

Parental Risk Factors Schizophrenia

by Ziske Maritska

Submission date: 21-Aug-2022 09:22AM (UTC+0700)

Submission ID: 1884826068

File name: Parental_Risk_Factors_Schizophrenia_August,_2022.pdf (348.08K)

Word count: 2586

Character count: 14767

Parental Risk Factors in Schizophrenia: The Apple Does Not Fall Far from the Tree

Ziske Maritska¹, Bintang Arroyantri Prananjaya², Nita Parisa³, Puji Rizki Suryani², Friska Anggraini⁴, Safa Nabila Putri⁴, Jesica Putri Salim⁴,
Mohammad Hilal Athariq Ramadhan⁵

¹Department of Biology Medicine, ²Department of Psychiatry, ³Department of Pharmacology, ⁴Undergraduate Student, ⁵Graduate Student,
Faculty of Medicine, Universitas Sriwijaya, Palembang, South Sumatera, Indonesia

Abstract

1
Despite its common prevalence, the etiology of schizophrenia is still elusive. Some studies suggest the involvement of several neurotransmitters, while some point out the role of genetics and environmental factors in the development of schizophrenia. Among varied proposed risk factors, several parental characteristics might constitute the risk factors for schizophrenia. Parental age, migration, and parental socioeconomic status are some of the suggested risk factors related to the development of schizophrenia in the offspring. This review aims to briefly discuss the three parental risk factors concerning the incidence of schizophrenia in the offspring.

Keywords: Migration, parental age, parental risk factors, risk factors, schizophrenia, socioeconomic status

INTRODUCTION

Eugen Bleuler came out with the term schizophrenia in the 20th century. It comes from the Greek word schizo means split, and phren means mind.^[1] It is defined as a functional psychotic disorder marked by delusions, hallucinations, and disturbances in thinking, perception, and behavior.^[1] People with schizophrenia will show various symptoms. There are two main categories of schizophrenia symptoms: positive and negative symptoms. Positive symptoms of schizophrenia include hallucinations, delusions, and distortion in thinking,^[1,2] while negative symptoms cover anhedonia, disorganized speech, and lack of motivation.^[1,2] In addition to these two symptoms, people with schizophrenia will also have disturbance in their cognitive function.^[1,2]

Schizophrenia becomes one of the global public health issues as it affects nearly 1% of the adult population worldwide, with a slight gender predilection in men.^[1] Its prevalence showed an increasing trend, with a 0.63% prevalence in 2011 rise to 0.94% in 2015.^[3] It is also one of the conditions that correlate with social and economic conditions, where many of its patients become unemployed and homeless after diagnosed with schizophrenia.^[2] The majority of the patients also suffered from comorbidities, both physically and mentally, leading to disabilities. Their life

expectancy reduced to almost a quarter from the population, where about 40% of it is associated with suicide.^[1,4]


The famous culprits

There have been numerous proposed theories regarding the pathogenesis of schizophrenia. One of the earliest theories is that schizophrenia belongs to neurodevelopmental disorders due to the abnormality found in the brain, such as the absence of gliosis. Another supporting evidence is that motor and cognitive impairments herald the disease's onset.^[1] A similar one stated that neuroanatomical changes seen in radiology examinations cause schizophrenia.^[1] Patients with schizophrenia display a degradation of gray matter volume in their temporal lobe and parietal lobes.^[1] Another supporting finding includes differences in size between frontal lobes and hippocampus that lead to an assumption that this finding lends a hand in the cognitive and memory impairment in schizophrenia.^[1]

Some studies conveyed abnormalities in several neurotransmitters such as dopaminergic, serotonergic, glutamergic, and (GABA) Gamma-aminobutyric acid in schizophrenia patients, making it one of the favored theories related to schizophrenia.^[2] Another

Address for correspondence: Dr. Ziske Maritska,
Jl. Dr. Mohammad Ali, Palembang 30128, South Sumatera, Indonesia.
E-mail: ziske_maritska@unsri.ac.id

