International Medical Society
http://imedicalsociety.org

International Archives of Medicine
Section: Epidemiology
ISSN: 1755-7682

2017
Vol. 10 No. 202
doi: 10.3823/2472

Clinical and Epidemiological Aspects of Hepatitis B Virus and Hepatitis C Virus in Fortaleza-Ceara

ORIGINAL

Gizelly Castelo Branco Brito[1], Maria Lúcia Duarte Pereira[2], Ivana Cristina Vieira de Lima[3], Lia Guedes Bravo[1], Patricia Alencar Dutra[1], Elys Bezerra Oliveira[1], Adriana Kelly Almeida Ferreira[4]

1 Master's Degree in Nursing from the Ceará State University (UECE), Fortaleza, Ceará, Brazil.
2 PhD and Post-Doctoral degree and associate professor of UECE and Postgraduate Nursing and Health Care Clinics/UECE.
3 PhD student in Nursing from the Federal University of Ceará (UFC), Fortaleza, Ceará, Brazil.
4 Master's Degree student in Nursing from the Ceará State University (UECE), Fortaleza, Ceará, Brazil.

Contact information:

Gizelly Castelo Branco Brito.

Address: Av. Dr. Silas Munguba, 1700. Bairro Itaperi. CEP: 60741-000. Fortaleza, CE.
Tel: (85) 31019823.

gizellycastelo@hotmail.com

Abstract

Introduction: Viral hepatitis is among the main problems that affect public health globally. The knowledge of the clinical and epidemiological situation of hepatitis B and hepatitis C is necessary for the establishment of prevention and control strategies together with individuals and communities in vulnerable situations.

Objective: To investigate the clinical and epidemiological aspects of the population affected by hepatitis B and hepatitis C from 2007 to 2014, in Fortaleza, Ceara, Brazil.

Methods: Descriptive, retrospective study involving data from the Notifiable Diseases Information System, with analysis of gender, age, race, illicit drug use, sex partnerships, tattoo/piercing, transfusion, dialysis and transplantation. Chi-squared tests were used for statistical analysis of the variables.

Results: It was reported 779 cases of hepatitis B and 756 of hepatitis C. Regarding the HBV, 69.7% were male, 77.5% of brown color, and a median age of 36 years. Regarding risk factors, there was highlight for sexual practice and number of sex partners ($p = 0.001$), blood transfusion ($p = 0.011$) and use of tattoo/piercing ($p = 0.011$). As for HCV, 57.7% were male and the mean age was 46 years. As for risk factors, the injecting drug use ($p = 0.001$), the presence of three or more partners ($p = 0.001$) and the use of tattoo/piercing ($p = 0.021$) stood out. Regardless of gender, age or race and drug use, transfusions and age over 40 years increased the risk for hepatitis. There were still high percentages of missing data in several variables.

Conclusion: This study contributes to alert the Brazilian health authorities on the importance of these infections and the need to expand and strengthen current health policies, and allows reflection on control strategies for hepatitis.

Keywords
Hepatitis B; Hepatitis C; Risk Factors.

Introduction

Viral hepatitis is inserted among the main problems that afflict public health globally [1]. It has a long course and often the carriers remain asymptomatic [2], which makes difficult the early diagnosis and treatment prior to the onset of liver damage and complications.

Worldwide, the prevalence of hepatitis differs according to the region. In some Asian countries, the prevalence of hepatitis B virus (HBV) ranges from 0.1 to 30% [3]. In India, this virus is responsible for 60% of cases of chronic liver disease. In Portugal, viral hepatitis is second place among the causes of liver disease [4-6]. Hepatitis C virus (HCV) infection affects about 3% of world population, totaling approximately 185 million people. It is noteworthy that 60% to 70% of patients will possibly develop chronic liver disease, requiring specialized and high complexity health care [7].

Hepatitis represents the tenth leading cause of mortality worldwide. The World Health Organization (WHO) estimates that worldwide one in every 12 people is a carrier of one of these viruses. In Brazil one in every 30 people can be infected by viruses that cause hepatitis B and C [3, 7].

It is estimated that in Brazil, from 1999 to 2011 about 120,343 new cases of HBV were confirmed, and about 26,000 new cases of hepatitis C were reported between 2004 and 2014. South and Southeast regions concentrated about 86% of all cases HCV reported in this period [8]. The Northeast region has about 9.2% of the total cases detected of HBV, most cases in the states of Bahia (30.4%) and Maranhão (14.3%). In Ceará, from 2007 to 2013 about 6,998 cases of HBV and 1,094 cases of HCV were notified from 2009 to 2014 [8]. The C virus is about 5.0% of cases in the country. Accordingly, hepatitis can be classified by its prevalence in the population as high when greater than or equal to 8%; intermediate when between 2% and 7%; and low when it reaches lower than 2% [9].

