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# EPIDEMIOLOGICAL PROFILE OF CONGENITAL SYPHILIS

## PERFIL EPIDEMIOLÓGICO DA SÍFILIS CONGÊNITA

## PERFIL EPIDEMIOLÓGICO DE SÍFILIS CONGÉNITA

*Isadora Maria Delmiro Silva[1], Eliane Maria Medeiros Leal[2], Hélder Freire Pacheco[3], José Gilmar de Souza Júnior[4], Filipe Santana da Silva[5]*

**ABSTRACT**

***Objective:*** to describe the epidemiological profile of Congenital Syphilis (CS) cases reported in a Northeastern municipality. ***Method:*** this is a cross-sectional study of all cases of congenital syphilis reported by the SINAN and the SINASC. The results are presented in the form of tables. ***Results***: 57 cases were identified, with a mean annual incidence rate of SC of 6.72 cases per thousand live births (LB), between 2011-2015, ranging from 11.20 / 1000 LB in 2012 to 3.77 / 1000 LB in 2015. A reduction of 7.4% in cases was recorded in the period, however, still exceeding the target of the Ministry of Health of incidence less than or equal to 1/1000 LB. ***Conclusion:*** the study points to the need for improvements in the quality of prenatal care, since even though there is a decrease in the incidence of CS, the indicators show values that are distant from the goal. ***Descriptors:*** Congenital syphilis; Live Birth; Birth; Pregnancy; Health Profile; Surveillance; Epidemiology.

**RESUMO**

***Objetivo*:** descrever o perfil epidemiológico dos casos de Sífilis Congênita (SC) notificados em um município nordestino. ***Método:*** trata-se de um estudo do tipo seccional, de caráter descritivo, de todos os casos de sífilis congênita notificados pelo Sistema de Informação de Agravos de Notificação (SINAN) e pelo Sistema de Informações sobre Nascidos Vivos (SINASC). Apresentam-se os resultados em forma de tabelas. ***Resultados:*** identificaram-se 57 casos, com taxa anual média de incidência de SC de 6,72 casos por mil nascidos vivos (NV), entre 2011-2015, variando de 11,20/1000 NV em 2012 a 3,77/1000 NV em 2015. Registrou-se no período uma diminuição de 7,4% nos casos, porém, ainda ultrapassando a meta do Ministério da Saúde de incidência menor ou igual a 1/1000 NV. ***Conclusão:*** aponta-se, pelo estudo, a necessidade de melhorias na qualidade da assistência pré-natal, pois, mesmo havendo a diminuição na incidência da SC, os indicadores mostram valores distantes da meta. ***Descritores:*** Sífilis Congênita; Nascimento Vivo; Nascimento; Gravidez; Perfil de Saúde; Vigilância; Epidemiologia.

**RESUMEN**

***Objetivo:*** describir el perfil epidemiológico de los casos de Sífilis Congénita (SC) notificados en un municipio nordestino. ***Método:*** se trata de un estudio del tipo seccional, de carácter descriptivo, de todos los casos de sífilis congénita notificados por el Sistema de Información de Agravios de Notificación (SINAN) y por el Sistema de Información sobre Nacidos Vivos (SINASC). Se presentan los resultados en forma de tablas. ***Resultados:*** se identificaron 57 casos, con una tasa anual media de incidencia de SC de 6,72 casos por mil nacidos vivos (NV), entre 2011-2015, variando de 11,20 / 1000 NV en 2012 a 3,77 / 1000 NV en el año En el período se redujo un 7,4% en los casos, pero superando la meta del Ministerio de Salud de incidencia menor o igual a 1/1000 NV. ***Conclusión:*** se señala, por el estudio, la necesidad de mejoras en la calidad de la asistencia prenatal, pues, aun habiendo la disminución en la incidencia de la SC, los indicadores muestran valores distantes de la meta. ***Descriptores***: Sífilis Congénita; Nacimiento Vivo; Nacimiento; Embarazo; Perfil de Salud; Vigilancia; Epidemiología.

