

Full Length Research Paper

Evaluation of viral hepatitis C screening at Institut Pasteur of Côte d'Ivoire from 2012 to 2022

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The hepatitis C virus (HCV) accounts for 48% of the 1.4 million deaths from viral hepatitis worldwide. The prevalence of HCV was estimated at 5% in Côte d'Ivoire in 2015. The aim is to evaluate screening for the HCV at the Institut Pasteur de Côte d'Ivoire (IPCI) from 2012 to 2022. A retrospective study was carried out to monitor changes in screening for the anti-HCV Ac at the IPCI. The parameters of interest were age, sex and anti-HCV antibody results during the study period. The data collected were recorded in an Excel file and analysed using Rstudio software. According to the results obtained, the positivity rate for males was 5.26% compared with 3.81% for females, and the financial support provided by ROCHE stimulated the screening of a large number of people. The positive rate for viral hepatitis C (4.6%) virtually mirrored the rate of 4.4% obtained in a study of blood donors in Côte d'Ivoire. Finally, this study demonstrated the endemic nature of the HCV in Côte d'Ivoire. Despite financial support to facilitate screening, the seroconversion rate among the population has not shown any increase in the number of people contracting the HCV.

Key words: Hepatitis C virus (HCV), prevalence, proportion of positivity.

INTRODUCTION

Viral hepatitis is a major public health problem. They are considered the seventh leading cause of death worldwide (Ongaro and Negro, 2022). Among them, viral hepatitis C occupies a key position due to the hepatic complications associated with it. It is slow progression from the acute to the cancer stage leading to chronicity in 60 to 80% of cases, followed by cirrhosis in 15 to 30% (Echeverría et al., 2021).

An estimated 71 million people worldwide are living with the chronic hepatitis C virus (HCV) (Dugan et al., 2021).

Viral hepatitis C accounts for 48% of the 1.4 million deaths from viral hepatitis worldwide (Ongaro and Negro, 2022).

If HCV-infected people remain undiagnosed and untreated, the HCV mortality burden will continue to rise (Umutesi et al., 2019). Thus, the WHO has proposed the elimination of viral hepatitis C as a public health burden by 2030. To achieve this goal, countries around the world must reach a diagnosis rate of 90%, a treatment rate of 80% and a 75% reduction in the risk

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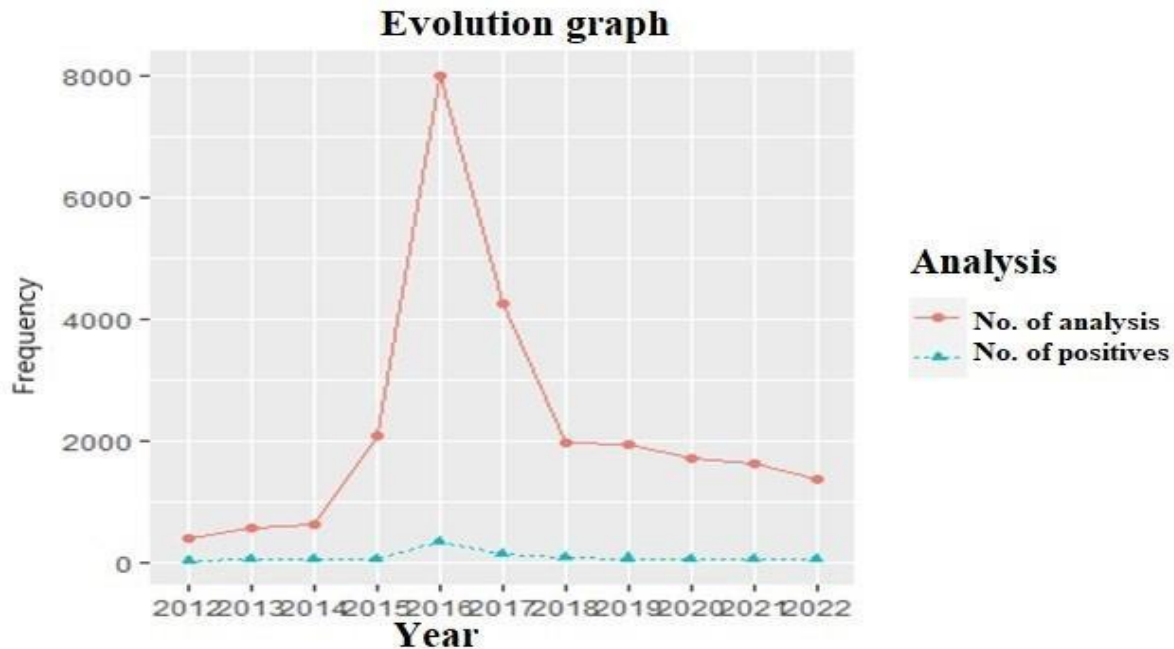


Figure 1. Samples analysed and positivity rates over the years.

