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Epidemiological surveillance of cholera in the 21st century

by Oscar Cruz Orozco

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The legacy of John Snow

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John Snow is considered the father of modern epidemiology, as he was the first to seek an association between a water intake and the outbreak of cholera in the mid-19th century. This occurred at a time when the paradigm of spontaneous generation was in a deadly battle with emerging scientific medical knowledge.

Previously, the explanation for the simultaneous occurrence of cases of a disease was considered divine punishment, caused by having disobeyed the laws of the people where the event occurred. An example is described in the plagues suffered in Egypt, specifically the sixth plague, which unfolded according to the biblical text, as follows: “Take handfuls of ashes from the furnace, and let Moses cast them up to heaven in the presence of Pharaoh. The ashes will turn to dust and fall on all the land of Egypt, and throughout Egypt they will produce boils with sores on people and animals. (Exodus 9:8-9).” This description is reminiscent of cutaneous anthrax caused by Bacillus anthracis. However, it could also have been epidemic typhus caused by Rickettsia prowazecki, as there had previously been a plague of lice. However, historians have found no evidence of this occurrence.

It is evident that diseases affect all living species on Earth, in a constant dynamic for survival. Thus, we can go from an epiphytic to an epizootic, to become a zoonosis and later an epidemic. Even in human evolution, there is evidence of diseases such as tuberculosis that have accompanied human history, as demonstrated by the characteristic lesions found in a Homo erectus fossil. Genetic material from the hepatitis B virus has also been found in 7,000-year-old fossils, although it is unknown whether the transmission mechanism would be the same as it is today. However, the first description of an epidemic dates back to the 5th century BC. B.C., when Hippocrates accurately described simultaneous cases of mumps in the city of Thasos, and the term "epidemic" was also used for the first time for this event. Later, the first Antonine Plague was documented in 165 A.D. in Imperial Rome, possibly caused by smallpox. Four centuries later, the Plague of Justinian, which devastated the Byzantine Empire in the 5th century A.D., has been identified

as the first appearance of bubonic plague. Almost ten centuries later, in the 14th century A.D., the Black Death appeared in Europe, both caused by Yersinia pestis, wiping out nearly a third of the continent's population.

Until the mid-19th century, the approach to epidemics was purely descriptive; that is, only the clinical characteristics and, occasionally, the environmental or social conditions present at the time were recorded. However, in 1849, John Snow published the report on the cholera epidemic in London, and later, in 1954, he supplemented it with a detailed description of the event. This event marked a milestone in the way we view health phenomena in the population. The main change was the causal approach to the increase in disease. From then on, a new science was created that would later be known as epidemiology.

Several contributions were made to epidemiology, a science capable of serving as an expert on the health-disease process in the population. Initially, it was adopted by public health decision-makers and later by clinicians, relying on the evidence that epidemiology could provide.

During the first half of the 20th century, public health had established itself worldwide as a guarantor of a better quality of life for the population, always supported by epidemiological knowledge, which in turn served as a pillar of knowledge.

Epidemiology, as a basic science, requires specific scientific research methods and statistics. Essential elements for finding associations between risk factors and disease.

Currently, databases and statistical software are indispensable for epidemiological work; however, the basic principle is the causal relationship, which was rationally explored by John Snow more than a century and a half ago.

You can consult:

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Postpartum depression is associated with the route of obtaining the newborn

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Abstract

Introduction: Postpartum depression is a condition where the disorder arises during the puerperium as a response to biochemical, hormonal, psychological, and social changes. It has an incidence of 10 to 15% and is the most common psychiatric disorder in the puerperium. It may be related to the mode of delivery and is often indirectly associated with sociodemographic factors.

Objective: To determine whether postpartum depression is associated with the route of obtaining the newborn.

Materials and methods: A prospective, observational, and descriptive epidemiological study was conducted with 189 patients with 24–48 hours of postpartum period. They were selected by simple random sampling based on consecutive cases using the 10-item Edinburgh Postnatal Depression Scale (EPDS). Results were interpreted using descriptive statistics with incidence and χ for dichotomous variables using SPSS, as well as relative risk for postpartum depression depending on the route of obtaining the newborn.

Results: The overall incidence of postpartum depression in the study population was 18.28%. The χ^2 statistic was 74.86, with a p-value of <0.001, indicating that the mode of delivery is significantly associated with the development of postpartum depression ($p < 0.05$). Women who received cesarean delivery were 2.09 times more likely to develop postpartum depression (DPP) compared to women who received vaginal delivery.

Conclusions: The study demonstrated that cesarean delivery was significantly associated with DPP.

Keywords: Puerperium, postpartum depression, route of obtaining the newborn.

INTRODUCTION

Pregnancy is a complex biopsychosocial experience, with childbirth being a crucial moment. This is defined as the exit of one or more fetuses from the

interior of the uterine cavity to the exterior. It begins with the first perceptible uterine contractions and ends with delivery. [1]

This event can occur vaginally, where the bony pelvis constitutes the canal through which the fetus must pass. Through this route, various cervical modifications occur, such as enlargement of the lower segment, effacement and dilation of the cervix (passive production as the fetus propels through the cervix), expulsion of the mucous plug, and engagement. This is where the fetus begins to descend and successfully cross the birth canal. [2]

It is important to understand the processes a woman goes through from the beginning of her pregnancy, explain their definition, and the types of birth canals through which the birth of the child may be possible. Define what depression is and, in more detail, what postpartum depression means, its phases, international, national, and local incidences, as well as the risk factors that may influence its onset.

Prospective studies have shown that mood and anxiety symptoms increase in the puerperal state, as does the risk of depression after childbirth. Therefore, once they are identified, the first step is an assessment to determine their severity. [3]

The Diagnostic and Statistical Manual of Mental Disorders, in its fifth edition (DSM-V), included major depressive disorder with onset in the peripartum period or in the first four weeks postpartum. [4] This indicates that, for diagnosis, five or more of the following symptoms must be present for at least two weeks: depressed mood, lack of interest or pleasure in activities, sleep disturbance, loss/lack of energy, psychomotor agitation or retardation, excessive feelings of guilt, decreased concentration, or suicidal thoughts. There is little evidence regarding the mode of delivery, considering variables such as parity, income, marital status, and area of residence. Therefore, it is helpful to understand a little more about the patient's context and discuss whether these have any impact on her emotional state.

It has been described that one of the relevant factors that affect the mother's perception and, therefore, her choice of mode of delivery is the experiences of the pregnant mother and the associated pain. This can generate psychological effects on her that can even increase the likelihood of suffering from PPD. That said, it is important to generate evidence that allows us to understand the factors that influence the development of this condition, including perceptions of the mode of delivery [2], as well as factors such as parity, socioeconomic status, and type of housing.

The postpartum period is a period of great biopsychosocial vulnerability for the mother due to the multiple changes it entails. The emotions experienced increase exponentially, whether due to insecurity in caring for the newborn, postpartum discomfort, excessive visits, and the discrepancy between the information the mother receives from professionals and those close to her. [5]

Globally, 70% of depressions present with physical symptoms, especially pain. Doctors associate these complaints with other illnesses and refer the mother to other professionals rather than a psychologist or psychiatrist, which can lead to a sustained increase in morbidity, a significant increase in the risk of developing other illnesses, and a decrease in quality of life. [6]

In Mexico, as in other countries, depression is found more in women than in men, with a difference of 10.4% and 5.4%, respectively. According to a meta-analysis, the prevalence of postpartum depression is estimated at 12%. There are also nine studies on the prevalence of this condition, ranging from 6.6% to 24.6% based on clinical interviews in urban areas. In the rural population, only two studies have been published, which estimate prevalences between 11% and 12.9%. [7]

Finally, the objective of the study is to determine whether postpartum depression is associated with the mode of delivery.

MATERIALS AND METHODS

A prospective, observational, and descriptive study was conducted to investigate the presence of postpartum depression (DPP) among women in the gynecology and obstetrics department located on the first floor of the General Hospital of Zone No. 14 with a Burn Unit (HGZ 14).

Women in the immediate postpartum period in the gynecological inpatient unit who had delivered vaginally or by cesarean section with a live fetus, assigned to General Hospital of Zone No. 14, were included.

Puerperal women with a previous diagnosis of depression or a history of taking antidepressant medication at the time of the survey, as well as those who had died, were excluded.

Patients with mental impairment, physical or visual limitations that prevented them from completing the interview and completing the questionnaire, or those who were unable to read or write, were also excluded. The surveys were incomplete or unreadable, impeding the interpretation of each of the variables

of interest, as well as those who dropped out of the study before completing the project.

The population consisted of 2,258 pregnant patients who completed their pregnancies either vaginally or by abdominal delivery in 2022 at the General Hospital of Zone No. 14 [8]. The finite population formula was used to calculate the sample, with a 95% CI and a statistical significance of ≤0.05, of which 186 were determined.

The dependent variable was postpartum depression, and the independent variables were: method of obtaining the product, occupation, housing, income, marital status, and parity.

