Original Research Article

Effect of Socio-demographic Factors and Comorbidities on Schizophrenia Patients Adherence to Treatment in a Primary Care Unit.

ABSTRACT

Aims: Understanding the characteristics of schizophrenia patients who adhere to treatment, in the primary care setting.Identifying socio-demographic factors and comorbidities is crucial for tailoring personalized interventions, ultimately enhancing health outcomes for this vulnerable population.
Study design:A cross-sectional studywas conducted.
Place and Duration of Study: Ambulatory Care Medical Unit. It was conducted with Mexican patients attending the Family Medicine Specialityoutpatient consultation at the Family Medicine Clinic "División del Norte", in Mexico City, from July 1st 2023 to January 31st,2024.
Methodology: Dataon adherence were collected through a prolective design using the Morisky Scale test and a structured survey on psychological adherence. Data on sociodemographic factors, and comorbidities were collected from the SIMEF system.
Results: We included 50 schizophrenia patients. Eighty per cent of patients adhered to pharmacological treatment, and 96% to psychological therapy. Adherent patients were predominantly older males with comorbidities like hyperlipidaemia and diabetes. Non-adherent patients, mostly male and younger, were more likely to suffer from depression and were geographically concentrated in specific neighbourhoods.
Conclusion: The study highlights the need for targeted interventions to improve adherence, offering insights to enhance schizophrenia management in primary care settings.

Keywords: Adherence to treatment, Georeferenced, Primary care, Schizophrenia.

1. INTRODUCTION

Schizophrenia is a persistent, chronic and severe brain disorder that affects approximately about 24 million people worldwide.[1-2] The median incidence rate for persons with schizophrenia was 15.2 per 100,000 inhabitants, and is higher in men compared to women, higher in urban sites compared to mixed urban/rural sites, and higher in migrants compared to native-born individuals.[3] It is an escalating public health issue that profoundly impacts patient's functionality and quality of life.[4] Overall, the public health system in Mexico and other countries in the America's region has ineffective care programmes in prevention and treatment.[5] In the current model of primary care medicalisation, there is no definitive solution for managing schizophrenia, and their therapeutic success is associated with the use of palliative treatments to maintain individuals in a social-functional state. The treatment of schizophrenia often involves a combination of pharmacological therapy and nonpharmacological interventions (psychotherapeutic approaches may be divided into three categories: individual, group, and cognitive behavioural) to manage symptoms and improve the patients' quality of life.[6-7] Adherence to these treatment modalities is crucial in

achieving positive outcomes; however, it is frequently influenced by various causes, and it is often associated with potentially severe clinical consequences and high costs.[6-12] The causes of non-adherence are multifactorial and can be categorised into several types: patient-related factors, environment-related factors, physician-related factors, health system-related factors, and treatment-related factors.[8-11] Therefore, both pharmacological and non-pharmacological non-adherence in patients with schizophrenia represent a growing public health challenge.[9] Moreover, in the context of primary care, where early intervention and continuous monitoring are crucial, it becomes essential to characterise the profile of patients adhering to treatment. Understanding the profile of those who maintain adherence to both pharmacological and psychological therapy, can help tailor interventions, improve patient outcomes, and optimise the allocation of healthcare resources, ultimately enhancing the effectiveness of schizophrenia management. However, despite the crucial role that primary care units play in treating schizophrenia by providing accessible and continuous care, treatment non-adherence continues to be a significant issue. This problem contributes to increase hospitalisations and places an additional burden on healthcare systems. Our objective is to determine the profile (sociodemographic and comorbid) of schizophrenia patients who adhere to pharmacological and psychological treatment within a primary care unit. By identifying this profile, the research aims to provide valuable insights that can enhance treatment strategies and improve patient outcomes in this setting.

1-1 The aim of the study was to:

Understand the socio-demographic factors and comorbidities in schizophrenia patients treated in a primary care unit.

1.2 Research question:

What is the relation between the socio-demographic factors and comorbidities in schizophrenia patients treated in a primary care unit?

