Descriptive Study of Cases of Schizophrenia in the Malian Population

Souleymane dit Papa Coulibaly (✉ niebap@hotmail.fr)
   Université des Sciences, des Techniques et des Technologies de Bamako

Baba Ba
   University Teaching Hospital Point G

Pakuy Pierre Mounkoro
   Université des Sciences, des Techniques et des Technologies de Bamako

Brehima Diakite
   Université des Sciences, des Techniques et des Technologies de Bamako

Yaya Kassogue
   Université des Sciences, des Techniques et des Technologies de Bamako

Mamoudou Maiga
   Institute for Global health, Northwestern University, Chicago

Aperou Eloi Dara
   University Teaching Hospital Point G

Joseph Traoré
   University Teaching Hospital Point G

Zoua Kamaté
   University Teaching Hospital Point G

Kadiatou Traoré
   University Teaching Hospital Point G

Mahamadou Koné
   University Teaching Hospital Point G

Boubacar Maiga
   University Teaching Hospital Point G

Zoumana Diarra
   University Teaching Hospital Point G

Souleymane Coulibaly
   Université des Sciences, des Techniques et des Technologies de Bamako

Arouna Togora
   Université des Sciences, des Techniques et des Technologies de Bamako

Youssoufa Maiga
   University Teaching Hospital Gabriel Toure

Baba Koumaré

Abstract

Background.

Schizophrenia is a relatively common disease worldwide with a point prevalence of around 5/1000 in the population. The aim of this present work was to assess the demographic, clinical, familial, and environmental factors associated with schizophrenia in Mali.

Methods.

This was a prospective descriptive study on a series of 164 patients aged at least 12 years who came for a follow-up consultation at the psychiatry department of the University Hospital Center (CHU) Point G in Mali between February 2019 and January 2020 for schizophrenia spectrum disorder as defined by DSM-5 diagnostic criteria.

Results.

Our results revealed that the male sex was predominant (80.5%). The 25–34 age group was more represented with 44.5%. The place of birth of the majority of our patients was the urban area (52.4%). The urban area also represented mainly the place of the first year of life of our patients (56.1%). The unemployed were more numerous with 56.1%. The number of singles represented 61%. Patients with secondary education were more frequent (58.5%). With the exception of education level, there was a statistically significant difference in the distribution of demographic parameters. Familial schizophrenia cases were observed in 51.7% against 49.3% for non-familial cases. The most common clinical manifestation of schizophrenia was the paranoid form (34.1%), followed by the Undifferentiated form (28.7%), and the Hebephrenia form (17.1%). Most of the schizophrenic patients were born during the cold season with 48.8% of cases. Most schizophrenic patients did not use cannabis (68.7%). The majority of schizophrenic patients came from families in which the father (51.2%) and mother (64.2%) did not attend school.

Conclusions.

The onset of schizophrenia in the Malian population has been associated with socio-demographic, clinical, genetic and environmental characteristics.

Background

Schizophrenia is a relatively common condition worldwide with a point prevalence of approximately 5/1000 in the population (1–3). Its pathophysiology is still poorly understood (4). Numerous studies have shown the involvement and interaction of genetic and environmental factors in the genesis of

schizophrenia (5–7). The suspicion of a genetic etiology is reinforced by adoption studies which revealed that the risk of schizophrenia was the same in children born to affected mothers, whether raised by the biological or adoptive mothers, and as well as studies in homozygous twins where the risk of schizophrenia is about 50% when one of the twins is affected (8, 9). The cases of familial aggregations of schizophrenia and synaptic or connectivity dysfunctions observed in association with schizophrenia also support the argument of a genetic implication (9). Thus, several studies have tried to link to any gene effect could explain schizophrenia, but the results were not significant at the genome scale (9–11). In addition, the aggregate data provide a genetic overlap between schizophrenia autism and bipolar disorder. No gene could be attributed to this very disparate clinical phenotype of schizophrenia (12). Rather than genetic replications, research shows the involvement of several types of genetic variations in this disorder. Beyond these inaccuracies on the genetics of schizophrenia, many studies have suspected the role of the environment in the expression of this pathology (5, 7, 11, 13, 14). The frequency of the association of schizophrenia and some of these environmental factors such as cannabis use, fetal hypoxia, prenatal maternal infection, maternal folate deficiency during pregnancy, maternal stress, maternal age, father has been reported (13). If in Western cultures psychosocial and biological explanations are advanced in the genesis of schizophrenia, in Africa beliefs still remain in supernatural causes of the disease (15). In Burkina Faso, Ouango et al asserted that the concept of mental illness among the Moose of the central plateau of Burkina Faso refers to the authority of the invisible world over the visible world (16). In Mali, popular belief attributes divine causation to mental illness. At the same time, concerns from families of patients with schizophrenia highlight the fear of heritability of this pathology. The aim of this present work was to examine the environmental and family factors associated with schizophrenia in Mali.

