International Journal of Multidisciplinary Research and Modern Education (IJMRME)
Impact Factor: 6.725, ISSN (Online): 2454 - 6119
(www.rdmodernresearch.org) Volume 3, Issue 1, 2017

OCCUPATIONAL RISK OF HEPATITIS C AMONG DENTAL PROFESSIONAL BY ESTIMATION OF ANTIBODY TITRE FOR HEPATITIS C

Khushali K Shah*, Dr. Caroline Annette Jacob & Dr. Archana*****

Saveetha Dental College and Hospitals, Masilamani Nagar, Seneerkuppam Bypass Road, Poonamallee, Chennai, Tamilnadu

Cite This Article: Khushali K Shah, Dr. Caroline Annette Jacob & Dr. Archana, "Occupational Risk of Hepatitis C among Dental Professional by Estimation of Antibody Titre for Hepatitis C", International Journal of Multidisciplinary Research and Modern Education, Volume 3, Issue 1, Page Number 314-316, 2017.

Abstract:

Aim: To determine the levels of Hepatitis C antibody (anti-HCV) from blood samples among a cohort of dental professional using quantitative seroanalysis.

Objective: Determination of the antibody titre levels of HCV provides information of dental health professionals with adequate protection against the HCV antigen.

Background: Dental health care workers have an occupational risk hazard of acquiring blood-borne viral pathogens such as hepatitis C virus (HCV). The risk is maximised due to constant contact of blood from performing dental procedures on patients who may in turn be carrying the virus via needle-stick injuries and open wounds. HCV can be prevented by strict adherence to standard microbiological practices and techniques and the routine use of appropriate barrier precautions to prevent skin and mucous membrane exposure when handling blood and other body fluids of all patients in health care settings.

Materials and Method: The cohort study included 85 dental professionals (M=42, F=43) who were currently pursuing or had pursued their under graduation and/or post graduation in dentistry. Subjects were informed about the study and a written consent form was obtained. 2ml of blood was collected intravenously and transferred to a vaccutainer tube. The blood was then allowed to coagulate for half an hour and later centrifuged at 3000rpm for 5 mins. The supernatant liquid was pipetted, stored in Eppendorf tubes and incubated at 4˚C. The HCV MICROLISA® kit was used to detect the antibody titre in the serum sample as per the manufacturer's instructions. The processing of the samples was then performed using an automated ELISA analyser.

Result: The results of the study showed that all the subjects tested negative for Anti-HCV titres.

Key Words: Hepatitis C, Dental Professionals, Antibody-Titre & Needle Stick Injury

Introduction:

Hepatitis C is an infectious disease caused by the hepatitis C virus (HCV) that primarily affects the liver. It is a major cause of acute hepatitis, chronic liver disease and liver cirrhosis; resulting in life-threatening complications such as liver failure, liver cancer, or esophageal and gastric varices. [1] HCV is primarily spread by blood-to-blood contact associated with intravenous drug use, poorly sterilised medical equipment, needle stick injuries in healthcare, and via blood transfusions.[2] Dental and medical professionals are at a greater risk of contracting HCV due to the various invasive and non-invasive procedures they perform. Medical practitioners and dentists are at a greater risk of experiencing needle stick injury and have 1.8% chance of subsequently contracting the disease themselves. [3] It is estimated that 170 million people worldwide which constitutes 3% of the world population are chronically infected with HCV and are under the risk of cirrhosis and liver cancer. [4] HCV infection leads to chronic hepatitis in 50% to 80% of individuals [5]. Thus, increasing global prevalence of this disease puts individuals employed in health care services at greater risk of con-tracting the disease [6]. Occupational exposure from percutaneous injuries is a substantial source of infection by blood borne pathogens among dental professionals. However, studies of medical professionals exposed to HCV by a needle stick injury, or any other percutaneous injury, have found that the incidence of anti HCV seroconversion is 1.8% (0%-7%) on average. [7] The prevalence in India's 1.2 billion population is about 1%, with an estimated 288,000 new HCV infections that occurred in India in 2014. In addition, the WHO reports the death of nearly 96, 000 infected individuals annually in India as a result of this hidden epidemic. [8]

Materials and Method:

The cohort study included 85 dental professionals (M=42, F=43) who were currently pursuing or had pursued their under graduation and/or post graduation in dentistry. Subjects were informed about the study and a written consent form was obtained which was modified based on those developed by Brevard University (North Carolina, United States), and Hep C Alert. 2ml of blood was collected intravenously and transferred to a vaccutainer tube. The blood was then allowed to coagulate for half an hour and later centrifuged at 3000rpm for 5 mins. The supernatant liquid was pipetted, stored in Eppendorf tubes and incubated at 4˚C. The HCV MICROLISA® kit was used to detect the antibody titre in the serum sample as per the manufacturer's

instructions. The processing of the samples was then performed using an automated ELISA analyser. The study population had 40 dental professionals who had completed their post graduation, 8 who had completed their under graduation and 37 who were pursuing their post graduation in dentistry. Of those who had participated in the study, 47 individuals had <5 years of clinical experience while 5 individuals had more than 16 years of experience. The cohort shows that there were more number of dental practitioners with fewer years of experience and the numbers decreased with the number of years of experience involved with the dental profession. A majority of dental professionals also appear to work for 41-60 hrs of clinical practise while 10 individuals had more than 70 hours of clinical practise per week

