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PREVALENCE OF HEPATITIS C VIRUS INFECTION AMONG PATIENTS ADMITTED IN MEDICAL WARDS IN PORT MORESBY GENERAL HOSPITAL

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ABSTRACT:
The major objective of this study was to assess the prevalence of HCV infection among selected patients admitted in the medical wards in Port Moresby General Hospital (PMGH). This hospital based cross-sectional study was carried out in 2012 and 2013. Patients were selected after their routine clinical examination by the clinical consultant during ward round. About 3ml of blood was obtained from the blood already collected for routine laboratory tests. The plasma obtained from each blood sample was stored at – 20 C till required for analysis. The Enzyme-linked Immunosorbent Assay (ELISA) Commercial Kit for qualitative detection of IgM-class antibodies to HCV in human plasma was used for analysis of the plasma samples. Three recommended cut-off points and criteria (Positive, Negative and Borderline) were used for the qualitative interpretation of the results. Appropriate ethical approval and permission were obtained from the various authorities including the Medical Research Advisory Committee (MRAC), National Department of Health (NDOH) PNG. Informed consent was also obtained from the 117 patients selected for this study. The mean age of all the patients was 36.0 ± 13.9 years and their age range was 14 to 63 years. Of the 117 plasma samples 16 (13.7%) were positive for HCV IgM, 11 (9.4%) were borderline and 90 (76.9%7) were negative for HCV IgM. The clinical diagnosis for admission of the 16 patients with positive HCV IgM included 5 (31.3%) with cardiovascular disorders (CVD), 3 (18.7%) with pneumonia, 3 (18.7%) with hepatic liver disease, 2 (12.5%) with HIV and 3 (18.7%) with TB-meningitis. Of the 5 patients with CVD two of them had Rheumatic heart disease with mitral regurgitation. The data obtained in this hospital based study revealed the extent of HCV infection among patients admitted in PMGH with different medical diagnosis. It can be considered as baseline data for healthcare providers to have a first glance at the extent of HCV prevalence among the patients in Port Moresby General Hospital and to a limited extent among the general population in Port Moresby.

Keywords: Hepatitis C Virus, Hospital, Prevalence, Positive, Negative, Borderline, Infection
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INTRODUCTION:

Hepatitis C virus (HCV) is the major course of both acute and chronic hepatitis, which can range in severity from a mild illness lasting a few weeks to a serious, lifelong illness [1 – 3]. According to the WHO estimates, globally about 71 million people have chronic hepatitis C infection; a

significant number of those who are chronically infected may develop cirrhosis or liver cancer [1]. Although there is no vaccine for HCV currently, antiviral medicines can cure more than 95% of patients with HCV infection, thereby reducing the risk of death from liver cancer and cirrhosis, but access to diagnosis and treatment is low, especially in the resource limited countries [1].

HCV is not only the cause of hepatic manifestations but also causes a significant number of extra-hepatic manifestations (EHMs) [4]. The most common modes of infection with HCV are through exposure to small quantities of infected blood, which may occur through injection drug use, unsafe injection practices, unsafe health care, and transfusion of unscreened blood and blood products [1]. HCV is not spread through breast milk, food, water or by casual contact such as hugging, kissing and sharing food or drinks with an infected person [1].

Diagnosis of liver diseases is routinely carried out in Port Moresby General Hospital (PMGH). Several cases of liver hepatitis and cirrhosis have been reported, however, laboratory investigation of HCV is not a routine procedure in PMGH [5, 6]. The clinical significance of early detection and diagnosis of patients with HCV in PMGH cannot be overemphasized, because the effort to prevent transmission and control HCV requires appropriate information and epidemiological data.

Currently, there are no published data to indicate effective monitoring of HCV prevalence among patients admitted in the clinical wards in PMGH. No published data are available on the prevalence of HCV among patients with liver disease. Thus, the implementation of sensitive and cost-effective programs directed towards enhancing the diagnosis of HCV among patients attending clinics and admitted in ward in PMGH will contribute to a decrease in the prevalence of complications among the severely ill and the vulnerable patients.

The major objective of this study was to assess the prevalence of HCV infection among selected patients admitted in the medical wards in PMGH.

SUBJECTS AND METHODS:

The study site:

The primary sites were the Medical words in Port Moresby General Hospital (PMGH), which is the major, general, specialist and referral hospital in the National Capital District (NCD) and PNG. PMGH is also the Teaching Hospital for the School of Medicine and Health Sciences (SMHS), University of Papua New Guinea (UPNG).