Because of its various forms of transmission, hepatitis remains circulating in the population. The most common forms of infection are sexual, parenteral and vertical [10]. However, other forms of transmission such as use of manicure tools, crack pipe and tools to inhale cocaine have been associated with hepatitis [11]. The incidence may be even higher than those reported in various regions of the country as often hepatitis is only diagnosed after clinical suspicion. The delay in diagnosis may contribute to a poor prognosis, with the presence of complications such as liver cirrhosis, hepatocellular carcinoma cell and even death.

Aspects such as the social and economic conditions, the distribution of access to health services and the heterogeneous use of technology for diagnosis and treatment in different regions of the country are factors that negatively influence the control of viral hepatitis [12]. When comparing Brazilian states and municipalities to each other, the number of infected people is often unknown or not properly registered, as the confirmation of diagnosis of hepatitis requires complex laboratory techniques of molecular biology, which increases

the costs and hinders the deployment of this type of service [13].

There is need of a wider knowledge of the epidemiological situation of these diseases, in order to establish strategies for prevention and control that adapt to the needs and peculiarities of individuals and communities at risk and in vulnerable condition, and with it, the current public policies must be adapted to the local epidemiological context [14].

The aim of this study was to identify the clinical and epidemiological aspects of cases of hepatitis B and hepatitis C in Fortaleza between 2007 and 2014.

Methods

Descriptive, retrospective study carried out from the analysis of data obtained from viral hepatitis compulsory notification of the Notifiable Diseases Information System (SINAN), in the period from 2007 to 2014. Authors studied the cases of hepatitis B and hepatitis C of residents in Fortaleza, Ceara, with data obtained from the Health Secretariat of the State of Ceara (SESA in Portuguese).

Inclusion criteria were: cases of hepatitis B and hepatitis C reported between the years 2007 and 2014, from residents in the city of Fortaleza. Cases that did not have complete data on relevant aspects for the proposed study were excluded.

The studied variables were gender, age, race, injecting drug users (IDUs), sex partnerships, tattoo/piercing, transfusion, dialysis and transplantation.

The Pearson's chi-square test was used to determine the significance of the variables. It consists of a test that compares experimentally obtained frequencies with theoretical frequencies, calculated mathematically for the same number of sample data. It was considered the statistical significance of $p < 0.05$ for the analysis of variables. Analyses were conducted using the Statistical Package for Social Sciences software (SPSS) version 20.0., license number 10101131007.

The study was approved by the Ethics Committee of the State University of Ceara - UECE under Protocol No. 1,267,857.

Results

Of the 779 cases of hepatitis B virus reported in SINAN in Fortaleza between 2007 and 2014, there was a predominance of males in 69.7% of cases, clearly related to the various exposure categories. The median age was 36 years. **(Table 1)**

The brown color was reported in 77.5% of valid cases. It is noteworthy that in all cases, only 261 were subject to appropriate analysis, as they contained enough data to draw a profile of people affected by the disease. In all variable, there was a large number of cases in which the possible way of transmission is ignored, with highlight to the exposure category related to sex with 586 ignored cases (75.2%); followed by the category three or more partners, 482 (61.9%); transplantation, 473 (60.7%); hemodialysis, 467 (59.9%); transfusion, 454 (58.3%); IDU, 450 (57.8%) and tattoo, 458 (58.8%).

Table 1. Distribution of forms of transmission of hepatitis B cases in Fortaleza, Ceara, from 2007 to 2014 according to gender. Fortaleza, 2015.

Type of 4transmission	Gender				P value*
	Male		Female		
	n	%	n	%	
Sex	21	11.9	12	14.5	0.697
3 or more partners	80	45.2	28	33.7	0.001
Tatoo/piercing	30	16.9	12	14.5	0.344
Transfusion	19	10.7	15	18.1	0.342
IDU**	9	5.1	4	4.8	0.713
Hemodialysis	15	8.5	10	12	0.682
Transplantation	3	1.7	2	2.4	0.824
Total	177	100	83	100	-

*: P value: Chi-square test, p< 0.05. **: IDU: Injecting drug use.

