

Case Report

Legacy of mental illness: A family with unusual genetic penetration

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Mental illnesses are multifactorial disorders caused by the interaction of genetic and environmental factors. Multiple lines of evidence suggest that the roles of genetic and environmental factors depend on each other. The aim of the report is to share the presentation of different psychiatric illnesses in generations of a family. A 31 year old male, unmarried, studied up to class eight, unemployed, muslim, non smoker, with average intelligence, hailing from the Dhaka with lower-middle economic background was diagnosed as a case of Schizophrenia. He has very strong family history of mental illness more prominent in male and persistent in generations. Males were affected by schizophrenia, personality disorder and substance related disorder, whereas only one female was affected by depression with suicide. In the patient's generation, two males were affected with schizophrenia, two male with personality disorder and two with substance related disorder without any presentation in female. In previous generation one male was affected with personality disorder (Father) and one female was suicide committer due to depression (Aunt). There was also presence of male psychotic patients in the grandmother's family of the patient. Family, twin and adoption studies have shown that, for schizophrenia, autism, manic depressive illness, major depression, attention deficit hyperactivity disorder, panic disorder and other mental illnesses, the transmission of risk was heredity. Our case strongly made us curious to search for any common genetic link between different mental illnesses running in the family.

Key words: Genetic inheritance, gene-environment interaction, case report.

INTRODUCTION

Mental illnesses are multifactorial illnesses caused by the interaction of various genetic and environmental factors that may include a reaction to environmental stresses, genetic factors, biochemical imbalances, or a combination of these (Department of Human Genetics,

EMORY University, 2008). Multiple lines of evidence suggest that the roles of genetic and environmental factors depend on each other (Uher, 2014). Sons and daughters of parents with mental illness are more vulnerable to the effects of prenatal and postnatal environ-

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mental exposures, suggesting that the expression of genetic liability depends on environment. Gene-environment interactions reflect a causal mechanism where one or more genetic variants and one or more environmental factors contribute to the causation of a condition in the same individual with the genetic factors influencing the sensitivity to environmental exposures (Uher, 2014).

The aim of the report is to share the presentation of different psychiatric disorders in generations of a family which demands further attention to find out the causative genetic association.

CASE REPORT

A 31 year old male, unmarried, currently unemployed, muslim, non smoker, with average intelligent level, hailing from the Dhaka city with lower-middle economic background was admitted in a Private Psychiatric Hospital through Emergency Medical Service Team by Squad, referred by registered General Practitioner with complains of recurrent sudden unprovoked aggressiveness towards family members for 7 days; social isolation, poor self care, sleep disturbances for 1 year and self muttering for 1 year. He was the only son of his parents; 55 years old father, unemployed, smoker, having no medical illness, a diagnosed case of cluster A personality disorder, and living without any mental health care support. There was no history of consanguinity of marriage in any generation of the family. He was delivered by normal vaginal delivery and his all domains of milestone were age appropriate. He studied up to class eight with an average performance and stopped due to poor parental influence and bullying from class fellows. He was unemployed for last 8 years and had no documented history of substance abuse, forensic or legal involvement. He had few friends with good understanding before illness. His abnormal behavior started 6 years back with complains of difficulty in concentration, fearfulness, undue suspiciousness, sleep disturbances and hearing voices. He was diagnosed as a case of Schizophrenia at that time on basis of positive symptoms of Schizophrenia like auditory hallucination, delusions and treated with antipsychotics and responded to the medications. However, he discontinued the medications after a few days. He had no co-morbid medical illness. His vitals were within the normal limit and detailed systemic examination revealed nothing contributory.

On mental state examination, he was unkempt, uncombed, unshaved, with poor dressing and an anxious look. Rapport was established but difficult to sustain. He had a depressed mood with blunted affect. Speech was in a decreased rate, low monotonous tone with sudden pause. He had poverty in thought stream and exhibited features of thought withdrawal. Hallucination or any abnormal perception could not be elicited. He had no

cognitive disturbance except problem in maintaining concentration. His insight was poor. He was diagnosed as a case of Schizophrenia and treated with tablet Aripiprazole and injection Fluphenazine Depot by consultant Psychiatrist. He responded to the medications and was discharged from hospital for further follow up with medications and active daily life plan after 1 month.

The patient has very strong positive family history of mental disorders. His father was a diagnosed case of cluster A Personality Disorder. He had two uncles and six paternal aunts. His eldest paternal aunt enjoyed good health with two sons and single daughter. One of her two sons suffered from Cluster B personality disorder diagnosed by a consultant Psychiatrist. His second paternal aunt enjoyed good health with two sons and one daughter. Among her sons one was suffering from Cluster B personality disorder and another died after suffering from Schizophrenia and both of them were diagnosed by a consultant Psychiatrist. His third paternal aunt enjoyed good health with a son, who is a substance abuser and suffered from substance related disorder living with continuous mental health care support and two daughters, who are free from mental illness. His fourth paternal aunt committed suicide at the age of about 35 years after sudden death of her daughter, and among the offspring of his fifth aunt, one of her son is substance abuser and suffered from substance related disorder. His sixth aunt offspring were completely spared from mental disorders. His grandfather and grandmother had no manifestation of mental illness while brother of his grandmother had mental illness and died due to it.

