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Prevalence rate of Hepatitis B and Hepatitis C on the 271 patients tested positive with Hepatocellular Carcinoma among 396 patients living with Decompensated Cirrhosis recorded at the Bertoua Regional Hospital in Est Region Cameroon

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ABSTRACT

Introduction: Hepatocellular Carcinoma (HCC) factors are dominated by chronic liver inflammation, with 80 – 90% of cases arising from cirrhosis. The primary drivers are chronic infections (Hepatitis B/C), alcohol abuse and metabolic dysfunction – associated steatosis liver disease (MASLD formerly NAFLD). Other key factors include smoking, obesity, type 2 diabetes and exposure to aflatoxins.

Methods: It is descriptive cross – sectional study done on 271 patients (187 men and 84 women) tested positive with HCC among 396 patients living with decompensated cirrhosis recorded at the Intensive Care Unit of Bertoua Regional Hospital from June to October 2025 after receiving ethical clearance and Research Authorization from Est Public Health Delegation – Cameroon. Convenience sampling was done. The analysis included major risk factors of HCC such HBV, HCV, Alcohol Toxic, Traditional Drugs Toxic, Aflatoxins and NAFLD.

Results: Out to 396 Cirrhosis patients, the prevalence rate of HCC was 68,43% and among 271 HCC patients, the prevalence rate of HBV for men is estimated at 41,69% and for women was 37,63%, followed by HCV (23,24% for men and 31,99% for women).

Conclusions: This study showed that the prevalence of Hepatitis B and C among patients living with hepatocellular carcinoma was high when compared to similar studies conducted in similar settings.

Keywords: *Hepatocellular Carcinoma,Liver Cirrhosis ,Hepatitis B,Hepatitis C*

1. INTRODUCTION

Global Distribution and Trends indicated in 2021 the high – risk regions like East Asia and Sub – Saharan African (SSA), often linked to endemic Hepatitis B (HBV), intermediate Regions as Southern Europe (eg: Italy, Spain.etc), and low – risks regions like North/South America, Northerm Europe, Oceania, though incidence is rising in the US, Madihi S et al (2020). In Sub-Saharan Africa (SSA), HCC is the second leading cause of cancer-related deaths for men and the fourth for women in 2020, with average age-standardized mortality rates of 8.2 and 4.2 per 100,000 persons/year, respectively, Daniel Mak and Anna Kramvis (2021).

In 2020, almost 906000 people were diagnosed with liver cancer globally, the most common form of which was Hepatocellular carcinoma. Hepatocellular Carcinoma is the third leading cause of cancer deaths worldwide, with a relative 5-year survival rate of approximately 18%, Sung H, Ferlay J and Siegel RL (2021). The similarity between incidence and mortality (830000 deaths per year) underlines the dismal prognosis associated with this disease. The diagnosis of hepatocellular carcinoma peaks in people aged between 60 and 70 years, and predominantly affects men, Siegel RL, Miller KD, Fuchs HE and Jemel A (2022). The incidence of hepatocellular carcinoma varies by geographical region and ethnicity, which is largely attributed to the prevalence of (and the age of exposure to) major risk factors, Jama Netw Open (2021).

[See Annex — Figure 1. Hepatocellular Carcinoma Global Distribution and Trends in the world]

2. RELATED WORKS

According to the Authors, Mohamed EI – Kassas and Mohamed El Badry (2022), the African population accounts for 12% of the Global population, most of them live in the Sub-Saharan Africa (SSA), where most inhabitants are blacks. On the other hand, North Africa’s Inhabitants are Mediterranean rather than African in terms of the race, customs and cultural background, that is why many of the distinctive features of cancers in Africa belong to SSA, Kew MC (2013).

Global Cancer Statistics estimated in 2020, the incidence and mortality of liver cancer cases in Africa represented 7,8% and 8,1% of the Global Cases, respectively. The liver cancer incidence and mortality statistics in different African areas for males and females were picked up. African areas were arranged descendingly according to the number of affected cases. In 2020, SSA had the fourth – highest number of diagnosed primary liver cancer (PLC) cases worldwide after South – Eastern Asia, South Central Asia and North America, with more than 38 000 new cases of PLC, 77% of them are HCCs, Mak D and Kramvis A (2021). Hepatocellular Carcinoma (HCC) is considered as a significant Health Burden in Africa, with high incidence rates, especially in West Africa (eg: Gambia, Guinea.), and major hotspots in Countries like Mozambique, Egypt and parts of Central Africa, driven by High Hepatitis B (HBV) and Hepatitis C (HBV prevalence, aflatoxin exposure, and lifestyle factors), Llovet JM et al (2021).