Table 2. Distribution of forms of transmission of hepatitis B cases in Fortaleza, Ceara, from 2007 to 2014, according to age and race. Fortaleza, 2015.

	Sex		3 or more partners		Tatoo/ piercing		Transfusion		IDU*		Hemodialysis		Transplantation		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age range																
<20	0	0	3	50	2	33.3	1	16.7	0	0	0	0	0	0	6	100
20 to 39	21	16	56	42.8	29	22.1	7	5.3	9	6	8	6.1	1	0.8	131	100
40 to 59	8	9.2	36	41.4	9	10.3	18	20.7	2	2.3	12	13.8	2	2.3	87	100
>60	4	12.1	10	30.4	2	6	8	24.3	2	6	5	15.2	2	6	33	100
P value**	0.203		0.335		0.011		0.011		0.326		0.257		0.352		-	
Race																
White	3	20	8	53.4	2	13.3	2	13.3	0	0	0	0	0	0	15	100
Black	0	0	4	40	0	0	4	40	0	0	2	20	0	0	10	100
Yellow	0	0	1	25	0	0	2	50	0	0	1	25	0	0	4	100
Brown	25	13.1	83	43.4	35	18.4	17	9	9	4.7	17	9	4	2.1	190	100
P value*	0.401		0.223		0.458		0.009		0.842		0.467		0.956		-	

*: IDU: injecting drug use. **: P value: Chi-square test, p< 0.05.

Researchers decided to delete cases among indigenous race from the table because, according to the cases reported for hepatitis B, this population did not have notification for the disease during the study period. **(Table 2)**

In relation to hepatitis C, 756 cases were reported from 2007 to 2014. The male gender accounted for 57.7% of cases, the brown race accounted for 65.6% of valid cases. The median age was 52 years. **(Table 3)**

Table 3. Distribution of forms of transmission of cases of hepatitis C in Fortaleza, Ceara, from 2007 to 2014 according to gender. Fortaleza, 2015.

Type of 4transmission	Gender				P value*
	Male		Female		
	n	%	n	%	
Sex	10	3.8	14	9.8	0.174
3 or more partners	62	23.9	27	18.8	0.001
Tatoo/piercing	24	9.2	15	10.4	0.398
Transfusion	56	21.6	48	33.3	0.806
IDU**	39	15	4	2.8	0.001
Hemodialysis	49	18.8	25	17.3	0.047
Transplantation	20	7.7	11	7.6	0.262
Total	260	100	144	100	-

*: P value: Chi-square test, p< 0.05. **: IDU: Injecting drug use.

It was also observed, in all exposure categories, many cases in which the possible way of transmission is ignored. The category sex showed 524 (69.3%), followed by the category three or more partners, 431 (57%); tattoo and piercing, 381 (50.4%); transplantation, 368 (48.7%); transfusions, 390 (48.4%); IDU, 360 (47.6%), hemodialysis, 346 (45.8%). **(Table 4)**

Discussion

The importance of viral hepatitis for Public Health is not limited to the quantity of cases, it also extends to complications of its acute and chronic forms [15]. Considering that the consequences are different depending on the clinical form, the ways of transmission and various other aspects, there is the need to know these aspects for identifying them and adopting consistent measures with each case [16].

The use of secondary data may have limitations on the quality of records and lack of explanatory hypotheses at the individual level [17]. In the results

Table 4. Distribution of forms of transmission of cases of hepatitis C in Fortaleza, Ceara, from 2007 to 2014 according to age and race. Fortaleza, 2015.

	Sex		3 or more partners		Tatoo/ piercing		Transfusion		IDU*		Hemodialysis		Transplantation		Total	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Age range																
<20	1	9.1	1	9.1	3	27.3	4	36.3	0	0	1	9.1	1	9.1	11	100
20 to 39	3	4.4	18	26	10	14.5	16	23.2	5	7.2	13	18.8	4	5.8	69	100
40 to 59	15	6.4	50	21.3	25	10.6	55	23.4	33	14	37	15.7	20	8.5	235	100
>60	5	5.8	20	22.9	1	1.1	29	33.3	5	5.8	23	26.4	4	4.6	87	100
P value**	0.941		0.370		0.021		0.692		0.025		0.498		0.439		-	
Race																
White	4	9.5	12	28.6	6	14.3	12	28.6	5	11.9	2	4.7	1	2.4	42	100
Black	0	0	2	15.4	2	15.4	3	23	1	7.8	3	23	2	15.4	13	100
Yellow	0	0	5	19.2	2	7.7	4	15.4	2	7.7	7	27	6	23	26	100
Brown	14	5.7	64	26	25	10.1	63	25.5	25	10.1	41	16.6	15	6	247	100
Indigeous	0	0	0	0	0	0	1	100	0	0	0	0	0	0	1	100
P value*	0.170		0.512		0.987		0.163		0.850		0.284		0.076		-	

