

PREVALENCE AND MOLECULAR CHARACTERIZATION OF OCCULT HEPATITIS B VIRUS INFECTION AMONG NYAOPE USERS

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BACKGROUND AND OBJECTIVES: Occult hepatitis B infection (OBI), characterized by detectable hepatitis B virus (HBV) deoxyribonucleic acid (DNA) without hepatitis B surface antigens (HBsAg), remains a diagnostic challenge. In South Africa, people who inject drugs (PWID)—nyaope users, are at high-risk of bloodborne viral infections such as HBV and human immunodeficiency virus (HIV) due to unsafe needle-sharing practices. This study aimed to investigate the prevalence and molecular characteristics of OBI among nyaope users.

METHODS: This descriptive study analysed 100 stored serum samples from users of nyaope. HBV DNA was extracted using High Pure Viral Nucleic Acid Kit (Roche Diagnostics, Germany) and amplified using an in-house nested polymerase chain reaction (PCR) targeting the HBV core region (~700bp). Positive amplicons were subjected to Sanger Sequencing using the ABI 3500XL Genetic Analyzer (Applied Biosystems, USA) at Inqaba Biotechnological Industries (Pty) Ltd. Bioinformatic tools were used to analyse the sequences and Geno2Pheno (<http://hbv.geno2pheno.org/index.php>) was used for mutational analysis.

RESULTS: The prevalence of OBI was 10% (10/100), with 70% (7/10) HBV-HIV co-infection. Nine successfully sequenced samples clustered with HBV genotype A1 and D (44%, 4/9) and genotype A and A/D (56%, 5/9). Mutational analysis of the precore/core regions identified mutations including V17F, E77Q, F24L, and C-terminal mutations associated with immune evasion and viral persistence—potentially contributing to OBI.

CONCLUSION: These findings highlight a significant prevalence of OBI among nyaope users in South Africa, with high HIV co-infection rates. The circulation of HBV genotypes A and D and immune escape-associated mutations highlight the importance of molecular HBV screening and harm-reduction interventions to prevent silent HBV transmission and related liver disease.