



Entrepreneurial &
Skilled Education
for the Future



Volume 5, Issue 2 - MAY 2026

IQ RESEARCH

A Quaterly Journal

ISSN: 2790-4296 (Online)

ISBN: 978-9956-504-74-9 (Print)

Published by IQRJ publications
www.iqresearchjournal.com



EDITORIAL BOARD

Editor-in-Chief

- ◆ Atanga D. Funwie (Professor) — Kesmonds International University / Nile University of Science & Technology / Green Hope University Somalia

Deputy Editor-in-Chief

- ◆ Dr. Mvogo Eloundou Guy Dieudonné, PhD, Public Health, Tropical Medicine and Infectious Diseases / Kesmonds International University

Associate Editor-in-Chief

- ◆ Tchouaffe Tchiadje Norbert (Professor) — Kesmonds International University / Massachusetts Institute of Technology USA / Pan African University

Editorial Assistants

- ◆ Professor Tchakounte Franklin — Kesmonds International University / University of Ngaoundere
- ◆ Professor Akah Roland Tiagha — Kesmonds International University / Walter Sisulu University South Africa
- ◆ Professor Guiherme Schneider — Mexico
- ◆ Professor Charles Fokunang — Cameroon Ethics Society / University of Yaounde 1
- ◆ Professor Tassang Ndah Andrew — Kesmonds International University / University of Buea
- ◆ Professor Daniel Tata — Switzerland
- ◆ Professor Truly Bush — Germany
- ◆ Professor Abraham Pius — The Academy of Advance Science, United Kingdom
- ◆ Professor Celestina Neh Tassang — University of Buea
- ◆ Professor Letlole Gabriel Gonnafela — Gonnafela Institute South Africa / Kesmonds International University
- ◆ Professor Patricia Samkia Asongwe — Ministry of Higher Education Cameroon
- ◆ Professor Sama Dobit — University of Yaounde I
- ◆ Professor Tony Ogiemen — American Heritage University of Southern California, USA
- ◆ Professor Gabriel Lopes — Unilogos University, USA and Brazil
- ◆ Professor Nukenine Elias — University of Ngaoundere
- ◆ Professor Neossi Guena Mathurin — University of Ngaoundere / Ngaoundere Regional Hospital
- ◆ Professor Angwanade Wilson — University of Ngaoundere
- ◆ Professor Esther Ngah — University of Ngaoundere
- ◆ Professor Yongho Shiwoh Louis — Kesmonds International University
- ◆ Professor Asakizi Nji Augustine — Kesmonds International University / University of Bamenda Cameroon
- ◆ Professor Rudolph Q. Kwanue — Rudolph Kwanue University Liberia
- ◆ Professor Mustaf Abdulle — President Green Hope University Somalia
- ◆ Professor Mathan Muse — Green Hope University Somalia / Nile University of Science & Technology
- ◆ Professor Lawrence Mwelwa — Queens College Zambia
- ◆ Professor Ibrahim Abdi — Green Hope University Somalia / Nile University of Science & Technology
- ◆ Professor Hussein Tohow — VC Green Hope University Somalia
- ◆ Professor Henry N. Fonjock — Cameroon Cooperative Credit Union
- ◆ Professor Zahir Shah — Professional Development Research Institute Pakistan
- ◆ Professor Brian Siamani — Dean Faculty of Medicine, Gideon Roberts University Zambia
- ◆ Professor Ernest Mutale — Ministry of Health Zambia
- ◆ Professor Kouam Lawrence — Kesmonds International University / University of Ngaoundere
- ◆ Professor Pascal Scheneller — Germany
- ◆ Professor Francis Pol Lim — Philippine
- ◆ Professor Mvondo M. Manuella — Kesmonds International University / University of Ngaoundere
- ◆ Professor Tamo Simo Richard — Kesmonds International University / University of Ngaoundere
- ◆ Professor Fodouop Simeon Pierre Tchegaing — Kesmonds International University / University of Ngaoundere
- ◆ Professor Elie Baudelaire — EMIE Business School Paris France
- ◆ Professor Sundjo Fabien — Kesmonds International University / University of Bamenda
- ◆ Professor Gidoen Mwanza — Gidoen Robert University Zambia

- ◆ Dr. Christina Jean Rahm — Institute of Clinical Research USA
- ◆ Dr. Oscar Monono — Ballbridge University
- ◆ Dr. Feugueng Micheal — Kesmonds International University United Kingdom
- ◆ Dr. Penya Elvis Che — Kesmonds International University / St John Paull II University Cameroon
- ◆ Dr. Shei Claude Nfor — Shalom Institute Cameroon
- ◆ Dr. Kabonbe Achile — Kesmonds International University / University of Ngaoundere
- ◆ Dr. Doudou Raisa — Ministry of Scientific Research Cameroon
- ◆ Dr. Zilefac Ebenezer Nwetlagwung — Kesmonds International University / Southeast University China

Editorial Secretaries

- ◆ Gana Christophe — Kesmonds International University
- ◆ Kalwa Yvette — Kesmonds International University
- ◆ Eng. Benson Lugalia — Kesmonds Group Limited
- ◆ Eng. Pokam Tchinda Martial — Kesmonds International University / University of Ngaoundere
- ◆ Dr. Kelly Kesten Manyi Atanga — Kesmonds International University / Jining Medical University, China
- ◆ Dr. Pauline Wanjiru Gititha — Kesmonds International University
- ◆ Dr. Eng. Anyangwe C. Anyangom — Kesmonds Group Limited, Kesmonds Institute of Technology