Study Design and Sampling:

This was a hospital based cross-sectional study. All patients admitted to the medical words in PMGH between May and July 2012 and also between April and August 2013 were eligible for enrolment in the study. The patients were selected after their routine clinical examination by the clinical consultant during ward round.

Collection of blood samples and questionnaire data:

The major aim of the study was explained to each of the selected patients and their accompanying relatives before requesting their signed informed consent. About 3ml of whole blood was obtained from the blood already collected for routine laboratory tests requested by the medical consultant. The blood samples were kept in a cool-box and transported to the research laboratory in the Division of Basic Medical Sciences (BMS), School of Medicine and Health Sciences (SMHS) University of Papua New Guinea. The plasma obtained from each blood sample was stored at – 20 C till required for analysis.

A self-designed pretested questionnaire was used to collect demographic data and other information about the patient including the medical cause of admission.

Exclusion criteria:

Patients with normal liver function tests, those that were screened positive for hepatitis A and B, severely ill patients, as determined by the clinical consultant, and those that did not give consent were excluded from the study.

Assay of HCV in plasma:

The Enzyme-linked Immunosorbent Assay (ELISA) Commercial Kit for qualitative detection of IgM-class antibodies to HCV in human plasma (Diagnostic Automation Inc, USA) was used for analysis of the plasma samples. Each plasma sample was assayed in duplicate. This ELISA kit is intended for clinical diagnosis, management and follow-up of patients with HCV infection [Ref]. Internal Bench Quality Control (QC) of the method was carried out according to instructions in the Diagnostic Automation protocol [Ref]. The performance characteristics of the method show specificity of 98.0 ± 2.0%, Sensitivity of 98.48 to 99.22% and Coefficient of Variation (% CV) of 4.5%.

Data analysis and Interpretation:

The statistical package for social sciences (SPSS) version 20 for Windows and Excel MS data pack software were used for statistical analysis of the data. Results were presented as the mean, standard deviation and range for quantitative variables.

In the present study, three recommended cut-off points and criteria were used for the qualitative interpretation of the results [7].

Negative indicates that no IgM-class antibodies to HCV were detected;

Positive indicates that IgM-class antibodies to HCV were detected; this indicates possible acute or chronic infection with HCV;

Borderline indicates that further testing with other analytical system should be conducted [7].

Ethical Clearance:

Approval for this study was obtained from the Ethics and Research Grant Committee in the SMHS, UPNG, and the Medical Research

Advisory Committee (MRAC), National Department of Health (NDOH) PNG. Permission was obtained from the appropriate authorities in PMGH. In addition, signed informed consent was obtained from each subject before using their blood sample.

RESULTS:

Informed consent was obtained from the 117 patients selected for this study. The mean age of all the patients was 36.0 ± 13.9 years; the age range was 14 to 63 years. Of the 117 patients 58.1% (68/117) were male and 41.9% (49/117) were female patients. The mean age of the male patients was 36.4 ± 13.5 years and age range was 14.0 to 63.0 years. For the female patients, the mean age was 35.5 ± 14.7 years and age range was 17.0 to 62.0 years. No statistically significant difference ($p > 0.05$) was obtained between the age of the male and female patients. The mean height of the male patients was 1.64 ± 0.08 meters and the range was 1.45 to 1.80 meters; the mean height and range for the female patients were 1.57 ± 0.08 meters and 1.40 to 1.85 meters respectively.

Of the 117 plasma samples 16 (13.7%) were positive for HCV IgM, 11 (9.4%) were borderline and 90 (76.9%7) were negative for HCV IgM. The mean age of the patients with positive HCV IgM was 39.7 ± 14.0 years and the age range was 14.0 to 63.0 years. For patients with borderline HCV IgM the mean age was 36.2 ± 14.0 years and the age range was 21.0 to 60.0 years.

Gender distribution of the 16 patients with positive HCV IgM showed that 56.3% (9/16) were male patients and 43.7% (7/16) were female patients. Table 1 shows the gender distribution of the patients with positive and negative HCV IgM and on borderline including their anthropometric parameters.