Results:

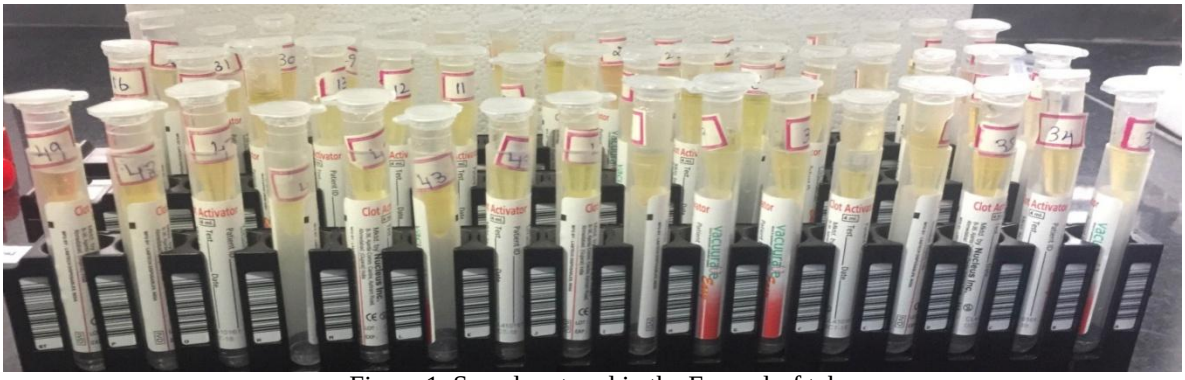


Figure 1: Samples stored in the Eppendorf tubes

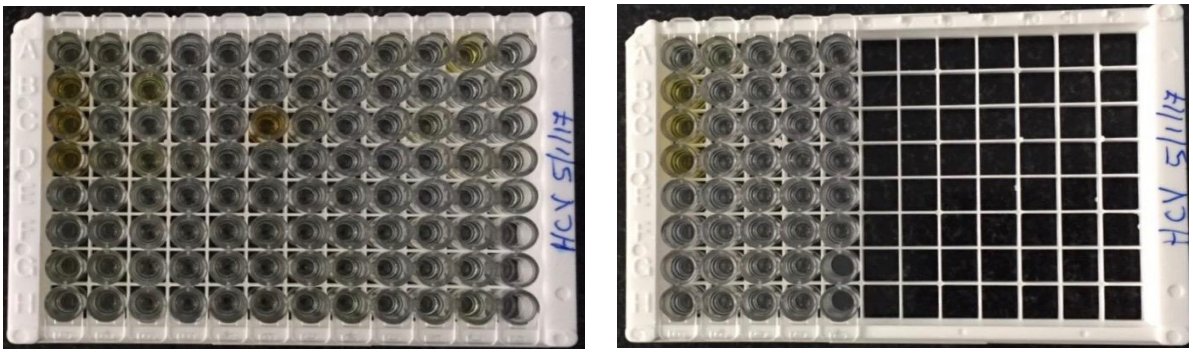
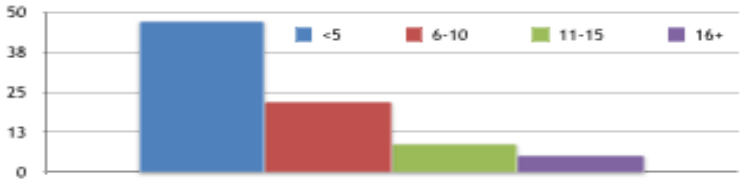
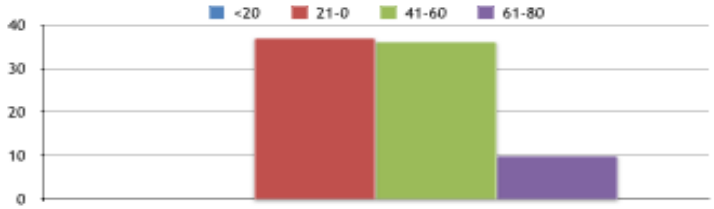


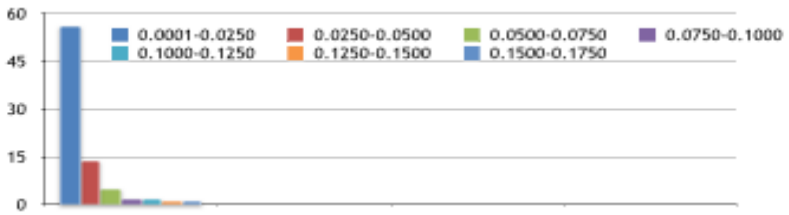
Figure 2: Results after the ELISA analysis



Graph 1: Years of clinical practice



Graph 2: Hours of clinical practice



Graph 3: Anti-HCV titres

Discussion:

