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Analysis of Parameters of an Epidemiological Survey on Hepatitis A, B, C in The State of Sétif (East Algeria).

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Abstract: *Viral hepatitis is a national and international public health problem and its frequency is increasing. The diagnosis of this disease is linked to several tests and techniques.*
The objective of this study is an epidemiological survey on viral hepatitis A, B, C, on consultation of the registers and the records of diseases with mandatory declaration of direction of health and population of the state of Sétif (East-Algeria) for three years. Analysis of the data showed that viral hepatitis accounts for 11.1% of the cases affected among the reportable diseases. Hepatitis A is the most abundant form of hepatitis (84% or 1618 patients affected); hepatitis B is the second most common form of hepatitis (12% or 227 patients affected) and hepatitis C is the third most common form of hepatitis (4% or 75 patients affected). These diseases are particularly common in the municipalities of Setif: Setif, El Eulma, Ain Oulmene and Ain El Kebira. The male sex is most affected compared to the female sex. The age range targeted by the hepatitis A virus is between 5 years and 14 years (usually children and adolescents in school), but the age range affected by the hepatitis B virus is between 20 years and 45 years (Adults), whereas the hepatitis C virus affected the age range from 45 to 64 years.
The analysis of these data has enabled the health department of the Setif State to set up a strategy to fight against hepatitis especially in the school field, based on prevention by raising awareness and informing the population.

Key Words*: Epidemiological survey, hepatitis A, hepatitis B, hepatitis C, Setif, Algeria.*

1. Introduction

Viral hepatitis is an international public health problem, comparable to other major communicable diseases such as HIV, tuberculosis or malaria. The disease caused 1.34 million deaths in 2015, similar to tuberculosis deaths and higher than HIV deaths (WHO, 2017).
Hepatitis is a liver disease characterized by an inflammatory phase that can be acute or chronic. Depending on the cause of this inflammation, there are two main categories of hepatitis, viral and non-viral.

Viral hepatitis, caused by a virus infection, of which five viruses have been identified in humans: hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), hepatitis D virus (HCV) and hepatitis E virus (HEV) and the list of other viruses remains open (Benhamou, 2002).

Hepatitis A, B and C are the most common, WHO estimated that in 2016, worldwide, 7,134 people died of hepatitis A (0.5% of viral hepatitis mortality) (WHO, 2020). And in 2015, the number of people with chronic hepatitis B virus (HBV) infection was estimated at 257 million, and that of people with hepatitis C virus (HCV) infection at 71 million (WHO, 2017).

The objective of this study is to make an epidemiological investigation on viral hepatitis A, B and C, based on the exploitation of the registers of the Public Health Directorate (DSP) of the wilaya of Sétif during the three years 2018, 2019 and 2020.

2. Materials and Methods

This work is carried out on consultation on the registers of the Directorate of Health and the population of the wilaya of Sétif concerning all hospitalized subjects or patients with viral hepatitis A, B and C that are registered on the registers. Patient data are collected from the Reportable Disease Records.

For our statistical analysis, we used the Microsoft Excel 2019 software.

3. Results and Discussion

Viral hepatitis is a major public health problem in the world, it is a liver disease characterized by an inflammatory phase that can be acute or chronic. Depending on the cause of the inflammation, viral hepatitis, caused by different viruses (VHA, VHB, VHC, VHD, VHE) is distinguished (Endougou 2015; Benhamou 2002).

The five hepatitis viruses (A, B, C, D and E) are very different. Their modes of transmission differ and affect different populations and do not produce the same health outcomes. Viral hepatitis caused 1.34 million deaths in 2015. The World Health Organization estimates the annual number of cases of hepatitis A worldwide at 1.5 million. The WHO estimated that in 2016, 7,134 people worldwide died of hepatitis A (0.5% of viral hepatitis mortality) (WHO, 2020). And in 2015, the number of people with chronic hepatitis B virus (VHB) infection was estimated at 257 million, and that of people with hepatitis C virus (VHC) infection at 71 million (WHO, 2017). Hepatitis B and C viruses can lead to chronic conditions, meaning that the subject does not get rid of the virus and can develop many serious complications of chronic hepatitis: cirrhosis and liver cancer. Severe hepatitis can lead to liver destruction and death (Pol et al., 2007).

In our study, the results were expressed in the form of graphs «figures» of patients registered on the registers of the Public Health Directorate (PHD) of the wilaya of Sétif.

Based on our investigation and the data collected from the prevention department of the PHD of the wilaya of Sétif and the exploitation of the reportable diseases (RD) surveys (reportable diseases), we found the following results:

1920 cases of viral hepatitis among 17,162 reportable diseases cases or 11.19% (Figure 1).