*: IDU: injecting drug use. **: P value: Chi-square test, p< 0.05.

shown in this study, the lack of some information did not invalidate the analysis nor the opposition of information between variables due to the relevance of epidemiological indicators used [14].

As for the variable gender and exposure categories in hepatitis B, the number of partners had greater significance associated with statistical tests, corroborating with the literature [18, 19]. The high infectivity of HBV virus during sex increases about 100 times the risk of infection compared with HIV [3].

Regarding age group, the most affected group by HBV was from 20 to 39 years, which is related to use of tattoos and piercings. This high influence stands out in the productive and sexually active age groups, corroborating some studies [20-22]. Sexual risk behavior coupled with other factors may contribute to the concentration of the disease in these age groups [23].

The study found more cases of HBV after transfusion in the age group from between 40 and 59 years. It is noteworthy that procedures carried out before 1993 did not have precise and specific tests before donation. HBV and HCV infections are considered the most common cause of post-transfusion hepatitis [24].

In this sense, as determined by the Brazilian Ministry of Health, all blood centers must apply highly sensitive tests to ensure the quality of donated blood. Laboratory tests to be performed are serology for hepatitis B and C, in addition to serology for HIV, syphilis, Chagas' disease and human T-lymphotrophic virus (HTLV) types I and II [25].

The prevalence of HCV infection in hemodialysis units varies according to the study site. A recent study Fortaleza identified prevalence of 52% and in Minas Gerais, 12% [26, 27]. The males above 50 years old are seen as the most affected [28].

The presence of piercing and tattoos was observed in this study as a risk factor for HCV infection, a fact that corroborates a study conducted in Parana, [29] in which 8.8% and 11.8% of individuals with C virus had one of two objects in the body, respectively.

This study showed a strong statistical significance in relation to injecting drug use and gender. The

vast majority of infected people used the sharing of needles and syringes, and other drugs with blood exposure before infection. This corroborates with the literature, [19, 30] in which the use of illicit injectable drugs is currently considered the main risk factor for acquiring hepatitis C.

The age range related to IDU observed in this study attests the exposure in the group from 40 to 59 years, a result also found in a study conducted in Minas Gerais, [31] which points out the IDU as the main transmission mechanism of the C virus.

It is noteworthy that in Fortaleza, screening for hepatitis usually occurs randomly in blood centers, testing centers and in some basic health units. [32]. The lack of technology and human resources in these locations often precludes early diagnosis and diagnosis usually occurs, like in the rest of the country, only after clinical suspicion and installation of late symptoms.

In this sense, there is no doubt that early diagnosis of hepatitis B and hepatitis C has benefits for people, allowing them to choose the most appropriate time to start a possible treatment with reduction of possible complications. However, the identification of asymptomatic chronic infectious diseases is very difficult and costly, which contributes to increased underreporting [15].

The study had difficulties regarding the completeness of the records in notification forms of the SINAN database. This corroborates with similar studies conducted in the states of Pernambuco [15] and Sao Paulo [33] about problems with the amount of ignored data found.

However, the progress of control measures, such as vaccination of specific groups, rapid testing and educational campaigns against viral hepatitis have contributed to a trend of reduction in carriers, but there is still difficulty related to notification of cases, which characterizes underreporting, including in quality services.

Conclusion

The study showed a predominance of brown males for hepatitis B, with median age of 36 years. In hepatitis C, 57.7% are males. The brown individuals were predominant, with a median age of 52 years. The statistical analysis suggests that the number of partners, that is, more than three in the last six months increases the risk for HBV infection. It is clear that, regardless of age and gender, the injecting drug use increased the likelihood of positive testing for HCV.

As study limitation there is the incompleteness of information available in SINAN databases with high percentages of ignored data in several variables. This may lead to a distancing of the legitimacy of the results, and represents a warning to the surveillance authorities on the importance of training health professionals in relation to notification.

