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Abstract

**Background**: People who inject drugs (PWIDs) are prone to a number of blood-borne viral infections. Hepatitis B virus (HBV) and hepatitis C virus (HCV) constitute an important public health concern in this high risk group.

**Aims**: We aimed to determine the prevalence of HBV and HCV antibody among PWIDs in Lebanon.

**Methods**: We conducted a prospective cross-sectional study between June 2015 and June 2016 on PWIDs recruited through Lebanese nongovernmental organizations in collaboration with the Lebanese Ministry of Public Health. The participants were tested for HBsAg and anti-HCV using rapid test kits. The prevalence of each virus was then calculated. The correlation between both infections and other possible risk factors was also analysed.

**Results**: A total of 250 people were included in our study, of whom 98% were males. Mean age was 31.9 (standard deviation 8.7) years. The prevalence of HBsAg and anti-HCV among PWIDs was 1.2% and 15.6%, respectively. Older age, longer duration of drug use and lack of awareness were significantly correlated with a higher rate of HCV infection (P

**Conclusion**: PWIDs remain the subpopulation most affected with chronic HCV in Lebanon.
Introduction

The World Health Organization (WHO) estimates that in 2015, 257 million persons, 3.5% of the world population, were living with chronic HBV infection. The African and Western Pacific regions accounted for 68% of those infected. Also, it is estimated that 71 million persons were living with HCV infection in 2015, i.e. 1% of the world population (1). In 2015, viral hepatitis was responsible for 1.34 million deaths. Mortality from viral hepatitis has increased by 22% since 2000 (1).

Transmission of HBV and HCV has been causally associated with injection drug use by people who inject drugs (PWIDs) due to sharing of needles and injection equipment contaminated with infected blood. Seroprevalence rates for HBV and HCV vary considerably among PWIDs depending on the geographic region and time period for the PWID populations tested.

Injection drug use, unsafe sex and unsterile tattoos are the main modes of transmission of HBV in patient not vaccinated. Injection drug use remains the main mode of transmission in industrialized countries, whereas unsterile tattoos and piercings in nonprofessional settings might play an increasing role in young populations (2).
Unsafe therapeutic injection practices and blood transfusions are also important routes of infection (3). Unsafe health care practices (including unsafe health care injections) and injection drug use remain the leading modes of transmission of HCV. Areas with high rates of infection are located in the Eastern Mediterranean Region and the European Region. In the Eastern Mediterranean Region, the most common cause of transmission of infection is unsafe health care injections (4,5). In the European Region, injection drug use accounts for a substantial proportion of infections (6).

According to the latest United Nations Office on Drugs and Crime report, around 16.5 million people (0.4% of the total world population) aged 15–64 years use heroin or opium (7).

Lebanon is ranked among the countries with a low endemicity profile for both viruses having a prevalence of 1.74% for HBV and 0.21% for HCV (8); HCV genotype 3 is the most prevalent genotype in the Lebanese PWID population followed by genotype 1 (9). The prevalence of these infections among PWID in Lebanon has previously been estimated at 2.5–5% for HBV and more than 50% for HCV, based on small scale reports (10).

The aim of this study was to determine the prevalence of both infections in PWIDs in the Lebanese population based on a screening strategy applied by a number of nongovernmental organizations and to establish the correlation between both infections and other possible underlying factors within this high-risk group.

**Methods**

**Study design**

We carried out this cross sectional study between June 2015 and June 2016 on injection drug users recruited through the Middle East and North Africa Harm Reduction Association (MENAHRA) in collaboration with many other nongovernmental organizations throughout Lebanon.

**Study conduct and data collection**

As part of a strategy to control blood-borne viral infections such as HIV and viral hepatitis in high risk groups by the Lebanese Ministry of Public Health, screening for HCV antibodies and HBs antigen and HIV in the PWID population was carried out followed by a vaccination protocol against HBV in seronegative patients. This work was done in collaboration with
nongovernmental organizations throughout Lebanon. These organizations were registered in Beirut and their geographic distribution covered Lebanese territory from north to south, Beqaa and Beirut. They included ESCALE, SIDC, SKOUN, AJEM, the nongovernmental organization platform of SAIDA, Oum el Nour, Jeunesse contre la drogue, Cenacle de la lumiere, Nusroto and Bonheur du ciel. The PWIDs presenting to these organizations were from different regions in Lebanon.