Editorial Board Members

- ◆ Prof. Nicolas Guanzon Ong, Ph.D. — Department of Teaching Languages, University of Science and Technology of Southern Philippines
- ◆ Prof. Ibrahim Hussein — Kesmonds Research Institute Uganda
- ◆ Prof. Zapryan Assen — Higher School of Security and Economics, Plovdiv
- ◆ Prof. Surendra Kumar Gautam — Department of Chemistry, Tri-Chandra Campus, Tribhuvan University, Kathmandu, Nepal
- ◆ Prof. SENHADJI L. — Oran University Hospital, Department of Anesthesia-Intensive Care
- ◆ Prof. Sabyasachi Pramanik — Department of Computer Science and Engineering, Haldia Institute of Technology
- ◆ Prof. Meron Mersha — Quantum Optics and Information, Arba Minch University, Ethiopia
- ◆ Prof. Dr. Zahir Shah — Kesmonds Research Institute, Pakistan
- ◆ Prof. Dr. Bond Richard — California South University (CSU), Irvine, California, USA
- ◆ Prof. Dr. Abubakar Mohammad — University of Technology, Baghdad, Iraq
- ◆ Prof. Charlanne Miller — LIGS University Hawaii, Canada
- ◆ Prof. Ali Usman — (Ethiopia)
- ◆ Prof. Ali Abdul-Hussain Ghazzay — Department of Biology, University of AL-Qadisyah, Iraq
- ◆ Prof. Nana Anabel — (Ghana)
- ◆ Dr. Leonard Ake — Maitre-Assistant du CAMES, Enseignant-chercheur, Universite Boubacar Ba de Tillaberi
- ◆ Dr. Wilson Dabuo Wiredu — MOCS, VC Academics Affairs, DMTU, Ghana
- ◆ Dr. Wansso Blakwe Ahmed
- ◆ Dr. Vijay Ramkisan Lakwal — Department of Zoology, Science and Commerce College, Jalgaon (MS), India
- ◆ Dr. Veronica Blade — (Algeria)
- ◆ Dr. Velinga Ndolok Aime Cesaire — Ph.D. in Public Health Epidemiology, UNDP Public Health Development Program
- ◆ Dr. Uthman Simeon Adebisi — Obafemi Awolowo University, Nigeria
- ◆ Dr. Tumi Humphred Simoben — Ph.D. in Public Health, Kesmonds Research Institute
- ◆ Dr. Toffic Abdel Hassan — Plant Protection Research Institute, Agricultural Research Center
- ◆ Dr. Thomas Abraham — Department of Hotel Management, Gondar, Ethiopia
- ◆ Dr. Tchifam Berthe — Ph.D. in Public Health Epidemiology, Faculty of Medicine Garoua Cameroon
- ◆ Dr. Tatoh Adeline Manjuh — Ph.D. in Healthcare Administration, Limbe Referral Hospital Cameroon
- ◆ Dr. Tateukam Alphonse — Doctor of Clinical Medicine, Kesmonds Research Institute
- ◆ Dr. T. Christina Mondimu — University of Gondar, Ethiopia
- ◆ Dr. Surachita Basu — (Bangalore, India)
- ◆ Dr. Sujita Darmo, ST., MT — Mechanical Engineering, Mataram University, Indonesia
- ◆ Dr. Shehuri Sharon — Department of Botany, Faculty of Biosciences, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria
- ◆ Dr. Rofrigo Jose Pablo — Universidad Empresarial De Costa Rica
- ◆ Dr. Rintu Sayak — (India)
- ◆ Dr. Resham Kumari — Professor Assistant of Agricultural Zoology, Plant Protection Department, Sohag University, Egypt
- ◆ Dr. Renato Dan A. Pablo II — CSPE, Mabalacat City College

