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Prevalence of viral hepatitis amongst dental patients attending university dental clinics in Basrah

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Abstract--Background: Hepatitis is a highly infectious blood-borne disease affecting the population worldwide. The dental team is highly susceptible to acquiring the disease if get injured by contaminated sharp objects. Immunization against hepatitis B became widely obligatory for dental students and dental team members. Materials and Methods: This retrospective study collected data from the university of Basrah dental clinics. Patients attending oral surgery department clinics from January 2021 to December 2021 were screened for Viral Hepatitis B and Viral Hepatitis C by lateral flow test strips. Data were collected and prevalence was calculated. Results: The sample included 561 patients, having 12 patients being excluded for missing information and the remaining 549 were included in the quantitative assessment. The test results for Hepatitis B revealed 5 total prevalence of 0.91%. For the test results for Hepatitis C, there was a total prevalence of 0.73%. Conclusions: The prevalence of Hepatitis B and Hepatitis C are relatively low among dental patients. However, the importance of screening is highly recommended to minimize the risk of transmission.

Keywords--hepatitis B, hepatitis C, Basrah, occupational disease.

Introduction

As a definition, Hepatitis is the inflammation of the liver. Hepatitis may be caused by infectious and non-infectious conditions. Viral hepatitis is the most common form of infectious hepatitis, while the non-infectious condition can be caused by drugs (e.g. Acetaminophen) or alcohol abuse. The liver plays an important role in drug metabolism, synthesis of coagulation factors, secretion of bile for fat metabolism, excretion of bilirubin, and other important functions. Five subtypes of viral hepatitis exist and include types A, B, C, D, and E. The causative virus is different for each subtype, but they all have one target organ (i.e. Liver), comparison of these different subtypes can be summarized in Table.1.

Table 1
Summary comparison between viral hepatitis subtypes

	Type A (HAV)	Type B (HBV)	Type C (HCV)	Type D (HDV)	Type E (HEV)
Main route of Transmission	Fecal / Oral	Parenteral, Sexual Contact	Parenteral, Sexual Contact	Parenteral, Sexual Contact	Fecal / Oral
Availability of Vaccination	Yes	Yes	No	No	No
Chronicity	No	Yes	Yes	Yes	No
Associated Complication	Rare	Possible*	Possible*	Possible*	Rare
* Increased risk of Liver cirrhosis and Hepatocellular carcinoma.					

Clinical presentation of the disease starts after the incubation period, most of the cases with HBV and HCV are asymptomatic. On the other hand, majority of patients with HAV are symptomatic. The signs and symptoms of Acute Hepatitis are initially similar to any viral infection and described as flu-like. These can be categorized into 3 phases, pre-icteric, icteric and post-icteric. In the pre-icteric (prodromal) phase, In this phase patients experience the non-specific symptom of abdominal pain, anorexia, nausea, vomiting, fatigue, malaise, and fever. This phase lasts for about 2 weeks. The icteric phase, this phase is characterized by the development of jaundice (i.e., Yellow-Brown discoloration of the eye, skin, oral mucosa, and urine.) and reduction in the non-specific symptoms experienced in the previous phase. Hepatomegaly and splenomegaly are frequently seen. This phase might last for 8 weeks. Post-icteric (convalescent or recovery) phase, this phase the symptoms generally disappear with the exception of hepatomegaly and abnormal liver function, which may continue for longer periods. The clinical recovery may require several months (Approximately 4 months)(Little et al., 2017, Schaefer and John, 2022).

