Original Article

Increasing frequency of Anti-HCV seropositivity in a cross-section of people in Karachi, Pakistan

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ABSTRACT

Objective: To determine the current frequency of circulating anti-HCV antibody in a cross section of subjects in Karachi, Pakistan and compare it with previous observations.

Methodology: A total of 35,191 individuals of both sexes presenting at a private diagnostic lab and its branches in Karachi city were screened for Anti-HCV antibody during a two year period ending Dec 2010. Positive tests were detected using EVOLIS automated 4th generation analyzer and confirmed with COBAS e411 random access solid phase chemiluminescent enzyme immunoassay. Also, a retrospective scrutiny of 37,391 subjects tested in the same lab during 2002-07 suggested 5.9% anti-HCV seropositivity, and was considered for comparison.

Results: Anti-HCV antibodies were detected in 3170 (9.01%) of those assessed. The youngest positive subject was a 5-day-old male neonate, the eldest an 82-year-old male. The majority of carriers (48.0%) were aged 30-49 years and 53.1% of those tested positive in Karachi, Pakistan were female. Carrier rate of anti-HCV antibody was 5.9% during 2002-07 recorded in the same lab.

Conclusion: HCV antibody frequency in our Karachi subjects have steadily increased from 5.9% in 2002-07 to 9.01% in 2009-10, encouraging awareness and enquiry of reasons for the increasing reach of a significant virus.

KEY WORDS: HCV, Frequency, Transmission.

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INTRODUCTION

Hepatitis C virus (HCV) was identified in 1988 as the main etiological agent of non-A, non-B (NANB) hepatitis accounting for 80-90% of post-transfusion hepatitis cases. In recent years Hepatitis C has emerged as a global public health problem and poses a more than trivial disease threat owing to lack of education and screening protocols, and absence of a protective vaccine. Worldwide, HCV has infected an estimated 130 million people, most of whom are chronically infected[1] and poses a higher propensity for causing chronic liver disease (CLD) in contrast to HBV.[2]

Most descriptions of HCV epidemiology depend heavily upon HCV seroprevalence studies. These exercises are typically cross-sectional in design and are done in selected populations such as blood

donors or patients with CLD which are not representative of the community or region in which they reside. Although HCV is endemic worldwide, there is a large degree of geographic variability in its distribution. Countries with the highest reported prevalence rates are located in Africa and Asia; areas with lower prevalence include the industrialized nations in North America, Northern and Western Europe, and Australia. Populous nations in the developed world with relatively low rates of HCV seroprevalence include Germany (0·6%), Canada (0·8%), France (1·1%), and Australia (1·1%). Low, but slightly higher seroprevalence rates have been reported in the USA (1·8%), Japan (1·5–2·3%), and Italy (2·2%).[1]

There is a wide range of prevalence estimates among developing countries, and generally less data are available to validate assumptions about the burden of disease than in the developed world. This range in prevalence is reflected in reviewing the estimates from developing countries that are among the world's most populous nations. China, whose citizens account for one fifth of the world's population, has a reported HCV seroprevalence of 3·2%. In India, which holds an additional one-fifth of the world's population, one community-based survey reported an overall rate of 0·9%. Indonesia's rate is 2·1%, but is based on serosurveys of voluntary blood donors. Seroprevalence in Pakistan have previously reported rates ranging between 2·4% and 6·5%. Egypt, with an estimated population of 73 million, has the highest reported seroprevalence rate of 22.0%.[3]

Although no recent population-based estimates for the prevalence of HCV are available in Pakistan, one done at Hafizabad[4] and others on blood donors suggested that the incidence ranged from 2-10%.[5,6] Approximately 0.2% and 0.4% of children under the age of 12 and between 12 and 19 years, respectively, are reported to be infected with HCV in Pakistan.[7]

Since there were apparently no recent estimates of HCV seropositivity in Karachi in particular, it was considered informative to assess the current prevalence figures in a cross-section of the City's population, and to compare the findings with approximations observed in preceding years.

METHODOLOGY

Subjects: a cross sectional retrospective study was done of 35,191 individuals presenting at a local diagnostic lab and its branches in key areas of Karachi City to be screened for anti-HCV antibody from Jan. 2009 to Dec. 2010. Also, a retrospective estimation of anti-HCV seropositivity in 37,391 subjects recorded during 2002-2007 (unpublished data) was also compared. Amongst the clients referred to the laboratory were neonates and children, women undergoing prenatal screening, blood donors, students, doctors and professional health workers, hospitalized patients, and those with disturbed or normal liver function enzymes.