Thus, this study contributes to alert health authorities on the importance of these infections and the need to implement coping strategies while encouraging the completion of further studies to better understand the situation. In addition, it is recommended to carry out studies to check the access to treatment and treatment adherence in people living with hepatitis B and hepatitis C under the Unified Health System (SUS) scope.

References

1. Tauil MDC, Amorim TRD, Pereira GFM, Araújo WND. Hepatitis B mortality in Brazil, 2000-2009. Cad de Saúde Pública. 2012; 28(3): 472-8. Portuguese.
2. Assunção AA, Araújo TM, Ribeiro RBN, Oliveira SVS. Vacinação contra hepatite B e exposição ocupacional no setor Saúde em Belo Horizonte, Minas Gerais. Rev Saúde Pública. 2012; 46(4):665-673. Portuguese.
3. World Health Organization. Hepatitis B. Fact sheet nº 204. Geneva: World Health Organization; 2011 [cited 2015 Sep 5]. Available from: http://www.who.int/media=centre/factsheets/fs204/en/2.
4. Costa Junior PRS, Oliveira HS, Silva LEL, Barbosa RFM, Silva RLF. Infecção por hepatites B e C em um município do estado do Pará. Rev Paraense Med. 2013; 27(2): 1-9. Portuguese.

5. Lopes TGSL, Schinoni MI. Aspectos gerais da hepatite B. Rev Cienc Med. Biol. 2012; 10(3):337-44. Portuguese.
6. Teston EF, Silva RLDT, Marcon SS. Convivendo com hepatite: repercussões no cotidiano do indivíduo infectado. Rev Esc Enf USP. 2013; 47(4): 860-8. Portuguese.
7. Center for Disease Control and Prevention. Hepatitis C Information for Health Professionals. Retrieved August 30, 2014, from CDC DVH - HCV FAQs for Health Professionals. [cited 2015 Dec 20]. Avaliable from: http://www.cdc.gov/hepatitis/HCV/HCVfaq.htm. E
8. Brasil. Ministério da Saúde (MS). Boletim Epidemiológico - Hepatites Virais. Secretaria de Vigilância em Saúde - Departamento de DST, Aids e Hepatites Virais. Ano III - nº 1. Brasília 2013. Portuguese.
9. Silva ACLG, Tozatti F, Welter AC, Miranda CC. Incidência e mortalidade por hepatite B, de 2001 a 2009: uma comparação entre o Brasil, Santa Catarina e Florianópolis. Cad Saúde Coletiva. 2013; 21(1): 34-9. Portuguese.
10. Ministério da Saúde. Secretaria de Vigilância em Saúde. Departamento de Vigilância Epidemiológica. Doenças infecciosas e parasitárias: guia de bolso. Ministério da Saúde. Secretaria de vigilância em Saúde. Departamento de vigilância epidemiológica. 8ª. Ed. rev. Brasília: Ministério da Saúde; 2010. Portuguese.
11. Centers of Diseases Control (CDC). The ABCs of hepatits fact sheet; 2015. [cited 2016 Jan 24]. Avaliable from: http://www.cdc.gov/hepatitis/Resources/Professionals/PDFs/ABCTable.pdf.
12. Fonseca JCF. História natural da hepatite crônica B. Rev Soc Bras Med Trop. 2007; 40(6): 672-7. Portuguese.
13. Aquino JA, Pegado KA, Barros PL, Machado LFA. Soroprevalência de infecções por vírus da hepatite B e vírus da hepatite C em indivíduos do Estado do Pará. Rev Soc Bras Med Trop. 2008; 41(4):334-77. Portuguese.
14. Pedrosa NL, De Sousa PS, Almeida RLF, Holanda ER, Kerr LRFS, Galvão MTG. Série histórica da AIDS no Estado do Ceará, Brasil Ciência & Saúde Coletiva. 2015; 20(4): 1177-84. Portuguese.
15. Barbosa D, Barbosa AMF. Avaliação da completitude e consistência do banco de dados das hepatites virais no estado de Pernambuco, Brasil, no período de 2007 a 2010. Epidemiologia e Serviços de Saúde. 2013; 22(1): 49-58. Portuguese.
16. Gomes AP, Vitorino RR, Lima LC, Silva AL, Santos ET, Henriques BD. Hepatites virais: abordagem clínica com ênfase nos vírus A e E. Revista Brasileira de Clínica Médica. 2012; 10(2): 139-46. Portuguese.
17. Peres MFT, Almeida JF, Vicentin D, Ruotti C, Nery MB, Cerda M. Evolução dos homicídios e indicadores de segurança pública no Município de São Paulo entre 1996 e 2008: um estudo ecológico de séries temporais. Cien Saude Colet. 2012; 17(12): 3249-57. Portuguese.
18. Lok ASF, McMahon BJ. Chronic hepatitis B: update 2009. Hepatology. 2009; 50(3):1-36.
19. Da Silva AL, Vitorino RR, Esperidião-Antonio V, Santos ET, Santana LA, Henriques BD, Gomes AP. Hepatites virais: B, C e D: atualização. Rev Bras Clin Med. 2012; 10(3): 206-18. Portugese.
20. Scaraveli NG, Passos AM, Voigt AR, Livramento A, Tonial G, Treitinger A. Seroprevalence of hepatitis B and hepatitis C markers in adolescents in Southern Brazil. Cad. Saúde Pub. 2011; 27(4): 753-58.
21. Sousa Neto AD, Monteiro EC, Tadeu HAC, Vasconcelos BM, Valadão AF, Motta PG, Barros HG, Soares E. Rastreio de hepatite b em pacientes atendidos no Ambulatório do instituto metropolitano de ensino Superior, Ipatinga –MG. Rev. Inic Cient Univ V Rio Verde. 2014; 4(1): 24-33. Portuguese.
22. Costa LG, Paula RCE, Ignotti E. Detecção de infecção pelo vírus da hepatite B nos municípios brasileiros segundo cobertura dos serviços de hemoterapia, no período de 2001 a 2008. Epidemio Serv Saúde. 2012; 21(4): 617-26. Portuguese.
23. Pudelco P, Koehler AE, Bisetto LHL. Impacto da vacinação na redução da hepatite B no Paraná. Rev. Gaúcha Enf. 2014; 35(1): 78-86. Portuguese.
24. Carrazzone CFV, Brito AM Gomes YM. Importância da avaliação sorológica pré-transfusional em receptores de sangue. Rev Bras Hematologia Hemoterapia. 2004; 26(2): 93-98. Portuguese.
25. Brasil. Ministério da Saúde. Secretaria de Atenção à Saúde. Coordenação Geral de Sangue e Hemoderivados. Sangue e hemoderivados: produção hemoterápica. Brasília, 2011. Portuguese.
26. Medeiros MTG, Lima JMC, Lima JWO, Campos HH, Medeiros MMC, Coelho-Filho JM. Prevalência e fatores associados à hepatite C em pacientes de hemodiálise. Rev Saúde Pública. 2004; 38(2):187-93.
27. Penido JMMO, Caiaffa WT, Penido MG, Caetano EVC, Carvalho AR, Leite AF, Faria SC, Gomide IV, Rosa AAB, Penido MGMG, Teixeira R. The seroprevalence of HCV in patients submitted to hemodialysis and health professionals in the state of Minas Gerais, Southwest of Brazil. Nefrología. 2008; 28(2):178-85.
28. Guimaraes MSF, Lima MFG, Santos, IMM. Descrição das características de homens em tratamento hemodialítico com vírus da hepatite B, C e HIV. Esc Anna Nery 2014; 18(4): 622-27. Portuguese.