[1]Specialist, Directorate of Primary Care, Municipal Health Department. Ipojuca (PE), Brazil. Email: isa.delmiro@gmail.com ORCID iD: https://orcid.org/0000-0003-2861-9705; [2]Master (doctoral students), Postgraduate Program in Public Health, Aggeu Magalhães Institute. Oswaldo Cruz Foundation. Recife (PE), Brazil. Email: eliane.medeiros.leal@gmail.com ORCID iD: https://orcid.org/0000-0002-6052-6501; Email: helderfp1989@gmail.com ORCID iD: https://orcid.org/0000-0001-7710-2337; [4]Master, Institute for Educational Development. Recife (PE), Brazil. Email: coordencaoenfermagemide@gmail.com ORCID iD: https://orcid.org/0000-0002-1985-559X; [5]PhD, Federal University of Health Sciences of Porto Alegre (UFCSPA). Porto Alegre (RS), Brazil. Email: filipe.santana@hotmail.com.br ORCID iD: https://orcid.org/0000-0002-6803-1407

## INTRODUCTION

Syphilis is known to be a systemic infectious and sexually transmitted disease caused by infection by gram-negative bacteria Treponema pallidum. Despite the existence of effective and low-cost treatment, it is still a serious public health problem in Brazil. There is a paradox considering that it is a pathology with accessible treatment and other infectious diseases of greater complexity, such as poliomyelitis and smallpox, have already been controlled.[1]

The eradication of T. pallidum was predicted with the advent of treatment for penicillin-based syphilis (1940). It is estimated that around 12 million new cases of syphilis occur annually in the world population and that at least half a million children are born with the congenital form of the disease.[2]

The congenital form of syphilis (or congenital syphilis, CS) of T. pallidum transmission via the transplacental (or vertical) pathway occurs. It is reported that CS transmission occurs from the infected mother (which has not been treated or inadequately treated), and transmission may occur at any stage of pregnancy or during delivery.[3]

It is reported that CS is responsible for high rates of fetal and neonatal morbidity and mortality. It is shown that of the various diseases that can be transmitted during the pregnancy-puerperal cycle, syphilis is the one with the highest rates of transmission.[4] Because of this, CS control is one of the goals of national and international health agencies.[5]

It is explained that there is a possibility that CS does not occur, provided that the woman infected with T. pallidum is identified and treated before and during pregnancy (eg, during prenatal care).[6] It should be emphasized that, as an initiative the Ministry of Health of Brazil launched (in 1993) the project to eliminate the disease in line with the proposal for the control of the disease in the Americas formulated by the Pan American Health Organization (PAHO) and the World Health Organization (WHO). It was defined, in this initiative, as a goal, the reduction of incidence to values less than or equal to one case per thousand live births.[7]

The "Plan of Action for the Elimination of the Vertical Transmission of HIV and Congenital Syphilis" was approved in 2009 by the member states of PAHO, establishing the following target for 2015: incidence rate of syphilis congenital to less than 0.5 per thousand live births (NV).[8]

In Brazil, the incidence of CS in the year 2011 was 3.3 / 1,000 NV. In the Northeast region (3.8/1000NV) and the Southeast region (3.6/1000NV), the highest rates were observed in comparison to the other regions.[9] In the year 2013, there were 21,382 cases of CS in Brazil, with an incidence rate of 4.7/1000 NV.[10]

It is inferred that CS is similarly worrisome in the municipality of Ipojuca, metropolitan region of Recife, being one of the eight priority municipalities of the State of Pernambuco due to the number of cases.[11] It is verified that in practice, the incidence indicators for CS have improved, but still do not present a tendency of decrease in Ipojuca.

Thus, it is revealed that the main contribution of this work is to provide municipal health managers with a clear evidence of the epidemiological profile of the population of Ipojuca before CS. It is pointed out that, indirectly, this work helps the improvement of management by subsidizing the elaboration of alternative forms of interventions specific to the local epidemiological context.

## OBJECTIVE

- To describe the epidemiological profile of Congenital Syphilis (CS) cases reported in a Northeastern municipality.

## METHOD

This is a cross-sectional, cross-sectional study carried out in the metropolitan region of Recife (PE), between 2011 and 2015, of all cases of congenital syphilis occurring in the municipality of Ipojuca (PE) and reported by the (SINAN) and the Information System on Live Births (SINASC).

Ipojuca is considered to be a medium-sized municipality occupying a land area of 527,317 km², with a population estimated at 92,965 inhabitants.[12] It is shown that Ipojuca (PE) is characterized by the presence of the Industrial Complex of SUAPE, as well as tourist beaches such as Porto of Chickens and Serrambi.

