

Seroprevalence of hepatitis C virus in the urban commune of Kindia-Republic of Guinea

Abstract

Introduction: Hepatitis C is an inflammation of the liver caused by the hepatitis C virus; its spread in humans has been boosted by the emergence of parenteral use for medical purposes or drug injections, as well as its asymptomatic nature in the acute phase.

The global prevalence of hepatitis C is estimated at 1%, with a variable distribution in different regions of the world, sometimes even within the same country.

General objective: To help improve the biological diagnosis and prevention of HCV infections in the urban commune of Kindia.

Methodology: The urban commune of Kindia was used as the study area. This prospective and descriptive study was carried out at the Institut de Recherche en Biologie Appliquée de Guinée (IRBAG) from June to December 2022. The biomaterial consists of 3,000 blood samples taken from patients attending consultations at health facilities. The Immuno-Enzymatic technique (ELISA) was used to test for anti-HCV antibodies.

Results: In the course of our work, out of 3,000 samples taken from patients admitted to health facilities, 78 cases tested positive for the anti-HCV antibody, representing a carriage rate of 2.6%. Females were the most affected, with 50 positive cases (1.67%). The 31-40 age group had the highest anti-HCV antibody carriage rate, at 0.70%.

Conclusion: All socio-professional groups are affected by this infection, but to varying degrees. Despite our efforts, hepatitis C virus infection remains a major concern, as there is currently no vaccine and existing treatments are expensive and inaccessible to middle-income countries.

Key words : Virus, Hepatitis C, anti-HCV Ab, ELISA, Kindia.

Introduction

Hepatitis C is an inflammation of the liver caused by the hepatitis C virus (HCV) [WHO, 2023 ; Irshad et al. 2012].

The hepatitis C virus, considered before its discovery in 1989 as non-A, non-B hepatitis, is responsible for liver lesions of varying severity from one individual to another, and can progress slowly to cirrhosis and then adenocarcinoma of the liver. The question of the source of HCV infection in humans and the origin of the divergence between genotypes remains highly debated. The latest scientific developments concerning these Hepaciviruses support the hypothesis of a zoonotic origin, most likely from rodents or bats, which diversified in humans [Lunel F. al. 1991; Scheel TKH et al. 2015].

Hepatitis C virus (HCV) infection is the cause of a major burden on populations in many countries. In the 20th century, its spread in humans was potentiated by the emergence of parenteral use for medical purposes or drug injections as well as its asymptomatic nature in the acute phase [Scheel TKH et al. 2015].

For the same reasons, the epidemiology of the infection remains relatively poorly understood today. Data on the prevalence and, even more so, the incidence of HCV infection are lacking in many countries, particularly middle- and low-income countries on the African continent. Despite these shortcomings, global HCV seroprevalence has been estimated at 170 million chronic carriers, or around 3% of the world's population. Africa as a whole could.

The global prevalence of hepatitis C is estimated at 1%, with a variable distribution in different regions of the world, sometimes even within the same country [WHO, 2017].

Prevalence is high in sub-Saharan Africa; the only review focusing on sub-Saharan Africa was carried out in 2002 by Madhava et al, with an estimated 18 million individuals carrying anti-HCV antibodies [Madhava V. et al. 2002]. In Guinea, according to studies carried out by Diakité F. et al. in 2019 in the Nephrology Department of the Donka National Hospital among patients with chronic renal failure, the seroprevalence of the hepatitis C virus was 4.61% [Diakité F. et al. 2019].

In 2021, a study of the impact of biological diagnosis of parenteral viral hepatitis by S. Boumbaly et al. in the Republic of Guinea showed an HCV antibody carriage rate of 18% [S. Boumbaly et al. 2021].

According to the Medical Department of Livi France, 2023, the risk factors for hepatitis C include:

- intravenous or intranasal drug users;
- having received a blood transfusion or organ, tissue or cell transplant before 1992;
- being a homosexual man
- have haemodialysis
- be an HIV carrier.

Initially reserved for populations at risk of infection, since 2017 systematic screening for hepatitis C has been recommended for all adults who have never been screened. This decision was taken after it was found that 30% of patients diagnosed with hepatitis C had no risk factor.

Methods of preventing the virus

Prevention is based on limiting transmission by :

Using condoms during sexual intercourse.

Using single-use injection equipment for intravenous drug users.

Using single-use or sterile equipment for tattoos and piercings.

Not sharing toiletries that may come into contact with blood: razors, nail scissors, nail clippers, toothbrushes.

Screening blood donations [Livi France Medical Department, 2023].