Hepatitis C virus (HCV), also known as parentally transmitted or post transfusion non-A non-B hepatitis, was first identified in 1989 as a single-stranded positive-sense RNA virus, enclosed in an envelope with a diameter of ~50 nm. It is classified in a separate genus of Hepacivirus as the third member of the Flaviviridae family (the other two genera remain as Pestivirus and Flavivirus). [9]Six major genotypes (namely 1 to 6) of HCV with different geographical distributions have been identified so far. Genotypes 1, 2 and 3 are distributed worldwide with genotype 1 accounting for 40-80% of all infected cases, whereas Genotype 4 is generally found in the Middle East and Egypt and genotype 5 in South Africa and genotype 6 in South-East Asia. [10] Dentists are at a greater risk since they are frequently exposed to biological fluids through skin and mucous membranes or through percutaneous injuries. Blood exposure incidents, which may cause the transmission of blood-borne viruses, occur regularly during dental treatment procedures due to the close proximity to patient tissues, sharp instruments such as endodontic files, syringes, limited visual field in a small working area as well as the frequent patient movements during dental procedures. [11]The risk of being infected with HCV after a single needle-stick injury is 3% [12]. Using the anesthetic syringe and incorrect needle recapping procedures holding the cap with one hand and re-sheathing the needle with the other, are likely to be the most important causes of needle stick injuries (NSI) in dentists and dental hygienists [13]. The results of the study showed that all the subjects tested negative for Anti-HCV titres. Graph 1 and Graph 2 present the years and hours of clinical hours of the subjects respectively. It was noted that with an increase in the number of years and clinical hours of practice, there was an increase in the antibody titre levels. Years of clinical practice ranged from less than 5 years to 16 years of experience, while the hours of clinically practice ranged from less than 20 hours up to 80 hours. As there are no vaccines available for HCV infection unlike Hepatitis B, the only other choice for protection against HCV is either palliative treatments to treat the underlying cause or maintenance of proper safety protocols. To reduce NSI in the dental clinics there is a need to invest resources into educating dentists and dental hygienists on the proper use of devices, focusing on administration of local anesthetic, recapping, changing the anesthetic cartridge and cleaning of instruments, as these factors contributed to a significant proportion of injuries among dental professionals. The focus of training for dentists and dental hygienists could be prevention of percutaneous injuries during local anesthetic administration, while for dental assistants it could be handling and cleaning of instruments. Another possible strategy to prevent percutaneous injuries could be the re-engineering of the anesthetic needle so that they are less likely to cause injury. [13]

Conclusion:

HCV infection is a condition with global impact. Along with common routes of transmission, Dentists and Dental hygienist are always suspected as to whether they infect their patients or get infected. Although there are reports informing that dentists and oral surgeons have infected their patients with HBV during dental treatments, to date there is no similar report on HCV. However, available reports imply that there is a threat in dentistry if universal infection control strategies are not adhered to. Therefore further studies are needed to assess the prevalence of HCV among Dental proffesionals.

References:

1. Ryan K J, Ray C G, eds. Sherris Medical Microbiology (4th Ed.).2004. pp. 551–2.
2. Maheshwari, A; Thuluvath, P J. "Management of acute hepatitis C". Clinics in liver disease. 2010.14 (1): 169–76.
3. Waheed Y, Shafi T, Safi SZ, Qadri I. Hepatitis C virus in Pakistan: a systematic review of prevalence, genotypes and risk factors. World J Gastroenterol 2009; 15: 5647-5653.
4. ŁAbedzka H, Simon K, Gładysz A. Clinical and epidemiological assessment of hepatitis C virus infection among vol- untary blood donors. Med Sci Monit 2002; 8: CR591-CR596.
5. Mastoi A A, Devrajani B R, Shah SZ, Rohopoto Q, Memon SA, Baloch M, Qureshi GA, Sami W. Metabolic investiga- tions in patients with hepatitis B and C. World J Gastroenterol 2010; 16: 603-607.
6. Richmond J A, Dunning T L, Desmond P V. Health professionals' attitudes toward caring for people with hepatitis C. J Viral Hepat 2007; 14: 624-632
7. Farahnaz Joukar, Fariborz Mansour-Ghanaei, Fatemeh Soati, Panah Meskinkhoda. Knowledge levels and attitudes of health care professionals toward patients with hepatitis C infection .World Journal of Gastroentology, 2012 May 14; 18(18): 2238-2244.
8. Global policy report on the prevention and control of viral hepatitis, 2012.
9. Pol S, Vallet-Pichard A, Corouge M, Mallet VO. Hepatitis C: epidemiology, diagnosis, natural history and therapy. Contrib Nephrol. 2012; 176:1–9.
10. Modi A A, Liang T J. Hepatitis C: a clinical review. Oral Dis. 2008; 14(1):10–4.
11. Brailo V, Pelivan I, Skaricic J, Vuletic M, Dulcic N, Cerjan-Letica G. Treating patients with HIV and Hepatitis B and C infections: Croatian dental students' knowledge, attitudes, and risk perceptions. J Dent Educ. 2011; 75(8):1115–26.
12. Shah SM, Merchant AT, Dosman JA. Percutaneous injuries among dental professionals in Washington State. BMC Public Health. 2006; 6(1):269.