The study population of all cases of congenital syphilis reported and investigated - including abortions and stillbirths - occurred in the children of mothers living in the municipality of Ipojuca in the period from 2011 to 2015. The exclusion criteria were the sample non-resident cases in the municipality, duplication of reporting and cases not investigated.

The sample was formed by 57 cases of CS (from SINAN) and 48 cases of live births (SINASC). 48 cases of SINAN with SINASC were

mapped based on the comparison of the mother's name and date of birth. It can be seen that the difference, i.e. from nine cases, corresponds to abortions and stillbirths present only in SINAN.

The mean annual incidence rate of CS was calculated for the description of the epidemiological profile. In addition, socioeconomic, demographic, diagnostic and health care variables were described. A list of analyzed variables is given below:

- **Maternal characteristics:** age, marital status, number of children in previous pregnancies, schooling;
- **Characteristics of prenatal care and delivery of reported cases:** prenatal consultation, number of prenatal consultations, type of delivery, diagnosis of maternal syphilis, treatment plan for pregnant women and the partner treated concomitantly with the pregnant woman;
- **Diagnosis of maternal infection in reported cases:** VDRL (Venereal Disease Research Laboratory) at delivery and VDRL titre at delivery;
- **Demographic, care and diagnostic characteristics of reported cases:** Newborn's sex (NB), gestational age, birth weight, clinical diagnosis, VDRL result in peripheral blood, and liquor VDRL result.

The following formula was used to calculate the annual incidence rate of CS:[13]

$$\frac{\text{Number of children less than one year old, abortions and born dead notified by SINAN and residents in the municipality of Ipojuca with CS diagnosis}}{\text{Number of live births registered by SINASC for the year in question}} \times 1000$$

The data was analyzed using the descriptive statistics for each of the aforementioned variables. This study was examined and authorized by the Research Ethics Committee involving Human Subjects (CAAE 69048517.0.0000.5198).

## RESULTS

The annual incidence rates of CS in the study period in table 1 are described. It has been verified that in the period between 2012 and 2015 the annual incidence rate has been decreasing.

It is reported that the mean annual incidence rate of CS during the study period was 6.72 / 1000 NV. Regarding the reported cases, two cases of abortion occurred (2012 and 2013) and four cases of stillbirths by CS (one in each of the years: 2011, 2012, 2014 and 2015).

Table 1. Annual Incidence Rate of Congenital Syphilis (CS) by reported cases and number of live births. 2011 to 2015. Ipojuca (PE), Brazil, 2015.

| Year | Notified cases | Number of live births (LB) | Annual incidence rate (by 1000 LB) |
|---|---|---|---|
| 2011 | 10 | 1.695 | 5.89 |
| 2012 | 19 | 1.696 | 11.20 |
| 2013 | 12 | 1.645 | 7.29 |
| 2014 | 9 | 1.643 | 5.47 |
| 2015 | 7 | 1.855 | 3.77 |
| **Total** | **57** | **8.534** | **6.7*** |

**Source:** SINAN (MH, Brazil), SINASC (MH, Brazil). *Mean value.

It is noted that three cases that had been reported through SINAN were not identified in SINASC, indicating under-notifications or sub-registrations in the system.

According to variables related to maternal characteristics (Table 2), the majority of pregnant women were single (81.25%) and did not have children born alive in previous pregnancies (41.6%). It is shown that the most frequent maternal age group was 20 to 30 years (mean of 23.7 years) and 57.87% did not complete high school.

Table 2. Maternal characteristics of reported cases of CS. 2011-2015. Ipojuca (PE), Brazil, 2015.

