of our study, being born in winter is a risk factor for being diagnosed with schizophrenia-schizoaffective disorder, while being born in autumn is a protective risk factor for being diagnosed with schizophrenia-schizoaffective disorder. In future studies, examining being born in autumn as a protective factor may make important contributions to elucidating the etiology of schizophrenia.

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Author Contributions:

Research idea: SÖ, YG.

Design of the study: SÖ, YG.

Acquisition of data for the study: SÖ.

Analysis of data for the study: SÖ.

Interpretation of data for the study: SÖ, YG.

Drafting the manuscript: SÖ, YG.

Revising it critically for important intellectual content: YG.

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