Chronic Hepatitis might develop with certain sub-types of this disease and the patient might remain asymptomatic for years (up to 30 Years). Eventually, liver complications occur and the signs and symptoms become apparent. Complications include hepatic fibrosis, liver cirrhosis, and hepatocellular carcinoma. The presentations of these complications include bleeding disorders, ascites, jaundice, spider angioma, dark urine, loss of weight, fatigue, and liver

tenderness (Little et al., 2017, Tang et al., 2018). Identification of those patient can be complicated sometimes, knowing the fact that they might be asymptomatic in nearly half of the cases (Dixit et al., 2007). This alert the healthcare provider to adopt strict infection control policy for every single patient, whether known to have the disease or not. Recommendation for Hepatitis B immunization have been applied worldwide and even made as an obligation to practice dentistry (Mackie et al., 2009).

Material and Methods

Following the ethical approval on this observational retrospective analysis from the scientific committee in the university of basrah / college of dentistry. Data regarding rapid immunochromatographic, lateral flow, test for hepatitis B and C virus screening were retrospectively obtained. The tests have been used for qualitative assessment of Hepatitis B surface antigen and Hepatitis C antibodies, fresh blood samples were obtained from 561 patients attending university clinics / Department of oral and maxillofacial surgery. The obtained sample were immediately used on sample application pad of rapid test cassette. Regarding the detection of Hepatitis B, the buffer solution is added on the application pad that contains antibody that can react with Hepatitis B surface antigen if present within the sample. The antigen-antibody complex then diffuses along the test strip and get captured by corresponding antibody on the test strip giving pink colour visible to naked eye. The result is available within 10 minutes and considered invalid after 20 minutes.

On the other hand, for the detection of Hepatitis C, the rapid test depends on double antigen sandwich technique. The test strip is impregnated with recombinant hepatitis C antigen. The sample is then added on the test application pad. The impregnated antigen would detect the presence of any hepatitis C antibody within the sample and form a complex if any is present. The formed complex would give pink coloured line visible to naked eye. The result is also available within 10 minutes and considered invalid after 20 minutes. The inclusion criteria for our data would include patients attends university dental clinics and underwent screening for hepatitis in the period between January 2021 and December 2021 and having information about age and gender. Exclusion criteria if any of the test results is unavailable or there is a missing information needed for the data like name, age, or gender. The data were then entered using computer program (Microsoft Excel 365). The total prevalence then had been calculated for both hepatitis B and hepatitis C by dividing the total number of positive cases on the total sample. The prevalence had been also calculated in relation to gender by dividing each gender positive cases to the total number of the specified gender. The relevant pie and bar charts were calculated by the same program.

Results

From 561 patients in the total sample, 549 patients satisfied the inclusion criteria. The sample had 12 patients been excluded as they had missing information regarding the gender. The remaining included sample had 217 males

and 332 females having percentage from total sample of 39.53% and 60.47% respectively (Fig.1).

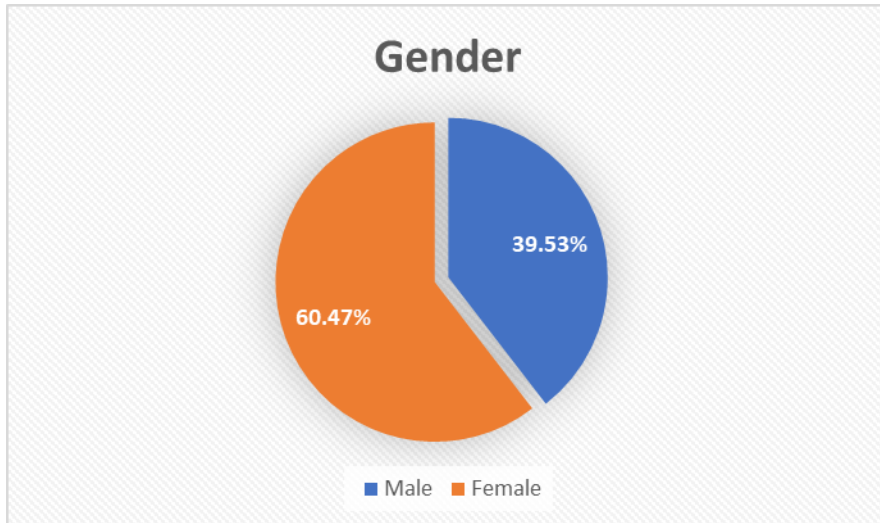


Figure 1. Distribution of gender

For the distribution of the age the sample were categorized within 4 groups: group 1 included patients having age below 20, group 2 for ages 20 years to below 40 years, group 3 include ages between 40 years to below 60 years and the final groups had ages of 60 years and above. The age ranged from 14 to 78 years and median of 46 years (Table 2) (Figure2).