| Maternal characteristics | | n | % |
|---|---|---|---|
| Age | Less than 15 years: | 02 | 3.50 % |
| | 15 - 19 years | 16 | 28.07% |
| | 20 - 30 years | 26 | 45.61% |
| | More than 30 years | 11 | 19.29% |
| | Not informed | 02 | 3.50% |
| Marital status | Single | 39 | 81.25% |
| | Married | 03 | 6.25% |
| | Stable union | 06 | 12.50% |
| Number of children in previous pregnancies | 0 | 20 | 41.66% |
| | 1 | 16 | 33.3% |
| | 2 | 04 | 8.33% |
| | 3 | 04 | 8.33% |
| | 5 | 03 | 6.25% |
| | More than 5 | 01 | 2.08% |
| Fetal loss or abortion in previous pregnancies | Yes | 09 | 18.75% |
| | No | 39 | 81.25% |
| Residence location | Rural Area | 08 | 14.03% |
| | Urban Area | 45 | 78.94% |
| | Not informed | 04 | 7.01% |
| Maternal schooling | Incomplete 1st to 4th grade | 07 | 12.28% |
| | Complete 4th grade | 03 | 5.26% |
| | Incomplete 5th to 8th grade | 11 | 19.29% |
| | Complete elementary education | 03 | 5.26% |
| | Incomplete high school | 09 | 15.78% |
| | Complete high school | 09 | 15.78% |
| | Ignored | 14 | 24.56% |
| | Not applicable | 01 | 1.79% |

Source: SINAN (MH, Brazil), SINASC (MH, Brazil).

In relation to prenatal care (Table 3), 89.47% of the women underwent prenatal care with four to six visits (47.91%). The diagnosis of CS was more frequent (42.1%) during childbirth or curettage. CS was diagnosed during prenatal care in 35.08% of the cases. It is reported that, in terms of the type of delivery, the normal and cesarean sections presented an equal division (50% for each).

Table 3. Characteristics of prenatal care and delivery of reported cases of CS. 2011 to 2015. Ipojuca (PE), Brazil, 2015.

| Characteristics of prenatal care and delivery. | | n | % |
|---|---|---|---|
| Performed prenatal consultation during pregnancy | Yes | 51 | 89.47% |
| | No | 01 | 1.75% |
| | Ignored | 05 | 8.77 |
| Number of prenatal consultations | More than 7 | 17 | 35.41% |
| | Between 4 and 6 | 23 | 47.91% |
| | From 1 to 3 | 08 | 16.99% |
| Type of birth | C-section | 24 | 50% |
| | Normal | 24 | 50% |
| Diagnosis of maternal syphilis | During Prenatal Care | 20 | 35.08% |
| | In Childbirth or Curettage | 24 | 42.10% |
| | After childbirth | 07 | 12.28% |
| | Ignored | 06 | 10.52% |
| Treatment scheme | Adequate | 08 | 16.99% |
| | Inadequate | 28 | 49.12% |
| | Not carried out | 09 | 15.78% |
| | Ignored | 12 | 21.05% |
| Partner treated concomitantly with the pregnant woman | Yes | 10 | 17.54% |
| | No | 27 | 47.36% |
| | Ignored | 20 | 35.08% |

Source: SINAN (MH, Brazil), SINASC (MH, Brazil).

In the registries, a percentage of ignored information was higher than 20% for the variables:

(i) Treatment of pregnant women; and

(ii) Partner treated concomitantly with the pregnant women.

The pregnant women are treated in (i) only 16.9% of the cases, according to the protocol of the Ministry of Health.[14] Only ten pregnant women in (ii) had their partners treated (54%).

The diagnosis of maternal syphilis (Table 4) showed that the majority performed the VDRL at childbirth (94.74%), among which, 91.22% were reactive. It is reported that the VDRL titre corresponding to the severity of infection at 52.63% was equal to or greater than 1/8 and, at 14.03%, greater than 1/64.

Table 4. Characteristics of the diagnosis of maternal infection in the reported cases of CS. 2011 to 2015. Ipojuca (PE), Brazil, 2015.

| Characteristics of the diagnosis of maternal infection. | | n | % |
|---|---|---|---|
| Realization of VDRL at childbirth | Reactive | 52 | 91.24% |
| | Non reactive | 02 | 3.50% |
| | Ignored | 03 | 5.26% |
| Title of VDRL at childbirth | Less than 1/8 | 22 | 38.59% |
| | 1/8 to 1/32 | 14 | 24.56% |
| | 1/32 to 1/64 | 08 | 14.03% |
| | More than 1/64 | 08 | 14.03% |
| | Not informed | 05 | 8.77% |

**Source:** SINAN (MH, Brazil), SINASC (MH, Brazil).

The predominance of males as to sex of the neonates is shown (Table 5), with 52.08%. The majority of cases presented weight equal to or greater than 2,500g (83.33%), and gestational age of 37 weeks or more (75%). It can be seen that, with regard to clinical diagnosis, 56.14% were asymptomatic for CS. There was a large percentage of information ignored (38.59%).