2. MATERIAL AND METHODS

2.1 Study design and settings.

A cross-sectional and exploratory study was designed. It was conducted with Mexican patients with schizophrenia attending the outpatient consultation of the Family Medicine Speciality and General Medicine at the Family Medicine Clinic (FMC) “División del Norte”, belonging to the State Employees' Social Security and Social Services Institute (ISSSTE by its acronyms in Spanish), in Mexico City. The study was conducted to assess the sociodemographic and clinical characteristics of patients with schizophrenia, focusing on adherence to pharmacological treatment and psychological therapy. The data collection employed a mixed-methods approach. The SIMEF system (Sistema de Información Médico Financiero by its acronym in Spanish) was used to gather sociodemographic variables (such as age and sex) and comorbidities through a retrospective analysis. Adherence to psychological therapy and pharmacological treatment was assessed using a prolective approach with two tools: (a) a questionnaire for psychological therapy adherence, and (b) the Morisky Medication Adherence Scale for pharmacological adherence. The study was conducted from July, 2023 to January, 2024.

2.2Study Population and Sampling Method.

The study included 50 patients with schizophrenia aged from 16 years old and above. Intentional sampling (a method of non-probabilistic sampling) was utilized by selecting individuals whose family members or clinicians reported schizophrenia. This approach was chosen to ensure that the participants accurately represented the target population for our study.

2.3Data Collection and Instruments.

Data collection was conducted using a structured questionnaire alongside the "SIMEF" records. Initially, patients were identified through the "SIMEF" system using the tenth edition of the International Classification of Diseases (ICD-10).[13]Thenceforward, a data collection sheet was employed to gather detailed information, including patient names, medical record numbers, dates of birth, addresses, and sociodemographic factors such as sex and age.[13] Excel files generated monthly by the "SIMEF" system were utilized as the working tools. The collected data was stored in an Excel workbook, serving as the statistical database for subsequent analysis. This process ensured the extracted data's accuracy, quality, and reliability, thereby supporting the integrity of our study's findings.

Information on psychotherapy and pharmacological adherence was gathered using a structured questionnaire. The Morisky-Green test, validated in its Spanish version,[14] was used to assess pharmacological adherence among participants. Each Morisky-Green test was conducted in a single session within a controlled, quiet, and private environment to minimize distractions and optimize participant comfort. The questionnaire consists of four questions, with dichotomous answers (yes or no).[14-15] Responses reflect the patient's adherence behaviors regarding pharmacological treatment; a patient is considered compliant if they provide the correct responses (No/Yes/No/No).[15]

2.4Selection Criteria.

The inclusion criteria were as follows: patients (16 years or older) with a confirmed diagnosis of schizophrenia (both sexes), as reported by family members or clinicians. Participants who currently engaged in treatment for schizophrenia, whether pharmacological or psychological. Informed consent was required from the participants or their legal guardians to participate in the study. Individuals with other primary psychiatric disorders or significant cognitive impairment were excluded to ensure a focused analysis on schizophrenia.Patients who did not complete the questionnaire, provided incomplete or inaccurate responses, or did not consent to participate were alsoexcluded. Finally, a final review of the new combined database was conducted to ensure completeness and consistency of the information.

2.5 pilot Study.

A pilot study was conducted on 16% (8 patients) of study subjects before embarking on the fieldwork to ascertain the clarity and applicability of the study tools, identify the time needed for them, the availability of the sample, and perform the required modification according to available resources.

2.6Statistical analysis.

The categorical variables are described as absolute frequency and percentage, and quantitative variables as mean, standard deviation (SD), and interquartile range (IQR). Confidence Interval 95% (CI95%) was included.

3. RESULTS AND DISCUSSION.

The patients included in the study had an average age of 51.64 years (SD=13.970), a median age of 53.00 years (IQR=40.75-63.00 years), an age range of 61 years, with a minimum age of 16 years and a maximum age of 77 years. Schizophrenia primarily affects male patients (n=30), who had an average age of 50.60 years (SD=13.69), a median age of 50.00 years (IQR=38.50-63.25), an age range of 45 years, with a minimum age of 30 years and a maximum age of 75 years. Schizophrenia affects female to a lesser extent (n=20); their average age was 53.20 years (SD = 14.60), with a median age of 54.00 years (IQR=43.75-62.50), an age range of 61 years, with a minimum age of 16 years and a maximum age of 77 years. We identified 80% (n=40, CI95% 68-90) of patients with