The instrument used was the Edinburgh Postpartum Depression Scale (EPDS), a screening tool developed from the Irritability, Depression, and Anxiety Scale. This instrument has advantages that facilitate the discussion of emotional problems and the monitoring of the clinical course of postpartum depression. It is one of the most widely used scales for postpartum depression and has been validated in national studies. [9, 10, 11, 12]

Each patient in the gynecology inpatient unit who met the study entry criteria was asked to participate in the study, and informed consent was obtained. The study was submitted to the local research committee and approved.

During the research period, the privacy of the research subject was confidentially protected, respecting the individual's bioethical principles of beneficence, nonmaleficence, autonomy, and justice.

Descriptive statistics were used to interpret the results through measures of central tendency (mean, frequencies, and percentages). Incidence was initially calculated as percentages, and a comparison was then made by delivery mode (vaginal or cesarean) to support or refute the working hypothesis with the results as a total percentage. Statistical analysis was performed to compare dichotomous variables using χ^2 and the analysis was carried out using the Statistical Package for the Social Sciences version 29 (SPSS v.29) statistical data package.

RESULTS

This study included 186 postpartum patients treated at the Burn Unit of Zone No. 14 General Hospital. Of the total patients (n=186), the mean age was 26.44 years (SD 5.67), indicating moderate variability in age distribution. The

majority lived in urban dwellings, representing 95.16% of the sample, while only a small percentage, 4.84%, came from rural areas (Table 1).

Table 1 Demographic data of postpartum patients

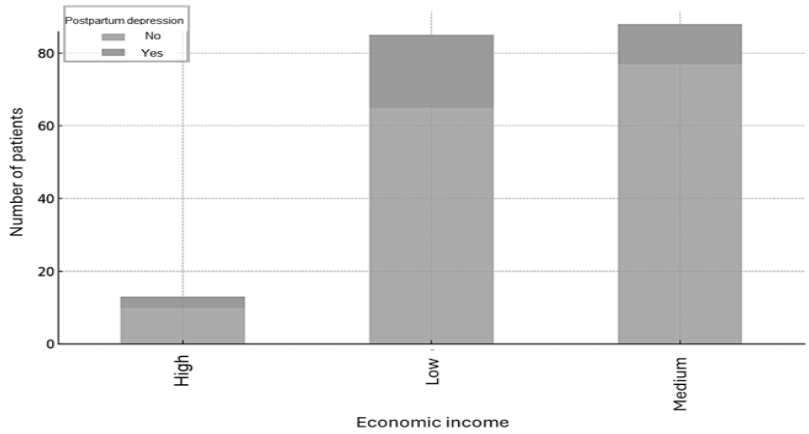
Variable	Total (n:186)
Age	26.44 ± 5.67
Route of obtaining the newborn	Vaginal: 56.45% Caesarean section: 43.55%
Parity	Primigravida: 43.55% Multigesta: 56.45%
Economic income	Low: 45.70% Medium: 47.31% High: 5.38
Home	Rural: 5.71% Urban: 94.29%
Marital status	Married: 52.38% Single: 47.62%

Source: Researcher-derived database created in Excel with a total of 186 patients interviewed using the Edinburgh Postnatal Depression Scale tool in patients treated at HGZ 14.

Regarding socioeconomic and personal characteristics, the reported occupations showed that 45.16% of the patients were homemakers and 40.32% were wage earners, reflecting the occupational diversity of the study participants.

The marital status of the patients was as follows: 51.61% were civilly married and 48.39% were single. In terms of income, almost half of the sample (47.31%) reported incomes between $6,000 and $10,000 or less than $5,000, which could indicate a predominant middle-to-low socioeconomic status in the sample. (Figure 1).

Figure 1 Comparison of the incidence of postpartum depression according to income



Source: Database obtained by researcher made in Excel, with a total content of 186 patients interviewed with the EPDS tool in patients treated at General Hospital of Zone, No. 14.

Using the EPDS, any patient who obtained a score ≥ 13 points was considered positive for DPP. According to the above, the overall incidence of postpartum depression in the study population was 18.28%, which is a high percentage compared to the reviewed history of DPP in Sonora.

The group of women who delivered vaginally had an incidence of 12.38%, while the incidence of women who delivered via cesarean section was 25.93%.

The risk ratio (RR) showed that women who had a cesarean section had a 2.09-fold higher risk of developing postpartum depression compared to those who had a vaginal delivery.

The chi-square statistic was 74.86, with a p-value of <0.001, indicating that the mode of delivery was significantly associated with the onset of postpartum depression ($p < 0.05$). Specifically, patients who underwent a cesarean section had a higher incidence of postpartum depression compared to those who had a vaginal delivery.

The results of the demographic table indicate no statistically significant differences between the groups of women who had a vaginal delivery and those who had a cesarean section in terms of age, occupation, income, housing type, and marital status. The statistical tests applied (chi-square, Mann-Whitney U, and Kruskal-Wallis) confirmed the demographic homogeneity between the two groups. ($p > 0.05$) (Table 2).

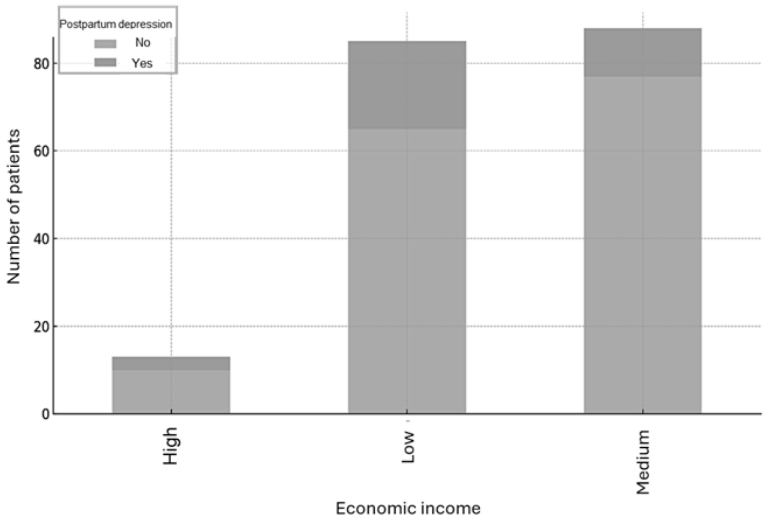
Table 2. Demographic Characteristics of Patients in the Puerperium by obtaining the newborn

Variable	Vaginal	Caesarean section	*p value*
Age	26.03 ± 5.43	26.96 ± 5.96	0.266
Occupation:			
Housewife	49.52%	39.51%	0.436
Employee	35.24%	46.91	
Economic income:			
< $5,000	48.57%	41.98%,	0.709
> $16,000	0.95%	2.47%	
Home:			
Rural	5.71%	3.70%	0.773
Urban	94.29%	96.30%	
Marital status:			
Married	52.38%	50.62%	0.928
Single	47.62%	49.38%	

Source: SPSS inferential statistics where; Chi-square statistical test for qualitative variables, Mann-Whitney U and Kruskall-Wallis for quantitative variables; with statistical significance value p<0.05

Regarding DPP and number of pregnancies, a total of 19 multipregnant women with a positive DPP test were found, 9 of them with vaginal delivery and 10 with cesarean delivery. Sixteen primigravidae women with DPP were found using the EPDS tool, 4 of them with vaginal delivery and 11 with cesarean delivery. This indicated that multipregnant patients had a higher frequency of DPP. (Figure 2)

Figure 1 Comparison of the incidence of postpartum depression according to income



Source: Database obtained by researcher made in Excel, with a total content of 186 patients interviewed with the EPDS tool in patients treated at General Hospital of Zone, No. 14.

DISCUSSION.

The overall incidence of DPP was 18.28%. This indicates that we are slightly above the percentages of postpartum depression indicated by the World Health Organization, which are 10 to 15% or what has been reported in the state of Sonora.[13] However, it is lower than what has been reported in other studies, which can reach 50.7%. [14]

When analyzing the type of delivery, it was observed that the incidence of DPP in the group of women who had cesarean sections was 25.93%. This percentage was provided by 21 patients with a positive EPDS test, which confirmed the working hypothesis due to the high incidence in that group.

The chi-square result was 74.86, with a p-value of <0.001, indicating that cesarean delivery is significantly associated with the development of DPP ($p < 0.05$). This has not been studied in depth in a prospective analysis in women without a history of depression, which is why screening and closer observation of these patients during their hospital stay is advisable.

In the group of women who delivered vaginally, the incidence of DPP was 12.38%, which is very similar to the international, national, and local average.

Women who delivered their baby by cesarean section, due to undergoing a major surgical procedure, had a longer hospital stay of 48 hours due to observation by the attending physician, greater pain during recovery, and a documented lower concentration of oxytocin, adrenaline, and noradrenaline, which slows maternal recovery and the onset of mother-child bonding.

Because the Mexican Social Security Institute (IMSS) varies widely in coverage, it was found that 95.2% of patients come from urban areas (Hermosillo, Sonora), which indicates that these patients have fewer social limitations compared to those without health insurance.