All the PWIDs patients presented to the aforementioned nongovernmental organizations were included in our study, after a clear explanation of the aims of the study, independently of their age, sex or duration of drug use. There were no exclusions.

All participants were able to read, 95% signed a consent form in Arabic. Their agreement was guided by the responsible person in the nongovernmental organization. At the time of the study, participants were not under the effects of drugs. They were tested for HBs Ag and HCV Ab using rapid test kits: RDT HEPATITIS B (SD Bioline HBsAg-01FK10W), HBsAg, RDT HEPATITIS C (SD Bioline HCV-02FK10), HCVAb, which are based on enzyme immune assay. None of the PWIDs included were prisoners but some had a previous history of incarceration that is not reported here.

Data collection included age, sex, nationality, presence of any other predisposing factor for viral hepatitis acquisition, other high risk behaviours such as sharing needles, men who have sex with men, sex working, living with someone infected with HBV and/or HCV, sex with a person infected with HBV/HCV, history of blood transfusion, the presence of piercings and tattoos. Further inquiry included the level of awareness and education, which were assessed by asking participants if they had ever heard about HBV/HCV, viral transmission through contaminated blood and unsafe sexual practices or about the existence of HBV vaccination for prevention. They were also asked about any previous HBV vaccination.

All these data were gathered by the responsible person in each nongovernmental organization and were registered in an Excel document.

**Statistical analysis**

The prevalence of HBV and anti-HCV antibody among the PWIDs in the study was calculated.
The correlation between the age of participants and test positivity was calculated. The impact of viral hepatitis risk factors of on the prevalence of HBV and anti-HCV antibody was also analysed. The prevalence of needle-sharing between the PWIDs as well as the duration of drug injection were specifically addressed in addition to their association with serologic positivity of HBV and HCV. Similarly, we investigated the knowledge of participants about viral hepatitis and mode of transmission and how it could affect their life. The proportion of participants vaccinated for HBV was also calculated to inform a future viral prevention programme.

The statistical analysis on these associations was done using the Chi-squared ($\chi^2$) test; P-value 80% (10).

Based on our results, Lebanon is among the areas with the lowest prevalence for HBV and HCV in PWIDs compared with the surrounding countries in the Middle East and North Africa, where the rate of HBV and HCV infection has reached extremely high levels, e.g. in Libya and Egypt (10). Although it may reflect the low baseline endemicity in the general Lebanese population, other factors may be related to such a low rate such as the current drug and harm reduction policies. Lebanon is one of the 5 Arab countries providing a needle and syringe exchange programme along with Egypt, Morocco, Palestine and Tunisia (24). On the other hand, what characterizes Lebanon from the majority of Arab countries is that the Lebanese court imposes dependence treatment besides sanction for incarcerated drug users, thus, reducing their future risk of viral exposure (25). Furthermore, opioid substitution therapy (OST) was implemented in Lebanon in 2011 along with only 4 other Middle Eastern countries, Bahrain, Islamic Republic of Iran, Morocco and the United Arab Emirates. According to Lebanese Ministry of Public Health reports, the prevalence of HCV was reduced from 27% to 16% in 2014, although a clear causal correlation could not be confirmed between the reduction and OST implementation (24). Harm reduction strategies for PWIDs such as needle and syringe programmes and OST had limited impact on HCV prevention; a combination of interventions is often needed (26).

