وقائع المؤتمر العلمي السنوي الثالث لكلية التربية الاساسية
في مجال العلوم الصرفة والموسوم:
(مؤتمر كلية التربية الاساسية في مجال العلوم الصرفة)
وتحت شعار
(بالعلوم الصرفة نبني واقعا معرفيا متجددا)
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Seroprevalence Of Hbv And Hcv Among Foreign Female Domestic Workers In Baghdad

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Abstract:

Hepatitis viruses (HBV and HCV) are considered worldwide public health concern, specifically among population with high exposure risk. Foreign female domestic workers represent a unique group due to mobility, living conditions, and potential occupational exposure. This study aimed to assess the seroprevalence of HBV and HCV among foreign female workers. A cross-sectional study was conducted on 150 female workers aged 18–45 years, recruited from licensed employment offices (n=100) and voluntarily from private clinics (n=50). Participants were from Nigeria, Ghana, Bangladesh, Ethiopia, Sierra Leone, and Kenya. Collected demographic variables encompassed age, marital status, multiple sexual partners, and type of work. Blood samples were tested for HBV and HCV antibodies. Positive HBV results were interpreted with caution due to potential vaccination-induced immunity. Among the participants, seven were Anti- HBsAg IgG antibody positive (4.7%), and three were Anti-HCV IgG antibody positive. Demographic analysis revealed that most Ethiopian participants were younger (18–35 years), while older participants (40–45 years) were primarily from Nigeria and Bangladesh, some with children or grandchildren. Occupations varied depends on the requirements of the employer as: household work, childcare, salon services, retail, and mixed work. This study showed low prevalence of HBV and HCV among foreign female workers in Baghdad. The most positive cases may reflect previous

vaccination rather than factual infection. Our study highlighted the importance of frequent laboratory screening health education with adoption of specialized vaccination programs for HBV for this population to prevent transmission of viruses, ensure health of female workers and promote the protection of community.

Keywords: HBV, HCV, Foreign female workers.

Note: The research is **NOT** based on an M.A thesis or a PhD dissertation (if any).

Introduction:

In many areas across the world, viral hepatitis infections as Hepatitis B virus and Hepatitis C virus present a major threat to public health safety, especially in developing regions where access to healthcare services is limited. These infections are the main cause of chronic liver disease, cirrhosis, and liver cancer if they are not properly managed. It is estimated that about 250 million individuals globally are affected by chronic Hepatitis B virus infection, while nearly 50 million people are affected by chronic HCV infection (Mandil et al., 2021). The risk of HBV infection can be reduced through vaccination; however, there is still no available vaccine for HCV. Therefore, control of HCV mainly depends on early detection and proper treatment (Saleh et al., 2022). The focus of the research conducted in Iraq and adjacent countries has consisted of the general population and specifically blood donors. Very low documentation has been found (with respect to hepatitis B & C) within these studies. This is inconclusive concerning the findings of foreign domestic workers (Al-Hashimi & Karim, 2023; Hassan et al., 2022). The majority of these workers come from countries like Nigeria, Ghana, Bangladesh, Ethiopia, Sierra Leone and Kenya. Each of these countries has a different hepatitis prevalence and vaccine coverage. Foreign domestic workers typically reside in and work within their employers' homes. There is frequent, direct contact between these workers and family members (including young children, elderly individuals, and chronically ill patients). This close proximity may increase the likelihood of transmission of infections such as hepatitis B and C and other infectious diseases. Infection transmission may also be affected by

differences in hygiene, health awareness, and vaccination status. Due to their important roles in providing child care, elderly care, household maintaining, hair-related services, and sometimes grocery sales; foreign female workers can be considered vulnerable individuals. Given their continuous close contact with family members, it is important to assess their health status and assess the possibility of transmission of illnesses. Research on this group is limited in Iraq, indicating a need for further studies describing the prevalence of viral infections and assessing demographic variables, such as age, marital status, total number of children, and past relationships that could influence disease risk. Understanding the seroprevalence of HBV and HCV within this group could aid public health programs and families in the development of screening, vaccination, and prevention strategies. Policymaking concerning how to protect vulnerable people in households from potential risk of infection will also benefit from this information. In this study, we aim to provide updated data about foreign female domestic workers in Baghdad, including their demographic characteristics, types of work, and the results of serological tests for HBV and HCV. This may help to improve awareness and enhance public health safety.