Table 5. Demographic, care and diagnostic characteristics of reported cases of CS. 2011 to 2015. Ipojuca (PE), Brazil, 2015

| Demographic, care and diagnostic characteristics | | n | % |
|---|---|---|---|
| Sex | Male | 25 | 52.08% |
| | Female | 23 | 47.91% |
| Gestational age | Less than 37 weeks | 10 | 20.83% |
| | More than 37 weeks | 36 | 75% |
| | Not informed | 2 | 4.1% |
| Weight at birth | Less than 2500g | 8 | 16.66% |
| | More or the same as 2500g | 40 | 83.33% |
| Clinical diagnosis | Asymptomatic | 32 | 56.14% |
| | Symptomatic | 3 | 5.26% |
| | *Ignored | 22 | 38.59% |
| Outcome of VDRL in peripheral blood | Reagent | 27 | 47.36% |
| | Non-reagent | 13 | 22.80% |
| | Not carried out | 4 | 7.01% |
| | Ignored | 13 | 22.80% |

Source: SINAN (MH, Brazil), SINASC (MH, Brazil).

It reaches 29.90% in relation to the laboratory diagnosis. It is shown that the percentage of unrecognized exams and unknown information reaches 29.80% for VDRL in peripheral blood and 77% for VDRL in liquor.

It was exposed during data collection that two mothers presented (each one) two pregnancies with a diagnosis of CS in different years, in which one pregnant woman had notifications in the years of 2011 and 2014 and the other in the years of 2011 and 2015. It is reported that recurrence of the reports may suggest a possible failure to treat or reinfection CS.

## DISCUSSION

An average annual incidence rate of SC of 6.72 / 1000 LB was found between 2011 and 2015. It is shown that this value means almost seven times the goal recommended by the Ministry of Health, which is to register equal or less of 1 / 1,000 LB.[8]

It is reported that this is an alarming fact, since CS is considered a sentinel event since it can be avoided by effective and effective actions for the health care performed with the pregnant woman.[10] It is known that, because it is a sensitive disease to prevention, the event induces a negative evaluation of the functioning of the health care network of the locality.[15]

CS is expected since both the infected pregnant woman and her sexual partner are diagnosed and promptly treated in the course of prenatal care.[16] It is noteworthy that, despite the increase in prenatal coverage, there is still a low effectiveness of preventive actions of CS in Brazil[15] evidenced by the average number of cases in the.

Despite the increase in the number of CS cases in Ipojuca between 2011 and 2012, the number of cases in the last three years (2013-2015) has been reduced gradually and significantly. However, the incidence in 2015 (3.77/1.000NV) is still well above the expected target of DM (1/1.000NV). It is revealed that the reduction of the indicator coincides with the result of a similar study carried out in the State of Espírito Santo from 2000 to 2005, which found an average annual incidence rate of CS of 5.6/1000 live births.[17]

It is suggested that the reduction of CS infection is related to the implementation of policies to combat syphilis. Evidence shows that examples of policies are the increase in the number of rapid tests for the tracing of cases and several itinerant actions aimed at combating the disease that allow early diagnosis and treatment. The importance of the Testing and Counseling Centers (TCC), in the testing coverage, in the city of Rio de Janeiro, in 2007.[18]

It became the TCC of the municipality of Ipojuca, implemented in 2010, responsible for supporting Primary Care in the detection, treatment, prevention, promotion and follow-up of CS in pregnant women.[19] It is stated that the promotion of health, through education of the population and professionals and diagnosis in a timely manner, influences the reduction of the incidence rates of CS evidencing the importance of these types of actions.[20] It should be noted that this initiative may have promoted an increase in the active search and

in the detection of new cases, resulting in an increase in the CS detection rate in the following two years, substantially, and then the abovementioned decrease.

It can lead to syphilis during pregnancy, spontaneous abortion, fetal and neonatal death, prematurity and damage to the health of the newborn with psychological and social repercussions. It is estimated that 40% of pregnant women with untreated syphilis develop fetal loss.[21] There were two abortions and four stillbirths in this study, representing 10.52% of CS cases, and ten newborns were premature, accounting for 20.83%.