pharmacological adherence and 96% (n=48, CI95% 90-100) of them have adherence to psychotherapeutics interventions (table 1). Fifty-four per cent (n=27, CI95% 40-68) of total patients with schizophrenia had a diagnosis of paranoid schizophrenia. The most prevalent comorbidities among patients with schizophrenia were: hyperlipidaemia (E78.2 and E78.5=10, 20%; CI95% 10-32), type 2 diabetes (E11.9=6, 12%; CI95% 4-22), essential (primary) hypertension (I10.X=6, 12%; CI95% 4-22), depressive episode (F32.9 and F33.9=6, 12%; CI95% 4-22), and unspecified epilepsy (G40.9=5, 10%; CI95% 2-20).

Table 1. Pharmacological adherence according to Morisky-Green test and psychological therapy adherence in the study population.

Variables	Total population (N=50) f, %; (IC95%)	Pharmacological adherence (n=40) f, %; (IC 95%)	Nonpharmacological adherence (n=10) f, %; (IC 95%)
Morisky item 1			
Yes	10, 20; (10-32)	0, 0; (0-0)	10, 100; (100-100)
No	40, 80; (-)	40, 100; (100-100)	0, 0; (0-0)
Morisky item 2			
Yes	47, 94; (86-100)	40, 100; (100-100)	7, 70; (40-99.7)
No	3, 6; (-)	0, 0; (0-0)	3, 30; (-)
Morisky item 3			
Yes	0, 0; (0-0)	0, 0; (0-0)	0, 0; (0-0)
No	50, 100; (0-0)	40, 100; (100-100)	10, 100; (100-100)
Morisky item 4			
Yes	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
No	49, 98; (-)	40, 100; (100-100)	9, 90; (-)
Are you currently receiving psychotherapy?			
Yes	48, 96 (90-100)	38, 95 (87.5-100)	10, 100 (100-100)

**Morisky-Green test:*
Item 1: Do you ever forget to take your medication to treat your condition?
Item 2: Do you take your medication at the prescribed times?
Item 3: When you feel well, do you stop taking the medication? and
Item 4: If it ever makes you feel unwell, do you stop taking it?

3.1 Characteristics of patients with schizophrenia and nonpharmacological adherence.

Twenty per cent of patients with schizophrenia do not adhere to their prescribed treatment. Their average age is 48.90 years (SD=14.286), with an age range of 45 years, a median age of 49.00 years (IQR=37.75-58.00), and ages spanning from a minimum of 30 to a maximum of 75 years. These patients are mainly characterised by being men (n=7): workers, retirees, and sons (table 2).Male patients have an average age of 45.71 years (SD=12.776), a median age of 45.00 years (IQR=31.00-56.00), with an age range of 34 years, a minimum age of 30 years, and a maximum age of 64 years. We also observed a wife, a mother and a retired female (table 2). In this female group, the average age was 56.33 years (SD=17.616), with an age range of 35 years, a minimum age of 40 years and a maximum age of 75 years, and a median age of 54.00 years.

Table 2. Sociodemographic characteristics of study population.

Variables	Total population (N=50)	Pharmacological adherence	Nonpharmacological adherence

	f, %; (IC95%)	(n=40) f, %; (IC 95%)	(n=10) f, %; (IC 95%)
Female	20, 40; (26-54)	17, 42.5; (27.5-57.5)	3, 30; (10-60)
Male	30, 60; (46-74)	23, 57.5; (42.5-72.5)	7, 70; (40-90)
Male worker	3, 6; (0-12)	1, 2.5; (0-7.5)	2, 20; (0-50)
Female worker	3, 6; (0-14)	2, 5; (0-12.5)	1, 10; (0-30)
Husband	3, 6; (0-16)	2, 5; (0-12.5)	1, 10; (0-30)
Wife	0, 0; (0-0)	0, 0; (0-0)	0, 0; (0-0)
Father	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Mother	3, 6; (0-14)	2, 5; (0-12.5)	1, 10; (0-30)
Son	13, 26; (14-38)	11, 27.5; (15-42.5)	2, 20; (0-50)
Douthard	6, 12; (4-22)	6, 15; (5-25)	0, 0; (0-0)
Retired male	10, 20; (10-32)	8, 20; (10-32.5)	2, 20; (0-50)
Retired female	8, 16; (6.1-26)	7, 17.5; (7.5-30)	1, 10; (0-30)

Source: Own elaboration based on database records.