(Zhou et al., 2023).

In North Africa, HCV prevalence is very high, especially in Egypt, where the rate can exceed 15%. Central and West Africa are areas of high endemicity, with prevalences in excess of 8% (Kalla et al., 2020).

In West Africa, HCV prevalence varies from country to country. It is 3% in Ghana (Masood and Mahbobeh, 2020), 4.12% in Benin (Kpoussou et al., 2021), and 3.8% in Burkina Faso (Meda et al., 2018).

In Côte d'Ivoire, while HCV prevalence was estimated at 5% in 2015 (Enel et al., 2015) very few recent studies have been carried out on this state of affairs unlike in neighboring countries.

The aim of this work is to evaluate HCV screening at the Institut Pasteur de Côte d'Ivoire frequented by the entire Ivorian population over the past 11 years.

MATERIALS AND METHODS

This is a retrospective study, which was carried out at the Bacterial and Viral Serology Unit of the Institut Pasteur de Cote d'Ivoire (IPCI) over the period from 2012 to 2022. The study involved data collected from viral hepatitis screening registers. The parameters of interest were age, sex and anti- HVC antibody results during the study period. After consulting the databases, anti-HVC antibody screening was determined by year, sex, and defined age ranges. A comparative study was then carried out to assess changes in the frequency of HCV screening during the study period.

All these parameters of interest were saved in an Excel file and analyzed using Rstudio software. The comparison of proportions test based on the χ^2 statistic was used to compare two or more different proportions with the `prop.test()` and `pairwise.prop.test()` functions, respectively. The test is significant when its p-value is

less than 0.05.

RESULTS

Trend in number of samples tested

A total of 24,687 samples were tested for anti-HCV Ac during the study period from 2012 to 2022, and 1,127 were positive, representing a prevalence of 4.6%. 12,973 (52.55%) were male, including 682 positives (5.26%), and 11,714 (47.45%) were female, including 447 positives (3.81%). The sex ratio was 1.11. Age ranged from 1 to 87, with an average of 39.71. We saw an increase in the number of analyses carried out in 2015 and 2016.

This increase is due to the financing of tests by the ROCHE company. This financial support has boosted screening.

Many patients who were ill or wanted to know their status with regard to viral hepatitis C came to our services. The percentage of positive tests for immunological response did not increase. It remains in the same range as in other years. HCV is circulating well in Côte d'Ivoire, but not at a very high level as for hepatitis B virus. A gradual decline in numbers has been observed from 2017 to 2022 (Figure 1).

Figure 2 shows the distribution of the number of samples analyzed from 2012 to 2014 (period before Roche's agreement with the Ivory Coast government), from 2015 to 2017 (period of the agreement), and from

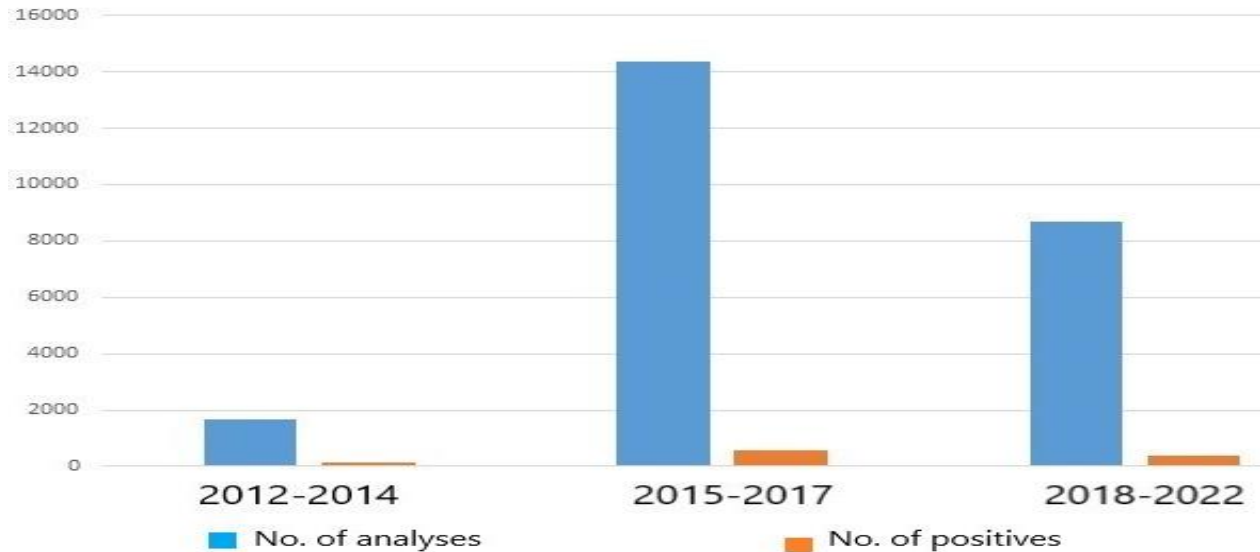


Figure 2. Breakdown of the number of tests before and after the agreement.