Studies of the effects of exposure to preventive interventions, including drug treatment (27), needle and syringe distribution (28), harm reduction and education programmes (29), and bleach disinfection (30), have failed to provide conclusive evidence of efficacy. While a recent Dutch study showed significant protective effects of comprehensive harm reduction (needle and syringe distribution and methadone treatment) on HIV and HCV incidence (31), a peer education intervention randomized controlled trial found reductions in risk behaviour but no difference in HCV incidence (18.4/100 person-years) between the intervention and control groups (32). These data suggest that further decreases in incidence are unlikely to be achieved without large scale and effective biomedical interventions, notably preventive vaccines (33).
In our study, sharing needles was significantly associated with a higher rate of infection. In a review and meta-analysis of the association between self-reported sharing of needles/syringes and hepatitis C virus prevalence and incidence among people who inject drugs, pooled prevalence and incidence of HCV was 59% and 11% among PWIDs who reported never and not recently sharing needles/syringes, respectively, with odds ratio 3.3 (95% CI: 2.4–4.6), comparing HCV infection among those who ever (or recently) shared needles/syringes relative to those who reported never (or not recently) sharing (34).

Programmes to provide PWIDs with access to sterile needles and syringes (NSPs) are generally considered to be among the most effective means of reducing HIV and HCV transmission among PWIDs (35).

A minimum of 20 to 30 syringes per PWID annually may be needed to affect HIV and/or HCV transmission in a population of PWIDs. Reaching high coverage levels (20–30 syringes per PWID per year and at least 50% of the PWIDs population) for NSP is very likely to be followed by reductions in HIV and/or HCV infection in the local population of PWIDs (36).

In this study, HCV positive PWIDs were found to be significantly older than the general PWID population. Similarly, we noted a strong correlation between the duration of their drug injection practices and anti-HCV positivity. Backmund et al. reported a correlation between older age, longer duration of drug use and positivity of HCV serology among drug users (37).

Further analysis of the study population has showed that a low index of awareness of HCV and mode of transmission was associated with a higher prevalence of infection. As limiting exposure to HCV is the only way of preventing viral transmission, it is of extreme importance to implement targeted educational programmes for all PWIDs in Lebanon and to inform them about the different modes of transmission as well as the possible methods of prevention.

Our study has some limitations. As the estimated drug user population in Lebanon is about 10 000–15 000 individuals (38), of whom 35% are PWIDs (39); our study population provides an estimation of HCV and HBV serology in this population group followed by the nongovernmental organizations and it could result in an underestimate of the exact prevalence of HCV and HBV in this population. Furthermore, illicit drug users are a hard to reach population as they tend to deny and hide their practices, which may be a basis for contempt in Lebanese society. Nor did we report on whether our PWIDs had a history of imprisonment, where viral spread may occur more frequently.
Prévalence des virus de l'hépatite B et de l'hépatite C chez les consommateurs de drogues injectables dans la population libanaise

Résumé

Contexte: Les consommateurs de drogues injectables sont exposés à un certain nombre d'infections virales transmises par le sang. Les virus de l'hépatite B (HBV) et de l'hépatite C (HCV) constituent une préoccupation de santé publique majeure dans ce groupe à risque élevé.

Objectif: La présente étude avait pour objectif de déterminer la prévalence du HBV et du HCV chez les consommateurs de drogues injectables au Liban.

Méthodes: Entre juin 2015 et juin 2016, nous avons mené une étude transversale prospective sur des consommateurs de drogues injectables recrutés par l'intermédiaire d'organisations non gouvernementales libanaises, en collaboration avec le ministère libanais de la Santé publique. Les participants ont été soumis à des tests de dépistage des antigènes de surface de l'hépatite B et des anticorps anti-HCV à l'aide de kits de dépistage rapide. La prévalence de chaque virus a ensuite été calculée. La corrélation entre les deux infections et d'autres facteurs de risque possibles a également été examinée.

Résultats: Au total, 250 personnes ont été incluses dans l'étude, dont 98 % d'hommes. L'âge moyen était de 31,9 ans (écart type 8,7). La prévalence des antigènes de surface du virus de l'hépatite B et des anticorps anti-HCV, parmi les consommateurs de drogues injectables, était respectivement de 1,2 % et de 15,6 %. On a observé une corrélation significative entre l'âge, une durée plus longue de consommation de drogue, le manque de sensibilisation et le taux plus élevé d'infection au HCV (p