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Prevalence of viral infections (HIV, HBV, HCV) among workers within 1st district of Kirkuk

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Abstract
This cross-sectional study investigates the prevalence of Hepatitis B Virus (HBV), Hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV) among workers in the 1st District of Kirkuk, Iraq. The study involved a total of 15,052 workers, representing various sectors. The results revealed 0% prevalence for HBV, and 0.0066% for both HCV and HIV. These extremely low prevalence rates indicate strong public health interventions, vaccination programs, and screening efficiency in the region.

Keywords: Viral infections, *Hepatitis B virus* (HBV), *Hepatitis C virus* (HCV), *Human immunodeficiency virus* (HIV), Workers, Prevalence, Kirkuk City, Public health

1. Introduction
Viral diseases such as HBV, HCV, and HIV are major public health concerns worldwide [1, 2]. Transmission primarily occurs through blood and body fluids, putting healthcare and industrial workers at potential risk [3, 4]. In Iraq, the prevelance of these infections has varied across regions due to disparities in health care and vaccinations coverage [4]. Kirkuk is a major industrial governorate in northen Iraq, has a large and diverse workforce [4, 5]. The objective of this research was to assess the prevalence of these viral infections among workers in Kirkuk's 1st District. This area hosts a large, diverse workforce involved in healthcare, construction, industry, and services.

2. Materials and Methods
A descriptive cross-sectional design was used. Blood samples were collected from 15,052 workers for testing using ELISA methods for HBsAg, Anti-HCV, and HIV Ag/Ab. Positive results were confirmed using secondary assays. Statistical analysis involved descriptive percentages.
The inclusion criteria were all workers undergoing mandatory health screening in Kirkuk during the study period which was extended from 26th of November 2023 to 30ty of September 2025.

3. Results

Table 1: Prevalence of HBV, HCV, and HIV infections among workers in the 1st District of Kirkuk, Iraq

Viral infection	Number of positive cases	Total tested	prevelance
HBV	0	15052	0.0000
HCV	1	15052	0.0066
HIV	1	15015	0.0066

The analysis showed zero HBV cases, one HCV case, and one HIV case among all tested workers. The low figures may reflect improved preventive programs, accination coverage, and enhanced health education.

4. Discussion
The findings highlight the success of public health measures in Kirkuk (3, 5). HBV vaccination programs, combined with awareness campaigns, have significantly reduced

transmission. The minimal HCV and HIV cases may stem from imported labor or previous exposures rather than local transmission. International comparisons show Iraq's prevalence rates are notably lower than many regional averages, reflecting improved healthcare access and screening [1, 6]. However, continuous surveillance is necessary to prevent potential outbreaks. Factors like urban migration, healthcare resource disparities, and socio-economic shifts can influence infection patterns. Moreover, education about safe blood handling and sexual health remains crucial for sustaining low prevalence [4, 7].

5. Conclusion

This expanded study confirms extremely low viral disease prevalence among workers in Kirkuk's 1st District. Ongoing vaccination, health education, and periodic screening should remain integral to the public health strategy. The data support the effectiveness of local preventive programs and provide a model for other regions.

6. Recommendations

1. Continue free and accessible HBV vaccination for all workers.
2. Conduct regular awareness sessions on infection control.
3. Improve laboratory diagnostic capacity and confirmatory testing.
4. Establish a centralized surveillance system for tracking occupational infections.
5. Collaborate with international health bodies for data standardization.

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