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Evaluation of the prevalence of hepatitis C virus through rapid test in public health services users in Campina Grande-PB

Avaliação da prevalência do vírus da hepatite C através de teste rápido em usuários dos serviços públicos de saúde de Campina Grande-PB

Evaluación de la prevalencia del virus de la hepatitis C mediante prueba rápida en usuarios de servicios de salud pública en Campina Grande-PB

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Abstract
Chronic hepatitis C is a silent evolution disease that can lead to outcomes such as liver cirrhosis and hepatocellular carcinoma (HCC), a public health problem due to high universal morbidity. It is transmitted by single-stranded ribonucleic acid (RNA) virus, discovered in 1989 through studies of contaminated chimpanzees. Unsafe health practices, use of illegal intravenous drugs and tattoos are among the major risk factors for the transmission of this virus. Currently, it is estimated that 71 million people are infected worldwide, in Brazil, the prevalence of 0.7% indicates that 1.032.000 individuals are contaminated. With quick execution and rapid results availability, Rapid Tests (RT) facilitate epidemiological studies and early diagnosis of hepatic impairment, allowing the modification of the natural history of the disease. To evaluate the presence of Anti-HCV antibodies and epidemiological characteristics of hepatitis C in users of health services in Campina Grande-PB. A prospective cross-sectional observational study, from February 2015 to July 2018. Individuals born between 1945 and 1970 who sought health services voluntarily underwent structured questionnaires and the Bioeasy® Rapid Anti-HCV Test. A total of 385 individuals were studied, with a prevalence of Anti-HCV antibodies of 1.84% (n = 7). Of the interviewees, the majority (29.7%) were in the age group between 45 and 50 years and 67.7% were female. Intravenous illicit drug use, tattooing and male sex presented the highest statistical relevance as a risk factor in the study population. A prevalence higher than that estimated for the country was found, which highlights the need to implement strategies aimed at the early detection of virus carriers.
Keywords: Hepatitis C; Point-of-Care Systems; Prevalence; Epidemiology.

Resumo
A hepatite C crônica é uma doença de evolução silenciosa que pode levar a desfechos como cirrose hepática e carcinoma hepatocelular (CHC), um problema de saúde pública com alta taxa de morbidade universal. É transmitida pelo vírus de ácido ribonucléico (RNA) de fita simples, descoberto em 1989 por meio de estudos de chimpanzés contaminados. Práticas de saúde inseguras, uso de drogas ilícitas intravenosas e tatuagens estão entre os principais fatores de risco para a transmissão desse vírus. Atualmente, estima-se que 71 milhões de pessoas estejam infectadas no mundo, no Brasil, a prevalência de 0,7% indica que 1.032.000 indivíduos estão contaminados. Com rápida execução e rápida disponibilidade de resultados, os Testes Rápidos (TR) facilitam os estudos epidemiológicos e o

diagnóstico precoce da insuficiência hepática, permitindo a modificação da história natural da doença. Objetivamos avaliar a presença de anticorpos anti-HCV e as características epidemiológicas da hepatite C em usuários de serviços de saúde de Campina Grande-PB. Este é um estudo observacional prospectivo transversal, de fevereiro de 2015 a julho de 2018. Indivíduos nascidos entre 1945 e 1970 que procuraram voluntariamente os serviços de saúde foram submetidos a questionários estruturados e ao Teste Rápido Anti-HCV Bioeasy®. Foram estudados 385 indivíduos, com prevalência de anticorpos anti-HCV de 1,84% (n = 7). Dos entrevistados, a maioria (29,7%) estava na faixa etária entre 45 e 50 anos e 67,7% eram do sexo feminino. Uso de drogas ilícitas endovenosas, tatuagem e sexo masculino apresentaram maior relevância estatística como fator de risco na população estudada. Encontrou-se uma prevalência superior à estimada para o país, o que evidencia a necessidade de implementação de estratégias voltadas para a detecção precoce dos portadores do vírus.
Palavras-chave: Hepatite C; Sistemas Point-of-Care; Prevalência; Epidemiologia.