- ◆ Dr. Ranendu Dutta Pukayastha — S.J.N.P.G College, Lucknow, India
- ◆ Dr. Rajinder Singh Sodhi — Guru Kashi University, Ilorin, Nigeria
- ◆ Dr. Rajat Mrinal Kanti, PhD, D. LITT — Physiotherapist, NIMHANS, Bangalore, India
- ◆ Dr. Rafah Almutarreb — School of Computer Science and Technology, Algoma University, Canada
- ◆ Dr. Rabindra Das Sinha — (Chennai, India)
- ◆ Dr. R. Francis Kaundra — DMI-St. Eugene University, Great North Road, Chibombo District, Lusaka, Zambia
- ◆ Dr. Priyanka Weerasekara — Faculty of Social Sciences & Languages, Sabaragamuwa University of Sri Lanka
- ◆ Dr. Pawan Thapa — Department of Geomatics Engineering, School of Engineering, Kathmandu University, Nepal
- ◆ Dr. Osman Ibrionke — Abia State University Uturu, Nigeria
- ◆ Dr. Osama Mohamed Anwar Nofal — Emeritus Professor, National Research Centre
- ◆ Dr. Onwubere Isabella — Sub-Dean, Samuel Obiajulu University, Osun State, Nigeria
- ◆ Dr. Onodugu Obinna Donatus — Department of Mathematics, Faculty of Physical Sciences, Abia State University, Nigeria
- ◆ Dr. Ola Sayed Mohamed Ali — Girls-AL-Azhar University, Cairo
- ◆ Dr. Okpala Sunday Ocheni — University of Mosul, College of Science, Biology Dept.
- ◆ Dr. Obike Godwill Ukamaka, M.Sc, Ph.D. — (Medical Microbiology), Jos, Plateau State, Nigeria
- ◆ Dr. Obafemi Emmanuel — Adekunle Ajasin University Akungba Akoko, Ondo State
- ◆ Dr. Nzuzi Rafael — Bakhita African Schools, Butembo
- ◆ Dr. Nwatu Celestine Chibuzu — Rivers State University, Nigeria
- ◆ Dr. Nouma Simon Joachim — Ph.D. in Political Economics, Consultant and Auditor Bank of Central African States
- ◆ Dr. Ngwa Mathias — Faculty of Laws and Political Sciences, University of Dschang, Cameroon
- ◆ Dr. Nazar Hassan — PMAS Arid Agriculture University, Rawalpindi
- ◆ Dr. Nadia Jamil — Department of Environmental Sciences, Hazara University, Mansehra
- ◆ Dr. Mulani Moshin Anware — Sant Ramdas Art's, Commerce and Science College, Maharashtra
- ◆ Dr. Muhammad Farooq — Assistant Professor (Economics), Okara University, Pakistan
- ◆ Dr. Mohammad Usman Awan — Centre for Biotechnology and Microbiology, University of Swat
- ◆ Dr. Mohamed Mustaf Abdulle — Green Hope University Somalia / Nile University of Science & Technology
- ◆ Dr. Mochammad Munir Rachman, M.Si. — PGRI Adi Buana University Surabaya, Indonesia
- ◆ Dr. Mahmoud Magdy Abbas — Plant Nutrition Dept., Dokki, Giza, Egypt
- ◆ Dr. Lukong Hubert Shalanyuy — Kesmonds Research Institute
- ◆ Dr. Liela Meta — Malla Reddy Institute of Technology and Science
- ◆ Dr. Kheambo Didier — Ph.D. in Healthcare Administration, Kesmonds Research Institute
- ◆ Dr. Khan Aneeka Habib — College of Business Administration, International University of Business Agriculture and Technology, Dhaka, Bangladesh
- ◆ Dr. Kabul Amid Aabbasi — University of Karachi, Pakistan
- ◆ Dr. Jesica Gate — (France)
- ◆ Dr. Javnyuy Joybert, MBA, DBA — CEO CELBMD Africa, Douala Cameroon
- ◆ Dr. Jason Chishime Mwanza — St. Eugene University, Lusaka, Zambia
- ◆ Dr. Ilayaraja Degu Kathirkaman — Department of Geology, Gondar, Ethiopia
- ◆ Dr. Ibrahim Mohammad Almoselhy — Food Science and Technology, Faculty of Agriculture, Ain Shams University, Cairo, Egypt
- ◆ Dr. Hossain Johangir — Bangladesh
- ◆ Dr. Habiba Aissatou — (Egypt)
- ◆ Dr. Geoffrey Kingibe — Department of Sustainable Agriculture, Tamale Technical University, Tamale
- ◆ Dr. Frederick Mbogo Akoth, PhD — Department of Computer Science and Software Engineering, Bondo, Kenya
- ◆ Dr. Francis Onyango, Ph.D. — Nairobi, Kenya
- ◆ Dr. Fitsum Etefa — Ethiopian Institute of Textile and Fashion Technology [EiTEX], Ethiopia
- ◆ Dr. Farhat Samreen — Federal Urdu University of Arts, Karachi, Pakistan
- ◆ Dr. Fahid Faryal Yawar — Kabul Polytechnic University, Kabul, Afghanistan
- ◆ Dr. Fadekemi Williams Oyewusi — Imo State Polytechnic, Umuagwo, Nigeria
- ◆ Dr. Ezedimora Louise Ocheni — School of Special Education, Federal College of Education, Oyo, Oyo State
- ◆ Dr. Emmanuel Muhairwa — Dodoma University of Dodoma, Tanzania
- ◆ Dr. Emilia Kheambo, CPA(Z) — Senior Lecturer, Faculty of Commerce, GSBM
- ◆ Lecture, Bijay Nera Poudel — Tribhuvan University, Trichandra Multiple Campus, Department of Psychology, Kathmandu, Nepal
- ◆ Dr. Emili Burnley — (Canada)
- ◆ Dr. Doudou Nafissatou — Ministry of Scientific Research Cameroon

- ◆ Dr. Djibrilla Yaouba — World Bank Public Health Development Program Northern Cameroon / University of Ngaoundere Cameroon
- ◆ Dr. Desmond Olushola — Microbiology Department, Kogi State University, Anyigba
- ◆ Dr. Deric Chang Tektook — Iraq
- ◆ Dr. Debashi Panna — India
- ◆ Dr. David Dowland — Habibullah Bahar University College, Dhaka
- ◆ Dr. Danish Armed, Joel Caleb — Uturu
- ◆ Dr. Celestine Mulugeta Degu — College of Business and Economics, Wollega University
- ◆ Dr. Camile Rodriguezz — (Malaysia)
- ◆ Dr. Biokgololo Abeltine — Faculty of Commerce & Business Administration, Gaborone University College, Botswana
- ◆ Dr. Bella Perez — (Canada)
- ◆ Dr. Bashir Zainab — Social Studies Department, Tai Solarin College of Education, Omu-Ijebu, Ogun State, Nigeria
- ◆ Dr. Baratha Dewannara — Bolton University, (UK) (Sri Lankan Branch)
- ◆ Dr. Baba Batoure — Ph.D. in Health Economics, Director State Registered Nursing School Garoua Cameroon
- ◆ Dr. Aya Khalil Ibrahim Hassan Moussa — Biological Anthropology Department, Medical Research Division, Cairo, Egypt
- ◆ Dr. Asanath Dira — (Cairo, Egypt)
- ◆ Dr. Ambarish Sachin Bhalandhare — Associate Professor of Economics, India
- ◆ Dr. Ali Zehra Zaida — Guru Kashi University, Bathinda, Punjab
- ◆ Dr. Ali Mushin Haji — Dean of College of Science, Al-Karkh University of Science, Baghdad, Iraq
- ◆ Dr. Akinsola Gloria Adedaja M. Hamed — Department of Mathematics, Yobe State University, Damaturu, Nigeria
- ◆ Dr. Adeshini Goke Francis — Al-Hikmah University, Ilorin, Nigeria
- ◆ Dr. Adda Goudougou — Garoua General Hospital Cameroon
- ◆ Dr. Abrima Francis — Post-Doctoral Researcher, American International University West Africa, The Gambia
- ◆ Dr. Abraham Aziz — (Bangalore, India)
- ◆ Dr. Abhishek B. — Assistant Professor, SRM University, Kattankualthur, Chennai, India
- ◆ Chan Dong Hyun, Bs, Ms, Ph.D., Geology — The Chinese University of Hongkong
- ◆ Dr. Abdul Malik — Minhaj University, Lahore, Pakistan
- ◆ Dr. Abdul Hussain — Department of Botany, GPGC Parachinar, District Kurram
- ◆ Dr. (Mrs.) T V Sanjeevanie — General Sri John Kotelawala Defence University, Sri Lanka
- ◆ Dr. Mubeena Munir — Oromia State University and Jimma University
- ◆ Dr. Lingbe Soconde — Kesmonds International University / University of Garoua Cameroon
- ◆ Dr. Garam Garam — Kesmonds International University / University of Garoua Cameroon
- ◆ Dr. Edward Mutengechi — Makere University, Mulago Hospital Uganda
- ◆ Dr. Awah Richard Ndoh — Cameroon Cooperative Society
- ◆ Dr. Abel Tadesse Belle K. — Jigjiga University, Jigjiga, Ethiopia
- ◆ Alobwede Pende Divine — Kesmonds International University
- ◆ Aissatou Missira — Kesmonds International University
- ◆ Paule Giovani Henriette — Kesmonds International University
- ◆ Nsuh Larissa — Kesmonds International University
- ◆ Nougho Nancy Merveille — Kesmonds International University
- ◆ Nfon Sergius Nfon — Kesmonds International University / University of Garoua Cameroon
- ◆ Ndapeyouene M. Zenabou — Kesmonds International University
- ◆ Mbanwie Nadege Ambeck
- ◆ Kalwa Yvette, Kesmonds International University
- ◆ Gana Christophe, Kesmonds International University