Methodology

The urban commune of Kindia was used as the study area. This prospective and descriptive study was conducted at the Institut de Recherche en Biologie Appliquée de Guinée (IRBAG) from June to December 2022. The biomaterial consists of 3,000 blood samples taken from patients attending consultations at health facilities. The Immuno-Enzymatic technique (ELISA) was used to test for anti-HCV antibodies.

Results

Table 1: Distribution of HCV seroprevalence in the urban commune of Kindia.

Results	Staff	Percentage
Positives	78	2.60
Negatives	2922	97.40
Total	3000	100

Out of a sample of 3000 samples, 78 were positive with a carrying rate of 2.60% against 2922 negative samples or 97.40%.

Table 2: Distribution of positive cases by sex.

Sexes	Effectifs	Positive cases	Percentage
Male	1160	28	0.93
Feminine	1840	50	1.67
Total	3000	78	2.60

From this table, we see that the female sex is the most affected with 50 cases or 1.67%. On the other hand, the male sex, being the least infected, totals 28 cases for a percentage of 0.93. This discrepancy could be explained by the fact that there is more sampling among women.

Table 3: Distribution of the population by age group.

Age Groups	Staff	Positive cases	Percentage	IC _{95%}
1 à 10	1448	7	0.23	[0.20-0.26]
11 à 20	240	5	0.17	[0.11-0.23]
21 à 30	360	14	0.47	[0.42-0.52]
31 à 40	486	21	0.70	[0.65-0.75]
41 à 50	224	13	0.43	[0.36-0.50]
51 à 60	153	10	0.33	[0.25-0.41]
Age > 60	89	8	0.26	[0.15-0.37]
Total	3000	78	2.60	[2.58-2.62]

This table shows that people aged 31 to 40 have the highest rate of HCV antibody carriage at 0.7%, followed by those aged 41 to 50, 21 to 30 and 51 to 60 with 0.47, 0.43 and 0.33 respectively

Table 4: Distribution of positive cases by socio-professional category:

Professions	Staff	Positive cases	%	IC _{95%}
Students	923	5	0.16	[0.05-0.27]
Officials	201	13	0.43	[0.36-0.50]
Health Workers	72	4	0.13	[0.01-0.25]
Traders	307	16	0.53	[0.47-0.59]
Military	25	5	0.16	[0.04-0.36]
Farmers	180	8	0.26	[0.19-0.33]
Without professions	1292	27	0.90	[0.87-0.93]

Total	3000	78	2.60	[2.58-2.62]
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From this table, we note that non-occupational patients occupy the first place in the rate of antibody carriage against Viral Hepatitis C (0.90%), followed by those who practice commerce and civil servants with 0.53 and 0.43% respectively.

Table 5: Distribution of positive cases by health facility

Health facilities	Staff	Positive cases	Parentage
Kindia Regional Hospital	1300	29	0.97
Manquepas Health Center	432	11	0.37
Cacia Health Center	340	09	0.30
Bibane Health Center	277	10	0.33
Wondy Health Center	353	14	0.47
Kénendé Health Center	298	05	0.17
Total	3000	78	2.60

It was found that patients seen at the Regional Hospital were more affected by this viral disease because of the greater number of patients and the existence of a viral infection screening centre than health facilities, with 0.97%, and the lowest infection rate was recorded at the Kénendé health centre (0.17%).

Discussion

In this work, after analysis by the ELISA method, 78 out of 3000 patients sampled tested positive, i.e. a carriage rate of anti-HCV antibodies of 2.6%.

This result is higher than those found in 2021 by TAL BALDE *et al.* in Guinea who reported that HCV antibodies were detected in only one case, 0.32%.

It is also higher than those found in 2014 by Gower *et al.* in Libya (1.2%), South Africa (1.7%), Madagascar (1.2%), Algeria (1.4%), and Ethiopia (1.3%).

The same trend was observed in 2015 by Julien Riou *et al.* (1.5%), Mali (1.9%) and Senegal (1%).

On the other hand, our result is lower than those found in 2004 by Tangara Omar and Hamid Traoré in Mali with 4.9% and 4.8% respectively. Similarly, it is lower than those found by Gower *et al.* in 2014 in Egypt 14.7%, Cameroon 11.6% and Nigeria 8.4%.

However, our result is comparable to that obtained in 2015 by Julien Riou *et al.* in Côte d'Ivoire 2.2%.

In the course of our work, it appears that the carrying rate for women is higher than for men, i.e. 1.67% compared to 0.93%. These results are contrary to those found by Diakité F. *et al.* in 2019 with a carrying rate of 3.07% in men compared to 1.54% in women.

The same trend was found by S. Boumbaly *et al.* in 2021 with 19.06% in males versus 15.75% in females.