Resumen
La hepatitis C crónica es una enfermedad de evolución silenciosa que puede derivar en desenlaces como la cirrosis hepática y el carcinoma hepatocelular (CHC), un problema de salud pública con una elevada morbilidad universal. Se transmite por el virus del ácido ribonucleico (ARN) monocatenario, descubierto en 1989 a través de estudios de chimpancés infectados. Las prácticas de salud inseguras, el uso de drogas ilícitas por vía intravenosa y los tatuajes se encuentran entre los principales factores de riesgo para la transmisión de este virus. Actualmente, se estima que 71 millones de personas están infectadas en el mundo, en Brasil, la prevalencia de 0,7% indica que 1.032.000 personas están infectadas. Con rápida ejecución y rápida disponibilidad de resultados, las Pruebas Rápidas (RT) facilitan los estudios epidemiológicos y el diagnóstico precoz de la insuficiencia hepática, permitiendo modificar la historia natural de la enfermedad. Nuestro objetivo fue evaluar la presencia de anticuerpos anti-HCV y las características epidemiológicas de la hepatitis C en usuarios de servicios de salud en Campina Grande-PB. Se trata de un estudio observacional prospectivo de corte transversal, de febrero de 2015 a julio de 2018. A las personas nacidas entre 1945 y 1970 que buscaron voluntariamente servicios de salud se les aplicaron cuestionarios estructurados y el Test Rápido Anti-VHC Bioeasy®. Se estudiaron un total de 385 individuos, con una prevalencia de anticuerpos anti-VHC del 1,84% (n = 7). De los encuestados, la mayoría (29,7%) tenía entre 45 y 50 años y el 67,7% eran mujeres. El consumo de drogas ilícitas por vía intravenosa, los tatuajes y el sexo masculino fueron estadísticamente más relevantes como factores de riesgo en la población estudiada. Se encontró una prevalencia superior a la estimada para el país, lo que resalta la necesidad de implementar estrategias encaminadas a la detección temprana de portadores del virus.
Palabras clave: Hepatitis C; Point-of-Care Systems; Predominio; Epidemiología.

1. Introduction

The Hepatitis C Virus (HCV) was discovered by Choo et al., in 1989, through cloning studies of viral sequences in chimpanzees infected with serum from patients with non-A non-B hepatitis (Choo et al., 1989). This virus belongs to the genus Hepacivirus, family Flaviviri (Simmonds et al., 2005), and its genomic structure is composed of a single strand of ribonucleic acid, with positive polarity, approximately 9,400 nucleotides, 7 genotypes and 67 subtypes (Smith et al., 2014). It is estimated that 71 million people are infected by the hepatitis C virus worldwide and that around 400,000 die every year due to complications from this disease (Westbrook et al., 2014; WHO, 2017).

In Brazil, it is assumed that the prevalence of seropositive people for HCV until the year 2016 was approximately 0.7% in the general population aged 15 to 69 years, which corresponds to about 1,032 .000 individuals (Brazil, 2018). In the Northeast region (NE), the prevalence of Anti-HCV antibodies in the general population aged 20 to 69 years was 0.97% between 2005 and 2009 (Pereira et al., 2013).

Between 1999 and 2016, the distribution of HCV carriers by regions showed that 64.1% were in the Southeast, 24.5% in the South, 5.5% in the Northeast, 3.3% in the Midwest and 2, 5% in the North (Brasil, 2018; Brasil, 2019).

The investigation of HCV infection can be carried out in a laboratory environment, outpatient clinics, in street actions or campaigns in regions with difficult access. Tests for Anti-HCV performed in a laboratory environment uses serological tests, such as the Enzyme-Linked Immunosorbent Assay (ELISA). The tests that can be performed outside the laboratory environment are the flow immunochromatographic tests, better known as Rapid Tests (Brasil, 2018; Nogueira, 2020).

There are individuals born between 1945 and 1970 who were exposed to known risk factors, carry the hepatitis C virus, but are unaware of their condition. In this sense, this research evaluated the prevalence of hepatitis C virus infection in individuals born between 1945 and 1970, users of public health services in Campina Grande-PB, in order to identify the risk factors related to the transmission of HCV in individuals users of public health services in the city of Campina Grande-PB; to determine the socio-demographic, epidemiological and clinical characteristics of the evaluated individuals; refer, in order to carry out serology for HCV, the cases considered positive by the rapid test and enable clinical and laboratory follow-up of individuals with positive serology and consolidate primary prevention measures in risk groups with educational activities.

2. Methodology

A prospective cross-sectional observational study was performed, in which the population of users of two public health services from February 2015 to July 2018 was evaluated through a structured questionnaire in the form of an individual interview. During the II Northeast Hepatology Symposium, that was held in João Pessoa/PB from September 24th to 27th, in 2014, The Brazilian Society of Hepatology (SBH) issued a Declaration of Shipment for Clinical Study (donation) of 400 Hepatitis tests. The Kits (HCV Rapid Test Bioeasy® - Standard Diagnostics, Yongin, Korea) were distributed by Bioeasy Diagnóstica Ltda, from Belo Horizonte and provided by the Brazilian Society of Hepatology.