Africa accounts for nearly 8% of Global Liver Cancer cases, with rates varying significantly showing sub – Saharan Africa (SSA) having higher overall burdens particularly in males, compared to North Africa, though North Africa faces major HCV challenging (Egypt), London WT et al (2018). More than 80% of Global Hepatocellular Carcinoma (HCC) patients are estimated to occur in Sub-Saharan Africa and Eastern Asia. The most risk factor of HCC in SAA

is chronic hepatitis B virus (HBV) infection, with the incidence highest in West Africa. HBV is highly endemic ins SSA and is perpetuated by incomplete adherence to birth dose immunization, lack of longitudinal follow – up care, and impaired access to antiviral therapy, Siegel RL et al (2022).

HBV may directly cause HCC through somatic genetic alterations or indirectly through altered liver function and liver cirrhosis. Most patients with hepatocellular carcinoma have a background of chronic liver disease as a consequence of chronic infections with the hepatitis B virus (HBV) or hepatitis C virus (HCV), alcohol abuse or alcoholic steatohepatitis (ASH), and non-alcoholic fatty liver disease (NAFLD) or non-alcoholic steatohepatitis (NASH) Obesity, diabetes, and nicotine use are also associated with increased incidence of hepatocellular carcinoma, as are rare conditions such as haemochromatosis or hereditary tyrosinaemia type 1, The interventional liver cancer association (2022). Additionally, rates of hepatocellular carcinoma in patients with HIV have increased, specifically in those who are co-infected with HBV or HCV. Exposure to aflatoxin B1 is especially relevant in Asia, where it overlaps with HBV infection, Johnson PJ, Ahamaraj S, Berhane S, Bonnett L and Ma YT (2021).

The prevalence of risk factors for hepatocellular carcinoma varies globally, with a predominance of HBV in Asia, HCV in Japan, and NAFLD and NASH and alcohol in Europe and North America, Kim HS, Yu X, Kramer J et al (2022). In many cases, the risks of developing hepatocellular carcinoma are multifactorial and include demographic factors (age, sex, and ethnicity), severity and activity of underlying disease (fibrosis stage, inflammatory activity, and treatment), metabolic factors (diabetes and obesity), and lifestyle factors (alcohol intake and smoking), Azoulay D, Ramos E, Casellas – Robert M et al (2020). The collection and analysis of epidemiology HCC data will play a critical role in guiding future disease prevention strategies and optimizing patient management, Alan P et al (2010). Previous epidemiology studies have highlighted striking global variations in the incidence of HCC, which is particularly high in much of East Asia and Sub-Saharan Africa, and lower, nut on the increase, in North America and most of Europe.

[See Annex — Figure 2: Global Variation in HCC incidence rates. From Parkin DM, Bray F, Ferlay J et al (2002)]

3. MATERIALS & METHODS

It was a descriptive cross – sectional conducted among 271 patients living with Hepatocellular Carcinoma recorded at the Intensive Care Unit of Bertoua Regional Hospital in the East Region of Cameroon from june to October 2025 after receiving ethical clearance and authorization research letter for Est Region Public Health Delegation - Cameroon which occupies the Southeastern portion of the Republic of Cameroon. It's bordered to the East by the Central African Republic, to the South by Congo, to the North by the Adamawa Region and the West by the Centre and South Regions. The East Region has a type A wet equatorial climate, its capital is Bertoua which is located the Bertoua Regional Hospital, it has a population estimated at more than 3 millions of inhabitants. The Bertoua Regional Hospital has been selected as the reference hospital for the management of chronic liver disease by the Cameroon Public Health Ministry.

Convenience sampling was done, all the cases of elective HCC admitted during the study period

were included. Age > 20, men and women, Cameroonians or not but residents in Cameroon. The simple size was 271 patients calculated was calculated using the formula n = (Z2 x p x q) / e2 where n = minimum sample size, z= confidence interval, p= prevalence of decompensated cirrhosis, q= 1 – p and e= margin of error, 3%.

The data for this study were collected using structured questionnaires, entered and analysed in Microsoft Excel 2016, confidence interval was calculated along with frequency and percentages for binary data

To assess the prevalence rates of risk factors of HCC, we collected data on the results of various tests performed by the Hospital on the 271 patients who tested positive for HCC including Hepatitis B Elisa used to diagnose HBV, Hepatitis C Elisa for HCV, Fibrotest – Actitest for NAFLD or Fatty Liver, Fibroscan and Liver Biospy to diagnose the level of Liver Toxins.

4. RESULTS & DISCUSSION

The study included the analysis of major HCC risk factors such as Chronic Hepatitis B, Chronic Hepatitis C, Alcohol Toxic, Traditional Drugs Toxic, Aflatoxins and NAFLD among 271 patients tested positive with HCC and during our period of research (from June to October 2025), (187 males and 84 females). The prevalence of Patient characteristics tested positive with HCC by nationalities are summarized in table 1.