Methods

The present study took place in the psychiatry department of the University Hospital Center (CHU) Point G in Mali from February 2019 to January 2020. This is a prospective descriptive study involving a series of 164 patients aged at least 12 years who had come for a follow-up consultation for at least one year for a schizophrenia spectrum disorder such as schizophrenia, the disorder schizophreniform and schizoaffective disorder defined according to the diagnostic criteria of DSM-5 (Diagnostic and Statistical Manual of Mental Disorders). Sociodemographic including age, gender, professional situation, marital status, level of education, rank in uterine siblings and environment (e.g., place of birth and life, monthly income of the family, season of birth, concept of cannabis consumption, concept of stay abroad, age of father and mother, father's educational level and mother's educational level) characteristics and the family history (father-mother consanguinity relationship and the number of relatives with schizophrenia) were collected for all patients. An informed consent was drawn up and signed for each participant.

Statistical analysis

SPSS 19.0 Software was used to analyze the data. The Chi-squared test with the value of $p < 0.05$ was carried out to evaluate the frequencies and significance level of the demographic, clinical, genetic and

environment factors.

Results

We investigated schizophrenia in 164 Malian patients. According to demographic characteristics (Table 1), the male gender was predominant in patients with 80.5%. The 25 to 34 age group was more represented with 44.5% of cases. The place of birth of the majority of our patients was the urban area with 52.4% against 39.6% and 7.8% for rural and semi-urban areas respectively. The urban area also represented mainly the place of the first year of life of our patients with 56.1%. Among professional status, the unemployed were higher with 56.1% of cases followed by active workers (43.3%) and retired worker (0.6%). In our patients, the number of singles was higher with 61% than married (31.1%), divorced (5.5%) and widow/ widower (2.5%). Patients with secondary education level were more frequent than others (primary, High and unschooled).The frequency of the level of education varies from 20.7–29.9%. Schizophrenic patients with average level was more represented in our study population (58.5%) (Table 1). Except the level of education, there was a statistically significant difference in the distribution of demographic parameters (Table 1).

Table 1: Demographic characteristics in patients with schizophrenia

Parameter	Frequency	Percent (%)	p.value
Gender	164		<0.0001
Male	132	80.5	
Female	32	19.5	
Age	164		<0.0001
15-24	35	21.9	
25-34	73	44.5	
35-44 year	38	23.2	
45-54 year	13	7.9	
55-64 year	3	1.8	
> 64 year	1	0.6	
Professional status	164		<0.0001
Active worker	71	43.3	
Retired worker	1	0.6	
Unemployed	92	56.1	
Marital status	164		<0.0001
Single	100	61	
Married	51	31.1	
Divorced	9	5.5	
Widower/widow	4	2.4	
Level of education	164		0.411
Primary	42	25.6	
Secondary	49	29.9	
High	39	23.8	
Unschooled	34	20.7	
Place of birth	164		< 0.0001
Rural	65	39.6	
Urban	86	52.4	
Semi-urban	13	7.9	

Place of the first year of life	164		< 0.000.1
Rural	60	36.6	
Urban	92	56.1	
Semi-urban	12	7.3	
Income level of family	164		< 0.0001
Low income	33	20.1	
Average income	96	58.5	
High income	35	21.3	

According to clinical characteristics (Table 2), the mean age of diagnosis was 28.9 ± 12.9 years, Sd = 6. Familial (51.7%) and non-familial (49.3%) cases of schizophrenia were roughly equal in proportion in our study sample. The most common clinical manifestation of schizophrenia was the paranoid form (34.1%, N = 56) followed by the Undifferentiated (28.7%, N = 47), hebephrenia (17.1%, N = 28) and the others (residual, Post- schizophrenia depression, simple and catatonia), the frequency of which varies from 7.3-3.0% (Table 2). A statistically significant difference was observed with the distribution of the proportion of schizophrenic patients according to clinical parameters (consanguinity of the biological parents and clinicals forms of schizophrenia) (Table 2).