Methodology

Study-design and participants

A Cross-sectional study was conducted in Baghdad, Iraq to investigate the prevalence of Hepatitis B virus and Hepatitis C virus among foreign female domestic workers. A total of 150 participants, aged from 18 to 45 years, one hundred were recruited from licensed employment offices (fifty from alkarkh and fifty from arusafa), and 50 were recruited voluntarily from private clinics. The female workers became from six deferent nationalities: Nigeria, Ghana, Kenya, Bangladesh, Ethiopia, and Sierra Leone. All workers included in this study were medically screened before being recruited to employment offices. This screening was done officially by the responsible authorities; included viral (HIV, HBV, HCV) tests and communicable diseases in addition to pregnancy check. Only workers who were found medically fit were accepted and registered as ready to start their work .

Data collection and laboratory methods

Demographic and personal data were collected included; age, marital status, number of children, history of previous sexual relationships (number of sexual contacts with different sex partners), and the type of work (household, childcare, salon, retail, or mixed tasks). These variables were included to examine potential associations with HBV and HCV serostatus. Five ml of Blood were collected from each female worker then Serum was separated and stored at –20°C until testing. An electrochemiluminescence immunoassay (ECLIA) using a Cobas e immunoassay analyzer (Roche Diagnostics, Germany) was used to screen patients for Hepatitis B Surface Antigen and for antibodies to Hepatitis C Virus. The Anti-HBsAg IgG antibody assay is based on a sandwich immunoassay principle for the qualitative detection of hepatitis B surface antigen, whereas the anti-HCV IgG antibody assay is based on an indirect immunoassay principle for qualitative screening of antibodies directed against Hepatitis C virus. The results were automatically calculated by the analyzer and expressed as a cut-off index (COI). Samples were analyzed as prescribed by the manufacturer using a classification system of COI < 1.0 for non-reactive results and COI ≥ 1.0 for reactive results. Signal values close to the cut-off were carefully noted and considered as low-level reactivity.

Ethical approval

Written informed consent was obtained from all female workers and ethical approval was obtained from the Review Board of Ibn Sina University of Medical and Pharmaceutical Sciences in 4th April 2025 with given number 40.1.26 .

Statistical analysis

The Statistical Package for Social Sciences (SPSS), version 26, was used to conduct data analysis. Descriptive statistics were used to summarizes the data set with continuous variables reported as mean ± standard deviation (SD) and categorical variables described as frequency and percentage. Differences between groups for categorical variables were assessed using Fisher's exact test. Associations between hepatitis B virus (HBV) and hepatitis C virus (HCV) infections and factors that could lead to infection

were calculated using odds ratios (OR) with 95% confidence intervals (CI). A likelihood of $p < 0.05$ was considered statistically significant .

Results

Demographic characterization

A total of 150 foreign female domestic workers participated in this study. Their ages ranged from 18 to 45 years, with a mean age of 29.6 ± 6.5 years. Most participants were from Nigeria (20%, n=30), Ethiopia (18%, n=27), Uganda (15%, n=23), Bangladesh (14%, n=21), Ghana (12%, n=18), Sierra Leone (10%, n=15), and Guinea (11%, n=16). Regarding marital status, 92 participants (61.3%) were married, 45 (30%) were single, and 13 (8.7%) were divorced or widowed. The number of sex partners was categorized into three groups: 0–1 (44.0%, n=66), 2–5 (30.7%, n=46), and more than 5 partners (25.3%, n=38). In terms of work type, 98 participants (65.3%) were engaged in domestic household duties such as cleaning and childcare, while 52 (34.7%) performed mixed work including caregiving and other domestic services as showed in Table 1.