Entrepreneurial
Education for a
Changing Society



Table of Contents

Assessing pregnant women's knowledge of HBV and HCV Routes of transmission at the Bertoua Regional Hospital in the East Region of Cameroon..... **65**



Assessing pregnant women's knowledge of HBV and HCV Routes of transmission at the Bertoua Regional Hospital in the East Region of Cameroon

Tatiana Jiengoué^{a,*}, Olivier Lieuga^a and Augustine Nji Asakizi^a

Affiliations

- a. ^a School of Health and Biomedical Sciences, Kesmonds International University of America

ABSTRACT

Studies in Cameroon indicate generally poor knowledge and low awareness of viral Hepatitis among pregnant women, despite high endemicity, viral Hepatitis is challenging the health condition of the people around the world, and is considered a serious public global health problem of the human kind in the 21st century. In the globe, there are two well-known forms of chronic Hepatitis and this corresponds to Hepatitis B and Hepatitis C. This cross-sectional study at Bertoua Regional Hospital of Cameroon (June 2025-January 2026) aimed at identifying HBV and HCV routes of transmission among pregnant women at the Bertoua Regional Hospital in Cameroon attending the maternity unit. the majority of them (62%) were aged within (19-28). (66.5%) of the pregnant women had knowledge about HBV or HCV routes of transmission, (49.5%) of them had never heard about the Mother-to-child-transmission expression, to the question of how can Hepatitis B or C be transmitted from one person to the other, nearly all of them were awaaer and only (3%) had no knowledge about it, almost half (46%) of the pregnant women knew that breastfeeding is safe as long as nipples are not bleeding,, (19.75%) of them said the baby transmission through C-section is not possible, while (52,(%) of them agreed that a HBV or HCV mother can transmit the virus to her baby during pregnancy or delivery, still, (62%) of them are of the view that HBV or HCV can be spread by sharing personal items like a toothbrush or razor. However, data identifying pregnant women knowledge on HBV or HVC routes of transmission among pregnant women across both community and healthcare settings remain limited, hence the need of this research. The findings align with the World Health Organization as well as others organisms fighting for the prevention and elimination of viral Hepatitis such as the Centre of Disease Control and Prevention

Keywords : *knowledge, HBV and HCV , Routes of transmission ,Pregnant women ,Cameroon*

Corresponding Author:

Tatiana Jiengoué Tchakonang

Email:

jiengouetatiana@kesmondsuniversity.org

Paper ID: IQRJ-V05102-26005010

1. INTRODUCTION

HBV and HCV are acquired by contaminated blood product exposure, sexual activity or perinatal transmission. Although the prevalence of HBV is relatively low, in the US and generally with approximately 1 million Americans are chronically infected by HBV (Sorell MF et al 2009), it is more prevalent in East Africa (8%) (Ott JJ et al 2011), Southeast Africa and India 1 to 66% and Sub-Saharan Africa (8 to 12%) (Ott JJ et al 2011).

Viral Hepatitis is challenging the health condition of the people around the World and is considered a serious public global health problem of the human kind in the 21st century. Hepatitis B virus is a member of the Hepnaviridae family, it is a DNA virus with partially double-stranded DNA and a core antigen surrounded by a shell containing hepatitis B surface antigen (HBsAg). Despite availability of a vaccine and antiviral treatment, HBV infection is still a major health problem causing considerable morbidity and mortality (Chaiba et al; 2015). A systematic review by (Mahamat et al; 2021) estimated that the prevalence of Hepatitis B in Cameroon was low, with overall 2.3% all ages? In 2015, the WHO estimates that 257 million people were living with chronic Hepatitis B including 65 million women of childbearing age, with estimated number of deaths at 887000 mainly due to HCC (Angeles et al; 2020).