Table 2
The age distribution

Group Number	Range	Number	Percentage from total
Group 1	< 20 Years	48	8.74%
Group 2	20-39 Years	156	28.42%
Group 3	40-59 Years	191	34.79%
Group 4	>=60 Years	154	28.05%
Total		549	100.0%

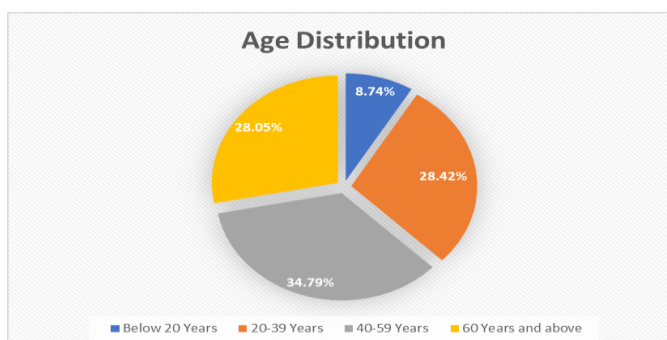


Figure 2. Age distribution of the taken sample

Regarding the test results for Hepatitis B, there were 5 positive cases in the total sample. The positive cases were 2 males and 3 females. Giving total prevalence of 0.91% and 0.92% in males and 0.90% in females (Figure 3).

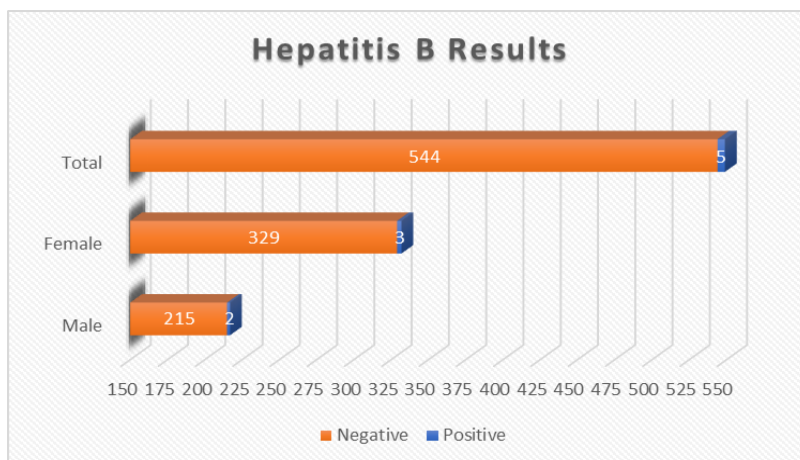


Figure 3. Results of Hepatitis B test in the included sample

For the test results of Hepatitis C, there were 4 positive cases in the total sample. Giving a total prevalence of 0.73%. The male group had 2 positive cases with 0.92% prevalence. The female group had 2 positive cases with 0.60% prevalence (Figure 4).