Table 1: Demographical characteristics of domestic female workers (n=150)

Demographic	Category	n	%
Age	Mean ± SD	29.6 ± 6.5	-
Age Range	18–45	-	-
Nationality	Nigeria	30	20.0
	Ethiopia	27	18.0
	Uganda	23	15.3
	Bangladesh	21	14.0
	Ghana	18	12.0
	Sierra Leone	15	10.0
	Guinea	16	10.7
Marital Status	Married	92	61.3
	Single	45	30.0
	Divorced/Widowed	13	8.7
Number of sexual partners	0–1	66	44.0
	2–5	46	30.7
	>5	38	25.3
Type of Work	Household Only	98	65.3

	Mixed Work	52	34.7

HBV and HCV prevalence

Serological testing showed that 7 participants (4.7%) were positive for hepatitis B surface antigen (HBsAg), and 3 participants (2%) were positive for anti-HCV antibodies, the positive result among participants did not show a co-infection with both viruses. HBV infection was observed across several nationalities table 2, with the highest frequency among females from Nigeria (n=2, 6.7%) and Ethiopia (n=2, 7.4%). HCV positivity was more evenly distributed, with single cases among Uganda, Bangladesh, and Ghana, all with different COI reactive values showed in table 3.

Table 2: Prevalence of HBV and HCV Infections by Nationality Among Participants (n = 150)

Nationality	Total Participants (n)	HBV Positive (n, %)	HCV Positive (n, %)
Nigeria	30	2 (6.7)	0 (0.0)
Ethiopia	27	2 (7.4)	0 (0.0)
Uganda	23	0 (0.0)	1 (4.3)
Bangladesh	21	0 (0.0)	1 (4.8)
Ghana	18	0 (0.0)	1 (5.6)
Sierra Leone	15	1 (6.7)	0 (0.0)
Guinea	16	2 (12.5)	0 (0.0)

Table 3: HBV and HCV Reactive Cases According to Nationality and COI Values

Virus	Nationality	Marker	Result	Signal Value (COI)
HBV	Nigeria	HBsAg	Reactive	1.10
HBV	Nigeria	HBsAg	Reactive	1.05
HBV	Ethiopia	HBsAg	Reactive	1.12
HBV	Ethiopia	HBsAg	Reactive	1.04
HBV	Sierra Leone	HBsAg	Reactive	1.10
HBV	Guinea	HBsAg	Reactive	1.13

HBV	Guinea	HBsAg	Reactive	1.11
HCV	Uganda	Anti-HCV	Reactive	1.07
HCV	Bangladesh	Anti-HCV	Reactive	1.06
HCV	Ghana	Anti-HCV	Reactive	1.09

All reactive samples showed signal values slightly above the cut-off (COI ≥ 1.0), indicating low-level reactivity.

Risk factors association with serological results

Age-specific analysis indicated that HBV infection was slightly higher among workers aged 25–34 years (n=4, 5.4%), whereas HCV infection was identified in two participants aged 35–45 years (n=2, 3.8%). Married women showed a slightly higher HBV prevalence (5.4%, n=5) compared to single participants (4.4%, n=2), but this difference was not statistically significant (P=0.73). The highest proportion of HBV and HCV positive cases were observed in the group with more than five partners compared to those with less 0-1 partners, the odds of HBV infection increased with the number of sexual partners, the highest risk observed in participants reporting more than five partners. (OR = 7.6, 95% CI: 0.85–67.8, P = 0.047). HBV was more common among workers performing only household duties (6.1%, n=6) than those engaged in mixed work (1.9%, n=1), with the association approaching statistical significance (P=0.078, OR=3.33, 95% CI=0.38–28.9). No significant associations were found between HCV positivity and age, nationality, marital status, or type of work (all P>0.05). History of previous surgery or tattooing was reported in 22 (14.7%) participants, among whom 2 were HBV positive (9.1%) and 1 was HCV positive (4.5%), but these relationships were not statistically significant. Overall, HBV prevalence exceeded HCV among this population, and infections appeared slightly associated with nationality and work type and significantly with number of sexual partners; *P-values* were calculated using Fisher's exact test, all showed in table 4.