The women studied, based on their socioeconomic and personal factors, show a high percentage of employment as homemakers, which implies greater time with the newborn.

Regarding monthly income, 47% are from a lower-middle socioeconomic level, with a monthly salary between less than five thousand and ten thousand pesos. Fifty-six percent of the women studied are pregnant with multiple children, which can create fear in the future about the new challenge with their other children. Financially, being a homemaker dependent on her partner to purchase hygiene items for the newborn, clothing, and, above all, not neglecting the needs of the rest of the family, affects the economy. On the other hand, a higher percentage of patients with DPP was found in multipregnancies, which corresponds to the literature consulted according to Clinical Practice Guide 15. Due to this research, a considerable incidence of suspected postpartum depression in postpartum women within the first 24 to 48 hours was determined, exceeding the international average of 10 to 15%.

Many of these patients tested positive for the EPDS tool. They reported constant crying, not always for a specific reason, fear about the future and how they carried out their daily lives with a new member of their family; feeling constantly nervous or restless, with difficulty sleeping, which can be detrimental to the mother, the child, and the family environment. There is evidence that anemic states due to a progressively shorter sleep routine of less than 6 hours can be detrimental in the long term, as the body cannot rest fully, and waking up can be irritating to start the new day.

These types of events had not been documented in the northwest of the country, as there were no previous studies comparing the variable of delivery route with the onset of postpartum depression. This is useful for recognizing

patients who need to pay closer attention when monitoring their postpartum status. This research will serve as a guideline for initiating new studies in the region, as well as for follow-up care, since, according to the literature, this condition may occur more frequently two to three months after delivery. This opens the possibility of studying a larger number of patients to obtain a more complete population.

It is worth mentioning that a higher level of postpartum depression could have been found if a longer follow-up period had been conducted, with patients in the puerperium approximately two months after the birth of their baby.

Being a prospective study, there are several limitations, especially within the hospital, since we do not receive a high influx of patients in the inpatient area because the majority of the population for vaginal and cesarean births is treated at the Pediatric Gynecology Hospital. A similarly prospective study is recommended, but with the involvement of the psychiatric and psychological staff at the unit, to provide comprehensive care to the patient suspected of having postpartum depression and to manage her postpartum period in a much more personally enjoyable way, with the mother-child bond.

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Prenatal treatment of congenital syphilis

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Abstract

Introduction: Considering the increasing incidence of syphilis, with states within Mexico, such as Sonora reporting a rise of up to 300%, it is vitally important to analyze the percentage of the population of reproductive age and newborns. Since congenital syphilis is a preventable disease, the availability of guidelines for prevention and treatment, prioritizing prenatal testing, and ensuring accessible and timely prescribed treatment become even more important.

Objective: To establish a correlation between adherence to the doses prescribed in national and international manuals, regulations, and guidelines for the treatment of pregnant women with acquired syphilis and the negative laboratory results for congenital syphilis in newborns.

Materials and methods: A descriptive study was conducted based on epidemiological studies and clinical records at a Regional General Hospital in Ciudad Obregón, Sonora, between January 2016 and May 2023, analyzing the impact of treatment administered to mothers of newborns with congenital syphilis on laboratory results.

Results: A sample of 67 cases was obtained, 39 classified by laboratory. The association between the standardized doses of Benzathine Penicillin G impacts the confirmation of cases, with a lower probability of congenital syphilis transmission at higher doses of Benzathine Penicillin G (> 7.2 million IU) (ρ(ro) -.344, p 0.03).

Conclusions: Screening and treatment processes during prenatal care require reinforcement to ensure that the chain of transmission of Treponema pallidum is interrupted.

Keywords: Congenital syphilis, VDRL, FTA-ABS, Western Blot IgM, Benzathine Penicillin G.

INTRODUCTION

Congenital syphilis (CS) is a sexually transmitted disease acquired in utero, resulting from vertical transmission from mother to fetus during pregnancy or during the peripartum period through contact with the mother's genital lesions.

Vertical transmission can occur within the first 4 years after infection, with a fetal mortality rate about 30–40%. The fetus can be infected by the untreated mother, being more likely in the early stages. Infection of the fetus during the initial four months of pregnancy is rare, so early miscarriages attributable to CS are not common. The consequences of infection can result in miscarriage, neonatal death, neonatal disease, or latent infection; two-thirds of newborns are born asymptomatic but will develop signs in the following weeks, predominantly osteochondral and mucocutaneous. Treatment of the mother during the first 4 months of pregnancy generally prevents the fetus from being born infected. The likelihood of vertical transmission is most associated with untreated primary syphilis infections during pregnancy (95%) and early latent syphilis (40%), and is considered unlikely in cases of late latent syphilis (10%).[1,2,3]

For pregnant women with early syphilis, it is recommended to administer, in order of preference, a single dose of 2.4 million IU of intramuscular Penicillin G benzathine (PGB) or 1.2 million IU of intramuscular procaine penicillin once daily for 10 days. If the period of infection is unknown or latent syphilis is suspected in pregnant women, it is advised to administer 2.4 million IU of intramuscular PGB once weekly for three consecutive weeks or 1.2 million IU of intramuscular procaine penicillin for 20 days.[1,4]

Macrolides are not recommended in pregnant women due to their inadequate cross through the placental barrier. Benzathine penicillin G is the only antibiotic recommended, reporting an effectiveness in reducing stillbirths of up to 82% and an 80% reduction in neonatal mortality when administered at least 28 days prior to birth with a single dose of 2.4 million IU intramuscularly.[1,4]

The treatment of probable or confirmed congenital syphilis, crystalline sodium penicillin G 50,000 IU/kilogram/dose intravenously every 12 hours during the first 7 days of life and every 8 hours after the seventh day of life until completing 14 days, within the first 4 weeks of life. For children older than 4 weeks, treatment consists of the same antibiotic intravenously every 6 hours lasting 14 days. In the management of asymptomatic newborns, full treatment should be provided. If adequate follow-up appointments outside the hospital can be ensured, PGB 50,000 IU/kg intramuscularly as a single dose may be administered to the newborn.[5,6,7,1]

Several studies conducted during 2001 and 2012, in Mexico, report a national prevalence of acquired syphilis in pregnant women of 0.26-2.3%. Currently, the 2021 morbidity annals with an incidence of congenital syphilis of 2.3 per

100,000 live births (LBN) and 62.84 per 100,000 children under 1 year of age, classifying it as a low-prevalence area according to the World Health Organization. Despite this, in some states, including Sonora, the rate is 1.37/100,000 IMSS beneficiaries, contributing 16.3% to the national statistics.[8,9,10]

Within Mexican protocols, the following lines of action are summarized: detection of syphilis cases in pregnant women (regardless of their clinical stage) throughout the first 12 weeks of gestation, at the time of the first gynecological consultation. In cases where prenatal care was not provided, prenatal or postpartum screening tests will be performed, with follow-up during each trimester and/or at 3, 6, and 12 months postpartum. The newborn will remain under surveillance for abnormal maternal results or clinical symptoms of the disease. Follow-up care for children born from mothers with syphilis should be provided at 2, 4, 6, and 12 months.[1,11,12]

As of 2016, Mexico was not at risk for Benzathine Penicillin G shortages; however, with annual incidences on the rise (121 cases in 2017 to 667 cases in 2021), it is of utmost importance to maintain supplies and agreements for the medication.[9]

Based on the above, we aimed to analyze the impact of the treatment administered to mothers of newborns with congenital syphilis prior to birth.

MATERIALS AND METHODS

An observational, descriptive-analytical, retrospective, was carried out at the Regional General Hospital No. 1 in Ciudad Obregón at the Mexican Social Security Institute, between January 1, 2016 and May 1, 2023. Hospital records and epidemiological studies completed by treating medical personnel or epidemiologists were taken, entered into a database (Access) for Congenital Syphilis and the Epidemiological Card of the unit, in the periods expanding through January 1, 2016 to May 1, 2023. The calculation was made for finite samples, considering the prevalence of Congenital Syphilis varies from 0.26 - 2.3% as established according to the reviewed reference of studies in the pregnant population in Mexico; which yielded a sample of n=35. Patients were included if they were recruited by the attending physician or epidemiologist from the congenital syphilis databases, the unit's epidemiological record, which had received clinical-hospital care at Regional General Hospital No. 1, Ciudad Obregón, Sonora of both sexes, were newborns (≤30 days old), had a diagnosis of a probable case of congenital syphilis (symptomatic or asymptomatic) in the cases form 2021 onward. Due to the changes in the

criteria for the scrutiny of cases, prior to 2021 newborns of mothers positive to any treponemal and non-treponemal tests were included.

Patient records were excluded if their final classification was based on clinical symptoms, cases without confirmatory laboratory tests (Western Blot IgM or FTA-ABS), and if their birth and completion of the clinical/epidemiological study form were in another unit.

Patient records were eliminated if their information in the congenital syphilis epidemiological study was incomplete.