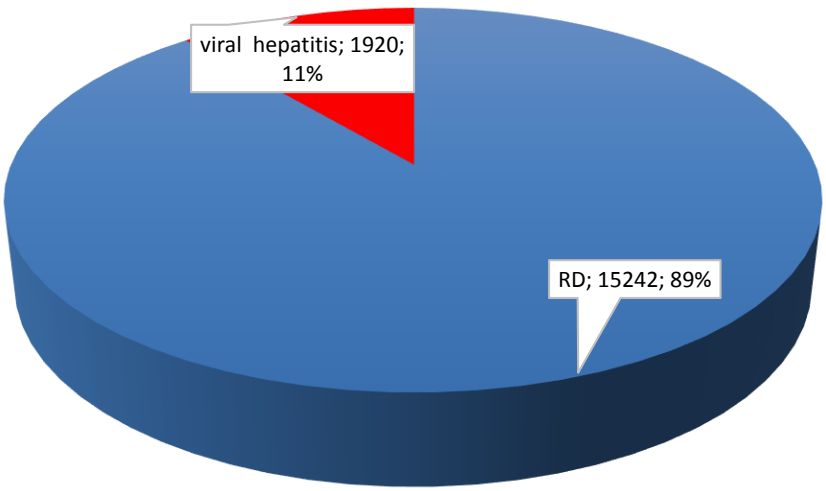

Fig. 1: Viral hepatitis compared to reportable diseases from 2018 to 2020 in the wilaya of Sétif.

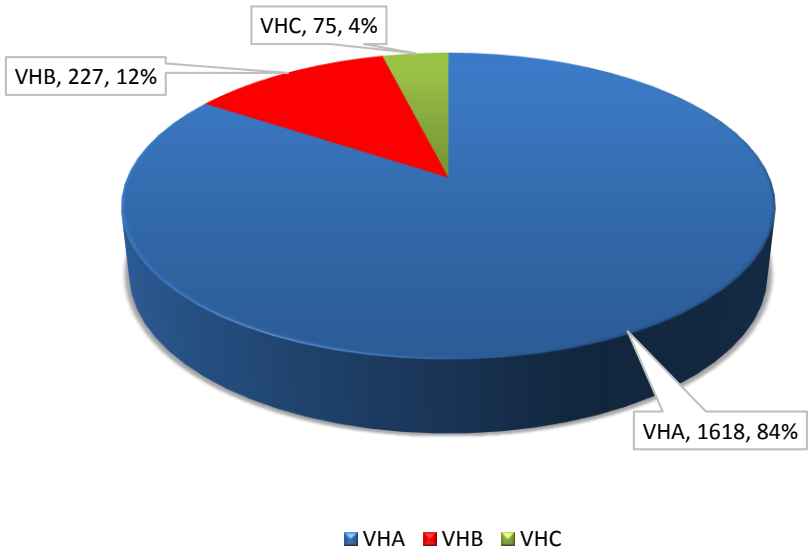

Fig. 2: distribution by the nature of hepatitis during the period 2018-2020 in the wilaya of Sétif.

Based on the results obtained, and according to the figures (Figure 2 and 3), we find that viral hepatitis A (HAV) represents a rate of 84% either (1618 affected subjects), viral hepatitis B (HBV), a rate of 12% either (227 affected subjects) and viral hepatitis C (VHC) with a rate of 4% or (75 subjects affected).