5
Submitted: 11-Dec-2021 Revised: 21-Jan-2022 Accepted: 21-Feb-2022 Published: 19-Aug-2022

Access this article online	
Quick Response Code: 	Website: www.anip.co.in
	DOI: 10.4103/aip.aip_150_21

2
This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Maritska Z, Prananjaya BA, Parisa N, Suryani PR, Anggraini F, Putri SN, et al. Parental risk factors in schizophrenia: The apple does not fall far from the tree. *Ann Indian Psychiatry* 2022;6:122-4.

preferred and prominent theory investigated by many is genetics. Genetics takes part in almost all diseases, and schizophrenia was not an exception. A study stated a nearly half concordance rate in monozygotic twins.^[2] Moreover, the risk of having schizophrenia increased to 40% when both father and mother are affected.^[2]

Aside from the many theories mentioned above, the environment also partakes in the occurrence of schizophrenia. Proposed factors include abnormal fetal development, gestational diabetes, preeclampsia, and other perinatal complications.^[1,2] Primordial germ cells, embryos, and fetuses' vulnerability to epigenetic dysregulation by environmental chemicals during pregnancy may cause it.^[5]

Mental health is mandatory to the state of complete well-being.^[6] Well-being is known to be affected by its surroundings. Schizophrenia is one of the mental health conditions that are affected by the surroundings, including parental influence.^[7] This fits the definition of schizophrenia as a multifactorial disease caused by more than one risk factor. Over the last five decades, numerous studies have tried to identify specific environmental factors that would increase the risk for schizophrenia. One of the known factors is sociodemographic, both parental and individual. It ranges from marital status, socioeconomic status (SES), ethnicity, family composition, residential mobility, ethnic density, level of social organization, and social capital.^[8] This review will provide a brief insight into parental age, migration, and parental SES in the development of schizophrenia in the offspring.

HOW FAR CAN AN APPLE FALL FROM ITS TREE?

Parental age

Many studies conducted over several decades have shown a relationship between advanced paternal age (APA) and an escalating risk of schizophrenia. There are reports where patients with no family history of schizophrenia tend to have an older father than those with a family history.^[9] *De novo* mutation is the most common hypothesis in explaining this phenomenon. The changes in DNA that happen spontaneously can be present in the paternal germ line, where point mutations can also accumulate in spermatogonial clones.^[10] It also can occur spontaneously and proliferate in successive spermatocyte clones in the male germ line during spermatogonial stem cell division,^[11] thus leading to the development of schizophrenia in their children. Another hypothesis on how APA is related to schizophrenia proposed epigenetic change. If the epigenetic modification is disturbed, it will cause changes in the structure of chromatin and DNA methylation patterns leading to changes in gene expression.^[11] There is a significant loss of methylation in older males' sperm that are similar in the offspring, supporting the theory.^[12]

Another theory states that if a man postpones becoming a father or decides to have his firstborn later in life, having late fatherhood is responsible for the APA effect.^[11] Studies show a significantly increased risk of having offspring who develop schizophrenia in men who have late fatherhood, around 30 years or older to earlier ones, 25–29 years old.^[13]

Men with DNA polymorphisms related to schizophrenia can pass on their genetic vulnerabilities to their descendants. If an assortative mating occurs, in this case, genetic vulnerabilities to psychiatric illness, then this possibility increases.^[11]

Last but not least is the environmental resource hypothesis. This theory proposed that the unequal distribution of resources over paternal age is related to schizophrenia. It may lead to an increased risk or protection of psychological development. Some examples of the resources include assisted reproductive technique, SES, and the death of a father during the early years.^[11]

Migration

It has been reported in several meta-analyses that migration is a risk factor for developing schizophrenia. This risk increases in both first- and second-generation migrants.^[14] Other studies have also found that the increased risk of schizophrenia is more common among refugees than nonrefugee migrants in several high-income countries such as England, The Netherlands, Denmark, France, Italy, and Canada.^[15]