The variables included treatment for syphilis acquired during pregnancy, neonatal age, neonatal sex, maternal risk factors, and positive and negative confirmatory tests for syphilis.

The research was authorized by the local health research committee in accordance with international and national guidelines.

Statistical analysis included relative and absolute frequency measurements for qualitative variables, and measures of central tendency (mean, median, mode) and dispersion (range, standard deviation, and variance) for quantitative variables.

Normality was determined using the Kolmogorov-Smirnov normality test. Hypothesis tests were analyzed as appropriate, using Student's t-test for quantitative variables, and categorical variables were analyzed using the Chi-square test or Fisher's exact test. Additionally, the risk ratio was examined using the Odds Ratio, applying a confidence interval (95% CI). A P value of less than 0.05 was considered statistically significant. Finally, the impact was measured with attributable risk, risk difference, or Spearman correlation, all using the SPSS version 26 statistical package.

RESULTS

An observational, descriptive, retrospective, and cross-sectional study was conducted, covering the months of January 2016 to May 2023. From a total of 75 records that met the inclusion, exclusion, and elimination criteria, 67 cases formed the study sample.

Categorical variables were analyzed based on their frequency, as shown in Table 1. In the distribution of cases by sex, males predominated, accounting for 55% (37) of the cases, while females accounted for 45% (30) of the observations.

The study elements were categorized based on the following parameters: initial diagnosis as a probable case of asymptomatic congenital syphilis in 70% (47) of the observations and symptomatic in 30% (20); the classification method was expert opinion (42% (28)) or laboratory test (58% (39). For the final classification of cases, the categorization was carried out into four groups: confirmation by expert opinion predominated at 39% (26), followed by laboratory-based exclusion at 36% (24), laboratory-based confirmation at 22% (15), and finally, exclusion by expert opinion at 3% (2), as shown in Table 1.

Clinical and treatment variables differ based on maternal factors such as risky activities and treatment received during pregnancy for probable cases. Likewise, as described in Table 1, the most prevalent maternal risk factor on the study was "having more than one sexual partner" in the last year, at 63% (42). Maternal treatment during pregnancy shows the distribution with superiority in the application of a scheme with 2.4 million IU of PGB 34% (23) of which 100% presented adherence to what was established in the guides and manuals, followed by the scheme with > 2.4 million IU of PGB 33% (22) with 63% of the treatments according to what was established, 21% (14) were not treated, and the prevalence of an alternative scheme or a scheme < 2.4 million IU of PGB is 6% (4) each respectively. Of the cases studied, the clinical data not specific for congenital syphilis are reported in Table 2.

The maternal age distribution, shown in Table 3, shows a mean of 25 years, median of 25, mode of 26, standard deviation of 5.27, variance of 27.8, range of 25, minimum range of 15, and maximum of 40. The Kolmogorov-Smirnov normality test was 0.142 and a p-value of 0.002.

The summary of laboratory results for treponemal and non-treponemal tests is shown in Table 4.

Table 5 presents the statistical results for hypothesis testing, association, and correlation of variables of interest in the study. They were categorized according to groups or associations of interest: non-treponemal tests at the onset of symptoms in newborns, maternal risk factors and laboratory classification of newborns, treatment variables, and case negativity. The maternal VDRL and neonatal VDRL variables obtained a point statistic of 95.733 ($p = 0.319$) and $\rho(ro) = 0.299$ ($p = 0.015$).

Table 1. Distribution of congenital syphilis cases

Variable	Frecuency	%
Sex		
Female	30	45
Male	37	55
Prenatal care unit		
Family Medical Unit 1, Ciudad Obregón	34	51
Family Medical Unit 33, Ciudad Obregón	7	10
Family Medical Unit 66, Ciudad Obregón	4	6
Regional General Hospital 1, Ciudad Obregón	3	4
Another medical unit	13	19
Without prenatal care	6	9
Probable case of congenital syphilis		
Symptomatic	20	30
Asymptomatic	47	70
Classification method		
Opinion	28	42
Laboratory	39	58
Final classification		
Laboratory confirmed	15	22
Ruled out by laboratory	24	36
Confirmed by opinion	26	39
Discarded by opinion	2	3
Maternal risk factors**		
Commercial sex worker	0	0
Intravenous drug user	2	3
History of a child with congenital syphilis	3	4
Sexual relations with intravenous drug users	6	8
More than one sexual partner	42	55
Others	2	3
Ignored	9	12
Risk-free	12	16
Maternal treatment during pregnancy		
Other	4	6
< 2.4 million IU Penicillin G Benzathine	4	6
2.4 million IU Penicillin G Benzathine	23	34
> 2.4 million IU Penicillin G Benzathine	22	33
Without treatment applied	14	21

*Due to the multiplicity of variables, the cumulative percentage is not presented.

Source: Research protocol carried out in 2023, Ciudad Obregón, Sonora.

Table 2. Frequency of clinical data of probable cases of congenital syphilis

Variable	Frecuency	%
Nonspecific clinical data of congenital syphilis*		
Joint inflammation	0	0
Rash on mouth, genitals and/or anus	1	1
Congenital pneumonia	1	1
Watery nasal discharge	1	1
Rash on face, palms and/or soles of feet.	3	4
Fever	4	6
Irritability	4	6
Low weight and/or developmental delay	5	7
Peeling on face, palms and/or soles of feet.	12	18
Specific clinical data for congenital syphilis*		
Blindness	0	0
Hutchinson's teeth	1	1
Hearing loss or deafness	1	1
Saber-shaped legs	1	1
Corneal opacity	3	4
Absence of the nasal bridge	4	6
Hepatosplenomegaly and/or splenomegaly	5	7
Other	10	15

*Due to the multiplicity of variables, the cumulative percentage is not presented.

Source: Research protocol carried out in 2023, Ciudad Obregón, Sonora.

Maternal screening test coverage was 87% (58), and 36% (21) were performed during the first trimester.

Table 3. Measures of central tendency and dispersion for maternal age

Variable	Maternal age
Average	25
Median	25
Mode	26
Standard deviation	5.27
Variance	27.8
Range	25
Minimum	15
Maximum	40
Kolmogorov-Smirnoff	0.142
p-value	0.002

Source: Research protocol carried out in 2023, Ciudad Obregón, Sonora.

Table 4. Summary of laboratory results for nontreponemal and treponemal tests performed during the workup of probable cases of congenital syphilis.

Applied Test	Frecuency	%
Newborn		
Non-Treponemal (VDRL)		
1:1	4	6
1:2	9	13
1:4	10	15
1:8	6	9
1:16	8	12
1:32	3	4
1:64	0	0
1:128	1	1
1:256	1	1
1:512	0	0
1:1024	1	1
Qualitative	0	0
Non-reactive	18	27
Unrealized	6	9
Treponemal (FTA-ABS)		
IgM (+)	14	21
IgM (-)	1	1
IgG (+)	10*	15
IgG (-)	0	0
Not specified (+)	21	31
Not specified (-)	1	1
Western-Blot		
IgM (+)	6	9
IgM (-)	24	36
IgG (+)	25*	37
IgG (-)	5*	7
Mothers		
Non-Treponemal (VDRL)		
1:1	0	0
1:2	6	9
1:4	10	15
1:8	13	19
1:16	3	4
1:32	10	15
1:64	4	6
1:128	1	1
1:256	0	0
1:512	0	0
1:1024	0	0
Qualitative	8	12
Non-reactive	3	4
Unrealized	9	13
Treponemal (FTA-ABS)		
Not specified (+)	7	10
Not specified (-)	0	0
Without confirmatory evidence	60	90

* Value that takes into account the results for FTA-ABS IgM, so they are not counted in the total.
Source: Research protocol carried out in 2023, Ciudad Obregón, Sonora.

Table 5. Association of congenital syphilis cases with study variables

Variable	χ^2	*p*	Fisher	Risk	IC 95%	*p*	Spearman	*p*
Non-treponemal tests in the clinical appearance of the newborn								
Maternal VDRL and Newborn VDRL	95.733	0.32	-	-	-	-	0.30	0.02
Maternal VDRL Titration 1:4 and Newborn Clinic	-	0.71	0.545	0.635	0.12 - 3.363	0.59	-0.09	0.47
Maternal VDRL Titration 1:2 and Newborn Clinic	-	0.71	0.289	0.542	0.104 - 2.812	0.46	-0.07	0.60
Maternal risk factors and laboratory positivity in newborns								
More than one sexual partner in the last year		0.740	0.271	1.429	0.372-5.487	0.740	0.083	0.610
Intravenous drug user		0.510	1.318	1.091	0.967-1.231	0.530	-0.184	0.260
History of a child with congenital syphilis		1.000	0.119	1.643	0.95-28.410	1.000	0.055	0.074
Sexual relations with intravenous drug users		1.000	0.641	1.043	0.96-1.134	1.000	-0.128	0.440
Others								
Ignored		0.180	2.830	4.000	0.632-25.319	0.180	0.247	0.130
Risk-free		0.120	3.690	0.143	0.16-1.288	0.120	-0.308	0.050
Clinical and laboratory positivity of the newborn								
Symptomatic	0.506	0.530		1.280	0.655-2.5	0.500	0.114	0.490
Asymptomatic	0.506	0.530		0.800	0.423-1.5	0.500	0.114	0.490
Treatment variables and case negativity								
Received any treatment		0.280	1.675	2.533	0.638-10.599	0.280	0.207	0.210
Application of benzathine penicillin G	2.278	0.180		2.766	0.725-10.632	0.180	0.242	0.140
Benzathine Penicillin G Dose < 2.4 million IU		1.000	0.036	0.786	0.065-9.498	1.000	-0.030	0.850
Benzathine Penicillin G Dose 2.4 million IU		0.720	0.317	1.500	0.364-6.183	0.720	0.090	0.590
Benzathine Penicillin G Dose > 2.4 million IU		0.050	4.603	0.119	0.013-1.064	0.050	-0.344	0.030
Other antibiotic applied		0.630	0.251	1.692	0.212-13.498	0.630	0.080	0.630
Dosage attached to standardized schemes	0.742	0.510		0.564	0.1525-2.0873	0.380	-0.138	0.400

Source: Research protocol carried out in 2023, Ciudad Obregón, Sonora.

