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Asymptomatic Carriage and Determinants of Chlamydia Infections: A Study Among Women of Childbearing Age Attending the Sino-Gabonese Friendship Hospital in Franceville (Southeast Gabon)

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Abstract:

➢ ***Background***

Curable STIs such as *Chlamydia trachomatis* (Ct) pose a major global public health challenge, particularly in sub-Saharan Africa, due to the complications they cause in pregnant women. This study aimed to assess the prevalence of asymptomatic Ct carriage and identify its determinants among women of reproductive age attending the Sino-Gabonese Friendship Hospital.

➢ ***Materials and Methods***

This retrospective and cross-sectional study was conducted from May 11 to June 11, 2025, based on the results of real-time PCR screening tests for chlamydias performed on women of reproductive age (15-49 years) who consulted between January 2022 and December 2024. The data, including sociodemographic information, were statistically analyzed using Microsoft Excel and R software. Descriptive and bivariate analyses were performed to evaluate associations between variables. Results were considered statistically significant for a p-value ≤ 0.05.

➢ ***Results***

The study recorded a total of 594 medical records of women of reproductive age, with a mean age of 40.21 ± 18.45 years. Among these records, 125 (42.09%) were for women aged 21 to 40 years. The diagnosis of chlamydias revealed that 94 cases were positive, corresponding to an overall prevalence of 15.82% (95% CI: [0.13; 0.1]), while 500 results were negative (84.18%). Bivariate analysis showed that women aged 15 to 19 years (Odds Ratio = 2.32; 95% CI [1.26 - 4.18], p=0.004*), those aged 20 to 24 years (Odds Ratio = 4.74; 95% CI [2.78 - 8.1], p≤0.001), and single women (Odds Ratio = 3.83; 95% CI [2.3 - 6.55], p≤0.001) had a significantly increased risk of chlamydias.

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➢ ***Conclusion***

This study highlighted a significant prevalence of chlamydias (15.82%) among women of reproductive age attending the Sino-Gabonese Friendship Hospital in Franceville. Young women and single women are particularly at risk, underscoring the need for targeted interventions to reduce the transmission of this infection. These findings contribute to the understanding of chlamydias in Central Africa and provide insights for improving local public health policies.

Keywords: *Asymptomatic Carriage, Chlamydia Trachomatis, Women, HSGF, Gabon.*

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I. INTRODUCTION

Chlamydia trachomatis (Ct), the most widespread bacterial sexually transmitted infection (STI) globally, primarily affects women of childbearing age, with a prevalence estimated at 4.0% among women according to the WHO [1]. In sub-Saharan Africa, curable STIs like Ct pose a significant public health challenge, with high rates of complications such as tubal infertility, ectopic pregnancies, and increased risks of HIV transmission [2]. Gabon, like other Central African countries, has a high burden of STIs, with concerning prevalences of syphilis (2.5%) and HIV (4.0%) among pregnant women [3]. Despite this, Ct infections, often asymptomatic, are underreported due to the lack of systematic screening and limited diagnostic resources. A historical study conducted in Franceville in 1991 showed that 71% of women with ectopic pregnancies were infected with *Chlamydia trachomatis* (Ct) [4]. Although a recent study in Libreville revealed a prevalence of 12.4% among pregnant women, highlighting the importance of this infection in the Gabonese context [5]. Recent data on asymptomatic carriage and socio-behavioral determinants are still insufficient, particularly in Franceville, in southeastern Gabon, where socio-economic conditions and access to healthcare vary. Therefore, there is no recent information on this phenomenon, even though it accounts for nearly 80% of transmissions [6]. Additionally, socio-economic determinants (precarity, multiple partnerships) and a lack of awareness about STIs exacerbate the risks in this region [7]. The Sino-Gabonese Friendship Hospital, a reference facility in Franceville, represents a strategic site to assess these dynamics, especially since previous studies have documented other sexually transmitted infections, such as HIV and HTLV-1, there [2]. It is in this context that this study was conducted to evaluate the prevalence and identify the determinants of asymptomatic carriage of *Chlamydia trachomatis* infections among women of childbearing age attending the Sino-Gabonese Friendship Hospital in Franceville.