The study took place in the following hospitals: Hospital Universitário Alcides Carneiro (HUAC) and Hospital de Emergência e Trauma Dom Luiz Gonzaga Fernandes (HETDLGF). The two health centers are located in the municipality of Campina Grande, Paraíba (PB), Brazil, and are qualified as tertiary-level hospitals that serve users of the brazilian public health care system, SUS (Sistema Único de Saúde).

The study population accomplished individuals born between 1945 and 1970, users of HUAC and HETDLGF. As inclusion criteria, subjects born between 1945 and 1970 (age between 45 and 70 years) were selected; both genders; sign the Free and Informed Consent Term (FICT) and answer a questionnaire with structured questions. And as exclusion criteria, individuals diagnosed with viral hepatitis B and/or C and pregnant women.

The data were arranged in a specific database created in the Excel® 2016 public domain program. The preliminary database was checked and corrected by statistician and research participants, generating a definitive database that was used for further statistical analysis.

Critical analysis of the data was runned out using the Excel® 2016 and IBM SPSS® 21 programs. Frequency distribution tables were obtained for the categorical variables and, considering the sample size and its results, the odds ratio was used for data analysis, which, through the confidence interval, brought statistical significance to the study.

The study meets resolutions of the Declaration of Helsinki and Resolution 466/12 of the Brazilian National Health Council. In addition, it was submitted, evaluated and approved by the Research Ethics Committee of the Center for Higher Education and Development (CEP – CESED), under number: 39845814.9.0000.5182.

3. Results

Seven months of collection were carried out on the premises of the referred hospitals, making it possible to apply the questionnaire and later collect material from 385 subjects. Four interviewees were excluded of the study because they did not meet the inclusion criteria. Within 381 subjects studied, seven had a positive result in the Bioeasy® anti-HCV rapid test, a prevalence of 1.84%. Despite the greater representation of females - with 67.7% of the surveyed public - the risk of male prevalence is equal to 4.1%, while for females it is 0.8%.

When asked about their age, 29.7% reported being between 45 and 50 years old, which is the prevailing age group in the study. Most respondents (35.7%) have completed elementary school, and 61.2% are married. About the profession, 19.4% are healthcare professionals.

A small group of 10.2% of respondents reported having received blood transfusions and/or blood products, in 23.1% of cases, more than once. As the technology capable of diagnosing HCV arrived at blood banks in Brazil in 1993(Brazil 2015), respondents were asked when donations were received and 33.3% said they had occurred before 1993, none of them had a positive result for HCV.

The present study showed that 91.3% of the investigated population had already used licit intravenous drugs and, among those, only 1.7% were positive for HCV.

Between the evaluated subjects, a group of 82.4% underwent hospitalization and 80.8% underwent a surgical procedure. In each subgroup 1.9% were seropositive. For individuals who used illicit intravenous drugs, the risk of prevalence of hepatitis C is 20.0%.

Regarding the reuse of healthcare equipment, 52.8% of the individuals interviewed had used glass syringes in the past. Concerning invasive dental treatment, 75.6% of the respondents said they had already undergone this procedure. Amid the subjects who participated in the study, 9.7% had acupuncture and 1.6% reported having piercing. Of the 17 patients who reported having a tattoo, 17.6% were positive for HCV.

4. Discussion

Between 2003 and 2016, the Northeast region of Brazil had the lowest detection rates of the hepatitis C virus in the country, even so, the incidence of the disease in this region showed a tendency to increase in the same period, being the main cause of death among viral hepatitis of 2000 to 2005. In the state of Paraíba, between 1999 and 2016, there were only 450 confirmed cases of hepatitis C virus, and the ranking of capitals with the highest detection rates of hepatitis C in Brazil, in 2016, showed that João Pessoa, Paraíba's capital, is the capital that least detects HCV in the country, with only 2,500 cases per 100,000 inhabitants. São Paulo was the champion in detection, with a rate of 38.4, surpassing the national rate of 13.3 (Brasil, 2017).

At HUAC, no positive cases were observed during HCV screening using the rapid test. However, in the present study, the prevalence of positive serology for Anti-HCV found in the sample was 1.84% (N=7), which corroborates the relevance of this study in the epidemiological scenario of the state of Paraíba and adjacencies .