2018 to 2022 (post agreement period).

By gender

According to the present study, the proportion of HCV positivity was not related to gender in subjects under 15 years of age ($p > 5\%$) (Figure 3A). On the other hand, this proportion was related to sex in subjects aged between 15 and 50 ($p < 5\%$) (Figure 3B) and in subjects aged over 50 ($p < 5\%$) (Figure 3C). Whatever the age group, the proportion of HCV positivity is higher in men than in women (Figure 4).

Recipes for serological tests

In terms of recipes from serological tests, one test is invoiced at 7,000 f cfa. Before the agreement with ROCHE, the Institut Pasteur analyzed 1,655 tests, for a total revenue of 11,550,000 f cfa (23 10 USD). Although the cost of the test is lower than in the private sector, some patients are unable to pay for this serological screening analysis.

During the period of the agreement, the price of screening for viral hepatitis B and C was 2,000 f cfa for these three markers (AgHBS, total Ac Anti HBc, and Ac anti HVC), and the number of samples analyzed was 14,371, representing revenue of 28,742,000 f cfa ($14,371 \times 2000$) for the IPCI, compared with 352,089,500 f cfa for the private sector.

After the agreement, the IPCI analyzed 8,661 samples for a revenue of 60,627,000 f cfa, compared with an estimated revenue of 212,194,500 f cfa for private-sector

laboratories, where the unit cost is 24,500 f cfa.

DISCUSSION

In this study, a total of 24,687 samples were included over a period of 11 years, and hepatitis C was thought to be underdiagnosed due to the cost of testing long before Roche's agreement with the state of Côte d'Ivoire. The finding is that although the cost of testing has been reduced with Roche's agreement with the state of Côte d'Ivoire, and the number of samples diagnosed has increased from 2015 onwards, the proportions of virus positivity have been virtually the same over the years. This leads us to say that the HCV is endemic in our country.

The proportion of HCV infection positivity obtained in the present study virtually mirrored the same result obtained in a study conducted among blood donors in Côte d'Ivoire between 1997 and 2012, which was 4.4% (Enel et al., 2015). This constancy in the positivity rate could be explained by the fact that the CNTS data just like the IPCI data reflect the general population of Côte d'Ivoire on one hand and the maintenance of the status quo despite the presence of a national viral hepatitis control program in Côte d'Ivoire.

According to the current study, the proportion of HCV positivity was not related to sex in the under-15s ($p > 5\%$), which could be explained by the fact that people in this age group are not sexually active. In our study, the male sex was more concerned by viral hepatitis C infection, with a proportion of 5.26%, in contrast to the study carried out in Ghana in 2019, where positivity rather concerned the female sex, with a proportion of positivity