DISCUSSION.

Several epidemiological studies have found a significant association between the risk of syphilis and exposure to different sexual partners during or one year prior to the pregnancy, with women with multiple sexual partners having a higher risk of contracting syphilis compared to those with only one sexual partner (23-26). In contrast, in our study, we found no association between a history of multiple sexual partners and T. pallidum seropositivity.

The only factor with statistical power was the ρ(r0) among women who reported "no history of risk" and the decrease in test positivity. The strength of the association was moderate (-0.31), with a negative impact (the higher the frequency of the history, the lower the risk) and a p-value of 0.05. However, both the hypothesis test and the OR yielded results that were not statistically significant, rendering these findings inconsistent. In summary, sexual risk factors are not associated with the confirmation or exclusion of congenital syphilis.

Research complementary to the referenced publications provided little information regarding the sexual risk history of the incident mothers, and we affirm the independence of maternal sexual risk factors and laboratory confirmation.

In recent years, the change in the operational definition of variables has led to more cases being studied than previously recorded, as the minimum maternal titer ratio has changed from 1:4 to qualitative, as many children are asymptomatic. However, no association is evident between the clinical manifestation of cases and titers below 1:4.

For the maternal VDRL and neonatal VDRL variables, a point statistic of 95.733 (p 0.319) and ρ(ro) 0.299 (p 0.015) was obtained, despite being represented in numerical values for analysis purposes, the variable is considered categorical, ordinal, polytomous, with a titration scale, so the central tendency measures are not performed. We found that the prevalence of symptomatic patients is consistent with the literature, and there is a lack of association between clinical presentation and maternal and neonatal VDRL values at dilutions of 1:4 and 1:2, respectively. This is as described in a study conducted in Uruguay by Moraes M. and Estevan M. (2011). They refute the association between symptoms with maternal titers lower than 1:16 and neonatal titers at 1:32. The lowest maternal titers recorded with symptoms were 1:8 with moderate association [ρ(ro) 0.334 (p 0.004)] but no causality. However, lack of treatment with benzathine penicillin G or temporality was also a cofactor.

The clinical presentation of probable cases of congenital syphilis did not correlate with laboratory confirmation of cases.

The purpose of our research was to analyze the impact of treatment on mothers of newborns with congenital syphilis. We observed that receiving any treatment, whether adequate or inadequate, is not statistically associated with the prevention of congenital syphilis.

The implementation of appropriate regimens for primary or latent syphilis achieved an adherence rate of 55%, with the percentage attributable to lack of confirmation due to the dose of benzathine penicillin being remarkably low (15.4%), as evidenced by the binary logistic regression model applied (B -0.302, Wald 3.732, p 0.05, Exp(B) 0.74, R^2 Nagelkerke 0.154). Similarly, the model reveals the statistical significance of each intervention in maternal treatment and covariates. It is highlighted that, when exceeding 2.4 million International Units of benzathine penicillin G, the probability of confirmation decreases. This finding is supported by moderate correlation strength and a

negative impact direction, indicating that as the dose increases, laboratory confirmation decreases. Consistent with what was found in the article by Gao J., Chen X., Yang M., Wu Y. et al. (2023), where standardized treatments are protective and predictive factors for congenital syphilis.

Despite finding a correlation between the dose of Benzathine Penicillin G administered to mothers, with a higher dose (>2.4 million IU) lowering the probability, the purpose of the study was to identify standardized treatments with negative results, with doses of 2.4 million IU (administered in cases of primary syphilis) not statistically significant.

While the Mexican statutes recommend confirming and ratifying screening tests for sexually transmitted infections, specifically syphilis, before the implementation of eradication treatment; in our healthcare system it typically experiences a delay of at least one month. Considering international guidelines and recommendations, and given the uncertainty in classifying maternal infection, the optimal treatment scheme would be administering 7.2 million IU of Benzathine Penicillin G divided into three doses, one dose each week, starting from the moment the infection is suspected based on a rapid test. As previously demonstrated, transmission rates decrease significantly when treatment is initiated following detection during the gestational trimester. Consequently, an investment in the mother results in reduced vertical transmission, improved neonatal health outcomes, and enhanced postnatal follow-up.

According to Herrera-Ortiz A., López-Gatell H., García-Cisneros S., et al. (2019), "to achieve the elimination of congenital syphilis, it is essential to have an updated regulatory framework focused on the mother-child relationship." Currently, the state of Sonora has guidelines for the diagnosis and treatment of gestational syphilis and the prevention of congenital syphilis; however, this guideline dates from 2012 and has not been recently updated. It is based on WHO and CDC treatment guidelines.

Adherence to care, primary and secondary prevention of syphilis in pregnant women has an impact on the incidence and confirmation of probable cases of congenital syphilis.

The study’s lower prevalence than the national average raises the question of whether the sharp increase in cases is due to an improvement in case detection and recruitment processes. In many Latin American countries, detection and prevention measures are not consistently implemented, and as a result, data on syphilis infection during pregnancy and congenital syphilis are unreliable.

Strengthening activities that ensure quality care and subsequently the perinatal transmission of these diseases could impact case detection, incidence, and therefore the allocation of resources.

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Antiretroviral therapy adherence in patients with HIV/AIDS and family functionality

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Abstract

Introduction: Adherence to antiretroviral treatment in patients with HIV/AIDS worldwide has a prevalence of 55%. Poor adherence to treatment is a risk factor for complications such as AIDS, genetic resistance to the drug, and multiple hospital admissions, impacting the patient's quality of life. Risk factors for poor treatment adherence have been found to include lack of patient awareness, lack of family and/or social support, and substance abuse.

Objective: To describe the perception of family functionality and antiretroviral therapeutic adherence in patients with HIV/AIDS.

Materials and methods: An analytical, retrospective, cross-sectional, prevalence study was conducted. 125 patients participated, obtaining a proportional sample. A univariate analysis of the qualitative variables was performed, cross-tabs with independent variables and dependent variable. The quantitative variables were measured by measures of dispersion and central tendency. The instruments used were the family APGAR questionnaire and SMAQ

Results: It was obtained that the independent variable ("Family functionality") and the dependent variable ("Treatment adherence"), 50 responses are "Adherent" representing 40% and 75 responses are "Non-adherent" representing 60%. The "Family functionality" based on the classification was obtained "Normal functionality" with 114 cases (91.2%), "Mild dysfunctionality" with 2 cases (1.6%), "Moderate dysfunctionality" with 4 cases (3.2%) and "Severe dysfunctionality" with 5 cases (4%).

Conclusions: Treatment adherence was not significantly associated with family functioning.

Keywords: Treatment adherence, family functionality, Acquired Immunodeficiency Syndrome, Human Immunodeficiency Virus.

INTRODUCTION

Adherence to antiretroviral therapy can be understood as: a patient's ability to be involved in the selection, initiation and monitoring of antiretroviral therapy (ART), leading to rigorous compliance with the main objective of achieving suppression of viral replication. There are a large number of variables that impact adherence to antiretroviral therapy in patients diagnosed with HIV (Human Immunodeficiency Virus) / AIDS (Acquired Immune Deficiency Syndrome), which include: those related to medication, socioeconomic factors, psychological and sociodemographic factors, level of knowledge of the disease and the treatment itself[1]. Adherence to HIV/AIDS treatment is of critical importance as a decisive factor in a person's life. This is due to the rapid replication and mutation of the virus, which requires good pharmacological adherence to achieve lasting viral suppression [2]. Furthermore, non-adherence is a risk factor that increases the likelihood of complications such as AIDS, genetic drug resistance, and multiple hospital admissions, impacting the patient's quality of life [3].