Table 4: Association between demographical characteristics and HBV and HCV infection (n=150)

Variable	Category	Total (n)	HBV Positive n (%)	HCV Positive n (%)	OR (95% CI)	p-value
Age Group	18–24	37	1 (2.7)	0 (0.0)	—	0.81
	25–34	74	4 (5.4)	1 (1.4)	—	
	35–45	39	2 (3.8)	2 (3.8)	—	
Marital Status	Married	92	5 (5.4)	2 (2.2)	—	0.73
	Single	45	2 (4.4)	1 (2.2)	—	
	Divorced/Widowed	13	0 (0.0)	0 (0.0)	—	
Work Type	Household Only	98	6 (6.1)	2 (2.0)	3.33 (0.38–28.9)	0.078
	Mixed Work	52	1 (1.9)	1 (1.9)	Reference	
History of Surgery/Tattoo	Yes	22	2 (9.1)	1 (4.5)	—	0.29
	No	128	5 (3.9)	2 (1.6)	—	
Number of Sexual Partners	0–1	66	1 (1.5)	0 (0.0)	Reference	**0.047**
	2–5	46	2 (4.3)	1 (2.2)	2.9 (0.25–33.5)	
	>5	38	4 (10.5)	2 (5.3)	7.6 (0.85–67.8)	

P-values were calculated using Fisher's exact test

Discussion

This study examined the seroprevalence of hepatitis B virus (HBV) and hepatitis C virus (HCV) among 150 foreign female domestic workers in Baghdad, Iraq. The nationalities included in this study were selected based on availability during the study period and recruitment from employment offices. Most participants were from African countries, this may explain the higher representation of African participants in this population. From all positive cases; co-infections did not observe, indicating the independent occurrence of infection among this population. Distribution of HBV and HCV infections was different according to nationality; These results suggest

that may nationality influence the risk of HBV exposure, due to possibility of differences in; vaccination coverage, HBV endemicity-specific countries, and previous access of healthcare (Al-Kubaisy, 2020; Hamid et al., 2018). The analysis of age groups revealed that the female workers aged (25-34) years had the highst HBV positive cases (5.4%), while three positive HCV cases was more among the older age group (35–45) years. These patterns in line with previous studies showing that younger adults in the working-age population may have increased exposure to HBV throughout occupational or household contacts (Al-Samarrai, 2019; World Health Organization, 2021). The highest prevalence of HBV and HCV were seen in Married participants compared to single female workers, but this showed non-significant differences, that aligns with previous studies indicating that marital status may have limited impact on viral exposure without additional behavioral risk factors (Mohammed et al., 2017). The influence of work-type on HBV infection incidence, workers with only household jobs showing a higher prevalence (6.1%) than those with mix work (1.9%). This may reflect that the closer contact with multiple family members while performing different house hold tasks increased the exposure to accidental injuries (Hassan et al., 2016). The history of tattooing or surgery was reported by 22 (14.7%) participants, with slightly higher HBV (9.1%) and HCV (4.5%) prevalence among this group, these associations were not statistically significant. Similar observations were reported in other studies from the region, pointing out that invasive procedures or skin-penetrating practices can play a role in viral transmission when infection control measures are inadequate (Al-Mousawi, 2015; Al-Shaikh et al., 2018). Regarding the number of sexual partners, the results showed that participants with more than five partners had higher odds of HBV infection compared to those with fewer partners. This finding is expected because increasing the number of partners can increase the chance of exposure to infection. Previous studies also reported that having multiple sexual partners is an important risk factor for HBV transmission (Trepo et al., 2014).

Also, the signal values (COI) in this study were mostly just above the cutoff value, around 1.0. This may indicate weak reactivity rather than strong

infection. It is possible that these cases represent early infection or low viral activity, but without confirmatory tests it is difficult to be sure (WHO, 2021; Mohammed et al., 2017). Similar findings were reported by Seo et al. (2017), Compared with previous reports from Iraq and neighboring countries, the prevalence of HBV and HCV in this study is relatively low but still highlights the presence of these infections among migrant domestic workers (Al-Kubaisy, 2020; Hamid et al., 2018).

This study has limitations; however, it provides important information regarding HBV & HCV in an at-risk population in Baghdad. Evidence from the current study shows that the Iraqi government's attempts to control infectious disease among expatriate workers are reflected in the low number of positive cases documented; likely due to screening programs for prospective employees. It is critical to highlight that electrochemiluminescent immunoassays such as those designed by Roche, are largely intended to be used as qualitative screening assays; thus, any reactive or borderline results should be interpreted with caution and preferably by more specific tests including polymerase chain reaction (PCR) to evaluate the presence of virus and assess viral load (WHO, 2017). Future directions for this population should be in raising awareness, providing prevention education and implementing targeted health interventions to help reduce the transmission of HBC and HCV.

