Disponible en http://www.revhph.sld.cu/

Revista del Hospital Psiquiátrico de La Habana

Volumen 22| Año 2025 | Publicación continua
ISSN: 0138-7103 | RNPS: 2030

Sección de adicciones

Original

Symptomatic Profile of Ecuadorian Patients with Withdrawal Syndrome due to Inhaled Heroin Use

Perfil sintomático de pacientes ecuatorianos con síndrome de abstinencia por consumo de heroína inhalada

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Recibido: 02/03/2025
Aceptado: 26/05/2025

Editores:
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Abstract

Introduction: The symptoms of opioid withdrawal syndrome vary depending on the specific drug used, adulterants, and route of administration. This study analyzed the symptom profile of withdrawal syndrome due to inhaled heroin use in Ecuadorian patients, and its relationship with sex and age.

Objective: Describe the symptom profile of withdrawal syndrome due to inhaled heroin use and its relationship with sex and age in Ecuadorian patients.

Methods: A descriptive cross-sectional study was conducted in a specialized care unit in Ecuador from 2018 to 2022. Patients with withdrawal syndrome due to inhaled heroin use were included. Symptoms were categorized into general, neuropsychiatric, gastrointestinal, and cardiorespiratory. Associations with sex, age, and year of care were analyzed using the Chi-square test ($p < 0.05$).

Results: A total of 983 patients were evaluated, 82 % were male, with a predominance of the 11–18 age group (n = 597). General symptoms predominated in all age groups except those over 35 years. The most common symptoms were rhinorrhea, anxiety, myalgia, arthralgia, nausea, vomiting, insomnia, diarrhea, chills, and headache.

Conclusions: The symptom profile of withdrawal syndrome in Ecuadorian inhaled heroin users was consistent with established clinical patterns, without significant variations among groups.

Keywords: substance withdrawal syndrome, opioid-related disorders, heroin dependence, withdrawal symptoms, heroin

Resumen

Introducción: los síntomas del síndrome de abstinencia a opioides varían según la droga consumida, los adulterantes y las vías de administración. Este estudio analizó el perfil sintomático del síndrome de abstinencia por consumo de heroína inhalada en pacientes ecuatorianos, y su relación con el sexo y la edad.

Objetivo: describir el perfil sintomático del síndrome de abstinencia por consumo de heroína inhalada y su relación con el sexo y la edad en pacientes ecuatorianos.

Métodos: se realizó un estudio descriptivo de corte transversal en una unidad de atención especializada de Ecuador, entre 2018 y 2022. Se incluyeron pacientes con síndrome de abstinencia por consumo de heroína inhalada. Los síntomas se categorizaron en generales, neuropsiquiátricos, gastrointestinales y cardiorrespiratorios. Se analizaron asociaciones con sexo, edad y año de atención mediante la prueba de ji cuadrado ($p < 0.05$).

Resultados: se evaluaron 983 pacientes, de los cuales el 82 % eran hombres, con predominancia del grupo etario entre 11 y 18 años (n = 597). Los síntomas generales predominaron en todos los grupos, excepto en mayores de 35 años. Los síntomas más

frecuentes fueron rinorrea, ansiedad, mialgia, artralgia, náuseas, vómitos, insomnio, diarrea, escalofríos y cefalea.
Conclusiones: el perfil sintomático del síndrome de abstinencia en consumidores ecuatorianos de heroína inhalada se correspondió con los patrones clínicos reconocidos, sin variaciones significativas entre grupos.
Palabras clave: síndrome de abstinencia a sustancias; trastornos relacionados con opioides; dependencia de heroína; síntomas de abstinencia; heroína.