According to age groups, our results show that seroprevalence is predominant among adults (0.70%) for the 31 to 40 age group followed by the 21 to 30 age group (0.47%). Our results are significantly lower than those found by Kalla N. *et al.* in 2020 who indicated that the 60-69 age group is the most affected with 40.70%, the seroprevalence in this age group is 12.79% [Kalla N. *et al.* in 2020].

Conclusion

In the course of our work, 3000 patients received for consultation in health facilities in the urban municipality of Kindia were sampled. After diagnosis by ELISA, 78 cases were positive, i.e. an anti-HCV antibody carriage rate of 2.6%. The predominance of viral hepatitis C seroprevalence is female in the urban commune of Kindia with 1.67%.

Patients between 31 and 40 years of age have the highest rate of HCV antibody carriage at 0.70%.

It appears that all socio-professional strata are affected by this infection, but to different degrees; The most affected among them are patients who do not have a defined professional situation, followed by those who work in commerce with 0.90% and 0.53% respectively.

Despite efforts, hepatitis C virus infection remains a major concern as no vaccine exists to date and existing treatments are expensive and very inaccessible for middle-income countries.

References

Daw MA, El-Bouzedi A, In association with Libyan Study Group of Hepatitis & HIV. Prevalence of hepatitis B and hepatitis C infection in Libya: results from a national population based survey. *BMC Infect Dis.* 2014;14: 17. doi:10.1186/1471-2334-14-17

Diakité F, Baldé MS, Bah A B, Traore M, Cherif I, Barry A Y, Bah A O, Kaba M L, Seroprevalence of viral hepatitis B and C and human immunodeficiency virus in chronic renal failure patients in the nephrology department of Donka National Hospital. Page 28 à 33 (2019).

Gower E, Estes C, Blach S, Razavi-Shearer K, Razavi H. Global epidemiology and genotype distribution of the hepatitis C virus infection. *J Hepatol.* 2014; 61: S45–S57. doi: 10.1016/j.jhep.2014.07.027

Kalla, N., Aouidane, S., Megaache, F., & Tebbal, S. 2020. Prevalence of hepatitis C virus infection in the general population of Barika city [Batna J Med Sci 2020;7:27-30]
Lavanchy D. Evolving epidemiology of hepatitis C virus. *Clin Microbiol Infect.* 2011; 17: 107–115. doi:10.1111/j.1469-0691.2010.03432.x

Lunel F, Cadranet JF, Perrin M, Gripon P, Desruenne M, et al. AntiHepatitis C virus antibodies in heart transplant recipients with post transplantation chronic viral B and non A non B hepatitis. *Dig Dis Sci* 1991; 36:124-5.








Madhava V, Burgess C, Drucker E. Epidemiology of chronic hepatitis C virus infection in sub-Saharan Africa. *Lancet Infect Dis*. 2002;2: 293–302.

Nerrienet E, Pouillot R, Lachenal G, Njouom R, Mfoupouendoun J, Bilong C, et al. Hepatitis C virus infection in cameroon: A cohort-effect. *J Med Virol*. 2005 ;76 : 208–214. doi:10.1002/jmv.20343.

Oumar TANGARA : Hepatitis B hepatitis C co-infection in blood donors at the CNTS in Bamako ; Thèse pharm : 2004 ; 57 P ; 61.

S. Boumbaly, E.N Serikova, A.V Semenov, Y.U.V Ostankova, D.E Valutite, A.N Schemelev, E.B Zueva, T.A.L Baldé, R.R Baimova, A.A Totoliav, Importance of Biological Diagnosis of Parenteral Viral Hepatitis in the Republic of Guinea. *Journal of Microbiology, Epidemiology and Immunology*. Page 440 à 449 (2021).

Scheel TKH, Simmonds P, Kappoor A. surveying the global virome identification and characterisation of HCV related animal hepacivirus antiviral.2015. 115.83-93.

T.A.L. Balde,  S. Boumbaly,  E. N. Serikova,  D. E. Valutite,  A. N. Shchemelev,  Yu. V. Ostankova,  E. B. Zueva,  A. V. Semenov, 2021.

Comparative Analysis of the Vertical Risk of Transmission of Some Blood-Borne Infections in the Republic of Guinea <https://doi.org/10.21055/0370-1069-2021-1-87-94>

World Health Organization. Geneva: WHO; 2017. World hepatitis report 2017; p. 83. Google Scholar.

World Health Organization WHO; Hepatitis C, 2023.

Medical Director of Livi France, 2023

Irshad M, Raza MN, Anwar Z, Ikram N, Afroz A, Iqbal HM. Prevalence of viral HBV and HCV among different group patients in Gujrat Pakistan. *Advances in Bioscience and Biotechnology*. 2012 Aug 24;3(04):423-36.