Despite the greater representation of females in this research, there was a predominance of hepatitis C infection of 71% in males, following the profile of the country. In Brazil, between 2003 and 2016, the detection rate of hepatitis C cases by sex showed minimum values of 1.3 (male:female), in all years, that is, at least 30% of cases were reported more in men than in women, each year (Brasil, 2017).

In 2005, the age group with peak prevalence of hepatitis C in North America was 55-64 years. In Brazil, from 1999 to 2016, the majority of confirmed cases occurred in the age group over 60 years (18.8%) (Brasil, 2017). In the group of HCV positives, a predominant age group of 55 to 60 years was found, this result confirms that hepatitis C is more diagnosed in adulthood or in the elderly, as it is a silent disease with a chronic evolution (Gomes, 2010; Melo et al., 2022).

The variable use of injecting illicit drugs revealed that 1.3% of the interviewees had already used the intravenous route for the use of narcotics and, therefore, the risk of being seropositive for these individuals was 20.0%, against 1.7% for those who had never used intravenous illicit drugs and 7.1% chose not to answer this question. Injecting drug use is currently

one of the most important risk factors for HCV transmission, reaching up to 50% of new cases in urban communities of underdeveloped countries (Carvalho et al., 2006).

Although the unsafe use of syringes during hospital practices still being an important route of transmission for HCV (WHO, 2017), in this research, the group of individuals exposed to this risk (those who used licit injectable drugs and/or underwent hospitalization procedures, surgery and invasive dental treatment) did not present a relevant statistical association in the calculation of the odds ratio as a risk factor for HCV. There was also no relevant association with the reuse of glass syringes (Bonfim et al., 2021).

Other routes for transmission of the hepatitis C virus are related to skin lesions associated with acupuncture, tattoos and piercing. The abrasions resulting from religious rituals, acupuncture, tattooing and the use of body piercings constituted risk factors for acquiring the hepatitis C virus (Ciorlia & Zaneta., 2013; Oliveira et al., 2018). Acupuncture and piercing were not relevant as risk factors in this study, however, the risk of disease prevalence among individuals with tattoos was 17.6%, against 1.1% of those who responded negatively to this item. Furthermore, with the estimated odds ratio equal to 19.286, and a confidence interval that does not contain the value 1, we have that for every 19,286 individuals aged 45 years and over with a tattoo and with Hepatitis C, there is 1 individual who doesn't have a tattoo in the same condition. Blood transfusion, use of licit intravenous drugs, use of a glass syringe and surgical history were not statistically significant in the present study.

The research had limitations that must be considered when interpreting the results. Information bias led to inconsistency in responses when filling out the questionnaires and generated missing values during the statistical analysis. Some patients already knew their conditions as a carrier of hepatitis C or B and omitted the information when being questioned, before carrying out the Rapid Tests. The study site brought a selected sample that does not reflect the conditions of the general population. In addition, due to the importance of early diagnosis of chronic Hepatitis C for modifying the natural history of the disease and preventing complications, individuals who requested to perform the rapid test, even though they did not meet the inclusion criteria of the study, were accepted by the researchers.

Another important consideration to be made is about the age group of the subjects studied, as, currently, the PCDTHCC 2018 guides that all individuals over 40 years age should be tested for hepatitis C at least once, due to the possibility of contamination in the past. However, in 2015, the Technical Manual for Viral Hepatitis recommended that screening for HCV should start from the age of 45. As treatment was recommended at the time until the age of 70, the age group of the population in this study was defined (Brasil, 2018; Brasil, 2017).

Currently, Brazil during the years 2020 and 2021 showed a drop in the number of people infected by the Hepatitis C virus, with a rate of 27.7 per 100,000 inhabitants (Brasil, 2020; Brasil, 2021).

5. Conclusion

The present study determined the epidemiological, socio-demographic profile and the main risk factors for HCV transmission of individuals born between 1945 and 1970 users of HUAC and HETDLGF, between April and October 2015. It also provided education to the population on prevention and transmission of the hepatitis C virus, which highlighted the need for educational campaigns on the theme.

Data analysis showed that the variables tattoo, use of intravenous illicit drugs and male gender showed an important statistical association as risks factors for the cases of hepatitis C found in this study.

It is necessary to expand serological screening for HCV, as it is a fundamental strategy for the early detection of virus carriers and modification of the natural history of the disease, avoiding HCC and allowing secondary prophylaxis of liver cirrhosis complications.

Epidemiological studies on hepatitis C in the state of Paraíba and the Northeast region are scarce and need to be encouraged, as they guide public health decisions, contributing to the planning, management and evaluation of interventions for the control and prevention of this harm to the health of the population.

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