Introduction

Opioid Use Disorder (OUD) is a chronic and relapsing condition marked by compulsive opioid consumption, tolerance, and withdrawal symptoms upon cessation. It affects over 16 million individuals worldwide and is responsible for approximately 120,000 deaths each year, making opioids the leading cause of mortality among people with substance use disorders. [1–3]

According to the latest global data, drug use reached 292 million people in 2022, reflecting a 20 % increase over the last decade. Opioids are now the second most commonly consumed illicit substance globally, with over 60 million users. In 2019 alone, they were implicated in 80 % of the 600,000 drug-related deaths. Despite the severity of the crisis, only one in ten individuals with substance use disorders receives treatment, with women facing disproportionate barriers to access. [2,4,5]

Heroin, a semi-synthetic opioid, is frequently used due to its low cost and potent psychoactive effects. The method of administration—whether injection, inhalation, or snorting—along with unknown adulterants, significantly affects both the intensity and variability of withdrawal symptoms. [6–8] These symptoms can range from mild (e.g., muscle aches, nausea, irritability) to severe (e.g., respiratory distress, cardiovascular complications), depending on individual, pharmacological, and contextual factors. [9,10]

In Ecuador, opioids rank among the top three most consumed illicit drugs and are closely associated with rising rates of violence, HIV transmission, and premature death. The emergence of inhaled heroin, commonly referred to as "H-hache," has worsened the addiction landscape, particularly among adolescents, due to its low price, widespread availability, and poorly understood chemical composition. [11–13] This study aims to characterize the symptom profile of withdrawal syndrome in Ecuadorian patients who use inhaled heroin and to examine the influence of demographic variables such as age and sex on these clinical manifestations.

Methods

An observational, cross-sectional, and analytical study was conducted from January 1, 2014, to December 31, 2017. The target population consisted of patients aged 11 to 61 years who presented to the emergency department of the Guayaquil Institute of Neurosciences (INC) for suspected opioid abuse.

The study universe included all patients admitted during the study period with a clinical suspicion of opioid use (ICD-10 code F11). From this group, the sample comprised 983 patients who received a confirmed diagnosis of opioid withdrawal syndrome (ICD-10 code F11.3).

A simple random sampling method was applied using a random number sequence to ensure representativeness. Inclusion criteria were: patients with complete medical records, a diagnosis of opioid withdrawal syndrome, and a reported route of heroin administration via nasal inhalation. Exclusion criteria included incomplete sociodemographic or clinical data and evidence of polydrug use during the withdrawal episode. Sociodemographic variables (age and sex) were collected, and clinical symptoms were classified into four categories: general (malaise, chills, headache, and weight loss), cardiorespiratory (dyspnea, cough, and tachycardia), gastrointestinal (nausea, vomiting, and abdominal pain), and neuropsychiatric (anxiety, insomnia, hallucinations, and suicidal ideation).

Procedure

Data were retrieved from the MIS system, which contains the electronic medical records supported by the Ecuadorian Ministry of Public Health (models 003 and 008). [14] Eligible cases were selected using a computer-generated random number sequence. Each record was reviewed by the research team to ensure compliance with inclusion and exclusion criteria.

Ethical Statement

This study was approved by the Department of Teaching and Research at the Guayaquil Institute of Neurosciences (INC), Ecuador. In accordance with national regulations, written informed consent was not required due to the retrospective design of the study. All data were anonymized, and patient confidentiality was maintained throughout the research process. The study complied with the ethical principles outlined in the Declaration of Helsinki (2024 version), which governs research involving human subjects.

Statistical Analysis

Quantitative variables were described using medians and interquartile ranges due to non-parametric distribution. Qualitative variables were reported as absolute and relative frequencies. Associations between categorical variables were examined using the Chi-square test, with statistical significance defined as $p < 0.05$. Statistical analyses were performed using R software, version 4.4.2. [15]

Results

Descriptive

A total of 983 patients diagnosed with withdrawal syndrome due to inhaled heroin use (ICD-10 code F11.3) were included in the study. These patients were selected from an initial universe of 1,517 individuals admitted to the emergency department of the Guayaquil Institute of Neurosciences (INC) between 2014 and 2017 for suspected opioid abuse. The final sample included 809 men and 174 women, with ages ranging from 11 to 61 years (mean = 18). The most affected age group was 11–18 years (n = 597), and the highest number of cases occurred in 2014 and 2015, followed by a notable decline in 2016 and 2017.