Moreover, the primary comorbidity in this group is depression (F32.9 and F33.9=3, 6%; CI95% 0-14), followed by pure hyperglyceridaemia (E78.1=2, 20%; CI95% 0-50), hyperlipidaemia (E78.2 and E78.5=2, 20%; CI95% 0-50, unspecified epilepsy (G40.9=2, 20%; CI95% 0-50), and disorders of the teeth (K08.8=2, 20% CI95% 0-50) (table 3).

Table 3. Comorbidities in thestudy population.

ICD-10	Total population (N=50) f, %; (IC95%)	Pharmacological adherence (n=40) f, %; (IC 95%)	Nonpharmacological adherence (n=10) f, %; (IC 95%)
Chapter-1	6, 12 (4-22)	5, 12.5 (2.5-22.5)	1, 10 (0-30)
Chapter-2	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
Chapter-3	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
Chapter-4	20, 40 (26-54)	16, 40 (25-55)	4, 40; (10-70)
Chapter-5	50, 100 (100-100)	40, 100 (100-100)	10, 100; (100-100)
Chapter-6	11, 22 (10-34)	8, 20 (10-60)	3, 30; (10-32.5)
Chapter-7	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
Chapter-8	0, 0 (0-0)	0, 0 (0-0)	0, 0 (0-0)
Chapter-9	12, 24 (12-36)	11, 27.5 (15-42.5)	1, 10; (0-30)
Chapter-10	6, 12 (4-22)	5, 12.5 (2.5-22.5)	1, 10; (0-30)
Chapter-11	6, 12 (4-22)	4, 10 (2.5-20)	2, 20; (0-50)
Chapter-12	0, 0 (0-0)	0, 0 (0-0)	0, 0; (0-0)
Chapter-13	5, 10 (2-18)	5, 12.5 (2.5-25)	0, 0 (0-0)
Chapter-14	7, 14 (4-24)	5, 12.5 (2.5-22.5)	2, 20 (0-50)
Chapter-15	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0 (0-0)
Chapter-16	0, 0 (0-0)	0, 0 (0-0)	0, 0; (0-0)
Chapter-17	3, 6 (0-14)	3, 7.5; (0-15)	0, 0 (0-0)
Chapter-18	10, 20 (10-22)	9, 22.5 (10-37.5)	1, 10; (0-30)
Chapter-19	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
Chapter-20	0, 0 (0-0)	0, 0 (0-0)	0, 0; (0-0)
Chapter-21	7, 14 (4.1-24)	5, 12.5 (2.5-22.5)	2, 20; (0-50)
Chapter-22	0, 0 (0-0)	0, 0; (0-0)	0, 0 (0-0)

Source: Own elaboration based on database records.ICD-10: International statistical classification of diseases 10th revision. Cap-1: Certain infectious and parasitic diseases (A00–B99). Cap-2: Neoplasms (C00–D48). Cap-3: Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50–D89). Cap-4: Endocrine, nutritional and metabolic diseases (E00–E90). Cap-5: Mental and behavioural disorders (F00–F99). Cap-6: Diseases of the nervous system (G00–

G99). Cap-7: Diseases of the eye and adnexa (H00–H59). Cap-8: Diseases of the ear and mastoid process (H60–H95). Cap-9: Diseases of the circulatory system (I00–I99). Cap-10: Diseases of the respiratory system (J00–J99). Cap-11: Diseases of the digestive system (K00–K93). Cap-12: Diseases of the skin and subcutaneous tissue (L00–L99). Cap-13: Diseases of the musculoskeletal system and connective tissue (M00–M99). Cap-14: Diseases of the genitourinary system (N00–N99). Cap-15: Pregnancy, childbirth and the puerperium (O00–O99). Cap-16: Certain conditions originating in the perinatal period (P00–P96). Cap-17: Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99). Cap-18: Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified (R00–R99). Cap-19: Injury, poisoning and certain other consequences of external causes (S00–T98). Cap-20: External causes of morbidity and mortality (V01–Y98). Cap-21: Factors influencing health status and contact with health services (Z00–Z99). Cap-22: Codes for special purposes (U00–U99).