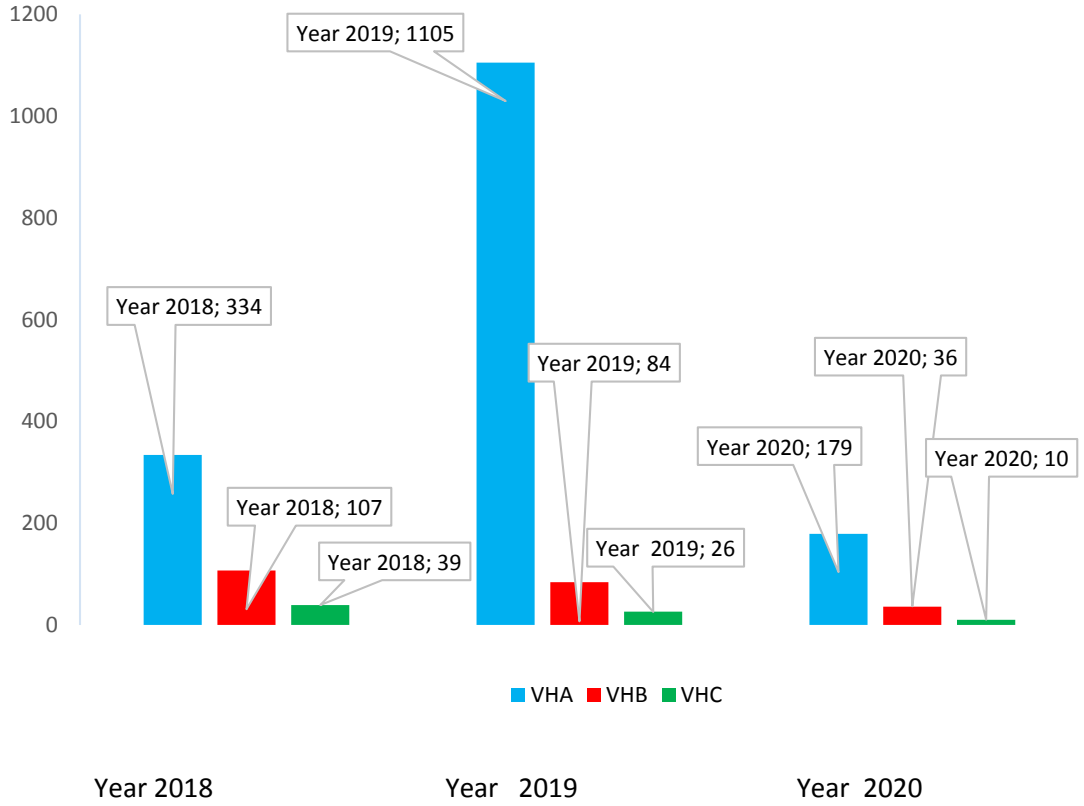

Fig. 3: Distribution of viral hepatitis by type and year (2018-2020) in the wilaya of Sétif

We note that VHA is very high during the year of 2019 (1105 cases), whereas VHB reached the maximum during the year of 2018 (107 cases affected) and finally VHC reached its maximum during

the year of 2018 (39 cases). This increase in VHA during the year of 2019 probably due to a strong spread of the virus by several modes of transmission such as: poor conditions of the sanitation network, contaminated water, the absence of hygienic conditions, Direct food-borne contamination during preparation by infected people.

In comparison with other studies carried out in the wilaya of Ain Timouchente during the period from 01 January 2001 to 31 December 2016, the results come in the following order: VHB (39.60%), VHA (33.90%) and finally VHC (26.50%) (Bradai and Taleb, 2014).

This work does not go in the direction of the results obtained in the wilaya of Sétif.The cases of viral hepatitis are reported throughout the year, with an increase in HAV in the months of January, February, November and December. Viral hepatitis is exclusively human so there is no seasonal trend. While HBV and HCV spread almost consistently throughout the year relative to HCV (Figure 4).

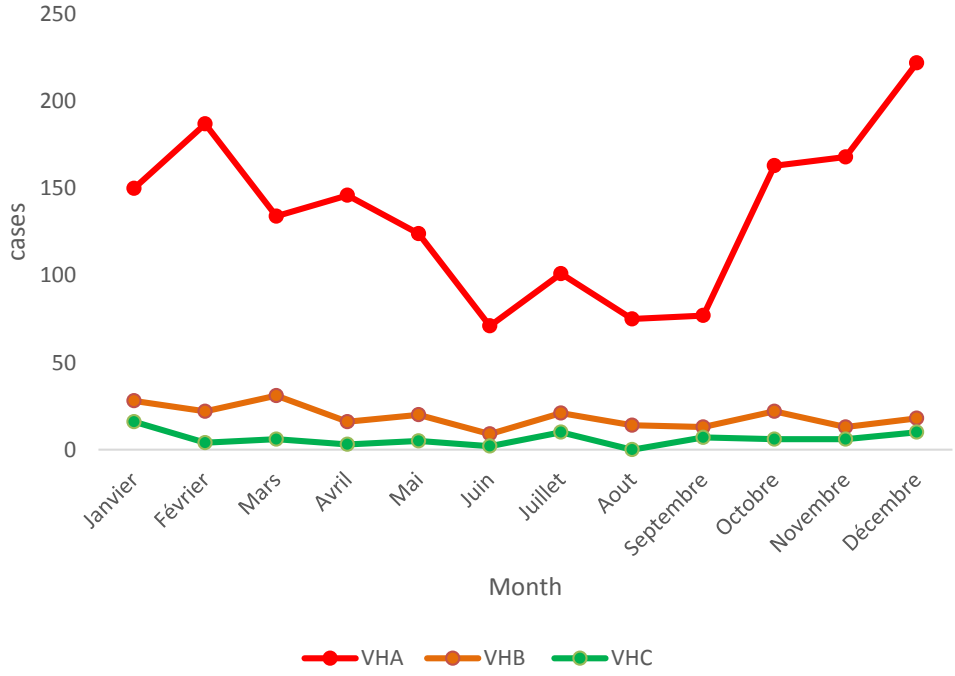

Fig. 4: distribution of viral hepatitis cases by reporting months (2018-2020) in the wilaya of Sétif.

4. Geographical Distribution of Viral Hepatitis by Municipality

4.1.Viral hepatitis A (VHA)

The number of cases affected by hepatitis A during the 3 years (2018-2020) is of the order of 1618 cases distributed in the 60 municipalities of the wilaya (Figure 5).
The results show an increase in the following municipalities: Sétif 421 cases (26.01%), Eulma 172 cases (10.63%), Ain oulmène 110 cases (6.79%) and Ain El kbira 102 cases (6.30%). These four communes have an infection 49.73% or half of the infections in the wilaya and the rest of the affected cases is spread over the remaining 56 municipalities.