Table 1. Frequencies by year

Year	**11-18** (n = 597 [1])		**19-34** (n = 368[1])		**35 or more** (n= 18[1])	
	Male	**Female**	**Male**	**Female**	**Male**	**Female**
2014	193 (19.6 %)	29 (3.0 %)	97 (9.9 %)	16 (1.6 %)	7 (0.71 %)	1 (0.1 %)
2015	215 (21.9 %)	59 (6.0 %)	120 (12.2 %)	25 (2.5 %)	4 (0.41 %)	0 (0.0 %)
2016	64 (6.5 %)	16 (1.6 %)	61 (6.2 %)	17 (1.7 %)	2 (0.20 %)	2 (0.2 %)
2017	18 (1.8 %)	3 (0.3 %)	26 (2.6 %)	6 (0.6 %)	2 (0.20 %)	0 (0.0 %)

Source: own elaboration
Note: *Percentages were calculated by age group [1]n (%)*

Across all symptom categories—general, neuropsychiatric, gastrointestinal, and cardiorespiratory—male patients aged 11–18 years consistently represented the largest proportion of cases. Patients aged 35 and older, regardless of sex, were the least represented. Notably, neuropsychiatric symptoms such as anxiety and insomnia were especially prevalent among adolescents, while gastrointestinal complaints such as nausea, vomiting, and abdominal pain also showed high frequencies in this group.

Table 2. Distribution of symptoms grouped with respect to sex and age

Grouped symptoms	Age group	Sex	n	%
Neuropsychiatrists symtoms	11 – 18 (n=579[1])	Female	84	8,5
		Male	364	37,0
	19 - 34 (n = 368[1])	Female	48	4,9
		Male	233	23,7
	35 and over (n= 18[1])	Female	3	0,3
		Male	13	1,3
General symtoms	11 - 18 (n = 597[1])	Female	89	9,1
		Male	437	44,5
	19 - 34 (n = 368[1])	Female	55	5,6
		Male	252	25,6
	35 and over (n= 18[1])	Female	2	0,2
		Male	11	1,1
Gastrointestinal symtoms	11 - 18 (n = 597[1])	Female	107	10,9
		Male	490	49,8
	19 - 34 (n = 368[1])	Female	64	6,5
		Male	304	30,9
	35 and over (n= 18[1])	Female	3	0,3
		Male	15	1,5
Cardiorespiratory symtoms	11 - 18 (n = 597[1])	Female	72	7,3
		Male	332	33,8
	19 - 34 (n = 368[1])	Female	39	4,0
		Male	198	20,1
	35 and over (n= 18[1])	Female	3	0,3
		Male	12	1,2

Source: own elaboration
Note: *[1]n (%) 2 Chi-square test of independence*

Anxiety was the most commonly reported symptom in both sexes, present in 56.7 % of men and 61.5 % of women. Arthralgia, diarrhea, chills, and headache were also among the most frequent manifestations. While men exhibited a wider range of symptoms—likely due to their greater sample size—women showed slightly higher rates of anxiety. Less frequent symptoms such as hallucinations, seizures, and chest pain appeared only sporadically.