29. Rodrigues Neto J, Cubas MR, Kusma SZ, Olandoski M. Prevalência da hepatite viral C em adultos usuários de serviço público de saúde do município de São José dos Pinhais - Paraná. Rev bras epidemiol. 2012; 15(3): 627-38. Portuguese.
30. Micallef JM, Kaldor JM, Dore GJ. Spontaneous viral clearance following acute hepatitis C infection: a systematic review of longitudinal studies. J Viral Hepat. 2006; 13(1):34-41.
31. Oliveira JMD, Maia MAC, Silva JDP, Queiroz CAD, Fortuna, CM, Andrade RD. Perfil epidemiológico de portadores de hepatite c: estudo descritivo em unidade de referência regional. Rev pesqui cuid fundam. 2015; 7(4): 3454-66. Portuguese.
32. Araújo MAL, Sales AAL, Diogenes MAR. Hepatites B e C em usuários do Centro de Testagem e Aconselhamento (CTA) de Fortaleza-Ceará. DST– J bras Doenças Sex Transm.2006; 18(3):161-167. Portuguese.
33. Cruz CRB, Shirassu MM, Martins WP. Comparação do perfil epidemiológico das hepatites B e C em um serviço público de São Paulo. Arq. Gastroenterol. 2009; 46(3):225-9. Portuguese.