Studies in Europe and North America also show an increased risk of schizophrenia in migrants and their children. However, there is still no sufficient explanation for this phenomenon. Possible factors include the experience of physical, psychological, and psychosocial problems related to migrants leaving their home countries due to conflict.^[14,16] Others contributing factors are social difficulties experienced in every stage of migration, including social isolation, and discrimination.^[15]

A migrant who lives in a low ethnic density is prone to experience frequent discrimination caused by different perceptions of the social environment, thus leading to a high level of social stress. On the other hand, if migrants live in the same area of origin, they would have a greater sense of belonging, thus having access to emotional and practical support.^[16]

Studies in Canada displayed an increment in striatal dopamine release in immigrants throughout the Montreal Imaging Stress Task exposure.^[17] Another study in the UK conveyed an increase in striatal dopamine synthesizing capacity in migrants. It concludes that social stress influenced dopamine function, whereas dopamine is involved in the pathology of schizophrenia.^[17]

Socioeconomic status

Growing up in a low socioeconomic environment is correlated with some environmental, health, and developmental outcomes in children that continue until adulthood.^[18] The lower income the parents have, the more the child is underprivileged. The longer they are, the greater the risk of developing schizophrenia.^[19]

One study reported that children with lower parental SES were at higher risk of developing mental illness.^[18] Another study found that lower parental SES was related to lower

executive function and the risk of schizophrenia. This study used the voxel-based morphometry test and conveyed that lower parental SES was associated with reduced gray matter volume, particularly in the superior frontal gyrus.^[20]

The risk of schizophrenia also increased among those who live in urban, especially those who lack socioeconomic resources, making them exposed to prolonged stress.^[18,21] That is why children who grow up in that kind of situation are associated with poorer health outcomes. This theory may explain the higher possibility of children who have parents with low SES to develop schizophrenia.^[18]

Parental income at birth is also one of the pivotal environmental exposures during pregnancy. Maternal factors such as maternal stress and obstetric complications may also be related to an increased risk of schizophrenia.^[18] These factors were more prevalent among mothers with lower SES.^[18] Children from low SES backgrounds are also at risk of experiencing physical and emotional problems that could lead to an increased risk of developing psychosis in the future. Psychosocial risk factors can accumulate in families with low SES, making detrimental effects on the physical and mental health. A better physical and social environment along with better financial resources may reduce the risk of schizophrenia. Thus, parental SES plays a pivotal role in determining the course of a person's mental health history.^[18,21]

CONCLUSIONS

Despite the various findings in previous studies, parental age, migration, and parental SES are the three parental environmental factors related to schizophrenia. The uncertainty of these risks should be acknowledged when predicting the individual risk of developing schizophrenia based on the findings.^[22]