On the other hand, in terms of georeferenced, the geographical location of patients with schizophrenia who lack adherence to their treatment (n=10), are concentrated in eight neighbourhoods, in Mexico City: Adolfo Ruiz Cortines, Ajusco, Avante, El Centinela, Ex Ejido Santa Úrsula Coapa, Pedregal de Santa Úrsula, Residencial Acoxpa, and San Lorenzo Huipulco (table 4). The neighbourhoods with the highest number of patients are Avante and Pedregal de Santa Úrsula (table 4).

Table 4. Geographic location of patients with schizophrenia.

Neighbourhoods	Total population (N=50) f, %; (IC95%)	Pharmacological adherence (n=40) f, %; (IC 95%)	Nonpharmacological adherence (n=10) f, %; (IC 95%)
Adolfo Ruiz Cortines	3, 6; (0-14)	2, 5; (0-12.5)	1, 10; (0-30)
Ajusco	5, 10; (2-19.9)	4, 10; (2.5-20)	1, 10; (0-30)
Arboledas Del Sur	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Avante	5, 10; (2-20)	3, 7.5; (0-15)	2, 20; (0-50)
Campestre Churubusco	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Ciudad Jardín	2, 4; (0-10)	2, 5; (0-12.5)	0, 0; (0-0)
Educación	5, 10; (2-20)	5, 12.5; (2.5-22.5)	0, 0; (0-0)
El Centinela	1, 2; (0-6)	0, 0; (0-0)	1, 10; (0-30)
El Reloj	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Ex Ejido De Huipulco	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Ex Ejido Santa Úrsula Coapa	1, 2; (0-6)	0, 0; (0-0)	1, 10; (0-30)
Huayamilpas	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
La Candelaria	2, 4; (0-10)	2, 5; (0-12.5)	0, 0; (0-0)
Nueva Diaz Ordaz	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Nueva Oriental Coapa	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Pedregal de Santa Úrsula	5, 10; (2-20)	3, 7.5; (0-15)	2, 20; (0-50)
Prado Coapa 1a Sección	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
PresidentesEjidales	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
PresidentesEjidales 1a Sección	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Pueblo La Candelaria	2, 4; (0-10)	2, 5; (0-12.5)	0, 0; (0-0)
Residencial Acoxpa	1, 2; (0-6)	0, 0; (0-0)	1, 10; (0-30)
San Francisco Culhuacán	2, 4; (0-10)	2, 5; (0-12.5)	0, 0; (0-0)
San Lorenzo Huipulco	3, 6; (0-14)	2, 5; (0-12.5)	1, 10; (0-30)

San Pablo Tepetlapa	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Santa Úrsula Coapa	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)
Xotepingo	1, 2; (0-6)	1, 2.5; (0-7.5)	0, 0; (0-0)

Source: Own elaboration based on database records.

3.2Characteristics of patients with schizophrenia and pharmacological adherence.

Eighty per cent of patients are adhered to their prescribed treatment. The average age of patients was 52.33 years (SD=13.990), with an age range of 61 years, a median age of 53.00 years (IQR=42-63.00), and a minimum of 16 and a maximum of 77 years. Like the other group, these patients are predominantly male (n=23), but most are retirees and sons (table 2). Male patients are on average 52.09 years old (SD=13.876), with a median age of 50.00 years (IQR=39.00–65.00). The age range spans 45 years, with the youngest patient aged 30 and the oldest aged 75. In the female group, the average age was 52.65 years (SD= 14.564), with an age range of 61 years, a minimum age of 16 years and a maximum age of 77 years, and a median age of 54.00 years (IQR=45.50–62.00). The most prevalence morbidities in this group are: hyperlipidaemia (E78.5=7, 17.5%; CI95% 7.5-30.0), followed by type 2 diabetes (E11.9=6, 15.0%; CI95% 5.0-27.5), hypertension (I10X=6, 15%; CI95% 5.0-27.5), and abnormalities in the glucose tolerance test (R73.0=4, 10%; CI95% 2.5-20) (table 3). Similarly, in terms of georeferenced, the geographical location of patients with schizophrenia who are adherence to their treatment (n=40) are concentrated in 23 neighbourhoods (table 4). The neighbourhoods with the highest number of patients are Educación and Ajusco (table 4).

3.3Discussion.