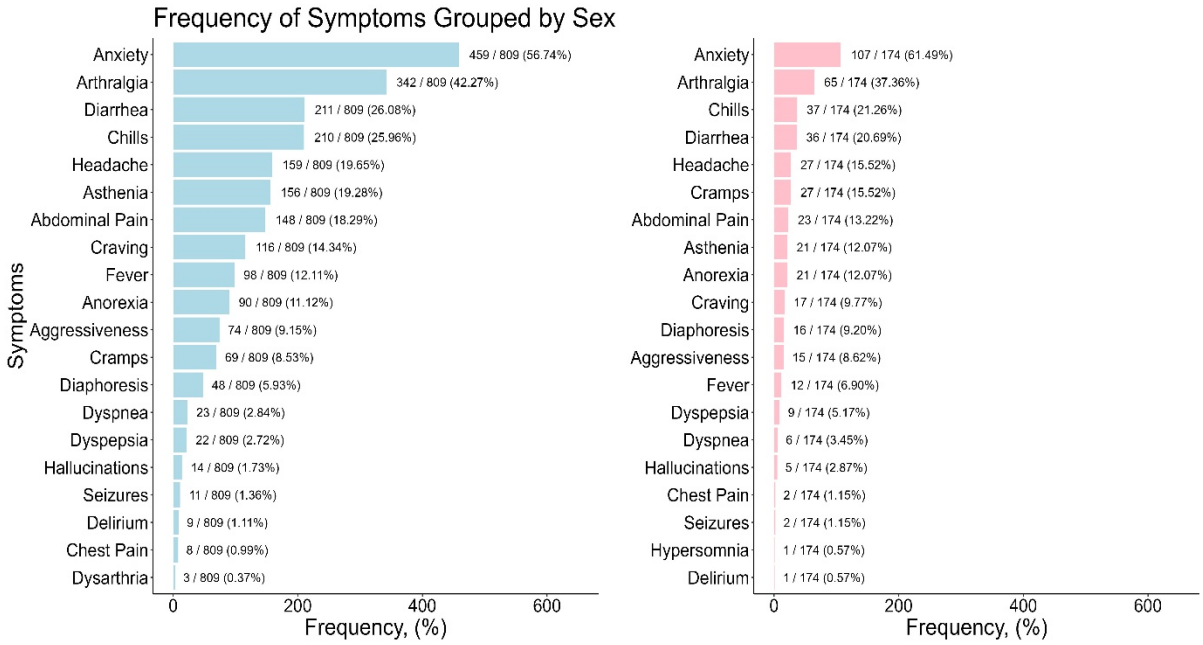

Figure 1. Frequenciy of symptons group by sex

Source: own elaboration

Note: *Percentages are calculated relative to the total number of patients within each sex group.*

Among male adolescents (11–18 years), the most frequent symptom combinations included anxiety, insomnia, malaise, chills, arthralgia, myalgia, and rhinorrhea. As the number of concurrent symptoms increased, the frequency of such cases decreased, with only a small number of patients presenting more complex clusters that included abdominal pain, tachycardia, and cough.

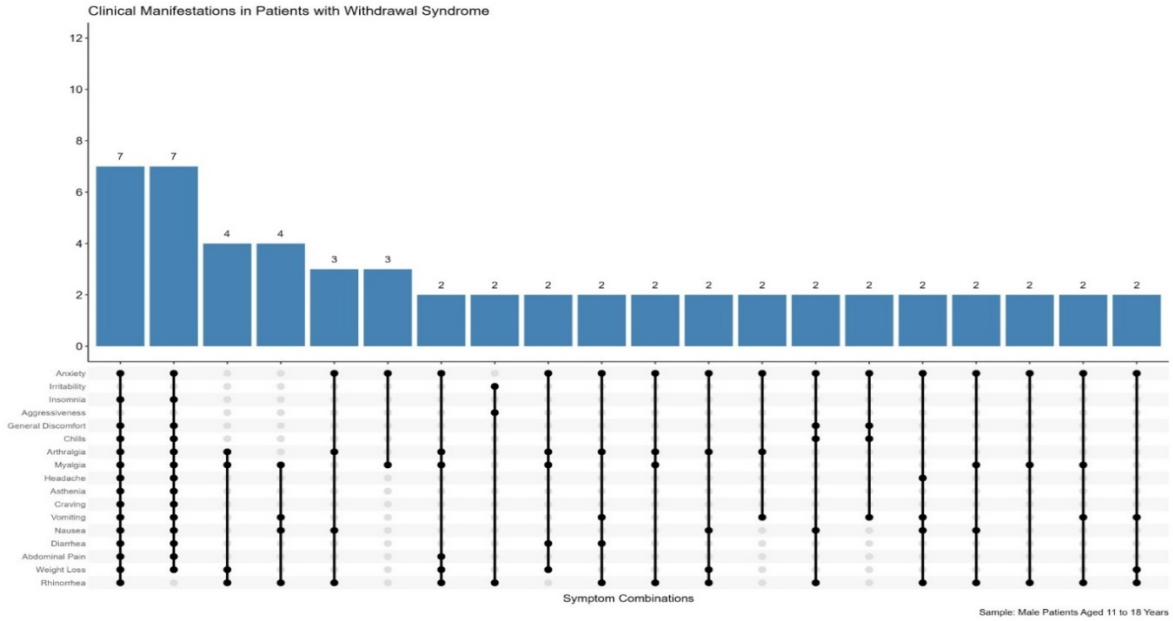

Figure 2. Clinical manifestations in patients with withdrawal syndrome

Source: own elaboration

Note: *Frequencies are calculated based on the total combination of symptoms for each patient*

