

# Original Research Article

## Sociodemographic Factors and Comorbidities in Schizophrenia Patients Treated in a Primary Care Unit.

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### ABSTRACT

**Aims:** Understanding the characteristics of schizophrenia patients who adhere to treatment, in the primary care setting.

**Study design:** A cross-sectional study was conducted.

**Place and Duration of Study:** Ambulatory Care Medical Unit. It was conducted with Mexican patients attending the Family Medicine Speciality outpatient consultation at the Family Medicine Clinic "División del Norte", in Mexico City, from July 1st 2023 to January 31st, 2024.

**Methodology:** Data on adherence were collected through a prospective 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: Schizophrenia; primary care; adherence to treatment; georeferenced.*

### 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.

## **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.

### **2.2 Study Population and Sampling Method.**

The study included 50 patients with schizophrenia aged from 16 years old and above. Intentional sampling was utilised by selecting individuals whose family members or clinician reported schizophrenia. This method ensured the inclusion of patients with schizophrenia who were relevant to the study's objectives.

### **2.3 Data Collection and Instruments.**

The data was collected using a structured questionnaire and through the "SIMEF" records. This database captures information on curative care consultations provided by the medical personnel assigned to preventive programmes.[13] These programmes include epidemiological surveillance, outpatient consultation, child growth and development, family planning, and others.[13] Initially, the patients were identified using the "SIMEF" system, through the International Classification of Diseases, tenth revision (ICD-10). Thenceforward, a data collection sheet was employed to gather detailed information (patient name, medical record number, date of birth, address) and sociodemographic factors (sex and age). The

"SIMEF" records include information on age, sex, type of entitlement, ICD-10 diagnostic code, and consultation dates.[13] The working tools included Excel files generated by the "SIMEF" system per month. The collected data was stored in an Excel workbook, which served as the statistical database for subsequent analysis. This procedure ensured the accuracy, quality, and reliability of the extracted data, supporting the integrity of our study's findings. We completed information on psychotherapy and pharmacological adherence using a structured questionnaire. The Morisky-Green test (which has been validated in the Spanish version),[14] was used to assess the pharmacological adherence of participants. Each Morisky-Green test was conducted in a single session within a controlled, quiet, and private environment to minimise distractions and optimise participant comfort. This questionnaire consists of four questions (with dichotomous answers: yes or no).[14-15] The answers reflect the patient's behaviour concerning pharmacological treatment adherence. It is assumed that if the patient has correct behaviour (correct answers: No/Yes/No/No) he or she is considered compliant.[15]

#### **2.4 Selection Criteria.**

Participants were selected from the "SIMEF" database based on the following inclusion criteria: all patients with schizophrenia diagnosis, of both sexes, who attended follow-up appointments in the outpatient clinic of the Family Medicine Speciality and General Medicine Service, and those who agreed to participate and provided informed consent. Patients who did not complete the questionnaire, provided incomplete or inaccurate responses, or did not consent to participate were excluded. Finally, a final review of the new combined database was conducted to ensure completeness and consistency of the information.

#### **2.5 Statistical 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.

#### **2.6 Ethical Considerations.**

The study was conducted in accordance with the Good Clinical Practice Guidelines of our laws and the Declaration of Helsinki for human experiments. The protocol was approved by two committees: The Research Committee and the Ethics Committee in Research of the FMC "División del Norte", ISSSTE. The Data was treated confidentially.

### **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 16 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) f, %; (IC95%)	Pharmacological adherence (n=40) f, %; (IC 95%)	Nonpharmacological adherence (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 study population.**