The demographic and clinical characteristics of the patients in this study reflect important trends in the profile of schizophrenia, particularly in relation to pharmacological adherence. The average age of the patients is mostly adults, implying a population facing long-term treatment for schizophrenia and its associated comorbidities. According to several authors, schizophrenia onset in adolescence and young adulthood with prevalence peaking at around 40 years of age (similar to our findingsand Japanese population) with a decline in the older age groups.[16-18] The predominance of male patients, particularly those who adhere to treatment (80%), is in line with the findings reported by Li X et al. who indicate that men are more likely to be affected by schizophrenia at a younger age.[19] Although other authors suggest that no gender differences have been found in the prevalence of schizophrenia, it seems that more new cases of schizophrenia have been detected in men (mainly persons under 45 years old).[16, 20-21]The next peak of schizophrenia occurs at the age of 60 years, affects mostly females.[21-22] Nevertheless, female patients, although fewer in number, are slightly older, indicating possible sex-based differences in the progression of the disorder.

Pharmacological adherence was relatively high: 80% of patients followed the prescribed treatment and an even a higher proportion (96%) adhered to psychotherapeutic interventions. This suggests that patients may attach considerable importance to the broader psychosocial support available to them. However, our study's non-adherence percentage is similar to other studies. The extent of non-adherence varies widely, and it has been recorded as low as 4 per cent and as high as 92%.[8, 23-24] The 20% of patients who did not adhere to their pharmacological regimen, represented a critical group at increased risk of relapse and hospitalisation. Lee SU et al. showed that age, type of medical institution, type of medication used, medication adherence, and the severity of symptoms at the time of their initial diagnosis are factors affecting relapse.[25] The non-adherent group was characterised by a mean age of 48.9 years. It was composed mainly of male patients, different from the Chinese population reported by Li Y, which was characterised by a mean age of 53.1 years and composed principally of female patients.[24] This reflects a trend where younger men

have more difficulty adhering to treatment. Moreover, while depression was a notable comorbidity in this group, other conditions, such as hyperglyceridemia and epilepsy, appeared more frequently, suggesting that these patients might have more complex medical profiles or additional challenges that make treatment adherence difficult. In contrast, patients who adhered to their prescribed drug treatments demonstrated a more stable clinical profile, with slightly higher rates of conditions such as type 2 diabetes, hypertension, and hyperlipidaemia, which are common among older adults. These comorbidities underscore the need for integrated care approaches, where schizophrenia treatment is managed alongside other chronic conditions, particularly those influenced by lifestyle factors.

Geospatial analysis adds a crucial layer of understanding to the challenges of managing schizophrenia in urban settings. The concentration of non-adherent patients were concentrated in eight neighbourhoods, with notable concentrations in Avante and Pedregal de Santa Úrsula, while adherent patients were distributed across 23 neighbourhoods, with higher concentrations in Educación and Ajusco. These findings point to socioeconomic and environmental factors that influence adherence, such as access to healthcare services, social support, and living conditions, which are known to be critical for managing chronic mental health disorders.

The analysis of social determinants of health by neighbourhood type provides a comprehensive framework for understanding disparities in health outcomes. It enables the development of interventions that are not only feasible but also have the potential for long-term impact. In this context, the study raises important questions about how mental health services can be adapted to address both pharmacological and psychosocial needs, particularly in areas with lower adherence rates. Targeted interventions, such as community health worker programmes or enhanced mental health outreach services, could prove effective in bridging the gap between patients who manage their schizophrenia well and those who struggle with adherence. These neighbourhood-focused strategies are essential, particularly as urbanity has long been associated with an increased risk of schizophrenia.[26-27] Studies have shown that the incidence of schizophrenia rises with higher levels of urbanity, typically measured by population size or density.[26-27] Tailoring mental health services to the specific needs of neighbourhoods with lower adherence could help improve outcomes for patients, addressing both the environmental and social factors that contribute to disparities in care.

3.4Limits.

A limitation of the study is the sampling method. While the intentional sampling ensured the inclusion of individuals relevant to the study's objectives, it also introduced the potential for selection bias. Because if the participants who did not report schizophrenia or who were less engaged with healthcare services may have been underrepresented, potentially affecting the findings to be extrapolated to the broader population of patients.