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Hany M, Rehman B, Azhar Y, Chapman J. Schizophrenia. StatPearlsSchizophrenia. Treasure Island (FL): StatPearls Publishing; 2021. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/30969686>. [Last accessed on 2021 Jun 29].
2. Stepnicki P, Kondej M, Kaczor AA. Current concepts and treatments of schizophrenia. *Molecules* 2018;23:2087.
3. Wu Y, Kang R, Yan Y, Gao K, Li Z, Jiang J, *et al.* Epidemiology of schizophrenia and risk factors of schizophrenia-associated aggression from 2011 to 2015. *J Int Med Res* 2018;46:4039-49.
4. World Health Organization. Schizophrenia; 2019. Available from: <https://www.who.int/news-room/fact-sheets/detail/schizophrenia>. [Last accessed on 2021 Jun 29].
5. Perera F, Herbstman J. Prenatal environmental exposures, epigenetics, and disease. *Reprod Toxicol* 2011;31:363-73.
6. World Health Organization. Mental health: Strengthening our Response; 2018. Available from: <https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response>. [Last accessed on 2021 Jun 29].
7. Galderisi S, Heinz A, Kastrup M, Beezhold J, Sartorius N. Toward a new definition of mental health. *World Psychiatry* 2015;14:231-3.
8. Vilain J, Galliot AM, Durand-Roger J, Leboyer M, Llorca PM, Schürhoff F, *et al.* Environmental risk factors for schizophrenia: A review. *Encephale* 2013;39:19-28.
9. Wu Y, Liu X, Luo H, Deng W, Zhao G, Wang Q, *et al.* Advanced paternal age increases the risk of schizophrenia and obsessive-compulsive disorder in a Chinese Han population. *Psychiatry Res* 2012;198:353-9.
10. Kollias C, Dimitrakopoulos S, Xenaki LA, Stefanis N, Papageorgiou C. Evidence of advanced parental age linked to sporadic schizophrenia. *Psychiatriki* 2019;30:24-31.
11. De Kluiver H, Buizer-Voskamp JE, Dolan CV, Boomsma DI. Paternal age and psychiatric disorders: A review. *Am J Med Genet Part B Neuropsychiatr Genet* 2017;174:202-13.
12. Krug A, Wöhr M, Seffer D, Rippberger H, Sungur AO, Dietsche B, *et al.* Advanced paternal age as a risk factor for neurodevelopmental disorders: A translational study. *Mol Autism* 2020;11:1-19.
13. Ek M, Wicks S, Svensson AC, Idring S, Dalman C. Advancing paternal age and schizophrenia: The impact of delayed fatherhood. *Schizophr Bull* 2015;41:708-14.
14. Brandt L, Hensler J, Müller M, Wall S, Gabel D, Heinz A. Risk of psychosis among refugees: A systematic review and meta-analysis. *JAMA Psychiatry* 2019;76:1133-40.
15. Stilo SA, Murray RM. Non-genetic factors in schizophrenia. *Curr Psychiatry Rep* 2019;21:100.
16. Dykxhoorn J, Lewis G, Hollander AC, Kirkbride JB, Dalman C. Association of neighbourhood migrant density and risk of non-affective psychosis: A national, longitudinal cohort study. *Lancet Psychiatry* 2020;7:327-36.
17. van der Ven E, Selten JP. Migrant and ethnic minority status as risk indicators for schizophrenia: New findings. *Curr Opin Psychiatry* 2018;31:231-6.
18. Hakulinen C, Webb RT, Pedersen CB, Agerbo E, Mok PL. Association between parental income during childhood and risk of schizophrenia later in life. *JAMA Psychiatry* 2020;77:17-24.
19. Agerbo E, Sullivan PF, Vilhjálmsson BJ, Pedersen CB, Mors O, Borglum AD, *et al.* Polygenic risk score, parental socioeconomic status, family history of psychiatric disorders, and the risk for schizophrenia: A Danish population-based study and meta-analysis. *JAMA Psychiatry* 2015;72:635-41.
20. Yeo RA, Martinez D, Pommy J, Ehrlich S, Schulz SC, Ho BC, *et al.* The impact of parent socio-economic status on executive functioning and cortical morphology in individuals with schizophrenia and healthy controls. *Psychol Med* 2014;44:1257-65.
21. Hur JW, Choi SH, Yun JY, Chon MW, Kwon JS. Parental socioeconomic status and prognosis in individuals with ultra-high risk for psychosis: A 2-year follow-up study. *Schizophr Res* 2015;168:56-61.
22. Gyllenberg D, McKeague IW, Sourander A, Brown AS. Robust data-driven identification of risk factors and their interactions: A simulation and a study of parental and demographic risk factors for schizophrenia. *Int J Methods Psychiatr Res* 2020;29:1-11.

Parental Risk Factors Schizophrenia

ORIGINALITY REPORT

11%

SIMILARITY INDEX

11%

INTERNET SOURCES

5%

PUBLICATIONS

5%

STUDENT PAPERS

PRIMARY SOURCES

1	www.anip.co.in Internet Source	5%
2	srpc.ca Internet Source	3%
3	www.researchgate.net Internet Source	1%
4	journals.lww.com Internet Source	1%
5	oamjms.eu Internet Source	1%
6	psychcentral.com Internet Source	1%

Exclude quotes On

Exclude bibliography On

Exclude matches < 1%