[See Annex — Table 1: Prevalence Rate of HCC Patient Characteristics]

per Nationalities at Bertoua Regional Hospital tested positive with Hepatocellular Carcinoma

Prevalence Rate of HCC Patient Characteristics

[See Annex — Table 2 : Tests Performed on 271 HCC patients to evaluate the prevalence rate]

of risk factors at the Bertoua Regional Hospital

Diagnostic of HCC Risk Factors

[See Annex — Table 3: Results on HCC Major Risk Factors at Bertoua Regional Hospital]

We have identified the following major risk factors to determine the HCC prevalence during our studies. After collecting and analyze data, it was found that among these 271 patients tested positive with HCC, Hepatitis B is the major risk factor, followed by Hepatitis C, Traditional Drugs Toxic, Alcohol Toxic and others. Hepatitis B represented 41,69% for the male against 37,63% for the female. Hepatitis C, 23,24% for the male and 31,99% for the female, Traditional Drugs Toxic, 21.03% for the male and 18,81% for the female. Results confirmed by the study done and published by Junaid Mahmond Alam et al,..(2023) “Prevalence of Hepatitis Infections in HCC Patients” including Patients both male and females, admitted in wards or visiting various clinics viz gastroenterology, oncology and -hepatology for diagnosis, treatment or recovery regiments were selected through their cas ehistory and lab-diagnosis results of hepatitis profile, AFP and histology. patients were grouped in the age range of>20 yr and <70yr; patients falling out side this sge range were excluded from the study. A breif history of Patients, with confirmed existence of HCC, was taken with clinical sympyoms and signs and initial diagnosis. Exclusively patients with CLD s, HCV and HBV or suspected of hepatitis infections with co-existence of HCC or vice versa, were selected and classified according to gender.

Another retrospective cross-sectional study was conducted at Hayatabad Medical Complex, Peshawar, Pakistan, using medical records of HBV-HCV co-infected patients from January 2023 to December 2024 on 348 HCC patients aged ≥18 years confirmed that the high prevalence rate of HBV and HCV as most risk factors of HCC.

5. CONCLUSION

According to our studies, the Cameroonian population was the most affected (61.99%), followed by Nigeriens (11.80%) and Central Africans (9.59%). Viral hepatitis B and C were the main causes of chronic hepatitis C (CHC) in these patients: 41.69% of men had HBV, compared to 37.63% of women, as confirmed by HBV ELISA tests. For HCV, we found 23.24% of men and 31.99% of women, confirmed by HCV ELISA tests. FibroScan was performed on only 1.84% of men and 5.16% of women, as the hospital lacked the technical facilities to perform FibroTest and Actitest tests, as well as liver biopsies. We recommended that the hospital establish partnerships with foreign medical analysis laboratories for toxicological examinations (aflatoxins, alcohol, chemical agents) in the liver, which are often the cause of liver cancer.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest in relation to this work.

HOW TO CITE

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ANNEXES

Annex I — Table 1: Prevalence Rate of HCC Patient Characteristics

Prevalence Rate of HCC Patient Characteristics	Cameroonians		Chadians		Nigerians		Centrafric Republic		Others Nationalities	
	n	%	n	%	n	%	n	%	n	%
HCC Patients Tested Positive per Nationalities	168	61,99	22	8,11	32	11,80	26	9,59	23	8,48
Gender										
Male	115	61,49	15	8,02	23	9,62	18	9,62	16	8,55
Female	53	63,09	7	8,33	9	8,52	8	8,52	7	8,33
Age (Years Old)										
20 – 35	98	58,33	7	31,81	15	46,87	9	34,61	12	52,17
35 - 55	56	33,33	11	50	13	40,62	12	46,15	6	26,08
55 – Over	14	8,33	4	18,18	4	12,5	5	19,23	5	21,73
Marital Status										
Single	78	46,42	6	27,27	14	43,75	11	42,30	16	69,56
Married	27	16,07	9	40,90	9	28,12	6	23,07	3	13,04
Divorced	63	37,5	7	31,81	9	28,12	9	34,61	4	17,39
Education Levels										
Primary	69	41,07	13	59,09	15	46,87	9	34,61	7	30,43
College	48	28,57	6	27,27	9	28,12	12	46,15	12	52,17
University	51	30,35	3	13,63	8	25	5	19,23	4	17,39
Employment										
Unemployed	72	42,85	6	27,27	8	25	10	38,46	7	30,43

Student	15	8,92	5	22,72	7	21,87	6	23,07	5	21,73
Employed	13	7,73	2	9,09	4	12,5	5	19,23	3	13,04
Self – Employed	47	27,97	3	13,63	3	9,37	3	11,53	7	30,43
Retired	21	12,5	4	18,18	10	31,25	2	7,69	1	4,34