II. MATERIALS AND METHODS

➢ *Description of the Host Structure*

This study was conducted at the medical analysis laboratory of the Sino-Gabonese Friendship Hospital in Franceville. Located in the second district of the city, this hospital serves patients from various backgrounds, as it has the appropriate technical platform for routine hospital examinations.

➢ *Type, Period, and Study Population*

This retrospective and cross-sectional study was conducted from May 11 to July 11, 2025. It was based on the results of Chlamydia screening tests performed during the study period on women of childbearing age (15-49 years) who consulted at the Sino-Gabonese Friendship Hospital in Franceville between January 2022 and December 2024, and recorded in a database of the hospital's health information management system. The objective of the study was to determine the prevalence of *Chlamydia trachomatis* infection during this period.

➢ *Inclusion and Exclusion Criteria*

Only medical records and PCR test results using the Abbott RealTime CT/NG molecular diagnostic kit were considered in this study. This method is recognized for its high sensitivity and specificity and is commercially available. The analyses were performed on serum or plasma samples collected from women of childbearing age (15-49 years) who consulted at the Sino-Gabonese Friendship Hospital in Franceville between January 2022 and December 2024. However, incomplete medical records due to missing data regarding the *Chlamydia trachomatis* test or risk factors were excluded.

➢ *Sampling Method*

A purposive sampling method was employed to focus exclusively on the results of analyses of serum or plasma samples collected from women of childbearing age (15-49 years) who consulted at the Sino-Gabonese Friendship Hospital in Franceville between January 2022 and December 2024, at the medical analysis laboratory of this hospital during the study period. To ensure the representativeness of the study, the sample size was determined by the number of cases recorded in the laboratory's database.

➢ *Data Collection Procedure*

The data used for this study came from the database containing the results of analyses of serum or plasma samples collected from pregnant women who consulted for a *Chlamydia trachomatis* test between January 2022 and December 2024, obtained from the laboratory of the Sino-Gabonese Friendship Hospital in Franceville. Access to this data was facilitated through collaboration between the

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hospital's general management and the University of Sciences and Techniques of Masuku. The extracted data were provided to us in digital format. All qualitative screening results for *Chlamydia trachomatis* were extracted and used for this study.

➢ *Data Collection*

In this study, sociodemographic data (age, education level, profession, marital status, place of residence), medical and obstetric history (parity, history of sexually transmitted infections, co-infections such as HIV, gonorrhea, and syphilis), as well as sexual behaviors (number of sexual partners, condom use) and the results of the *Chlamydia trachomatis* test (positive or negative) were collected.

➢ *Ethical Considerations*

Although the study is retrospective, permission for the use of data was obtained from the Board of the Sino-Gabonese Friendship Hospital in Franceville, which collaborates with the Faculty of Sciences at the University of Sciences and Techniques of Masuku (USTM), in accordance with local and international ethical guidelines. Additionally, an internship agreement was granted by the Dean of the Faculty of Sciences to conduct the study within this institution, and the data provided contained neither the identity nor personal information regarding the women.

➢ *Data Analysis*

The data collected during this study were entered into a Microsoft Excel 2016 spreadsheet. After being cleaned and secured, they were analyzed using R software (version 4.0). Descriptive statistical analyses were performed to determine frequencies, means, and standard deviations to describe the characteristics of the population. A bivariate analysis, conducted using Fisher's exact test, was used to compare proportions. The association between independent variables (sociodemographic, behavioral, clinical, and obstetric factors) and the dependent variable (Chlamydia infections, positive/negative) was evaluated. Results were considered significant within a 95% confidence interval for any p-value less than or equal to 0.05.