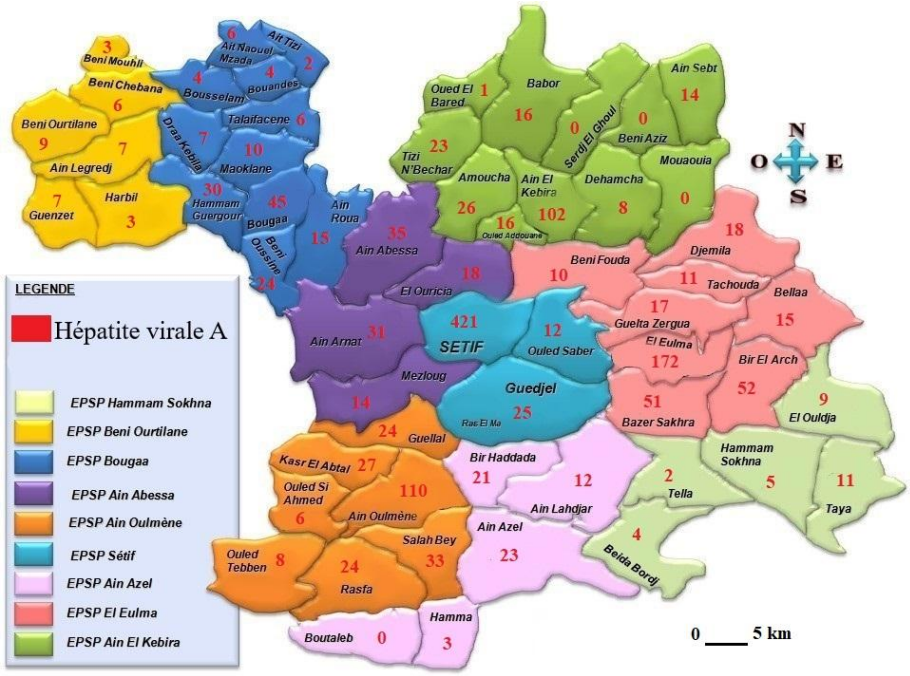

Fig. 5: distribution of cases of viral hepatitis A (HAV) by municipality (2018-2020) in the wilaya of Sétif.

4.2. Viral hepatitis B (VHB)

The cases affected during the 3 years (2018-2020) are of the order of 227 cases distributed in the 60 municipalities of the wilaya (Figure 6).

The results are high in the following municipalities: Sétif 84 cases (37%), El Eulma 16 cases (7.04%), Guedjal 16 cases (7.04%) Ain Lahdjar 14 cases (6.16%) and Ain oulmène 13 cases (5.72%), all five municipalities reach 62,96%, or more than half of the infections in the wilaya and the rest of the cases affected are spread over the 55 municipalities.

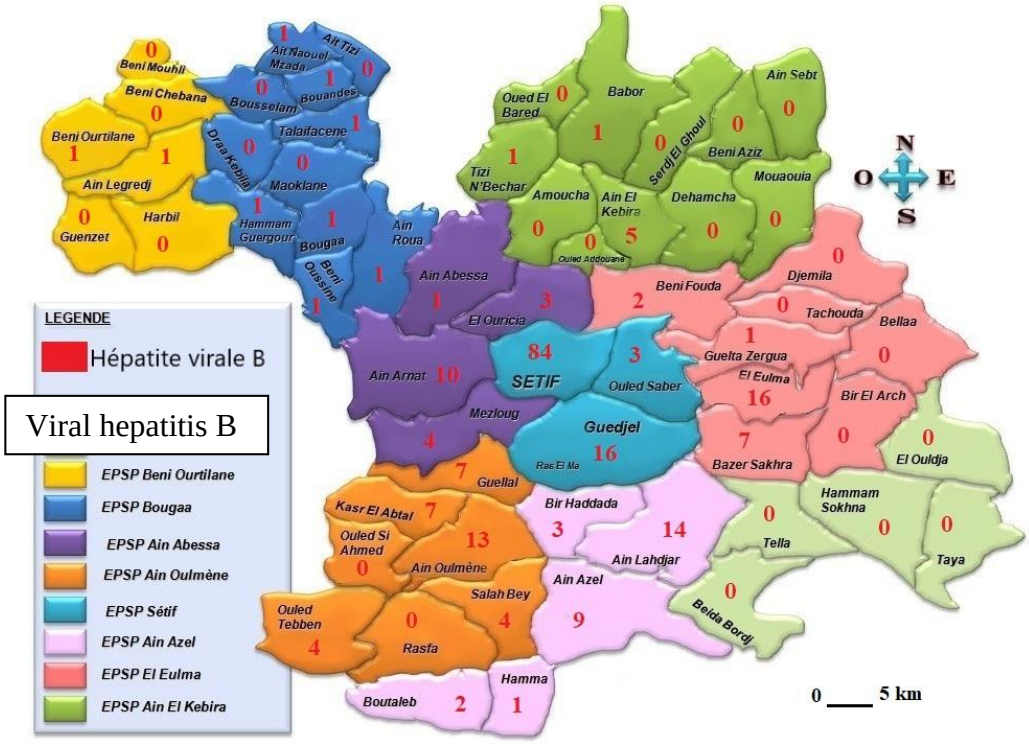

Fig. 6: Distribution of cases of viral hepatitis B (HBV) by municipality (2018-2020) in the wilaya of Sétif.