Hepatitis C virus is an RNA virus of the flaviviridae family and appears to have humans and chimpanzees as the species susceptible to infection (Samuel et al; 2004), about 170 million people are infected with HCV worldwide (Obi et al; 2006). In Cameroon, a study of (Mouchili et al; 2024) found anti-HCV overall prevalence of 13.50%; HBV and HCV can be prevalent and

affect a wide range of population that include human immune deficiency virus (HIV) infected individuals, healthcare workers, blood donors, pregnant mothers, their children (Elkhateeb et al; 2018); various studies indicate that the prevalence of HBV and HCV among pregnant women becomes serious public health importance (Dabsu et al; 2019). In Cameroon, a study of (Frambo et al; 2014) reported a HBV prevalence in pregnant women of 9.7%, while in 2018, (Fouelifack et al; 2018) reported a 1.6% HCV pregnant women. Mother-to-child transmission of HBV which might be via uterine transmission is a common phenomenon and causes chronic infection of the virus (Zhao et al; 2022); it is one of the main routes of transmission worldwide, despite the proven effectiveness of immunoprophylaxis, in particular the birth dose vaccine. Mother-to-child transmission can occur during pregnancy, during delivery or during breastfeeding (Mendoua et al; 2013); mother-to-child transmission is responsible for more than third chronic viral hepatitis cases (Noele teal; 2016) other routes of transmission include: having history of polysexual practices, previous history of dental procedures, health facility admission, blood transfusion (Mamuye et al; 2020). Overall, there is a paucity of research specifically addressing pregnant women and routes of transmission identification in Cameroon. Therefore, this study aims at identifying the various HBV and HCV routes of transmission among pregnant women at the Bertoua Regional Hospital in Cameroon, in other words, what knowledge do pregnant women have of Hepatitis B and C routes of transmission?

2. RELATED WORKS

Childbearing women can potentially transmit HBV and HCV to their children, they transmit an

infection to new-borns usually during birth following close contact. There is a higher likelihood of vertical transmission of infection from mothers to offspring in 4.6% and 1.6% of babies delivered to pregnant women with HBV and HCV infections respectively (Dagneu et al 2020). New-borns who are exposed to HBV will have almost 85-90% risk of developing chronic liver disease (Brian J. Mc Mahon et al 1990).

Vertical transmission is common among asymptomatic female carriers who are unaware of their status, in cases of high viral multiplication in the mother, and in the absence of serovaccination, 90% infected newborns are likely to develop chronic Hepatitis B (Sogni et al; 2015) and have a much higher risk of developing liver disease, including HCC in adulthood (Dong et al; 2015).

A Cameroonian previous study of (Mbongue et al; 2024), a prospective, cross multicenter study was conducted from 17 September 2018 to 25 February 2019 in 102 pregnant women aged 15 to 44 years. The results showed out that scarification and tattooing were significantly associated with HBV infection and previous contact with HBV.

Another study of (Ayenew et al; 2023), A cross-sectional study conducted from March 15th to September 16th, 2022, at the Debre Tabor Comprehensive Specialized Hospital antenatal care clinic. The results showed out that tattooing and dental therapy were significantly associated with HBV infection.

3. MATERIALS & METHODS

Inclusion criteria were Pregnant women aged of 19 years and above (58) who freely consented, and came for antenatal care visit at the maternity unit of the BRH, and had not been vaccinated against HBV within the study period; as well, the

study excluded pregnant women less than 19 years and non-pregnant women. Those of them who had receive HBV vaccine at the period of the study were also excluded. The prospective health facility-based study setting was chosen because of the required study population of pregnant women who register for regular antenatal care visits. Moreover, data collected at a specific point in time was deemed adequate to establish a diagnosis of HBV virus, hence, justifying the choice of a cross-sectional study design, this is because testing for Hepatitis B and C virus has been made a routine test for all the pregnant women on their antenatal care visit at the Bertoua Regional Hospital and actually were free of charge during the study. A total of 400 pregnant women were consecutively sampled (non-probabilistic) registered for their visit during the study period and all were approached with a request and signed the informed consent to take part in the study, all of them gave their consent to participate in the study and they were consecutively enrolled to the study.

Participants were assigned codes for anonymity purposes, we used for HBV screening Diaspot HBsAg, these are step Hepatitis B Surface Antigen (HBsAg) test strip package insert and for HCV, Diaspot HCV virus anti-body (HCV-Ab) test strips. Those are immune-chromatographic strips for qualitative detection of antibodies and antigens. Their sensitivity and specificity are above 99% and 98% respectively. Results were disclosed to participants with proper counselling; all infected pregnant women were counselled on the disease and referred for proper specialization care while the non-infected were counselled for HBV vaccination. Data were obtained using a well-structured questionnaire which was designed for the research and for laboratory analysis; questions

elicited data to cover the objectives of the study, the questionnaire included seven sections, each focusing on a particular aspect to answer the research questions and gaps as well. The quantitative part of the questionnaire featured MCQ and Likert-scale questions allowing participant to rate their experiences, knowledge, feelings and attitudes. The questionnaires also included open-ended questions inviting participants to give other factors not mentioned. Frequencies (sums and percentages) were calculated for the socio-demographic factors and the different attitudes, feelings and practices towards HBV and HCV.

Tables displaying the frequency distribution for knowledge, attitude and practice towards HBV and HCV were entered into graph, each of the tables had frequencies for knowledge, maternal HBV/HCV preventive modes and practices, modes of transmission. Data were analyzed using Excel 2016 frequencies and percentages were determined

4. RESULTS & DISCUSSION

[See Annex — Table 1: Socio-demographic information and prevalence rates among pregnant women attending ANC]

The results showed that the majority of pregnant women (62%) were aged within the framed age (19-28), most of them (59.5%) were single, (32.5%) of the pregnant women had no formal education, while (38.75%) of them were housewives, (89.5%) were Christian and more than half (76.25%) were multigravida that is they were pregnant more than once

[See Annex — Table 2: HBV/HCV Routes of transmission among pregnant women at the BRH]

(66.5%) of the pregnant women had some knowledge about Hepatitis B and C transmission, (49.5%) of them were not aware of the expression Mother-to-child-transmission, to the

question of how can Hepatitis B or C be transmitted from one person to the other, nearly all the pregnant women were right and aware, just 3% had no knowledge about it, almost half (46%) of the pregnant women knew breastfeeding is safe unless the nipples are not bleeding, (19.75%) of the pregnant women said a new-born baby cannot be transmitted HCV through C-section; while (52.5%) agreed that HBV/HCV mothers cant transmit the virus to her baby during pregnancy or delivery, (62.%) are of the view that HBV/HCV can be spread by sharing personal items like toothbrush or razor, the study showed a strong relationship between education, religion, and pregnant women awareness about HBV/HCV routes of transmission.

