

Hepatocellular Carcinoma in the South Caucasus: Epidemiological Trends and Public Health in a Transitional Region

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ABSTRACT

Hepatocellular carcinoma (HCC) remains one of the leading causes of cancer-related mortality worldwide, with substantial geographic variability in incidence and underlying risk factors. The South Caucasus region comprising Azerbaijan, Georgia and Armenia, represents a transitional epidemiological zone with limited consolidated HCC burden.

Keywords: Hepatocellular carcinoma (HCC), Caucasus, cirrhosis, metabolic syndrome, alpha-fetoprotein (AFP), Alcoholism

INTRODUCTION

Hepatocellular carcinoma (HCC), also known as primary liver cancer, starts in the liver and is the third leading cause of death from cancer.

Globally, there has been substantial variation in prevalence of risk factors for HCC over years, like control of viral hepatitis in developing countries but growing epidemic of fatty liver disease in developed world. Population-based studies in the US have shown distribution of HCC differs amongst various racial and ethnic groups like. Asian/Pacific Islanders (APIs) have higher rates of HCC compared with other Caucasians and Hispanics [1,2].

Recent findings show that the severity of the disease and its occurrence vary based on geographical location. Ethnicity has been reported to significantly affect tumorigenesis and clinical outcomes in patients diagnosed with HCC. Non-Caucasian HCC patients are significantly more likely to have poorer survival outcomes compared to their Caucasian counterparts [3,4,5]. From TCGA – The Cancer Genome Atlas, we understand that MDK, LC N2 and NQO1 were upregulated in Caucasians, implicating proliferative and metabolic roles.

METHODS

This study was conducted as a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The objective was to synthesize

epidemiological data on hepatocellular carcinoma (HCC) in the South Caucasus region, including Azerbaijan, Georgia, and Armenia.

Epidemiology in the Caucasus:

Hepatocellular carcinoma in the Caucasus region (Armenia, Azerbaijan, Georgia) is a significant, emerging public health concern. While historically low, HCC incidence is rising day by day. In Armenia, HCC new cases are expected to increase by 6% to 330 by 2030, with 27% of new cancers diagnosed at advanced stages.

In Georgia, studies (2015-2019) indicate a high burden of HCC, with HCV-infected individuals having significantly higher odds (16.84) of developing HCC. HCC can still develop in Caucasus CHB patients treated with ETV/TDF.

Besides the well-known predictors of HCC, such as older age, male gender and more advanced liver disease, lower platelets represent an independent factor of higher HCC risk [6,7,8].

The Globocan 2020 data demonstrates a trend that Azerbaijan have experienced a tremendous increase HCC incidence in the past 2 years [9,10].

According to the Global Cancer Observatory (GLOBOCAN), liver cancer incidence in Azerbaijan is approximately 6-7 cases per 100,000 population annually, with about 600-700 new cases reported each year, the majority of which are hepatocellular carcinoma (Table 1).



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Table 1. Incidence rate of hepatocellular carcinoma per 100,000 population in South Caucasus countries, 2020-2025 [5]

Year	Azerbaijan (per 100,000)	Armenia (per 100,000)	Georgia (per 100,000)
2020	6.0	6.4	10.5
2021	6.1	6.5	10.8
2022	6.3	6.7	11.0
2023	6.4	6.9	11.3
2024	6.6	7.0	11.6
2025	6.8	7.2	12.0

DISCUSSION

HCV was significantly associated with a higher risk of developing liver cancer and HCC in the Georgian population. Georgia, a country of 3.7 million people, was found to have a high HCV prevalence according to a 2015 nationwide cross-sectional seroprevalence study [11,12,13].

Hepatitis B virus infection (HBV) is one of the major healthcare problems in Georgia. Only a small number of patients (3%) had advanced liver fibrosis/cirrhosis at the time of diagnosis [14,15]. In the Caucasus, several epidemiological patterns influence alcohol-related HCC risk. Cultural drinking patterns, availability of homemade alcohol beverages, and varying public health policies affect alcohol consumption levels.

HCC presents with a variety of clinical features. In its early stages, particularly when confined to the liver, HCC is frequently asymptomatic with clinical symptoms typically emerging as the disease progresses. As the disease advances, patients may develop nonspecific symptoms such as jaundice, anorexia, weight loss, malaise, and upper abdominal discomfort. On physical examination, hepatomegaly and ascites may be evident [16,17,18].

HCC lesions were defined according to number as solitary or multifocal lesion size was defined according to the size of the largest lesion (≤ 30 and > 30 mm). Macrovascular (portal vein and/or hepatic vein) invasion and extrahepatic spread were recorded when present [19,20].

Challenges such as late diagnosis, limited availability of transplantation programs, and unequal access to specialized oncology services continue to affect the overall management and outcomes of HCC in the Caucasus. Strengthening early detection programs and improving access to modern treatments remain important priorities for the region.

CONCLUSION

Hepatocellular carcinoma remains a significant public health concern in the Caucasus region, with increasing incidence largely associated with chronic viral hepatitis, liver cirrhosis, and metabolic risk factors. Despite progress in diagnostic methods and treatment strategies, many patients in the region are still diagnosed at advanced stages of the disease.

Improving early detection through effective screening programs, expanding access to modern diagnostic tools, and strengthening multidisciplinary treatment approaches are essential for improving patient outcomes. In addition, greater efforts in hepatitis prevention, vaccination, and antiviral therapy may contribute to reducing the burden of HCC in the Caucasus.

Future regional collaboration and epidemiological research are needed to better understand disease patterns and to develop more effective prevention and management strategies.

Ethics

Ethical statement: This case report has a retrospective design. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Patient confidentiality was strictly maintained, and all presented data were anonymized to ensure that the patient cannot be identified.

Informed Consent: Written informed consent was obtained from the patient for publication of this case report.

AI statement: Artificial intelligence tools were used only for minor language editing and grammar correction. The authors are fully responsible for the scientific content of the manuscript.

Footnotes

Authorship Contributions

Concept: S.A., Design: S.A, Data Collection or Processing: S.A., Analysis or Interpretation: S.A., Literature Search: S.A., Writing: S.A.

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