III. RESULTS

➢ *Overall Prevalence of Chlamydia Infections Among Study Participants (N=594)*

A total of 594 medical records of women of childbearing age were recorded for this study. With a mean age of 40.21 ± 18.45 years, the majority of the study records, 125 (42.09%), were aged 21 to 40 years. The diagnosis of Chlamydia infections indicated that 94 records were positive for this disease, resulting in a prevalence of 15.82% (95% CI: [0.13; 0.1]), compared to 84.18% for 500 negative results.

➢ *Overall Prevalence of Chlamydia Infections Based on Sociodemographic Information Obtained from Study Records (N=594)*

The bivariate analysis of the overall prevalence of Chlamydia infections, based on the sociodemographic data collected in the study, revealed that women aged 15 to 19 years (Odds Ratio = 2.32; 95% CI [1.26 - 4.18], p=0.004*), those aged 20 to 24 years (Odds Ratio = 4.74; 95% CI [2.78 - 8.1], p≤0.001), as well as those who were single (Odds Ratio = 3.83; 95% CI [2.3 - 6.55], p≤0.001) were significantly associated with an increased prevalence of Chlamydia infections in this study (see Table 1).

Table 1 Univariate Analysis of the Prevalence of Chlamydia Infections Based on the Sociodemographic and Obstetric Characteristics of Women of Childbearing Age in the Study (n=594).

Variables	Total Number of Women of Childbearing Age in the Study *N* (%)	Prevalence of Chlamydia Infections		Bivariate Analysis	
		Positive N (%)	Negative N (%)	Crude OR 95% CI	p-value
Age Groups (years)					
15- 19	76 (12.79)	21 (27.63)	55 (72.37)	2.32 [1.6 – 4.18]	**0.004***
20 - 24	104(17.51)	36 (34.62)	68(65.38)	4.74 [2.78 – 8.1]	**≤0.001**
25 - 29	197 (33.17)	4 (2.03)	193 (97.97)	Reference	-
30 - 34	143 (24.07)	18 (12.53)	125 (87.47)	0.71 [0.38 – 1.26]	**0.21**
35 - 49	74 (12.46)	15 (20.27)	59 (79.73)	1.42 [0.71 – 2.69]	0.31
Marital status					
Single	278 (46.8)	69 (24.82)	201 (75.18)	3.83 [2.31 -6.55]	**≤0.001**
Married/Cohabiting	135(22.73)	16 (11.85)	119 (88.15)	0.66 [0.34 -1.19]	**0.18**

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Divorced/Separated	181 (30.47)	9 (4.97)	172 (95.03)	Référence	-
Education level					
Primary	212 (35.69)	41(19.34)	171(80.66)	Référence	-
Secondary	302 (50.84)	42 (13.91)	260 (86.09)	0.71 [0.45 -1.14]	**0.15**
Higher Education	80 (13.47)	11(13.75)	69 (86.25)	0.83 [0.38 -1.66]	**0.74**
Residence					
Franceville (Urban)	324 (54.55)	62 (19.14)	262 (80.86)	Référence	-
Outside of Franceville	270 (44.45)	32 (11.85)	238 (88.15)	0.56 [0.35 -0.92]	**0.018**