Among psychological factors, interpersonal issues may involve the family, which plays a role of family support and perceived social and familial esteem [4]. The family is considered an institution and/or group of individuals, whether blood-related or not, who live under the same roof; or it is perceived as the union of people who share a long-term life project, in which feelings of permanence are generated, thereby developing a personal commitment among its members and establishing relationships of intimacy, reciprocity, and dependence [5]. The family plays a fundamental role in the management of chronic pathologies, as they activate self-regulation mechanisms, thus achieving homeostasis within their functionality and causing changes in family interactions. These changes in interactions, whether conscious or unconscious, can generate complex situations of balance or imbalance, jeopardizing family well-being and patient management [6]. Worldwide, the prevalence of people living with HIV in 2020 was 37.7 million; the incidence for the same year was 1.5 million, and 680,000 people died from an AIDS-related illness [7].

The prevalence of HIV in Mexico from 1983 to the fourth quarter of 2021 is a total of 331,437 reported cases. The prevalence rate in men was 270,035 cases (81.5%) and in women 61,402 (18.5%).

In Lima, Peru, a study was conducted among patients with HIV/AIDS, which revealed normal family functioning (43%), mild dysfunction (23%), severe dysfunction (21%), and moderate dysfunction (13%) [8].

At Family Medicine Unit No. 53 in León, Guanajuato, Mexico, in 2020, the Family APGAR instrument was administered to a sample of 71 participants, with a single selection criterion of HIV/AIDS. Results were obtained of good family functioning (36%), mild family dysfunction (27%), severe family dysfunction (27%), and moderate family dysfunction (10%) [9].

A meta-analysis conducted in 2010 with a total of 23 observational studies compiled, with a total of 9,931 participants over 18 years of age and receiving HAART, concluded that 55% of patients had treatment adherence greater than 90% [10].

At General Hospital of Zone No. 15, Dr. José Zertuche Ibarra, Mexican Social Security Institute, in Reynosa, Tamaulipas, obtained the results of adherence to antiretroviral treatment. 90.3% responded that in the last week they had taken the drugs based on medical indications; only 9.7% did not take the medication as prescribed [11].

In 2018, a study was conducted in Centro Habana, obtaining a statistical association in the family functioning variable with a $p < 0.05$ and an odds ratio = 6. Concluding that family dysfunction was a risk factor for poor therapeutic adherence to HAART (Highly Active Antiretroviral Therapy) [12]. Another study conducted in 2002, which used an observational, prospective (9-month) methodology at the Son Duretal Hospital, located in the Balearic Islands, Spain; In a study involving a total of 202 participants, the variable of living status (independent or with a partner and parents or family) was not statistically significant as a factor in non-adherence to antiretroviral drugs.

Therefore, the objective of this study was to describe the perception of family functioning and antiretroviral therapy adherence in patients with HIV/AIDS.

MATERIALS AND METHODS

A descriptive, cross-sectional study was conducted during the months of August and September 2023 at General Hospital Zone No. 5 in Nogales, Sonora.

The selection criteria for participation in the survey were: patients over 18 years of age with HIV/AIDS, who agreed to participate in the study by signing an informed consent form, and who were receiving treatment with an antiretroviral drug.

Patients with psychiatric conditions, those undergoing a study protocol for HIV/AIDS confirmation, those who did not agree to participate in the protocol, and those recently diagnosed with HIV/AIDS (less than 4 months ago) were excluded.

Surveys without complete responses were eliminated (surveys with a minimum of 80% completed).

Using the nominal census of current patients diagnosed with HIV/AIDS who attended follow-up visits from 1998 to 2021, a total of 139 patients were identified, ranging in age from 20 to 83 years. The sample size calculation formula for a proportion of a finite universe was used, yielding a sample size of 123.

The dependent variable was adherence to antiretroviral therapy, while the independent variables were family functioning, defined as a family's ability to maintain balance in a changing environment. Sex, age, duration of antiretroviral therapy, marital status, and educational level were also taken into account.

To assess therapeutic adherence, the Simplified Medication Adherence Questionnaire (SMAQ), validated in 1998-1999 in the Spanish community, was used. To identify participants' perceptions of family functioning, the Family APGAR survey was administered. Sociodemographic variables were added to the survey to describe the study population.

The research did not pose any risks to participants, as data was collected through physician-patient surveys. Furthermore, the study protocol was submitted to the local research committee and approved for implementation.

A univariate analysis was performed, describing the quantitative variables through measures of central tendency and dispersion. The bivariate analysis used the chi-square test for categorical variables. The statistical software programs Excel and SPSS® version 25.0 for Windows® were used.

RESULTS

A sample of 125 participants surveyed was analyzed. The average age of the population was 38.1 years. Regarding education, the highest percentage had a bachelor's degree (32%). The majority were male, with 85.6% (107), and 90% (113) denied using any type of drug. The predominant marital status was single, with 68% (86).

The variable "Family Functionality" was categorized as: "Normal Functionality," "Mild Dysfunction," "Moderate Dysfunction," and "Severe Dysfunction." The frequencies obtained were "Normal Functionality" with 114 cases (91.2%), "Mild Dysfunction" with 2 cases (1.6%), "Moderate Dysfunction" with 4 cases (3.2%), and "Severe Dysfunction" with 5 cases (4%). The frequencies obtained are presented in Table 5. The frequency of the dependent variable "Treatment Adherence" was 40% (50). The average duration of antiretroviral treatment was 6.5 years. Table 1

Table 1. Frequency of variables studied

Variable	N	%
Age in years	38.1*	11.1**
Level of education		
Incomplete primary school	3	2.40
Primary school completed	3	2.40
Incomplete secondary school	2	1.60
Secondary school completed	28	22.40
High school incomplete	1	0.80
High school completed	36	28.80
Unfinished degree	6	4.80
Bachelor's degree completed	40	32.00
Postgraduate	6	4.80
Sex		
Male	107	85.6
Female	18	14.4
Marital status		
Single	86	68.8
Married	21	16.8
Free unión	12	9.6
Widower	6	4.8
Drug use		
No	113	90.4
Yes	12	9.6
Family functionality		
Normal functionality	114	91.20
Mild dysfunction	2	1.60
Moderate dysfunction	4	3.20
Severe dysfunction	5	4.00
Adherence to treatment		
Adherent	50	40
Non-adherent	75	60
Years on antiretroviral treatment	6.5*	5**

Source: Analysis of data obtained through questionnaires directly from participants in the study "PERCEPTION OF FAMILY FUNCTIONALITY AND ANTIRETROVIRAL THERAPEUTIC ADHERENCE IN PATIENTS WITH HIV/AIDS AT GENERAL HOSPITAL ZONE #5.", through the SPSS edition 25 program, *mean. **standard deviation

The result that presented statistical significance was "High School Completion," with p = 0.008. A relationship was found between the two variables: OR = 2.98 and 95% CI = 1.30-6.42. The remaining categories within each variable were not statistically significant. Table 2.

Table 2. Factors associated with adherence to treatment

Variable	Adherence to treatment		*p*	OR	95%CI
	Yes	No			
Level of education					
Incomplete primary school	0% (0)	100% (3)	0.21	1.69	1.46-1.96
Primary school completed	0% (0)	100% (3)	0.21	1.69	1.46-1.96
Incomplete secondary school	0% (0)	100% (2)	0.36	1.68	1.45-1.95
Secondary school completed	39.3% (11)	60.7% (17)	0.93	0.96	0.40-2.27
High school incomplete	0% (0)	100% (1)	0.60	1.67	1.45-1.93
High school completed	58.3% (21)	41.7% (15)	0.01	2.98	1.30-6.42
Unfinished degree	16.7% (1)	83.3% (5)	0.23	0.28	0.03-2.52
Bachelor's degree completed	37.5% (15)	62.5% (25)	0.70	0.85	0.39-1.85
Postgraduate	33.3% (2)	66.7% (4)	0.54	0.74	0.13-4.19
Sex					
Male	39.3% (42)	60.7% (65)	0.68	0.8	0.29-2.21
Female	44.4% (8)	55.6% (10)	0.68	1.23	0.45-3.39
Drug use					
No	40.7% (46)	59.3% (67)	0.43	1.37	0.39-4.82
Yes	33.3% (4)	66.7% (8)	0.43	0.72	0.20-2.56
Marital status					
Single	38.4% (33)	61.6% (53)	0.58	0.8	0.37-1.73
Married	47.6% (10)	52.4% (11)	0.44	1.45	0.56-3.73
Free unión	33.3% (4)	66.7% (8)	0.43	0.72	0.20-2.56
Widower	50% (3)	50% (3)	0.46	1.53	0.29-7.91
Family functionality					
Normal functionality	42.1% (48)	57.9% (66)	0.11	3.27	0.67-15.83
Mild dysfunction	0% (0)	100% (2)	0.36	1.68	1.45-1.95
Moderate dysfunction	25% (1)	75% (3)	0.47	0.49	0.04-4.84
Severe dysfunction	20% (1)	80% (4)	0.33	0.36	0.03-3.34

Source: Analysis of data obtained through questionnaires directly from participants in the study "PERCEPTION OF FAMILY FUNCTIONALITY AND ANTIRETROVIRAL THERAPEUTIC ADHERENCE IN PATIENTS WITH HIV/AIDS AT GENERAL HOSPITAL ZONE #5.", through the SPSS edition 25 program, *mean. **standard deviation

DISCUSSION.