Table 2
Clinical characteristics in patients with schizophrenia

Parameter	Frequency	Percent (%)	P value
Age mean of diagnosis	28.9 ± 12.9 years		
Types of schizophrenia	164		0.875
Family cases	81	49.3	
Non-family cases	83	51.7	
Clinicals forms of schizophrenia	164		< 0.0001
Paranoid	56	34.1	
Hebephrenia	28	17.1	
Catatonia	5	3.0	
Undifferentiated	47	28.7	
Post-schizophrenia depression	8	4.9	
Residual	12	7.3	
Simple	8	4.9	

For genetic factors, 30.5% (N = 50) of schizophrenic patients had a history of consanguinity of the biological parents (father and mother) against 69.5% of cases of non-consanguinity. The birth order among uterine siblings was more represented with 31.1% followed by second (20.1%), third (14.6%), fourth (11.6%), and the others whose frequency varied from 8.0–1.0% (Table 3). A significant difference was observed in the distribution of the proportion of birth order among uterine siblings and consanguinity of the biological parents.

Table 3
Distribution of schizophrenia patients according to genetic characteristics.

Parameter	Frequency	Percent (%)	P value
Birth order among uterine siblings	164		< 0.0001
First	51	31.1	
Second	33	20.1	
Third	24	14.6	
Fourth	19	11.6	
Fifth	12	7.3	
Sixth	7	4.3	
Seventh	8	4.9	
Eighth	7	4.3	
Nineth	2	1.2	
Tenth	1	0.6	
Consanguinity of the biological parents			< 0.0001
Yes	50	30.5	
Non	114	69.5	

According to environmental factors, most of the schizophrenic patients were born during the cold season (48.8%) compared to 21.3% during the hot season, 18.9% in the rainy season and 11.0% in the unspecified season. 68.7% of patients have not used cannabis and 54.9% of cases have a history of staying abroad (Table 4). The majority of schizophrenic patients came from families where father and mother were out of school (51.2% and 64.2%, respectively). A statistically significant difference was observed with the environmental parameters with the exception of the notion of stay abroad (Table 4).

Table 4
Distribution of schizophrenia patients according to environmental characteristics.

Parameter	Frequency	Percent (%)	P value
Season of birth	164		< 0.0001
Cold season	80	48.8	
Hot season	35	21.3	
Rainy season	31	18.9	
Unspecified	18	11	
Cannabis use	164		< 0.0001
Yes	53	32.3	
No	111	68.7	
Notion of stay abroad	164		0.211
Yes	74	45.1	
No	90	54.9	
Father's level of education	164		< 0.0001
Primary	29	17.7	
Secondary	26	15.9	
High	25	15.2	
Unschooled	84	51.2	
Mother's level of education	164		< 0.0001
Primary	35	21.3	
Secondary	22	13.4	
High	5	3.0	
Unschooled	102	62.2	

Discussion

Schizophrenia is one of the major contributors to the global burden of disease. Several factors are mentioned in its occurrence. The hypothesis of neurodevelopmental disease due to fetal exposure to maternal viral influenza, rubella, or toxoplasmosis infection during pregnancy has been supported by several studies (1–4). Other studies have found a gene-environment involvement (5, 6). In view of these studies, the explanatory model of schizophrenia appears complex (5). Beyond these assumptions,