Variables	Total population (N=50)	Pharmacological adherence (n=40)	Nonpharmacological adherence (n=10)
	f, %; (IC95%)	f, %; (IC 95%)	f, %; (IC 95%)
A009	4, 8 (2-16)	3, 7.5 (0-17.5)	1, 10 (0-30)
A059	1, 2 (0-6)	1, 2.5 (0-10)	0, 0; (0-0)
B029	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
D259	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
D352	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
D500	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
D649	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
E039	4, 8 (2-16)	3, 7.5 (0-17.5)	1, 10 (0-30)
E119	6, 12 (4-22)	6, 15 (5-27.5)	0, 0; (0-0)
E660	3, 6 (0-12)	3, 7.5 (0-17.5)	0, 0; (0-0)
E669	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
E780	3, 6 (0-12)	3, 7.5 (0-17.5)	0, 0; (0-0)
E781	2, 4 (0-10)	0, 0; (0-0)	2, 20 (0-50)
E782	4, 8 (2-16)	3, 7.5 (0-17.5)	1, 10 (0-30)
E785	9, 18 (8-30)	7, 17.5 (7.5-30)	2, 20 (0-50)
E790	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
E85	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
E878	1, 2 (0-6)	1, 2.5 (0-10)	0, 0; (0-0)
F029	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F062	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F067	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F103	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
F179	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F200	27, 54 (40-68)	23, 57.5 (42.5-72.5)	4, 40 (10-70)
F201	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
F203	3, 6 (0-14)	2, 5 (0-12.5)	1, 10 (0-30)
F206	5, 10 (2-20)	3, 7.5 (0-15)	2, 20 (0-50)
F208	9, 18 (8-30)	9, 22.5 (10-35)	0, 0; (0-0)
F209	38, 76 (64-86)	30, 75 (60-87.5)	8, 80 (50-100)
F259	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F329	5, 10 (2-18)	3, 7.5 (0-15)	2, 20 (0-40)
F339	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
F412	3, 6 (0-14)	3, 7.5 (0-17.5)	0, 0; (0-0)
F419	2, 4 (0-11.9)	2, 5 (0-12.5)	0, 0; (0-0)

F429	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F450	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
F451	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
F452	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
F601	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
F709	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G20X	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G210	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G248	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G249	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G409	5, 10 (2-20)	3, 7.5 (0-17.5)	2, 20 (0-50)
G473	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
G478	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
G938	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
H041	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
H409	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I10X	6, 12 (4-22)	6, 15 (5-27.5)	0, 0; (0-0)
I270	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I440	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I451	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I519	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I672	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
I679	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I778	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
I872	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
J029	4, 8 (2-16)	3, 7.5 (0-17.5)	1, 10 (0-30)
J304	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
J310	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
J449	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K010	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K020	2, 4 (0-10)	1, 2.5 (0-7.5)	1, 10 (0-30)
K023	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K036	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K040	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K047	2, 4 (0-10)	1, 2.5 (0-7.5)	1, 10 (0-30)
K053	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K072	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K075	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K078	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K083	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K088	3, 6 (0-14)	1, 2.5 (0-7.5)	2, 20 (0-50)
K089	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
K219	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
K291	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K296	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K297	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K319	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
K589	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
M199	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
M350	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
M545	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
M839	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
M939	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)

N189	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
N300	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
N390	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
N40X	1, 2 (0-8)	1, 2.5 (0-7.5)	0, 0; (0-0)
N508	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
N944	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
O860	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Q348	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Q667	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Q909	1, 2 (0-6)	1, 2.5 (0-10)	0, 0; (0-0)
R060	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R31X	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R529	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R53X	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R600	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R619	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
R730	4, 8 (2-16)	4, 10 (2.5-20)	0, 0; (0-0)
R739	3, 6 (0-12)	2, 5 (0-12.5)	1, 10 (0-30)
S800	2, 4 (0-10)	2, 5 (0-12.5)	0, 0; (0-0)
S909	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Z000	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Z006	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)
Z012	3, 6 (0-14)	2, 5 (0-12.5)	1, 10 (0-30)
Z029	2, 4 (0-10)	1, 2.5 (0-7.5)	1, 10 (0-30)
Z123	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
Z124	1, 2 (0-6)	0, 0; (0-0)	1, 10 (0-30)
Z638	1, 2 (0-6)	1, 2.5 (0-7.5)	0, 0; (0-0)

Source: Own elaboration based on database records.

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 Acoxta, 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.**

Variables	Total population (N=50)	Pharmacological adherence (n=40)	Nonpharmacological adherence (n=10)
	f, %; (IC95%)	f, %; (IC 95%)	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	1, 2; (0-6)	0, 0; (0-0)	1, 10; (0-30)

Coapa			
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.

### 3.2 Characteristics 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 16 to 77 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 16 to 77 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).

### 3.3 Discussion.

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 Charlson FJ et al. schizophrenia onset in adolescence and young adulthood with prevalence peaking at around 40 years of age (similar to our findings) with a decline in the older age groups.<sup>16</sup> 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.<sup>17</sup> 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.<sup>16, 18</sup> 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%.<sup>8, 19-20</sup> 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.<sup>21</sup> 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.<sup>20</sup> 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.<sup>22-23</sup> Studies have shown that the incidence of schizophrenia rises with higher levels of urbanity, typically measured by population size or density.<sup>22-23</sup> 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.

### **3.4 Limits.**

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.**

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

### **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.

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UNDER PEER REVIEW