The results obtained for the independent and dependent variables were compared with those reported in the theoretical framework. The order in which the data were contrasted followed both international and national levels. It is worth noting that the literature reviewed did not include state-level information for either variable; therefore, data from another state within the country were used as a national reference.

Lizano Pastrano (2019), in Lima, Peru, reported perceptions of normal family functionality in 43% of participants, mild dysfunction in 23%, severe dysfunction in 21%, and moderate dysfunction in 13% [8]. In comparison, the present study showed 91.2% normal family functionality, 1.6% mild dysfunction, 3.2% moderate dysfunction, and 4% severe dysfunction.

Caldera Guzmán et al. (2020), in Guanajuato, Mexico, found 36% of participants perceived normal family functionality, 27% mild dysfunction, 10% moderate dysfunction, and 27% severe dysfunction [9]. Compared with the results of the present study—91.2% normal family functionality, 1.6% mild dysfunction, 3.2% moderate dysfunction, and 4% severe dysfunction—our findings indicate higher perceptions of normal family function and lower levels of dysfunction across all categories. Ortego et al. (2011), conducted in Spain, showed that 55% of patients achieved treatment adherence greater than 90% [10]. In the present protocol, adherence to antiretroviral therapy was 40%, while non-adherence reached 60%.

Hernández et al. (2012), conducted in Reynosa, Tamaulipas, reported that 90.3% of participants adhered to antiretroviral treatment over the past week according to medical indications, while only 9.7% did not take their medication as prescribed [11]. Compared to these findings, our study demonstrates a lower level of adherence to antiretroviral therapy.

It is concluded that the population studied in this research protocol provided a general overview of the status of the evaluated variables at the time. The results indicate that adherence to antiretroviral therapy in this population is lower when compared with both national and international studies. Regarding family functionality, the proportion of participants reporting normal family function was higher, while all categories of dysfunction (mild, moderate, and severe) were lower compared to other studies at both national and international levels.

The recommendations derived from this study include exercising particular caution with the subgroup of individuals who have completed high school, in order to improve adherence to antiretroviral therapy. Multidisciplinary support is also advised to identify underlying causes of non-adherence and to develop targeted interventions.

Finally, no association was found between family functioning and adherence to antiretroviral treatment.

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ERSJ EPIDEMIOLOGICAL RESEARCH AND SURVEILLANCE JOURNAL

What do we need in Latin America and Mexico to eliminate vertical transmission of HIV and syphilis?

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In this review we do not propose to analyze vertical transmission; we will first identify it by pathology and then relate their similarities and differences together.

Mother-to-child transmission (MTCT) of the human immunodeficiency virus (HIV) represents a significant challenge for global and regional public health. In Latin America and the Caribbean, MTCT has decreased significantly in the last two decades, but inequalities persist between countries and population groups. 1,2 The EMTCT Plus Initiative, launched by the Pan American Health Organization (PAHO) in 2010, aims to eliminate vertical transmission of HIV, syphilis, hepatitis B, and Chagas disease, setting a target of reducing transmission to less than 2% of HIV in infants born to infected mothers. 1,4,6 In 2022, the average regional rate of vertical transmission of HIV was 6%, with significant variations: countries such as Cuba and Chile reported less than 2%, while Guatemala and Haiti exceeded 10%. 1,6 Between 2010 and 2021, EMTCT interventions in the region prevented approximately 34,000 HIV infections in infants. 1 Success in reducing MTCT of HIV is associated with increased antiretroviral treatment (ART) coverage during the pregnancy, which in several countries exceeds 90%.5,6 However, gaps persist in early access to diagnosis and postpartum follow-up, especially in rural areas and indigenous populations.11,16,17 In Mexico, CENSIDA data show a downward trend in vertical transmission, with an estimated rate of 3.1% in 2022 and ART coverage in pregnant women with HIV of 94%.5,11,17 However, recent multicenter studies report cases associated with late diagnosis or lack of adherence to treatment during pregnancy.17,25 Currently, the method of confirming cases in pregnant women has changed. When a reactive screening is registered, viral load is performed and antiretroviral treatment must be initiated, in order to reach term as undetectable, which means untransmittable.

Congenital syphilis is a preventable disease that indicates failures in the detection and treatment of syphilis in pregnant women.2,12,13 Globally, the World Health Organization The World Health Organization (WHO) estimated that in 2016 there were approximately 661,000 cases of maternal syphilis, resulting in around 350,000 associated adverse outcomes, including 143,000 fetal and neonatal deaths, 61,000 premature or low birth weight births, and 109,000 clinical cases of congenital syphilis in newborns.12 In Latin America, the average incidence of congenital syphilis was 1.7 cases per 1,000 live births in 2021, although countries such as Brazil and Paraguay reported rates higher than 3 per 1,000 live births (13–15). Since 2015, several countries in the region have shown an increase in cases, attributed to deficiencies in prenatal screening coverage, incomplete or late treatment, and problems in the supply of benzathine penicillin (13–15). In Mexico, despite having guidelines for screening in the first and third trimesters of pregnancy, the national rate of congenital syphilis increased from 0.9 cases per 1,000 live births in 2018 to 1.3 in 2022, reflecting a sustained increase. 10,18 Among the causes are the lack of repeat testing during pregnancy, omission in the treatment of sexual partners, and failures in postpartum follow-up of exposed newborns. 17,18,20

It is also relevant to note that the operational definitions changed, referencing confirmatory studies with IgM western blot on children born to mothers with syphilis detection despite completing their treatment and despite being asymptomatic. With this strategy, the notification of congenital syphilis cases increased since 2021. In addition, cases in which it was not possible to perform a confirmatory laboratory study are currently being determined by a group of experts. Hospital to carry out these actions and subsequent notification.

Mother-to-child transmission of HIV has made notable progress in Latin America thanks to targeted interventions such as the EMTCT Plus initiative, with a regional average vertical transmission rate of 6% in 2022, but with notable disparities ranging from less than 2% in countries like Cuba and Chile to rates exceeding 10% in Guatemala and Haiti. Mexico reduced its rate to 3.1% in 2022, with ART coverage of 94%, demonstrating considerable progress, although with cases still linked to late diagnosis and lack of adherence.

On the other hand, congenital syphilis reflects a worrying picture, with an increase in incidence since 2018 in Mexico (from 0.9 to 1.3 per 1,000 live births), and rates in Latin America ranging from 1.7 to more than 3 cases per 1,000 live births in countries such as Brazil and Paraguay. The WHO reported 661,000 maternal cases and 350,000 associated adverse outcomes globally, including thousands of fetal and neonatal deaths. This increase is associated

with problems in early detection, timely treatment, and a shortage of benzathine penicillin.

Both transmissions are marked by gaps in access to prenatal care, geographical differences, and social challenges such as stigma and health inequalities. However, syphilis also presents a significant structural problem: the exclusive dependence on benzathine penicillin, which has led to vulnerability to shortages.

Progress:

•The region has significantly reduced the rate of vertical HIV transmission, thanks to expanded access to antiretroviral therapy (ART), integrated universal screening programs, and postnatal follow-up, especially in countries with robust health systems. Mexico has achieved ART coverage of over 90% among pregnant women and has reduced its vertical transmission rate to around 3%.

•In congenital syphilis, although the situation is more critical, guidelines for prenatal screening and treatment have been strengthened, and awareness of the importance of disease control has increased.

Pending Challenges:

•Inequalities in access to early diagnosis and timely treatment persist, especially in rural and indigenous areas, making it difficult to achieve elimination goals.

•Congenital syphilis is facing a worrying upsurge in several countries, including Mexico, due to failure to repeat testing, incomplete or late treatment, omission of treatment in sexual partners, and shortages of benzathine penicillin.

•Treatment adherence and postnatal follow-up of mothers and newborns remain critical areas for both infections.

•The fragmentation and weakness of epidemiological surveillance systems limit the capacity for effective monitoring and response.

Will the WHO goals be met?

Meeting the WHO targets for eliminating mother-to-child transmission of HIV and syphilis is possible, but will require coordinated and sustained efforts, such as:

1. Strengthening health systems to guarantee universal, continuous, and high-quality coverage for screening, treatment, and follow-up.

2. Ensuring an adequate and timely supply of essential medicines, especially benzathine penicillin for syphilis.

3. Implementing specific strategies for vulnerable and geographically isolated populations, including actions to reduce stigma and improve education for health workers and the general population.

4. Improving surveillance and registration systems to ensure timely and accurate data to guide interventions.

Only with a comprehensive approach that combines effective public policies, sufficient resources, and multisectoral commitment will Latin America and Mexico be able to achieve the sustainable elimination of these transmissions, which so severely impact maternal and child health. However, for now, it will not be possible to meet the goals set by the World Health Organization.