Blood Specimens: Disposable sterile syringes were used to collect 5ml of blood samples from adults and 1-3ml from infants and children aseptically by venipuncture, which were then transferred into sterile test tubes, allowed to clot at room temperature, centrifuged at 1000rpm for 15 minutes, and the supernatant serum promptly removed from packed cells and debris. Grossly hemolyzed or lipemic samples as well as specimens containing particulate matter or exhibiting obvious microbial contamination were discarded. Positive tests were detected using EVOLIS automated 4th generation analyzer and confirmed with COBAS e411 random access solid phase chemiluminescent enzyme immunoassay employing pertinent reagents (Roche) which affords a diagnostic specificity of 99.8% for random samples and 95% confidence interval.

Subject data: Clients were self presenting or referrals for routine checkups. Besides age and gender, no attempt to record any data was feasible to obtain any history of contact or likely mode of infection associated with those subjects whose blood tested positive.

RESULTS

A total 3,170 of the 35,191 cases of all ages tested during the two years study period were anti-HCV positive suggesting a frequency rate of 9.01%. The youngest seropositive subjects were 5-day-old and 12-day-old males, while the eldest was an 82-year-old male; subjects tested ranged in age from the newborn to senior citizens aged 85 years.

The approximate percentages of seropositive subjects in five age groups with most cases detected between the ages of 30-49 years (48.1%) are given in (Table-I). The positive cases in respect of gender indicated that the number of female subjects (n=1684) was fairly higher (11.7%) than that of the males (n=1486).

DISCUSSION

Although being heavily burdened with hepatitis and CLD, the national level estimates on the frequency of HCV have been sparsely documented in Pakistan. Certainly there have been studies, but

Table-I: Association of age of subjects with anti-HCV seropositivity.

Age	*No. Positive*	*Percentage*
01 day – 15 years	44	1.4%
16 – 29 years	755	23.8%
30-49 years	1527	48.1%
50-59 years	510	16.1%
60-85 years	334	10.5%

mostly involving small groups of subjects and reporting a varying range of frequency percentages. However, in October 2008, a major review article merging several studies concluded an average anti-HCV seroprevalence in the pediatric population to be 2.1% (range 0.4–5.4%). In adults, studies of HCV seroprevalence in non-blood donors showed higher rates (5.4% weighted average; range 2.1–31.9%) than in blood donors (2.8% weighted average; range 0.5–20.7%). The overall HCV seroprevalence in healthy adults, based on combined data from blood donors and non-donors was 3.0%, with studies in different provinces of Pakistan showing higher prevalence in the Punjab as compared to other provinces.[8]

Our results (frequency 9.01%) were decidedly higher than the earlier reported averages, and also the 5.9% estimated in our data in 2002-07, indicating an alarmingly elevated incidence. An added observation, worth discussing, was that males (46.9%) and females (53.1%) shared the burden of HCV, with the age group having the highest seropositivity being the child-bearing and sexually-active period of 16 – 49 years.

The lack of plainly significant gender bias raises questions on the modes of transmission currently considered contributory, such as transfusion of infected blood, since if this was a commonly involved way the ratio would be much more inclined towards females, given that males are comparatively rarer recipients of transfused blood.[9] Concerning males, other related means of spread like circumcision or shaves by street barbers that reuse fixed blades need to be further explored as to how much they are contributing to the spread of HCV.[10]

HCV is not reported to be dispersed by breast feeding, coughing, hugging, sneezing, sweating, tearing, or in saliva or urine; even sharing eating utensils or drinking glasses is said to be unimportant, since the fragile virus envelope is susceptible to damage by dryness when exposed to the environment, and gastric juices when ingested. It is generally accepted that the common risk factor for infection and transmission is sharing needles for intravenous drug use; other possibilities include sharing of items such as razors and toothbrushes that might have blood on them, being a health care worker with frequent contact with blood on the job, mother to fetus, and getting a tattoo with unsanitary instruments.

The possibility of an insect vector being involved comes to mind, but has been refuted in several studies; the mosquito, for instance, is reported to be incompetent as a vector of both HBV and HCV transmission, since mosquitoes inject saliva, not blood, when feeding.[11] The insect can certainly spread some diseases such as malaria and yellow fever, but in saliva, while HBC and HCV are blood-borne and need to home in on liver cells, which mosquitoes lack. And although Burton (1963)[12] claimed that bed bugs have been suspected in the transmission of 41 human diseases, Goddard (2003)[13] later questioned whether this really occurred with viruses.