It can be seen that the characteristics of vulnerabilities related to mothers were similar to those of women approached by studies in Bahia[22-3] and Rio Grande do Norte.[3] It is revealed that in these studies, which showed the existence of pregnant women with low schooling, most of them between 20 and 30 years of age, single and with limited socioeconomic conditions. It is pointed out that the lower educational level of the mothers is associated with the increase in CS cases.[10]

Also neglects the variable education in completing the CS notification. In this study, almost 25% had this information ignored. This coincided with a study conducted in Ceará, where the number of cases ignored reached 36.4%, [24] and Bahia, [22] in which almost 40% were ignored. It is noticed that the expressive quantity of data ignored suggests probable sub-registrations, classification errors of the professional that made the notification or filling.

It is recommended that the Ministry of Health, in relation to prenatal care, perform VDRL rapid tests during the first and third trimesters of pregnancy and at the time of delivery.[25] It is pointed out that the first two moments are aimed at ensuring the early diagnosis of syphilis and its treatment in a timely manner, and the third examination allows the early treatment of the newborn.[26]

It was identified that, despite this recommendation, only 35.08% of the pregnant women were diagnosed in the prenatal period and the remainder at the time of delivery. It is reported that about 49% had an inadequate treatment regimen, allowing relapses and resistance to treatment.

These indicators are corroborated in a study in Natal (RN) where almost 40% of the pregnant women did not perform the VDRL during prenatal care, but 96% took the exam at the time of delivery.

The treatment of pregnant women with CS during gestation should be performed, and the partner should be treated during the same period.[3] Low percentages were found in the study in pregnant women with adequate treatment and pregnant women whose partners were treated.

A low proportion of adequately treated pregnant women and treated partners was found, 16.99% and 17.54%, respectively. However, it is still higher than in a study carried out in the city of Natal (RN).[3] Only 4.5% of the pregnant women were adequately treated, 11.3% of the partners underwent treatment and 16.4% ignored information.

It was considered, in another study conducted in Ceará, [24] among partners who received treatment, 47.2% were not adequately treated, and 44% did not receive any treatment, and these indicators substantially influence reinfection.

It is essential to understand the importance of the treatment of partners for the elimination of CS, since this problem is one of the major obstacles for the pregnant woman to be considered adequately treated.[2]

## CONCLUSION

It is concluded that the findings presented in this study show that Congenital Syphilis (CS) is above that defined by the Ministry of Health and PAHO / WHO in the municipality of Ipojuca (Pernambuco). It is considered that the annual rates and the average of the years in the period of 2011 to 2015 were well above the parameter recommended by the Ministry of Health, although suggesting a decline from 2012.

It should be noted that the analyzed characteristics related to mother, newborn, health care and diagnosis point to (still) a low effectiveness of prenatal care. This is in contrast to the fact that CS is a sentinel event to determine the quality of prenatal care.

In this sense, it is indicated by the data of this study, the need to implement actions aimed at the reduction of CS cases, immediately, as:

i. Evaluation of the quality of prenatal care since, in most of the cases observed, the mothers consulted during this gestational period. However, it was found that this did not prevent vertical transmission of syphilis;
ii. Analysis of the mechanisms that integrate the partner to the prenatal and, thus, favor its adherence to the treatment when positively diagnosed;
iii. Evaluation of treatment access since family health units do not

offer on-site treatment and patients have to attend services of medium complexity;

iv. Carrying out training for the professionals of the prenatal health teams, with the monitoring of the activities developed for the prevention of CS, stimulating the commitment of professionals with the appropriate behaviors.

v. Improvement of the joint action of the epidemiological surveillance of CS in Primary Care generating important information for the decision-making of health managers aiming at an improvement in the quality of assistance to pregnant women and, consequently, the reduction of CS cases in the municipality.

It is noted that CS is a serious public health problem not only in the municipality of Ipojuca, but also throughout Brazil. It should be emphasized that this article subsidizes professionals and managers on the possible needs to modify or update practices of women's health care policies that are fundamental to contain vertical and horizontal transmission of the disease.

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**Corresponding Address**

Isadora Maria Delmiro Silva
Rua Naipu, 61
Jardim Atlântico
CEP: 53060-230 – Olinda (PE), Brazil