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ERSJ EPIDEMIOLOGICAL RESEARCH AND SURVEILLANCE JOURNAL

Review article

Epidemiological surveillance of cholera in the 21st century

by Oscar Cruz-Orozco*

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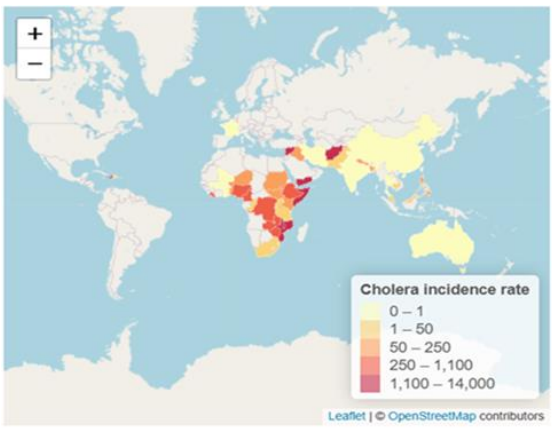
More than a century and a half has passed since John Snow's observations on the spread of cholera in London. Even though the causative agent was unknown, the hypothesis of waterborne and foodborne transmission proved correct.

In 1854, the causative agent of the disease, Vibrio cholerae, had been identified by Filippo Pacini; however, credit for the discovery was given to Robert Koch 30 years later.

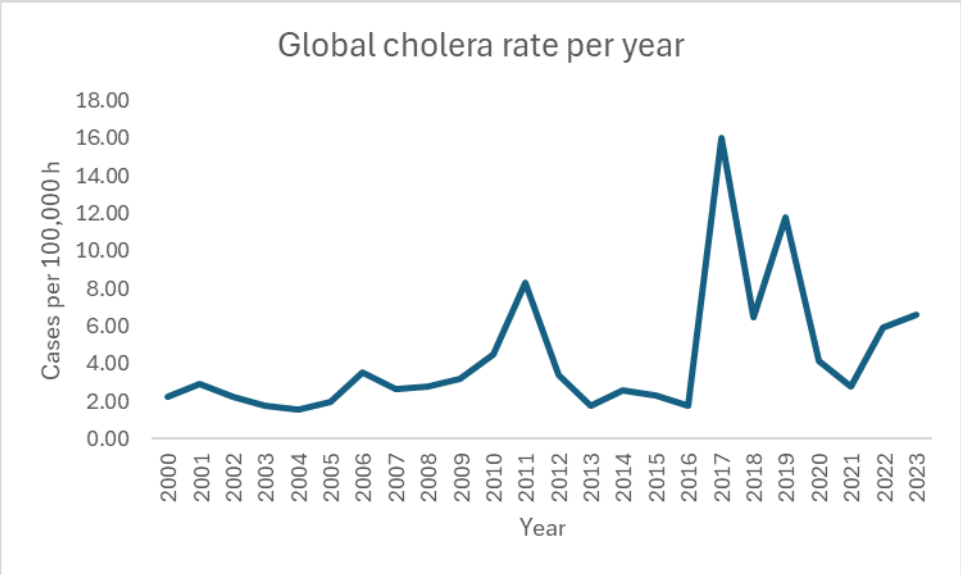
Vibrio cholerae is a Gram-negative, facultative anaerobic bacillus, classified into 198 serotypes based on the somatic antigen "O." Serotype O1 is pathogenic, although serotype O139 has also been identified in India. Therefore, this characteristic is commonly referred to as O1 and Non-O1, which includes O139.

Serotype O1 is divided into biotypes: Classical and Tor. They are further divided into three serotypes: Inaba, Ogawa, and Hikojima. Cholera toxin is the primary virulence factor of Vibrio cholerae O1.

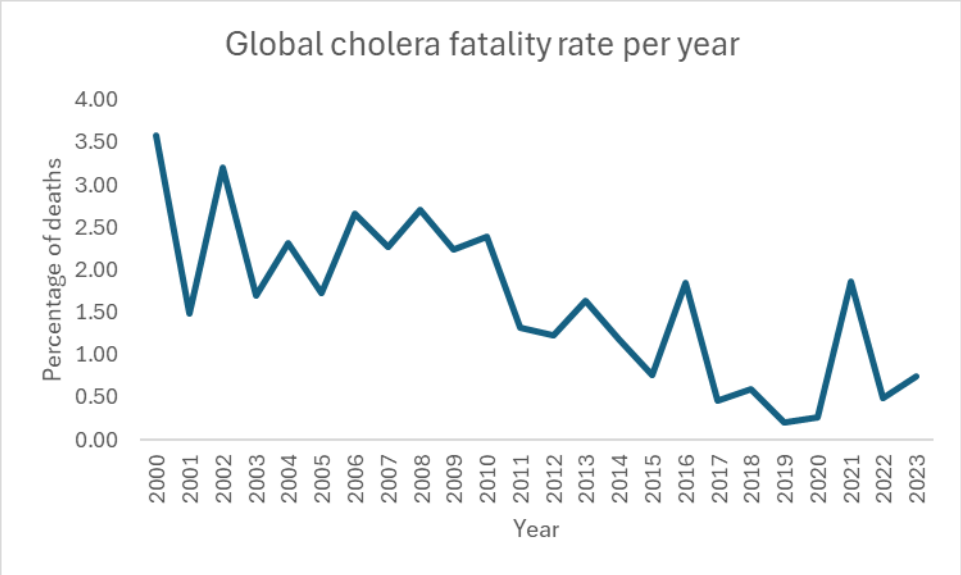
Living conditions in developed countries have virtually eliminated cholera. The cases that do occur are imported from countries where the disease remains endemic.



Since 2000, a periodic increase in cases has been observed, especially in the Middle East and Africa. 2017 saw the highest number of cases this century, with 1,227,392 cases reported, with the most cases occurring in Yemen, Haiti, the Dominican Republic, and Somalia. Despite the upward trend, a decrease in case fatality has been observed worldwide.

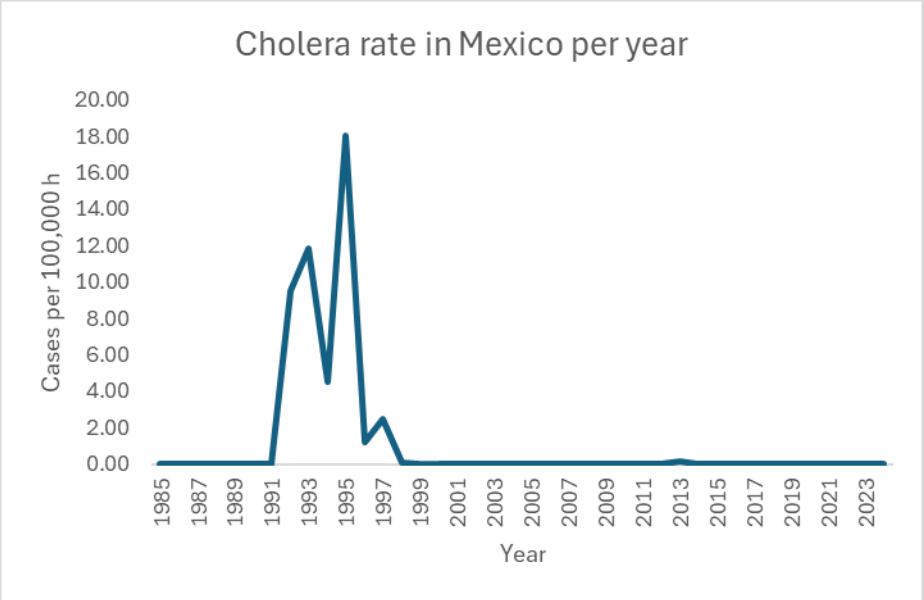


Source: Cholera global overview 2000-2023



Source: Cholera global overview 2000-2023

In Mexico, one case was reported in 2018, and there have been no subsequent cholera cases, despite the high migration of Haitians to the north of the country. Official records indicate an outbreak in 2013 with its epicenter in the state of Hidalgo, reaching 187 patients diagnosed with cholera due to toxigenic Vibrio cholerae O:1 Ogawa; in 2014, 15 cases were confirmed, 14 of which were serotype O1 Ogawa and one of which was serotype O1 Inaba toxigenic; in 2015, one case of toxigenic Ogawa was confirmed, and in 2016, one case of toxigenic Ogawa was confirmed. Previously, in the mid-1990s, there was an explosive increase in cases, with the highest number of cases occurring in 1995, reaching 16,430 cases and a fatality rate of 1.1%. The most affected states were Yucatán, Campeche and Chiapas.



Source: Epidemiology Bulletin 1985-2023, General Directorate of Epidemiology.

In 2024, Yemen was the country with the most reported cholera cases, with 260,552, followed by Afghanistan with 175,262 cases, and Pakistan with 77,217. Togo, located on the African continent, had the highest case fatality rate, with 6.03%.

In 2025, as of July 21, 355,848 cases of cholera had been reported worldwide, with the countries with the most cases being Afghanistan (89,882), South Sudan (68,206), and Yemen (50,015).

You can consult:

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