4.3. Viral hepatitis C (VHC)

Finally the cases affected by viral hepatitis C during the 3 years (2018-2020) are of the order of 75 cases distributed in the 60 municipalities of the wilaya (Figure 7). The results observed are high in the following municipalities: Sétif 24 cases (32%), Ain Azel 7 cases (9.33%), El Eulma 5 cases (6.66%) and Ain Oulmène 4 cases (5.33%), all of these four municipalities reach 53,32% and more than half of the infections of the wilaya and the rest of the affected cases is distributed among the 56 municipalities.

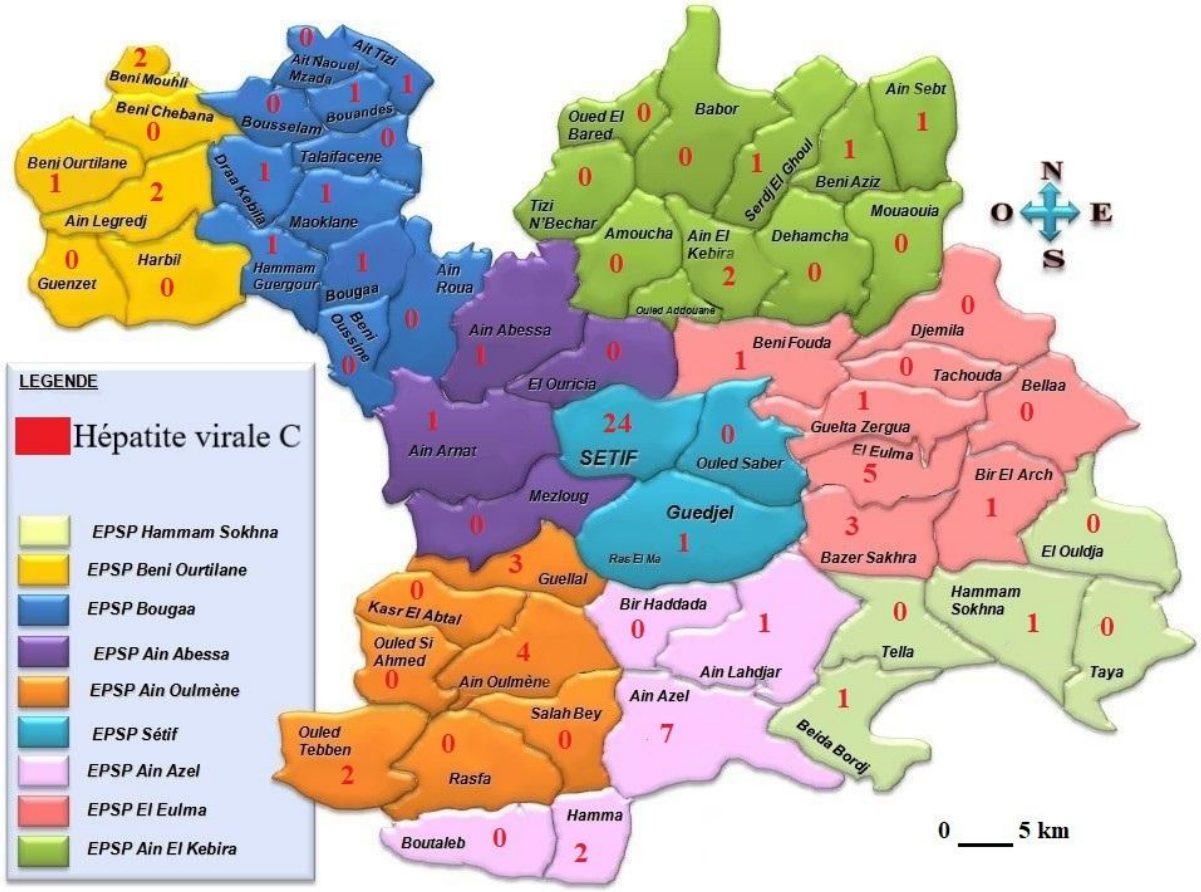

Fig. 7: distribution of cases of viral hepatitis C (HCV) according to municipalities (2018-2020) in the wilaya of Sétif.

5. Epidemiological Profile of Viral Hepatitis by Sex and Age Group

5.1.Viral hepatitis A:

a) Sex

The cases affected during the 3 years (2018-2020) are of the order of 1618 distributed as follows: 864 men (53%) and 754 women (47%), The male sex is the most affected (Figure 8).