4. CONCLUSION.

The study highlights the need for targeted interventions to improve adherence, offering insights to enhance schizophrenia management in primary care settings.The demographic and clinical characteristics of the patients in this study highlight the complex landscape of schizophrenia, particularly concerning pharmacological adherence. The predominance of male patients, especially in the adherent group, aligns with literature suggesting earlier onset in men. The relatively high adherence rates, especially to psychotherapeutic interventions, underscore the importance of psychosocial support in managing the condition. However, non-adherence remains a critical issue, particularly among younger men, who present a higher risk of relapse and hospitalisation, compounded by comorbidities such as epilepsy.

Geospatial analysis reveals that non-adherence is concentrated in specific neighbourhoods, suggesting that socioeconomic and environmental factors significantly influence treatment outcomes. The need for tailored interventions, including neighbourhood-focused mental health outreach, is evident. These strategies could mitigate disparities in care and improve outcomes for those in urban areas where the incidence of schizophrenia is higher. Finally, while the study offers valuable insights, its limitations—particularly in sampling methods—suggest that further research is necessary to generalise the findings to a broader population of schizophrenia patients.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

Option 2:

Author(s) hereby declare that generative AI technologies such as Large Language Models, etc. have been used during the writing or editing of manuscripts. This explanation will include the name, version, model, and source of the generative AI technology and as well as all input prompts provided to the generative AI technology

Details of the AI usage are given below:

1.

2.

3.

CONSENT.

A medical professional informed all participants about the study's objective, its benefits, and potential adverse events. After providing a clear explanation, the signatures of those who voluntarily decided to participate in the study were collected, ensuring that participants had sufficient time to read and sign the corresponding informed consent form.

ETHICAL APPROVAL.

This study was conducted in accordance with good clinical practices as defined by Mexican legislation and the Declaration of Helsinki for research involving human subjects.The protocol was approved by two committees: The Research Committee and the Ethics Committee in Research of the Family Medicine Clinic "División del Norte", ISSSTE. The Data was treated confidentially.

REFERENCES

1. Yao L, Liu H, Tian X. Medication adherence among community-dwelling schizophrenia patients during the COVID-19 pandemic: A cross-sectional study. Psychiatry Res. 2022;317:114841.
2. Saparia P, Patel A, Shah H, Solanki K, Patel A, Sahayata M. Schizophrenia: A Systematic Review. Clin Exp Psychol. 2022;9(1):8-13.
3. McGrath J, Saha S, Welham J, El Saadi O, MacCauley C, Chant D. A systematic review of the incidence of schizophrenia: the distribution of rates and the influence of sex, urbanicity, migrant status and methodology. BMC Med. 2004;2,13.
4. Rodríguez-Matías OG, González-Nicolás DE. [The association of schizophrenia with chronic non transmissible diseases]. Rev Méd Chile. 2017;145(8):1047-1053. Spanish.
5. Pedroza-Cosío GA, Sánchez-Escobar LE, Munguía-Lozano S, Beltrán-Lagunes L, Ferrer-Álvarez JG, Medina-Arreguín R, et al. [Evaluation of the FD-66 Scale as a tool for predicting treatment adherence in patients with chronic non-communicable diseases]. Rev Panam Salud Publica. 2017;41:e113. Spanish.
6. Patel KR, Cherian J, Gohil K, Atkinson D. Schizophrenia: overview and treatment options. P T. 2014;39(9):638-45.
7. Loots E, Goossens E, Vanwesemael T, Morrens M, Van Rompaey B, Dilles T. Interventions to Improve Medication Adherence in Patients with Schizophrenia or Bipolar Disorders: A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2021;18(19):10213.
8. Acosta FJ, Hernández JL, Pereira J, Herrera J, Rodríguez CJ. Medication adherence in schizophrenia. World J Psychiatry. 2012;2(5):74-82.
9. Guo J, Lv X, Liu Y, Kong L, Qu H, Yue W. Influencing factors of medication adherence in schizophrenic patients: a meta-analysis. Schizophr. 2023;9,31.
10. Misdrahi D, Dupuy M, Dansou Y, Boyer L, Berna F, Capdevielle D, et al. Predictors of medication adherence in a large 1-year prospective cohort of individuals with schizophrenia: insights from the multicentric FACE-SZ dataset. Transl Psychiatry. 2023;13,341.
11. Kim J, Ozzoude M, Nakajima S, Shah P, Caravaggio F, Iwata Y, et al. Insight and medication adherence in schizophrenia: An analysis of the CATIE trial. Neuropharmacology. 2020;168: 107634.
12. Phan SV. Medication adherence in patients with schizophrenia. Int J Psychiatry Med. 2016;51(2):211-9.
13. Lopez-Hernandez D, Beltran-Lagunes L, Soto-de-la-Cruz P, Brito-Aranda L, Pavon-Delgado E, Castro-Diaz AM, et al. Associated Factors of Polypharmacy Among Elderly Patients Attended at Primary Care Setting". CJAST. 2024;43(8):73-87.
14. Val-Jiménez A, Amorós-Ballestero G, Martínez-Visa P, Fernández-Ferré ML, León-Sanromà M. [Descriptive study of adherence to antihypertensive pharmacological treatment and validation of the Morisky and Green test]. Aten Primaria. 1992;10:767–770. Spanish.
15. Rodríguez-Chamorro MA, García-Jiménez E, Amariles P, Rodríguez-Chamorro A, Faus MJ. [Review of the test used for measuring therapeutic compliance in clinical practice]. Aten Primaria. 2008;40(8):413-8. Spanish.
16. Charlson FJ, Ferrari AJ, Santomauro DF, Diminic S, Stockings E, Scott JG, et al. Global Epidemiology and Burden of Schizophrenia: Findings From the Global Burden of Disease Study 2016. Schizophr Bull. 2018;44(6):1195-1203.
17. Zhan N, Sham PC, So HC, Lui SSY. The genetic basis of onset age in schizophrenia: evidence and models. Front Genet. 2023;14:1163361.
18. Baba K, Guo W, Chen Y, Nosaka T, Kato T. Burden of schizophrenia among Japanese patients: a cross-sectional National Health and Wellness Survey. BMC Psychiatry. 2022;22(1):410.