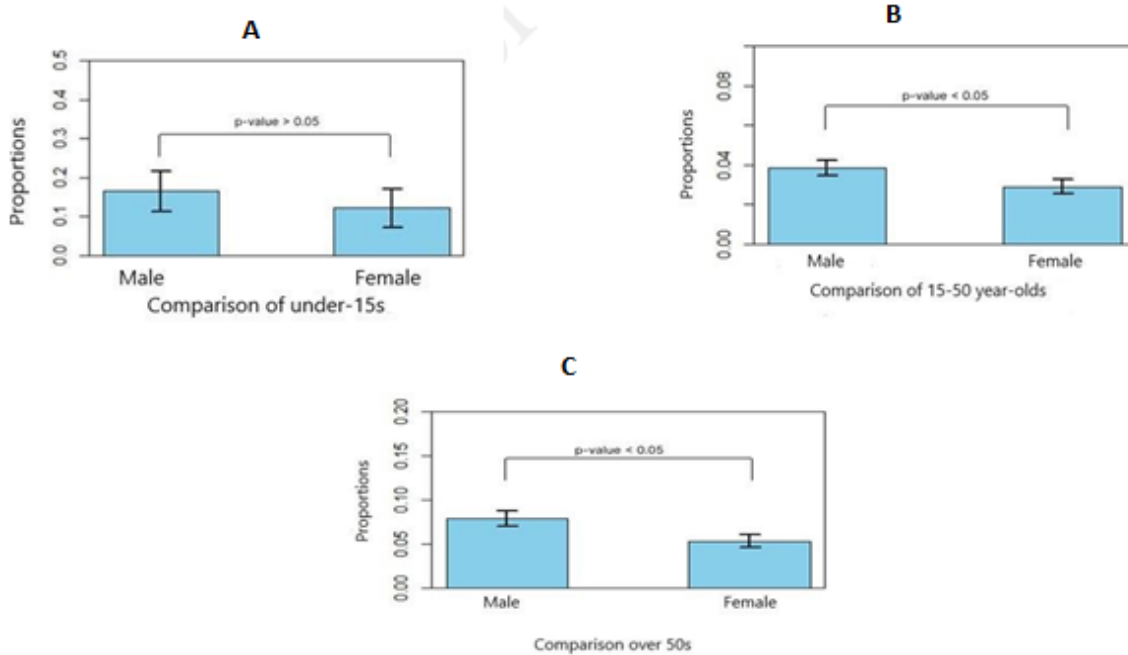


Figure 3. A, B, C: Comparison of the proportion of positivity by age.

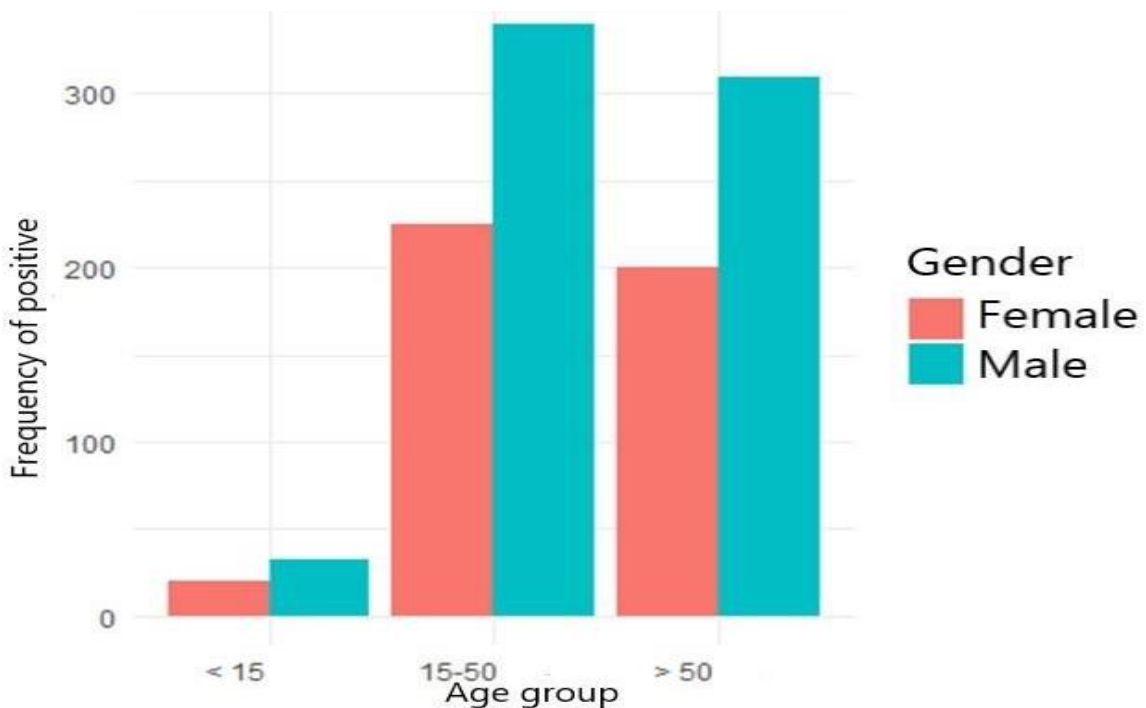


Figure 4. Proportions by gender and age group.

of up to 60% female in the study population (Masood and Mahbobeh, 2020). This large difference can be explained by the different objectives of the two studies.

The Ghana study focused on at-risk subjects, while the present study did not. The age range in our study [1-87 years] was practically the same as in the study by

Kpoussou et al. (2021) in Benin, with an age range of 0 to 86 years. This could be explained by certain age-related characteristics specific to West African countries. Our study showed that the proportion of HCV positivity was linked to gender in subjects aged over 15, as in the study conducted in Rwanda (Umutesi et al., 2017).

Conclusion

This study has enabled us to evaluate HCV screening at the Institut Pasteur de Côte d'Ivoire attended by the entire Ivorian population from 2012 to 2022. It also shows us the endemic nature of the HCV in Côte d'Ivoire. In our study, the male sex was more affected by viral hepatitis C infection, with a proportion of positivity of 5.26% versus 3.81% for the female sex. Despite financial support to facilitate screening, the seroconversion rate of the population did not show an increase in the number of subjects having contracted the HCV. This virus circulates in Côte d'Ivoire, but seems to cause less viral hepatitis than the hepatitis B virus. Systematic screening for this virus should nevertheless be pursued.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests

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