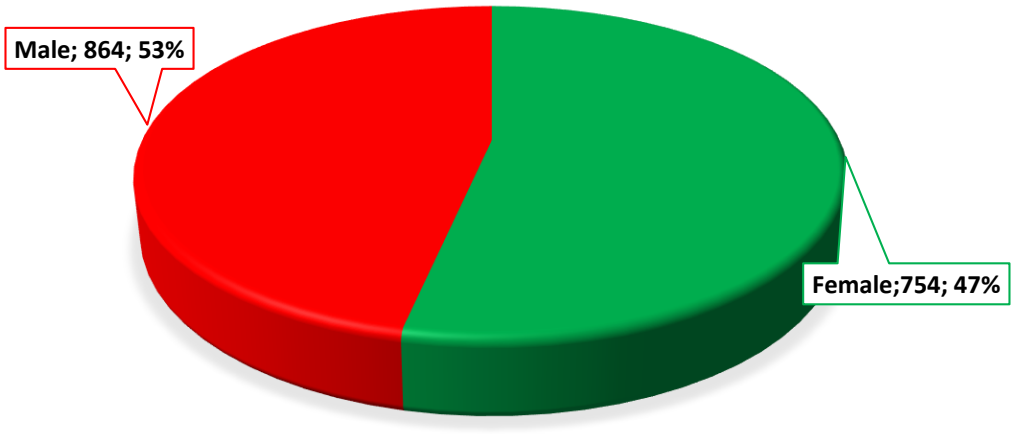

Figure 8: distribution of hepatitis A patients by sex in the wilaya of Sétif.

b) **Age**

The recorded results show that the age group of patients most affected by HAV is 5 to 9 years (38.08%) which shows the peak and decreases from 10 to 44 years and the age groups 0-1 year (0.56%) and 45-64 years are the least affected (Figure 10).

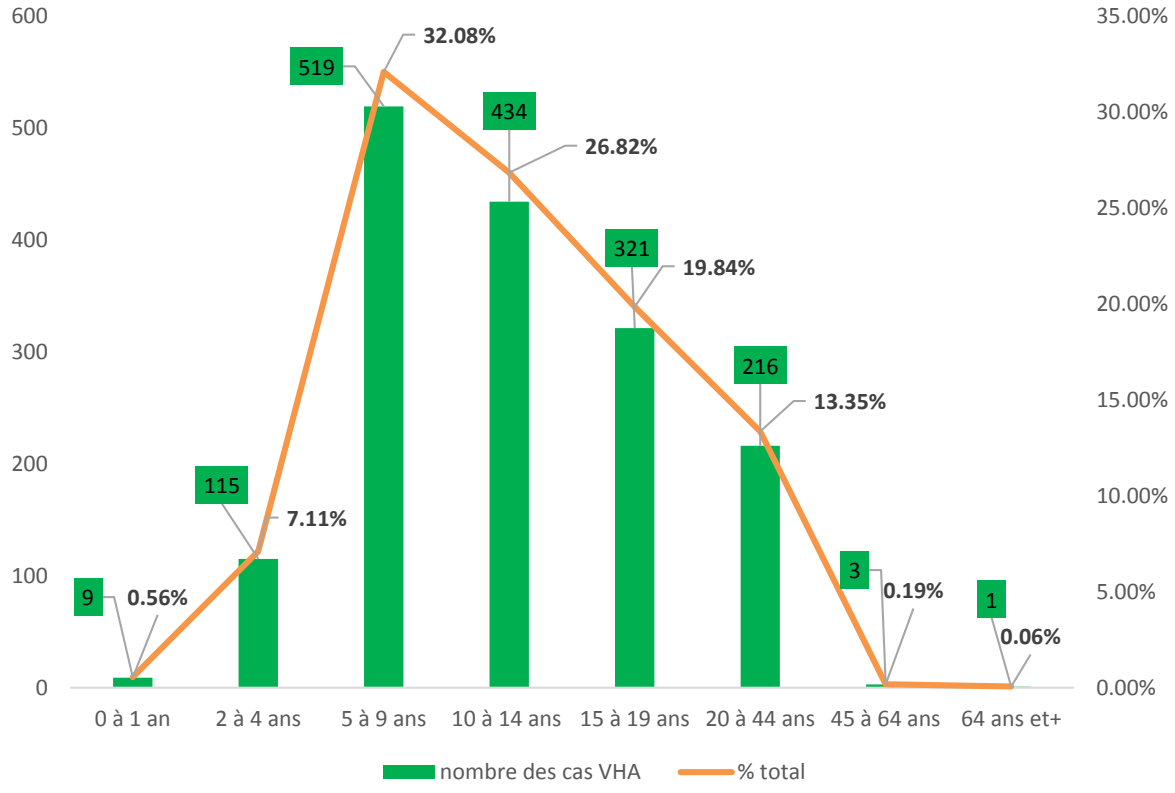

Fig. 10: Distribution of HAV cases by age group in the wilaya of Sétif.

These results are consistent with work obtained in the wilaya of Ain Témouchent during the period (2001-2016) which shows that the male sex and the age group from 5 to 10 years are the most affected (Benyakoub, 2017).

5.2. Viral hepatitis B

a) Sex

In our study we found 227 cases of viral hepatitis B including 102 male cases (45%) and 125 female cases (55%) (Figure 11).