Conclusion

The study reported that of the 150 female migrant workers who participated in the project, 4.72% were positive for hepatitis B virus (HBV) and 3.26% were positive for hepatitis C virus (HCV). No co-infection was found among the migrant female domestic workers. Overall, the prevalence of HBV was higher among Nigerians, Ethiopians and Guineans than from other backgrounds. Among those aged from 25 to 34, HBV was more common. The prevalence of HBV was slightly higher for those doing only household duties, when compared to mixed duty households. The weak reactivity to HBV antibodies and the number of sexual partners significantly accounts for the increase in risk of HBV. The risk of HBV and HCV infections with influence of marriage and invasive procedures such as

surgery or tattoo is not statistically significant. The authors recommend that routine screening for HBV and HCV, vaccination for HBV and education regarding safe practices should be implemented.

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انتشار الأجسام المضادة لفيروس التهاب الكبد B وفيروس التهاب الكبد C بين العاملات المنزليات الأجنبيات في بغداد

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ملاحظة : هل البحث مستل من رسالة ماجستير او اطروحة دكتوراه ؟ كلا :

مستخلص البحث:

تُعدّ فيروسات التهاب الكبد (بي وسي) من المشاكل الصحية العامة على مستوى العالم، لا سيما بين الفئات السكانية الأكثر عرضةً للإصابة. وتمثل العاملات المنزليات الأجنبيات فئةً فريدةً نظرًا لتنقلهن وظروف معيشتهن واحتمالية تعرضهن المهني للفيروس. هدفت هذه الدراسة إلى تقييم مدى انتشار الأجسام المضادة لفيروس التهاب الكبد بي وفيروس التهاب الكبد سي بين العاملات الأجنبيات. أُجريت دراسة مقطعية على 150 عاملة تتراوح أعمارهن بين 18 و45 عامًا، تم اختيارهن من مكاتب التوظيف المرخصة (ن=100) ومن عيادات خاصة (ن=50) طواعيةً. كانت المشاركات من نيجيريا وغانا وبنغلاديش وإثيوبيا وسيراليون وكينيا. شملت المتغيرات الديموغرافية التي جُمعت: العمر، والحالة الاجتماعية، وتعدد الشركاء الجنسيين، ونوع العمل. خضعت عينات الدم لاختبارات الأجسام المضادة لفيروس التهاب الكبد B وفيروس التهاب الكبد C. تم تفسير نتائج اختبار الأجسام المضادة لفيروس التهاب الكبد B الإيجابية بحذر نظرًا لاحتمالية وجود مناعة ناتجة عن التطعيم. من بين المشاركات، كانت سبع منهن إيجابية للأجسام المضادة IgG لمستضد سطح فيروس التهاب الكبد B (4.7%)، وثلاث منهن إيجابية للأجسام المضادة IgG لفيروس التهاب الكبد C. أظهر التحليل الديموغرافي أن معظم المشاركات الإثيوبيات كنّ من فئة الشباب (18-35 عامًا)، بينما كانت المشاركات الأكبر سنًا (40-45 عامًا) في الغالب من نيجيريا وبنغلاديش، وبعضهنّ لديهنّ أطفال أو أحفاد. وتنوعت المهن تبعًا لمتطلبات صاحب العمل، وشملت: العمل المنزلي، ورعاية الأطفال، وخدمات صالونات التجميل، والتجزئة، وأعمالًا مختلطة. وأظهرت هذه الدراسة انخفاض معدل انتشار التهاب الكبد الفيروسي B وC بين العاملات الأجنبيات في بغداد. وقد تعكس الحالات الإيجابية الأكثر شيوعًا التطعيم المسبق أكثر من كونها إصابة فعلية. وسلطت دراستنا الضوء على أهمية الفحص المخبري الدوري والتثقيف الصحي، إلى جانب تبني برامج تطعيم متخصصة ضد التهاب الكبد B لهذه الفئة السكانية، وذلك للوقاية من انتقال الفيروسات، وضمان صحة العاملات، وتعزيز حماية المجتمع.

الكلمات المفتاحية: التهاب الكبد الفيروسي B، التهاب الكبد الفيروسي C، العاملات الأجنبيات.