19. Li X, Zhou W, Yi Z. A glimpse of gender differences in schizophrenia. Gen Psychiatr. 2022;35(4):e100823.
20. Ferrara M, Curtarello EMA, Gentili E, Domenicano I, Vecchioni L, Zese R, et al. Sex differences in schizophrenia-spectrum diagnoses: results from a 30-year health record registry. Arch Womens Ment Health. 2024;27(1):11-20.
21. Kuo SS, Musket CW, Rupert PE, Almasy L, Gur RC, Prasad KM, et al. Age-dependent patterns of schizophrenia genetic risk affect cognition. Schizophr Res. 2022;246:39-48.
22. Stępień-Wyrobiec O, Nowak M, Wyrobiec G, Morawiec E, Wierzbik-Strońska M, Staszkiewicz R, et al. Crossroad between current knowledge and new perspective of diagnostic and therapy of late-onset schizophrenia and very late-onset schizophrenia-like psychosis: An update. Front Psychiatry. 2022;13:1025414.
23. Mohammed F, Geda B, Yadeta TA, Dessie Y. Antipsychotic medication non-adherence and factors associated among patients with schizophrenia in eastern Ethiopia. BMC Psychiatry 2024;24:108.
24. Li Y, Wen H, Xiong C, Lin C, Yang X, Wang D, et al. Medication Nonadherence and Risk of Violence to Others Among Patients With Schizophrenia in Western China. JAMA Netw Open. 2023;6(4):e235891.
25. Lee SU, Soh M, Ryu V, Kim CE, Park S, et al. Analysis of the Health Insurance Review and Assessment Service data from 2011 to 2015. Int J Ment Health Syst. 2018;12:9.
26. Vassos E, Pedersen CB, Murray RM, Collier DA, Lewis CM. Meta-analysis of the association of urbanicity with schizophrenia. Schizophr Bull. 2012;38(6):1118-23.
27. Pedersen CB, Antonsen S, Timmermann A, Pedersen MG, Ejlskov L, Horsdal HT, et al. Urban-Rural Differences in Schizophrenia Risk: Multilevel Survival Analyses of Individual- and Neighborhood-Level Indicators, Urbanicity and Population Density in a Danish National Cohort Study. Schizophr Bull Open. 2021;3(1):sgab056.