Table 1: General characteristics of the male and female patients with positive and negative HCV IgM and on the borderline

	Positive (n = 16)		**Borderline (n = 11)**		**Negative (n = 90)**	
	Males	**Females**	**Males**	**Females**	**Males**	**Females**
HCV IgM	9	7	7	4	52	38
Mean age± SD (yrs)	34.2±3.7	46.7±11.5	31.4±11.6	45.0±14.7	37.5±13.7	32.2±13.9
Age range (yrs)	14.0 – 63	30.0 – 62.0	21.0 – 55.0	25.0 – 60.0	14.0 – 60.0	17.0 – 62.0
Mean Height (m)	1.64±0.05	1.57±0.06	1.66±0.07	1.58±0.04	1.63±0.08	1.57±0.09
Height range (m)	1.55 – 1.72	1.5 - 1.64	1.56 – 1.75	1.55 – 1.64	1.45 – 1.80	1.4 – 1.85
Mean Weight (kg)	60.8±16.2	52.9±6.4	69.1±17.7	52.8±12.1	58.3±13.1	46.2±8.4
Weight range (kg)	30.0 – 90.0	45.0 – 55.0	50.0 – 100.0	38.0 – 65.0	30.0 – 100.0	32.0 – 64.0
Mean BMI (m/kg2)	22.4±5.7	21.3±1.8	24.9±5.3	21.1±4.3	21.9 ±4.4	18.7±3.1
BMI range (m/kg2)	11.7 – 33.1	18.7 – 24.2	17.3 – 32.7	19.5 – 25.0	11.7 – 32.7	12.5 – 26.0

The clinical diagnosis for admission of the 16 patients with positive HCV IgM included 5 (31.3%) with cardiovascular disorders (CVD), 3 (18.7%) with pneumonia, 3 (18.7%) with hepatic liver disease, 2 (12.5%) with HIV and 3 (18.7%) with TB-meningitis. Of the 5 patients with CVD two of them had Rheumatic heart disease with mitral regurgitation.

DISCUSSION:

Results obtained in the present study indicated that 16 (13.7%) of the 117 plasma samples were positive for HCV IgM and 11 (9.4%) were borderline. According to the WHO expert committee, confirmatory tests should be carried out on the 16 positive samples. The nucleic acid test for HCV ribonucleic acid (RNA) is recommended to confirm if the infection is chronic because about 15–45% of people infected with HCV spontaneously clear the infection by a strong immune response without the need for treatment. Although no longer infected, these patients will still test positive for anti-HCV antibodies [1]. The 11 (9.4%) plasma samples in the borderline group should also be subjected to further testing by either serological method or the nucleic acid test.

The 13.7% prevalence obtained in the present study was higher than the 1.0 to 1.9% prevalence reported for Turkey, Spain and Italy [4]. One of the major differences is that the present study was hospital based study; the sites of the other studies were not indicated by the authors. However, the 13.7% prevalence was higher than the 0.6% (1/154) reported for a hospital based study in Northern Cyprus [4].

Other studies have reported HCV prevalence rates of between 3.2 to 4.1% in countries in North Africa and the Middle East [2, 8]. In Egypt, the prevalence of HCV ranges from 5.0 to 25.0% [8, 9]. In Nigeria, the prevalence of HCV ranges from 4.75 to 30.0% [10, 11].

Although the 13.7% prevalence obtained in the present study was from the screening of patients admitted in the PMGH, nevertheless it can be considered as a baseline study that provides the basis for a more elaborate epidemiological assessment of the prevalence of HCV among the vulnerable groups in PNG.

Such a project will be in line with the policy adopted by the World Health Assembly in May 2016: “Global Health Sector Strategy on Viral Hepatitis, 2016 – 2021” [12]. The strategy highlights the critical role of Universal Health Coverage and the targets of the strategy are aligned with those of the Sustainable Development Goals (SDG). The strategy has a vision of eliminating viral hepatitis as a public health problem and this is encapsulated in the global targets of reducing new viral hepatitis infections by 90% and reducing deaths due to viral hepatitis by 65% by 2030 [12].

It is important for the authorities in PNG to adopt and implement the actions and strategies that

WHO has proposed for the elimination of viral hepatitis as a public health problem. The WHO is working in the following areas to support countries in moving towards achieving the global hepatitis goals under the 2030 SDG Agenda: Raising awareness, promoting partnerships and mobilizing resources, formulating evidence-based policy and data for action, preventing transmission and scaling up screening, care and treatment services [12].

CONCLUSIONS:

The data obtained in this hospital based study revealed the extent of HCV infection among patients admitted in PMGH with different medical diagnosis. It can be considered as baseline data for healthcare providers to have a first glance at the extent of HCV prevalence among the patients in Port Moresby General Hospital and to a limited extent among the general population in Port Moresby. It is hoped that this data provides the basis for a more elaborate epidemiological assessment of the prevalence of HCV among the vulnerable groups in PNG.

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