We found that (66.5%) of the pregnant women were able to identify HBV/HCV routes of transmission, and almost half (49.59%) of them were not knowledgeable about the expression Mother-to-child transmission, this was the case in the study of (Anyalem et al;2025), among the 419 pregnant women attending ANC at that Hospital, (80.7%) were not knowledgeable about the HBV vertical transmission, the overall knowledge of vertical transmission was poor (23.75%) of the pregnant women said that Hepatitis C can be passed from one person to another by sharing needles, this study is similar, to that of (Ephraim et al; 2015), a cross sectional study of 168 pregnant women recruited from the Agogo Presbyterian Hospital, in which the results showed that sharing needles, were associated with Hepatitis C infection). Also, a study of (Ivan et al; 2014) showed that a proportion of babies (as high as 34%) may acquire infection after birth due to close contact with the mother, while it is the contrary in our study, in which pregnant women are not aware

of the baby's risks of infection after his birth from an infected HBV mother. Another study is that of (Arzu et al; 2009), in which (90%) of the healthcare staff was aware of the sexual transmission route, which was not actually the case with our study in which just (15.25%) of the pregnant women were aware that Hepatitis C can be transmitted through sex, also, (62%) of the pregnant women were aware that Hepatitis B/C can be spread by sharing personal items like a toothbrush or razor, this actually was the case in (Arzu et al; 2009) in which (94%) of the healthcare workers were aware of the transmission rules by sharing personal items such as toothbrushes, razors, and nail scissors.

5. CONCLUSION

In conclusion, we found adding to our observations that pregnant women do have some general knowledge on routes of transmission viral Hepatitis, but their knowledge is superficial, we also noticed that the quasi-inexistence of antenatal classes within the hospital and lack of trained personnel in Hepatology might justify some unawareness.

So efforts should be addressed on counselling.

REFERENCES

- Alter et al (1976). Type B hepatitis: the infectivity of blood positive for e antigen and DNA polymerase after accidental needle stick exposure, *N. Engl. J. Med*, 295,909-913.
- Anaedobe et al (2015). Prevalence, Socio-Demographic Features and Risk Factors of Hepatitis B Virus Infection among Pregnant Women in South-western Nigeria. *The Pan African Medical Journal*, 20, 406.
- Ansari, et al (2023). Risk of early horizontal transmission of hepatitis B virus in children of uninfected mothers in sub-Saharan Africa: A systematic review and meta-analysis. *Lancet Glob. Health* 2023,
- Cabot B, et al (1997). Structure of replicating hepatitis C virus (HCV) quasispecies in the liver may not be reflected by analysis of circulating HCV virions. *J Virol*71:1732-1734.
- Delamare, H. et al (2024). Proportion of pregnant women with HBV infection eligible for antiviral prophylaxis to prevent vertical transmission: A systematic review and meta-analysis. *JHEP Rep.* 2024, 6, 101064.
- Di Filippo Villa, et al (2023) D.; Navas, M.C. Vertical Transmission of Hepatitis B Virus-An Update. *Microorganisms* 2023, 11, 1140.
- Ducancelle et al. (2013) High Endemicity and Low Molecular Diversity of Hepatitis B Virus Infections in Pregnant Women in a Rural District of North Cameroon. *PLoS ONE*, 8, e80346.
- Ducancelle et al. (2013) High Endemicity and Low Molecular Diversity of Hepatitis B Virus Infections in Pregnant Women in a Rural District of North Cameroon. *PLoS ONE*, 8, e80346.
- El-Sayed, M. et al (2019). THU-137-DAA therapy in women of child bearing age: accidental conception during therapy and pregnancy outcome [abstract]. *J. Hepatol.* 70, e221 (2019).
- El-Sayed, M. H.& Indolfi, (2020). G. Hepatitis C virus treatment in children: a challenge for hepatitis C virus elimination. *Semin. Liver Dis.* 40, 213-224 (2020).
- European Centre for Disease Prevention and Control (ECDC) (2022) Introduction to the Annual Epidemiological Report. In: ECDC. Annual epidemiological report [Internet]. Stockholm: ECDC; 2022
- European Centre for Disease Prevention and Control (ECDC) (2022) Introduction to the Annual Epidemiological Report. In: ECDC. Annual epidemiological report [Internet]. Stockholm: ECDC; 2022
- European Paediatric Hepatitis C Virus Network. (2005). A significant sex-but not elective cesarean section-effect on mother-to-child transmission of hepatitis C virus infection. *J Infect Dis*192:1872-1879.
- European Paediatric Hepatitis C Virus Network. (2005). A significant sex-but not elective cesarean section-effect on mother-to-child transmission of hepatitis C virus infection. *J Infect Dis*192:1872-1879.
- F. Fiehn, et al (2024). Hepatitis C virus and hepatocellular carcinoma: carcinogenesis in the era of direct-acting antivirals.
- Farooq H.Z. et al (2024). Risk factors for hepatocellular carcinoma associated with hepatitis C genotype 3 infection: a systematic review. *World J. Gastrointest. Oncol.* 2024;16(4):1596612. doi: 10.4251/wjgo.v16.i4.1596. 15 avr.
- Fogel RS, Chappell CA. (2023). Hepatitis C virus in pregnancy: an opportunity to test and treat. *Obstet Gynecol Clin North Am* 50:363-373. doi: 10.1016/j.ogc.2023.02.008
- Fomulu, et al. (2013). Prevalence, Correlates and Pattern of Hepatitis B among Antenatal Clinic Attenders in Yaoundé-Cameroon: Is Perinatal Transmission of HBV Neglected in Cameroon. *MC Pregnancy and Childbirth*, 13, 158.
- Fomulu, et al. (2013). Prevalence, Correlates and Pattern of Hepatitis B among Antenatal Clinic Attenders in Yaoundé-Cameroon: Is Perinatal Transmission of