Annex II — Table 2 : Tests Performed on 271 HCC patients to evaluate the prevalence rate

Diagnostic of HCC Risk Factors	Elisa Hepatitis B Test		Elisa Hepatitis C Test		Fibrotest – Actitest Score		Fibroscan		Liver Biopsy	
	n	%	n	%	n	%	n	%	n	%
Gender										
Male	113	41,69	63	23,24	0	0	5	1,84	0	0
Female	102	37,63	84	31,99	0	0	14	5,16	0	0

Annex III — Table 3: Results on HCC Major Risk Factors at Bertoua Regional Hospital

Prevalence Rate of HCC Major Risk Factors at BRH	Hepatitis B		Hepatitis C		Alcohol Toxic		Traditional Drugs Toxic		Aflatoxins		NAFLD	
	n	%	n	%	n	%	n	%	n	%	n	%
Gender												
Men	113	41,69	63	23,24	0	0	0	0	0	0	5	1,84
Women	102	37,63	84	31,99	0	0	0	0	0	0	14	5,16

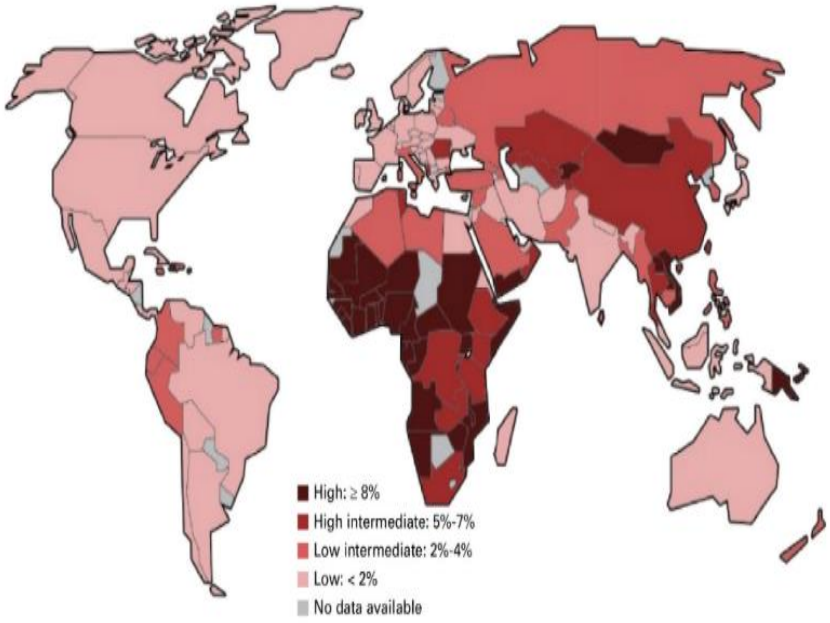

Figure 1. *Hepatocellular Carcinoma Global Distribution and Trends in the world*

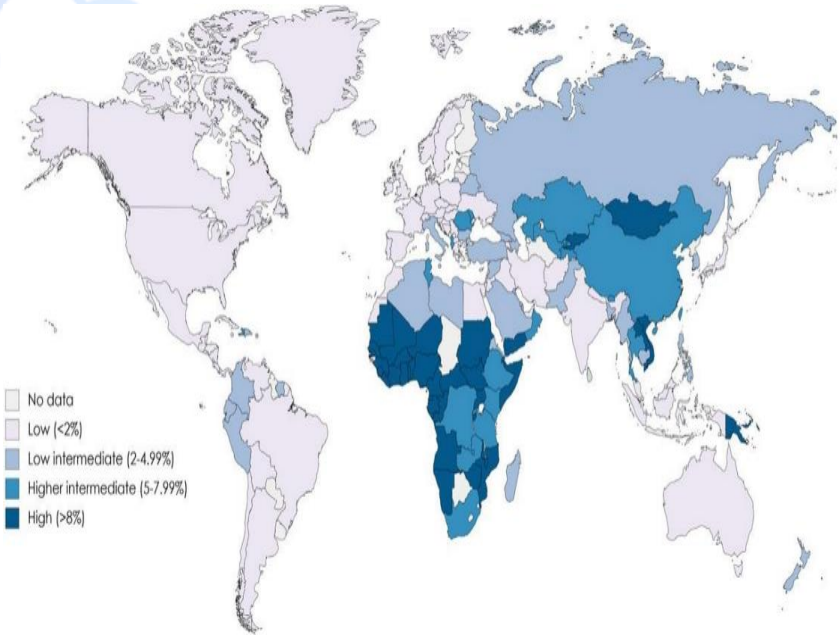

Figure 2. *Global Variation in HCC incidence rates. From Parkin DM, Bray F, Ferlay J et al (2002)]*