DISCUSSION

Genetics is one of the major sources of information on the classification of mental illness and it is typically indexed as heritability, a measure ranging from 0 to 1 that reflects the proportion of differences between people that are attributable to genetic factors (Figure 1). It has been known for decades that mental illness runs in families, and twin studies have produced heritability estimates ranging from 0.37 to 0.90 (Uher, 2013). Here presentation of mental disorders is different with high penetration in male and relatively safer state in female in the consequent three generations. Males are affected by schizophrenia, personality disorder and substance abuse whereas; only one female was affected by the major depression with suicide. Among the offspring of six females (patient's aunts), the offspring of the sixth were spared. With three males (patient's father and uncles), only one patient was affected with Schizophrenia, with the father having personality disorder. Persons free from mental illness are in the high functioning status. In the current generation of the family, there are two males with schizophrenia, two male with personality disorder, two males with substance related

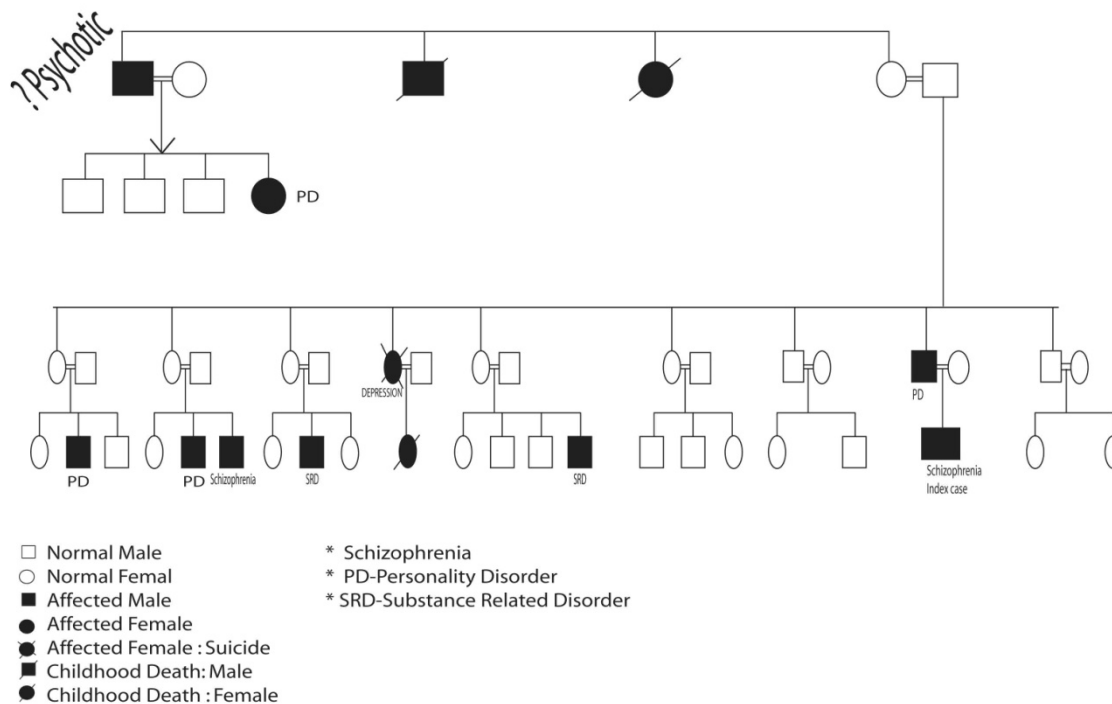


Figure 1. Family tree showing the genetic penetration in generations.

disorder with none of the female offspring being affected. In the previous generation there was one personality disorder male patient and one female suicide committer due to depression, and in generation before that there was one male psychotic patient but no female sufferer. MacKinnon reviewed a book in 2012 titled: “*A lethal Inheritance: A mother uncovers the science behind three generations of mental illness*” by Victoria Costello. From the report, it was found that Ms. Costello’s sons, sister, father, grandfather, and herself suffered from mental illness and this happened in the late 1990s. There among the writer’s two sons, the elder one, suffered from schizophrenia and the younger one suffered from depression. The writer suffered from depression with suicidal ideation and received treatment with antidepressant of serotonin–norepinephrine reuptake inhibitors (SNRI) group, and her sister died from complications of long-term drug abuse. Her father was alcoholic and her grandfather died a mysterious, violent death on the railroad tracks. This pattern of presentation of mental disorders in the reported family reveals strong genetic linkage in the psychiatric disorders. Here, presentation of the described family differs significantly by affecting the male offsprings more than the female and demands detailed genetic study. In Bangladesh, absence of such genetic analysis limits the final opinion. Moreover, every affected person was not interviewed directly as information gathered retrospectively, though most of diagnoses were confirmed by a consultant psychiatrist, and few are confirmed by a registered Physician.

Conclusion

The available evidence indicates that virtually all psychiatric disorders show a significant genetic contribution to individual differences, with heritabilities at least in the 20 to 50% range” (Johnston et al., 2011). Family, twin and adoption studies have shown that, for schizophrenia, autism, manic depressive illness, major depression, attention deficit hyperactivity disorder, panic disorder and other mental illnesses, the transmission of risk is due to heredity (Hyman, 2000). The case strongly demands a search for any common genetic link between different mental illnesses running in the family, as the presentation happened in definite different environment, and this raises a strong suspicion of having common responsible gene resulting in the different penetration and this demands further extensive genetic research.

Conflict of interest

Authors have none to declare.

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