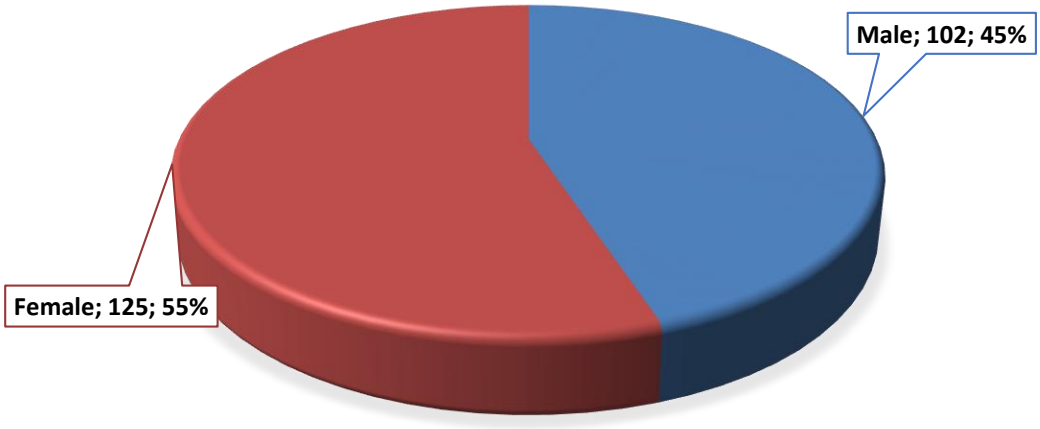

Fig. 11: Distribution of HBV cases by sex in the wilaya of Sétif.

b) Age

The rate of HBV infection is very low in the 1-year to 14-year-old age group, while the age group most affected by HBV ranges from 20 to 44 (a peak of 45.81%) and decreases from 44 to 64 years and older (Figure 12).

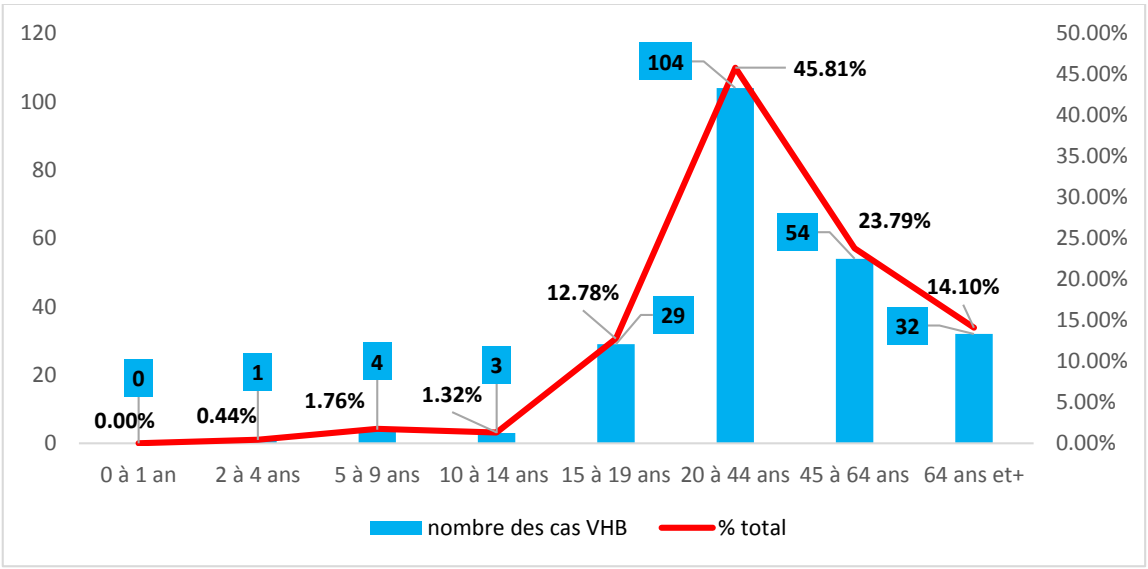

Fig. 12: Distribution of HBV cases by age group in the wilaya of Sétif

These results can be linked to the transmission of the virus during the reuse of needles or syringes in healthcare settings or among injecting drug users (rare in our region). In addition, infections can occur during medical procedures during childbirth or other surgical or dental procedures or when using razors or similar objects, contaminated with infected blood.

The study conducted at the molecular biology laboratory at the Institut Pasteur in Morocco (Casablanca), between March 2006 and July 2009 shows that 276 cases affected by HBV including 216 male cases (78%) and 60 female cases (22%) and this does not go in the direction with our work, By contrast, the most affected age group in Morocco is 30 to 39 years, which is consistent with the results of our study (Sbai et al, 2012).

Viral hepatitis C

a) Sex

The number of reported cases of viral hepatitis C is 75, 46 male (61%) and 29 female (39%) cases (Figure 13).