schizophrenia is recognized as a ubiquitous pathology, the onset of which occurs most often in boys (between 15 and 24 years old) and girls (25 and 35 years old) (17). Our results showed a significant link between certain environmental or family factors and schizophrenia in Mali. Our results showed that schizophrenia was frequent in males than in females with a statistically significant difference. Aleman et al. confirmed evidence for a gender difference in the risk of developing schizophrenia (7). Some previous studies. reported evidence that the gender difference in schizophrenia reflects differences both in neurodevelopmental processes and in social effects on risk and disease course (8). Markham et al. also suggested a protective role of ovarian hormones against schizophrenia (9). The 25 to 34 years old age group was the most represented in our study. These results were comparable to that reported by Weiser et al. who found that the majority of people diagnosed with schizophrenia were between 25 and 34 years old (10). Mounkoro et al. found the same trend with the range 27 to 35 years old (11).

Although a small number of cases of schizophrenia appear after age 40, the majority of cases of schizophrenia occur in adolescence (12). The unemployed were the most represented in our study sample. This trend has also been observed in certain studies such as the reports of Houngbé et al. and Marwaha et al. in which they found a significantly high prevalence of schizophrenia among the unemployed in Benin and United Kingdom, respectively (13, 14) Other studies have confirmed the link between the increased risk of schizophrenia and social disadvantages including the unemployment rate high (15). The most common marital status found in our study was that of single people. This trend has also been observed in the work of Messias et al. (16). The most common level of education found in our schizophrenic population was high school. Several authors reported that growing up in an urban area is associated with a high risk of developing schizophrenia. Villain J et al. reported that urbanity can be considered a "marker" for the risk of schizophrenia (17). Our results have shown the same trend with a predominance of schizophrenics having for place of birth and first year of life the urban environment. Paranoid schizophrenia was the most common form in our sample. The patients who were the first born of the siblings were the most affected by schizophrenia in our study (31.1% of cases). Although in several studies it emerges the predominance of firstborn presented schizophrenia, some authors recommend caution about evoking a causal link (18, 19). We found a consanguinity rate of 30.5% in schizophrenic patients. In Egypt, H. Mansour et al. reported a rate of 46.6% in the Nile Delta region (20). Our results showed a higher representation of familial cases of schizophrenia with 51.7%. Mortensen et al. found a considerable relative risk of schizophrenia for people whose mother, father or sibling had schizophrenia (21). Patients born during the cool season were the most represented with 48.8% of cases and 21.3% were born in the hot season and 18.9% during the rainy season. The birth in rainy period is found in schizophrenia by previous work (22, 23). Several authors support this trend and several hypotheses have been put forward to explain the high frequency of this disease in the rainy season (21, 24. 25). Among them, exposure to infectious agents, in particular the influenza virus, which is the best documented (26). The notion of cannabis use was found in 32.3% of schizophrenic patients in our study population. Schizophrenia and cannabis seemed to have a close relationship. The role of tetrahydrocannabinol (THC) in the onset of psychosis and schizophrenia in the population at risk has already been suspected (27). Our results also showed a strong representation of schizophrenic patients whose biological parents were

unschooled. Cao et al found that parental education level and childbearing age are associated with an increased risk of schizophrenia in a Chinese population (28).

Conclusions

This work helps support the role of family and environmental factors in schizophrenia. This work showed a strong representation of familial cases of schizophrenia. In addition, this work supports knowledge of the intricacy of environmental factors in schizophrenia.

Declarations

Availability of data and materials

The datasets generated and/or analyzed in this study are available from the corresponding author upon reasonable request and with the permission of FMPOS Ethics Committee.

Ethics approval and consent to participate

This study was approved by the FMPOS Ethics Committee, Université des Sciences, des Techniques et des Technologies de Bamako (USTTB), Mali. No experiments were carried out in this study. All methods were carried out in accordance with the Declaration of Helsinki.

Consent for publication

All participants accepted and signed the written informed consent.

Competing interests

 The authors declare that they have no competing interests.

Author contributions

All authors read and approved the final manuscript. Study concept and design: SPC, BB, PPM, SC, AT and BC. Clinical data collection: SPC, BB, PPM, AED, JT, KT, ZD Analysis and interpretation of data: SPC, BD, YK, MM. Drafting of the manuscript: SPC with assistance from by BD, YK, MM. Critical revision of the

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