- HBV Neglected in Cameroon? *BMC Pregnancy and Childbirth*, 13, 158.
- Freriksen, J. J. M. et al (2019). Review article: direct-acting antivirals for the treatment of HCV during pregnancy and lactation – implications for maternal dosing, foetal exposure, and safety for mother and child. *Aliment. Pharmacol. Ther.* 50, 738–750 (2019).
- Funk, A. et al (2020). Efficacy and safety of antiviral prophylaxis during pregnancy to prevent mother-to-child transmission of hepatitis B virus: a systematic review and meta-analysis. *Lancet Infect Dis.* [https://doi.org/10.1016/S1473-3099\(20\)30586-7](https://doi.org/10.1016/S1473-3099(20)30586-7) (2020)
- G.M. Kassa, et al (2024). Prevalence, trends, and distribution of hepatitis C virus among the general population in sub-Saharan Africa: a systematic review and meta-analysis.
- Gross, M. S., Ruth, A. R. & Rasmussen, S. A. (2020). Respect women, promote health and reduce stigma: ethical arguments for universal hepatitis C screening in pregnancy. *J. Med. Ethics* 46, 674–677 (2020).
- Hamadou N.H.M., al (2025). Traitement de l'Hépatite C de Génotype 1 par les antiviraux d'Action Directe au Cameroun : résultats préliminaires. *HEALTH SCIENCES AND DISEASE [Internet]* 2025.
- Honegger JR, et al (2013). Loss of immune escape mutations during persistent HCV infection in pregnancy enhances replication of vertically transmitted viruses. *Nat Med* 19:1529–1533.
- Honegger JR, et al (2013). Loss of immune escape mutations during persistent HCV infection in pregnancy enhances replication of vertically transmitted viruses. *Nat Med* 19:1529–1533.
- Indolfi, G. et al (2019). Hepatitis B virus infection in children and adolescents. *Lancet Gastroenterol. Hepatol.* 4, 466–476 (2019).
- Indolfi, G. et al (2019). Hepatitis C virus infection in children and adolescents. *Lancet Gastroenterol. Hepatol.* 4, 477–487 (2019).
- Jiang, W. et al (2018). Sofosbuvir inhibits hepatitis A virus replication in vitro assessed by a cell-based fluorescent reporter system. *Antivir. Res.* 154, 51–57 (2018).
- Joshi, et al (2020). Presence of Precore (C)/C Promoter Mutants in Peripheral Blood Mononuclear Cells of Chronic Hepatitis B (CHB) Carriers During Pregnancy Does Not Correlate with Increased Risk of Liver Disease in 4 Years of Follow-Up. *Dig. Dis. Sci.* 2020, 65, 204–214.
- Joshi, et al (2020). Presence of Precore (C)/C Promoter Mutants in Peripheral Blood Mononuclear Cells of Chronic Hepatitis B (CHB) Carriers During Pregnancy Does Not Correlate with Increased Risk of Liver Disease in 4 Years of Follow-Up. *Dig. Dis. Sci.* 2020, 65, 204–214.
- Kaberg, M. & Weiland, O (2020). Hepatitis C elimination - macro-elimination. *Liver Int.* 40, 61–66 (2020).
- Khan A., et al (2022). Core amino acid substitutions in HCV-3a isolates from Pakistan and opportunities for multi-epitopic vaccines. *J. Biomol. Struct. Dyn. Mai.* 2022;40(8):375368. doi: 10.1080/07391102.2020.1850353.
- Knegendorf, L. et al (2018). Hepatitis E virus replication and interferon responses in human placental cells. *Hepatol. Commun.* 2, 173–187 (2018).
- Kushner, T. & Terrault, N. A. (2019). Hepatitis C in pregnancy: a unique opportunity to improve the hepatitis C cascade of care. *Hepatol. Commun.* 3, 20–28 (2019).
- L. Bhebhe, M. Anderson, S. Souda, W.T. Choga, E. Zumbi ka, Z.M. Shaver, et al (2019). Molecular characterization of hepatitis C virus in liver disease patients in Botswana: a retrospective cross-sectional study
- Labarga P, et al (2007). Infant of 22 months of age with no anomalies born from a HCV- and HIV-infected mother under treatment with pegylated interferon, ribavirin and antiretroviral therapy during the first 16 weeks of pregnancy. *Reprod Toxicol* 24:414–416.
- Labarga P, et al (2007). Infant of 22 months of age with no anomalies born from a HCV- and HIV-infected mother under treatment with pegylated interferon, ribavirin and antiretroviral therapy during the first 16 weeks of pregnancy. *Reprod Toxicol* 24:414–416.
- Larouche A, et al (2012). Seronegative hepatitis C virus infection in a child infected via mother-to-child transmission. *J Clin Microbiol* 50:2515–2519.
- Larouche A, et al (2012). Seronegative hepatitis C virus infection in a child infected via mother-to-child transmission. *J Clin Microbiol* 50:2515–2519.
- Law M, et al (2008). Broadly neutralizing antibodies protect against hepatitis C virus quasispecies challenge. *Nat Med* 14:25–27.
- Li C, et al (2020). Impact of maternal HIV-HBV coinfection on pregnancy outcomes in an underdeveloped rural area of southwest China. *Sex Transm Infect.* 2020 Nov;96(7):509-515.
- Li C, et al (2020). Impact of maternal HIV-HBV coinfection on pregnancy outcomes in an underdeveloped rural area of southwest China. *Sex Transm Infect.* 2020 Nov;96(7):509-515.
- Li, M. et al (2020). Hepatitis E virus infection and its associated adverse fetomaternal outcomes among pregnant women in Qinhuangdao, China. *J. Matern. Fetal Neonatal. Med.* 33, 3647–3651 (2020).
- Li, P. et al (2020). The global epidemiology of hepatitis E virus infection: a systematic review and meta-analysis. *Liver Int.* 40, 1516–1528 (2020).
- M. Amougou-Atsama, P. Jean Adrien Atangana, D. Noah Noah, P. Fewou Moundipa, P. Pineau, R. Njouom (2020). The role of hepatitis C virus genotypes and core mutations in hepatocellular carcinoma in Cameroon.
- Ma, X. et al (2018). Chronic hepatitis B virus infection and preterm labor (birth) in pregnant women—an updated systematic review and meta-analysis. *J. Med. Virol.* 90, 93–100 (2018).