OR = Odds Ratio; CI = Confidence Interval; * = Significant Test

IV. DISCUSSION

Chlamydia infections represent a major public health issue, particularly among women of childbearing age. They are among the most prevalent sexually transmitted infections (STIs) worldwide, with potentially serious consequences for reproductive health, such as infertility and complications during pregnancy. The analysis of 594 medical records of women of childbearing age, along with diagnostic results, allowed for the study of asymptomatic carriage of this infection, revealing an overall prevalence of 15.82% of chlamydia infections. Although this result is comparable to the prevalence of 15.6% observed among women in urban settings [8], it is higher than the rates found in contexts where effective prevention programs are in place, such as in China (11.3%) [9] or Bangladesh (9.8%) [10]. This underscores the importance of targeted interventions to reduce the transmission of *Chlamydia trachomatis*. However, the results of this study are slightly lower than the higher rates reported in other sub-Saharan African countries, such as Tanzania (22.4%) [11] or Ethiopia (19.7%) [12]. These variations may be explained by several factors, including access to healthcare, as populations in rural or disadvantaged areas are often less aware of sexually transmitted infections (STIs) and have limited access to screening services. Additionally, risky sexual behaviors, such as multiple partners or lack of condom use, vary by region and demographic groups. Finally, methodological differences, such as diagnostic techniques and sample size, may also influence the results. With a mean age of 40.21 ± 18.45 years, the majority of participants were aged 21 to 40 years. The results of the bivariate analysis in this study revealed that younger women, particularly those aged 15 to 24 years, had a significantly increased risk of chlamydia infections. These findings are consistent with other research that has shown that young women are particularly vulnerable to sexually transmitted infections (STIs) due to various factors, such as risky sexual behaviors, lack of sexual education, immaturity of genital mucosa, and limited access to healthcare services [13]; [14]; [9]. These results highlight the importance of strengthening prevention and screening programs targeting young women, particularly within schools and universities. The study also showed that single women were significantly associated with an increased prevalence of chlamydia infections (OR = 3.83). This finding aligns with previous research that has also highlighted that single women are often less likely to get tested for STIs. Furthermore, unprotected sexual behaviors, low condom use, and less stable sexual relationships may contribute to a higher prevalence within this population [12] ; [15]. Additionally, marital status was also identified as a significant risk factor, with single women having an Odds Ratio of 3.83. This may be explained by riskier sexual behaviors or a lack of access to preventive care. Previous studies have also emphasized that single women are often less likely to get tested for STIs, which may contribute to a higher prevalence in this population [15].

➢ *Public Health Implications*

The prevalence of 15.82% observed in this study highlights the need for increased attention to the reproductive health of women of childbearing age in Gabon. Chlamydia infections, often asymptomatic, can lead to serious complications, including pelvic inflammatory disease, ectopic pregnancies, and fertility issues (**WHO, 2021**). Therefore, it is crucial to implement targeted screening and awareness programs, particularly for young women and those who are single.

➢ *Study Limitations*

It is important to note that this study has certain limitations. Due to its retrospective nature, the sample size, while significant, may not be representative of the entire female population of childbearing age in Gabon. Additionally, the data rely on medical records, which may introduce selection bias or classification errors. Future studies should consider more robust data collection methods, such as direct surveys, to obtain a more accurate picture of the prevalence of chlamydia infections and associated factors.

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V. CONCLUSION

In conclusion, this study highlights the concerning prevalence of chlamydia infections among women of childbearing age at the Sino-Gabonese Friendship Hospital in Franceville. The results underscore the importance of a proactive approach to screening and prevention, particularly for the identified at-risk groups. Improved awareness and increased access to healthcare services are essential to reduce the incidence of chlamydia infections and improve the reproductive health of women in Gabon.

➢ *Future Perspectives*

The results of this study call for further research to better understand the determinants of chlamydia infections in Gabon. A multicentric approach including urban and rural populations would help validate these findings. Additionally, longitudinal studies would be useful to assess the impact of public health interventions on the prevalence of chlamydia infections.

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➢ *Author's Contributions*

This study was conceived by HKM and led by TNM. TNM, FMM, and ABPP collaborated on the study design, data analysis, and the writing of the materials and methods section. BBO and FMM drafted the initial manuscript, which was then critically reviewed by TNM, HKM, and AN. All authors contributed to and approved the final manuscript.

➢ *Data Availability Statement*

Data supporting this study's findings are available from the corresponding author upon reasonable request.

➢ *Conflicts of Interest*

The authors declare that they have no conflict of interest.

➢ *Source of Funding*

The authors declare that they received no funding for this study.

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