Over the four-year study period, the overall prevalence of symptoms declined. In 2014, anxiety and arthralgia peaked at nearly 70 % and 50 %, respectively. However, by 2017, all symptom proportions had decreased substantially, with anxiety and arthralgia remaining the most common symptoms (around 40 %), while symptoms such as delusions and hallucinations were virtually absent.

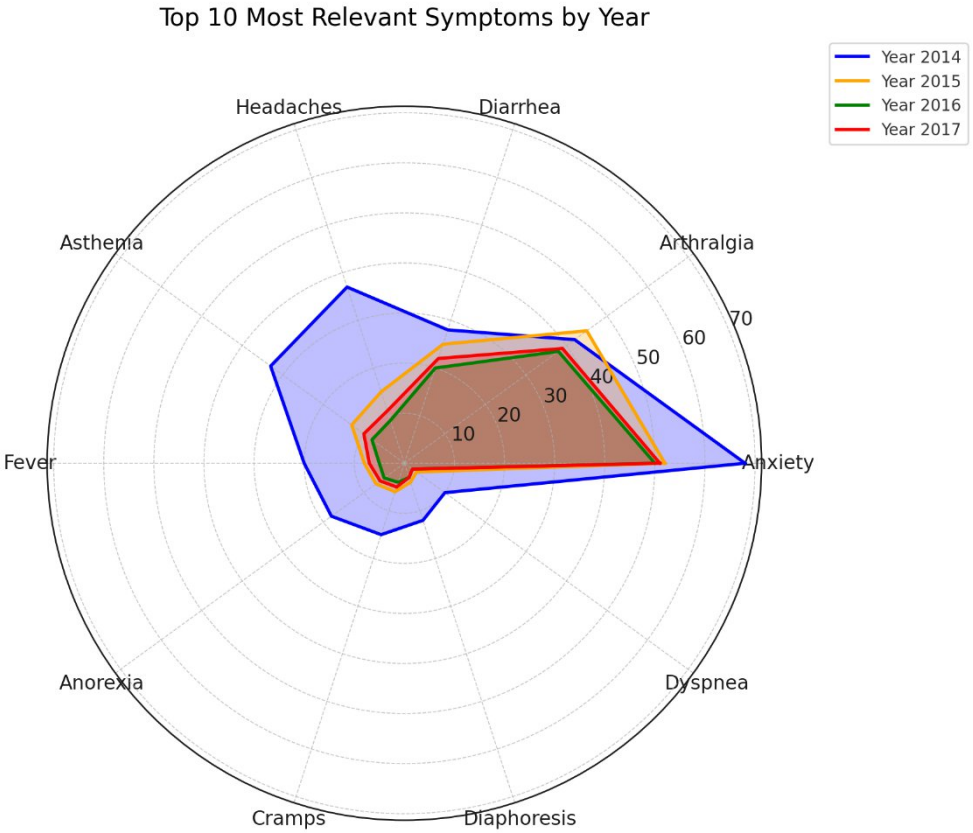

Figure 3. Graph of symptom profile by years

Source: own elaboration

Note: The radar chart presents the top 10 most relevant symptoms for each year from 2014 to 2017, showing variations in symptom prevalence across time

Discussion

This study analyzed 983 Ecuadorian patients diagnosed with withdrawal syndrome due to inhaled heroin use, with a majority of cases occurring in adolescents aged 11–18 years and a higher representation of males. The peak in cases observed in 2014 and 2015 may reflect increased accessibility of heroin during those years, while the subsequent decline could be associated with restricted service access at the Guayaquil Institute of Neurosciences (INC). Classifying symptoms into four categories (general, neuropsychiatric, gastrointestinal, and cardiorespiratory) and analyzing trends by year and demographic variables allowed for a deeper understanding of withdrawal manifestations and their consistency over time.