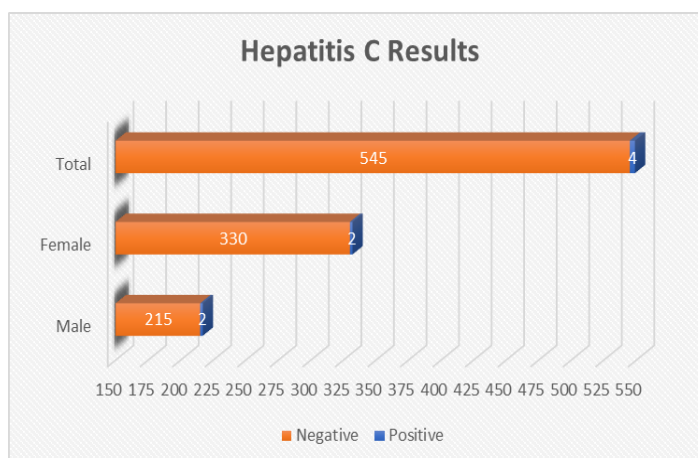


Figure 4. Results of Hepatitis C test in the included sample

The age distribution for positive cases in the included sample was as follows, the patients with positive Hepatitis B were 2 patients within group 3 and 3 patients within group 4. While for hepatitis C the positive cases were categorized as follow, 1 patient within group 2 and 3 patients in group 3 (Table 3).

Table 3

Age distribution for patients with positive result of Hepatitis B and Hepatitis C within the included sample

Group Number	Range	<i>Positive Hepatitis B</i>	<i>Positive Hepatitis C</i>
Group 1	Below 20 Years	0	0
Group 2	20-39 Years	0	1
Group 3	40-59 Years	2	3
Group 4	60 Years and above	3	0
Total		5	4

Discussion

The screening of hepatitis in university clinics is important to minimize risk of disease transmission to dental students, which are considered as one of the risk groups for occupational acquired disease (Sacchetto et al., 2013). The prevalence of hepatitis in Iraq is not correctly calculated because of the ongoing political, social, and economic instability in the area (Al-Rubaye et al., 2016). However, several studies have calculated the prevalence in different areas in Iraq for different groups (Al-Rubaye et al., 2016, Khudhair et al., 2020, Tarky et al., 2013, Ramadhan, 2018). The lateral flow test which is had been used in this study is considered as a rapid ,economic and simple method for detection of patients with viral hepatitis (Koczula and Gallotta, 2016). The sensitivity and specificity of the lateral flow test in detection of hepatitis B had been evaluated by several studies and considered a good diagnostic tool in cases where resources are limited to perform more complicated polymerase chain reaction tests (Sun et al., 2021, Zhang et al., 2021). In addition, the Hepatitis C lateral flow test also had demonstrated high sensitivity and specificity, but the sensitivity was reported to be affected by patients HIV status, with lower sensitivity in HIV positive patients (Vetter et al., 2020).

The age group for our study ranged from 14 to 78 years which is comparable to other studies (Al-Rubaye et al., 2016, Ramadhan, 2018). The median was 46 years while it was reported to be 34 years (Al-Rubaye et al., 2016) and 25 years in other studies(Ramadhan, 2018). Older population was evident in our study is due to the selection criteria for patient attending the oral surgery clinic in our department. Other studies had wider age distribution giving lower median values (Al-Rubaye et al., 2016, Ramadhan, 2018). The prevalence of hepatitis B in our study was reported to be 0.91%, the test identified 5 positive cases out of 549 participants. Previous study by Al-Rubaye and his collages in basrah showed higher prevalence of 2.3%. The latter had used serological testing for HBsAg and anti-HBc for blood donors and included larger test group, which might contribute to larger and probably more accurate reported prevalence. The Iraqi national reported prevalence of Hepatitis B was 1.6% in 2005(Tarky et al., 2013).

The prevalence of hepatitis C had been identified as 0.73% by our study. Similar low rate was also reported by the national prevalence of 0.4% in 2005 (Tarky et al., 2013).Higher incidence was reported among Thalassaemic patients (3.2%)(Khudhair et al., 2020). This can be attributed to regular blood transfusion taken by these patients which alert the need for better testing for blood donors.

Other study also reported comparable low prevalence in basrah of 0.1% (Al-Rubaye et al., 2016).

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