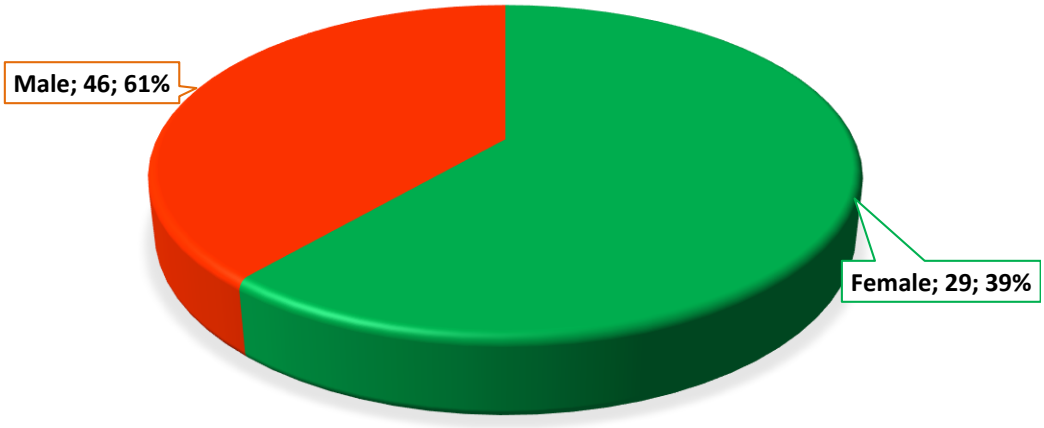

Fig. 13: distribution of HCV cases by sex in the wilaya of Sétif.

b) Age

The rate of HCV infection is very low in the 1-year-old to 19-year-old age group and increases for the 20-44 year-old age group (18.67%), whereas the most affected by HCV is between 45-64 years (it is a peak 44%) and begins to decrease slightly from age 64 and over (30.67%) (Figure 14).

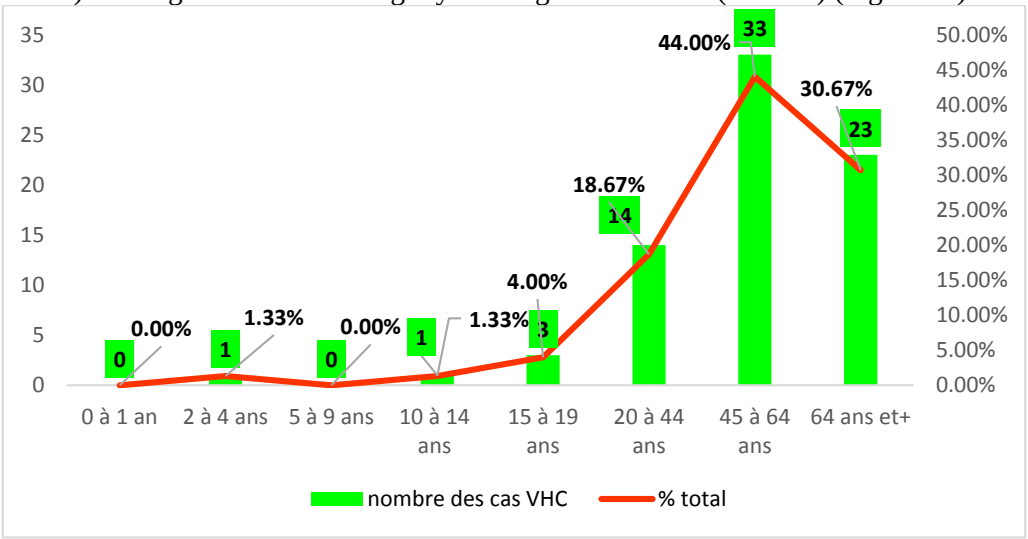

Fig. 14: distribution of HCV cases by age group in the wilaya of Sétif.

These results could be explained by occupational contamination related to accidental injuries from soiled blood material, incomplete reuse or sterilization of medical equipment and blood transfusion without screening, family transmission, through the sharing of toiletries, potentially in contact with blood (razor, toothbrush, nail clippers, file), even jewelry such as pierced earrings, injection drug use with sharing of injection equipment. These results do not go in the direction of work carried out in western Algeria or the number of women infected is higher than that of men; however, the age group most affected in this study is 40 to 59 years, which is consistent with the results obtained in Sétif (Zemour, 2017).

Based on this study, viral hepatitis A, B and C are rapidly spreading infectious diseases that constitute a global health problem, and among all hepatitis it is reported that the three types of viral hepatitis (A, B and C) are the most frequent. Hepatitis A leads to acute infection while hepatitis B and C may or may not progress to a chronic form, and in the case of chronicity it will lead to serious diseases.

6. Conclusion

• Viral hepatitis is a major problem for national and international public health, given that in our wilaya (Sétif) hepatitis presents a very high rate among MDO in recent years.
• Viral hepatitis A is more common than viral hepatitis B and C, especially in Sétif, Eulma, Ain oulmène and Ain El kbira.
• Hepatitis is much more prevalent in large urban centres with strong dynamics than in other less populated centres.
• Males are the most affected than females.
• The age range targeted by HAV is between 5 and 14 years of age, while the age range for HBV is between 20 and 44 years of age, while HCV is between 45 and 64 years of age.
• To curb the increase in viral hepatitis, it is necessary to:
Improve living conditions, taking into account the quality of drinking water, encourage prevention in all these forms especially awareness of the population of the wilaya, improve medical and paramedical training taking into account medical developments and strengthen therapeutic education. The establishment of a national virological surveillance system for hepatitis cases to monitor changes in the epidemiology of these infections.

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