- N.H.M. Hamadou, et al (2025). Traitement de l'Hépatite C de Génotype 1 par les antiviraux d'Action Directe au Cameroun : résultats préliminaires. HEALTH SCIENCES AND DISEASE.
- P.A. Tagnoukam-Ngoupo, M.N. Ngoufack, S. Kenmoe, S.F. Lissock, M. Amougou-Atsama, R. Banai, et al (2019). Hepatitis C virus genotyping based on Core and NS5B regions in Cameroonian patients.
- P.A. TagnoukamNgoupo, et al. (2019). Hepatitis C virus genotyping based on Core and NS5B regions in Cameroonian patients.
- Quaranta M.G., et al (2024). Reduction of the risk of hepatocellular carcinoma over time using direct-acting antivirals: a propensity score analysis of a real-life cohort (PITER HCV) Viruses. 2024;16(5):682. doi: 10.3390/v16050682. 26 avr.
- R. Njouom, et al (2003). Hepatitis C virus infection among pregnant women in Yaoundé, Cameroon: prevalence, viremia, and genotypes.
- R. Njouom, et al (2012). Phylogeography, risk factors and genetic history of hepatitis C virus in Gabon, central Africa
- R.D. Trimbilas, et al (2016). Molecular characterization of hepatitis C virus core region in Moroccan intravenous drug user
- Ragusa R, Giorgianni G, Lupo L et al (2018). Healthcare-associated Clostridium difficile infection: role of correct hand hygiene in cross-infection control.
- Revill, P. A. et al (2020). The evolution and clinical impact of hepatitis B virus genome diversity. Nat. Rev. Gastroenterol. Hepatol. 17, 618–634 (2020).
- Schillie S, et al (2020). CDC Recommendations for hepatitis C screening among adults—United States, 2020.
- Schillie S, et al (2020). CDC Recommendations for hepatitis C screening among adults—United States, 2020.
- Shimakawa, Y. et al (2019). Hepatitis B core-related antigen (HBcrAg): an alternative to HBV DNA to assess treatment eligibility in Africa. Clin. Infect. Dis. 70, 1442–1452 (2019).
- Wang F, et al (2017). Post-vaccination serologic testing of infants born to hepatitis B surface antigen positive mothers in 4 provinces of China. Vaccine. 2017;35(33):4229–35.
- Wang W, et al (2020). Dual-targeting nanoparticle vaccine elicits a therapeutic antibody response against chronic hepatitis B. Nat Nanotechnology. 2020; 15:406–16
- Wong, et al (2023). Real-world treatment outcome with protease inhibitor direct-acting antiviral in advanced hepatitis C cirrhosis: a REAL-C study Hepatol Int. 2023/
- World Health Organization (2016). global health sector strategy on viral hepatitis 2016–2021: towards ending viral hepatitis. Geneva: World Health Organization; 2016 (<http://apps.who.int/iris/bitstream/10665/246177/1/WHO-HIV-2016.06-eng.pdf?ua=1>, accessed 2 April 2020).
- World Health Organization (2017). Elimination of mother to child transmission of HIV and syphilis. Geneva.
- Zou H et al (2012) Virologic factors associated with failure to passive-active immunoprophylaxis in infants born to HBsAg-positive mothers. J Viral Hepat. 2012 Feb;19(2): e18-25

CONFLICTS OF INTEREST

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

HOW TO CITE

Tatiana Jiengoué, Olivier Lieuga and Augustine Nji Asakizi.(2026). Assessing pregnant women's knowledge of HBV and HCV Routes of transmission at the East region of Cameroon. IQ Research Journal, 5(2), IQRJ-V05I02-26005010. www.iqresearchjournal.com

ANNEXES

Annex I — Table 1: Socio-demographic information and prevalence rates among pregnant women attending ANC

Variables					
Age	(19-28)	(29-38)	(39-48)	(49-58)	-
n	248	82	62	8	-
%	62%	20.5%	15.5%	2%	-
Marital status	Single	Married	Divorced	Widow	-
n	238	112	33	17	-
%	59.5%	28%	8.25%	4.25%	-
Education level	No formal education	Primary school	Secondary school	College	Postgraduate
n	130	122	84	49	15
%	32.5%	30.5%	21%	12.25%	3.75%
Occupation	Housewife	Business	Farming	Government employed	-
n	155	135	68	42	0
%	38.75%	33.75%	17%	19.5%	0%
Religion	Christian	Muslim	-	-	-
n	358	42	-	-	-
%	89.5%	10.5%	-	-	-
Gravidity and parity	First pregnancy	More than one pregnancy	-	-	-
n	95	305	-	-	-
%	23.75%	76.25%	-	-	-

Annex II — Table 2: HBV/HCV Routes of transmission among pregnant women at the BRH

HBV/HCV Routes of transmission	Pregnant women awareness	MTCT expression awareness	HBV and HCV Breastfeeding	Baby transmission after birth	Baby risk of transmission	
Yes						
n	266	202	184	28	136	
%	66.5%	50.5%	4%	70%	34%	
No						
n	134	198	124	15	244	
%	33.5%	49.5%	31%	37.5%	61%	