Opioid withdrawal is typically mild but distressing, with symptoms lasting between 3 to 10 days depending on the opioid's half-life. Classical manifestations include sweating, tremors,

restlessness, gastrointestinal disturbances, and anxiety, with severe cases potentially progressing to delirium or cardiopulmonary compromise. [16] The most prevalent symptoms in our sample—anxiety, arthralgia, diarrhea, chills, and headache—are in line with those described in other studies on heroin withdrawal.[17-19] Interestingly, the frequency of depressive symptoms, typically reported in 40–65 % of withdrawal cases [20], was low in our cohort, possibly due to the acute nature of the observed episodes or underreporting in emergency settings.

Anxiety was consistently the most reported symptom across all subgroups, with slightly higher prevalence in females, which aligns with previous findings on sex differences in withdrawal expression. [18] The broader range of symptoms reported by males may be attributed to their numerical predominance in the sample rather than to true clinical variability. The symptom patterns observed in this study were comparable to those described in parenteral opioid withdrawal, [16] reinforcing the notion that the route of administration does not fundamentally alter the core withdrawal profile, although it may affect symptom onset and intensity.

The stability of symptom profiles over time suggests minimal variation in the chemical composition of the heroin consumed in Ecuador during the study period. However, changes in the proportions of cutting agents could still explain subtle shifts in the prevalence of certain symptoms. [21] This reinforces the complexity of opioid withdrawal as a phenomenon influenced by pharmacological, physiological, and psychosocial factors. [22]

Findings from this study are consistent with international reports from the European Community [23] and the United States, [24] which may be due to the circulation of similar adulterants in the global heroin market. This consistency underscores the global nature of the opioid crisis and the need for harmonized treatment strategies that can be adapted to local contexts.

This study has several limitations. First, it is based on retrospective data collected from electronic health records, which may be incomplete or subject to reporting bias. Second, the reliance on emergency department admissions may underrepresent patients with milder symptoms or those who did not seek care. Third, the study focused exclusively on inhaled heroin use, and its findings may not be generalizable to users of other opioids or administration routes.

Despite these limitations, the study provides valuable insights into the clinical presentation of withdrawal syndrome in a vulnerable population, with implications for early identification, triage, and treatment. It also highlights the need for standardized symptom monitoring

protocols and further research into demographic and psychosocial variables that influence withdrawal severity and treatment response.

Conclusions

This study described the symptom profile of withdrawal syndrome in Ecuadorian patients who use inhaled heroin and examined its association with age and sex. The most frequent symptoms identified were anxiety, arthralgia, and diarrhea, aligning with clinical patterns reported in international literature. No significant differences were observed in symptom distribution across sex, age groups, or study years, suggesting a stable chemical composition of the heroin consumed during the study period. These findings highlight the need for standardized clinical approaches that prioritize the most prevalent symptoms and incorporate demographic considerations into withdrawal management. Moreover, the results reinforce the importance of ongoing public health strategies focused on prevention, early identification, and expanded access to treatment for populations at higher risk of opioid use disorder.

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Conflict of Interest Disclosure
The authors declare no conflict of interest.

Author Contributions
José Alejandro Valdevila Figueira: Conceptualization of the study, methodological design, supervision of the research process, acquisition of funding, critical revision of the manuscript, and correspondence with the journal during the submission and revision process.
Andrés Ramírez Coronel: Statistical analysis, interpretation of results, and drafting of the methods and results sections.
Indira Dayana Carvajal Parra: Critical content review, drafting of the discussion section, and ensuring compliance with the journal's editorial guidelines.
Jimmy Martin-Delgado: Data processing, preparation of tables and figures, and verification of references.
José María Durán Pérez: Literature review, data collection, and initial drafting of the manuscript.
Rocío Valdevila Santiesteban: Validation of the questionnaire design, final editing of the manuscript and coordination among authors.

Funding Declaration
This research received no external funding.

Data availability statement
The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.