Intimate contact and exchange of sexual fluids are known modes of spread of HBV, but whether this also occurs commonly with HCV has not been clearly validated. Indeed, HCV is suspected to be rarely spread through sexual contact and that the transmission to spouses during intercourse is rare, but it can happen, as in having unprotected sex with multiple partners, and intra-household clustering.[14]

Unnatural sexual practices could possibly have played a role in some seropositive males, as emphasized in one study on HBsAg frequency in Karachi and Sindh[15], but this remains a subject of speculation. Both Islamic and non-Islamic countries across Asia have in fact reported homosexual behavior,[16] and even the constitution of Pakistan forbids it and prescribes under section 377 penal code a minimum of two years in prison as punishment,[17] yet discreet liaisons between male and male continue.

Finally, with the mode of transmission of HCV in over 20% of cases said to be unidentified, it is of interest to consider the possibility of antigens in nature cross-reacting with HCV, thereby eliciting false-positive tests. Wedemeyer et al[18] have, for example, reported cross-reactivity between HCV and Influenza A, and several abstracts in international moots presenting unpublished data have suggested HCV-antibodies arising in patients with SLE, syphilis, and schistosomiasis, opening a new chapter of enquiry. Our study is presented with the recommendation that major clinical labs should carry out annual statistical trend analyses of specific PCR-HCV prevalence in order to alert relevant organizations concerned with the control of pertinent hepatitis viruses.

Admittedly, we have not attempted to explore the modes of transmission among our sero-positive cases, and thus cannot contribute positive data for generating awareness in order to reduce the spread of HCV.

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REFERENCES

1. Alter MJ. Epidemiology of hepatitis C virus infection. World J Gastroenterol 2007;13(17):2436-2441.
2. James CM, Chen L. In Liver and Biliary Tract, Pathological Basis of Disease. 8th edition, WB Saunders Elsevier's Company, 2010: 847-848.
3. Shepard CW, Finelli, Alter MJ. Global epidemiology of hepatitis C virus infection. Lancet Infect Dis 2005;5:558–567.
4. Luby S, Qamruddin C, Shah A. The relationship between therapeutic injections and high prevalence of hepatitis C infection in Hafizabad, Pakistan. Epidemiol Infect 1997;119:349-356.
5. Zuberi SJ. Seroepidemiology of HBV and HCV in Pakistan. Int Hepat Commun 1996;5:19-26.
6. Parker SP, Khan IH, Cubitt WD. Detection of antibodies to hepatitis C virus in dried samples from mothers and their offspring in Lahore, Pakistan. J Clin Microbiol 1999;37:2061-2063.
7. Hamid S, Umar M, Alam A, Siddiqui A, Qureshi H, Butt J. PSG Concensus statement on the management of hepatitis C virus infection-2003. J Pak Med Assoc 2004;54:146-150.
8. Ali SA, Rafe MJ, Donahue, Qureshi H, Vermund H. Hepatitis B and hepatitis C in Pakistan: Prevalence and risk factors. Int J Infect Dis 2009;13(1):9–19.
9. Qureshi H, Zuberi SJ. Hepatitis B and D. J Inf Dis Pak 1996;3(4):10-11.
10. Shazi L, Abbas Z. Comparison of risk factor for Hepatitis B and C in patients visiting a Gastroenterology clinic. J Coll Phys Surg Pak 2006;16(2):104-107.
11. Berquist KR, Maynard JE, Francy DB, Sheller MJ, Schable CA. Experimental studies on the transmission of Hepatitis B by mosquitoes. Am J Trop Med Hyg 1976;25(5):730-732.
12. Burton GJ. Bedbugs in relation to transmission of human diseases. Pub Health Rep 1963;78:513-524.
13. Goddard J. Bed bugs bounce back – but do they transmit disease? Infect Med 2003;20(10):473-474.
14. Akhtar S, Moatter T. Intra-household clustering of Hep C virus infection in Karachi, Pakistan. Trans R Soc Trop Med Hyg 2004;98(9):535-539.
15. Abdulla EM, Abdullah FE. Seropositive HBsAg frequency in Karachi and Interior Sindh. Pak J Med Sci 2007;23(2):157-160.
16. Schmidt A, Safer J. Sexuality and eroticism among males in Moslem Societies. New York, Harrington Press, 1992.
17. Murray S, Roscoe W eds. Islamic Homosexuality. New York, NY University Press, 1997.
18. Wedemeyer H, Mizukoshi E, Davis AR, Bennink JR, Rehermann B. Cross-reactivity between HCV and Influenza A. J Virol 2001;75:11392-11400.

Authors contribution:

1. Dr. Farhan Essa Abdullah. Initial conception to the idea and critical revision of the intellectual contents along with giving the final approval for the submission of the article to be published.
2. Hamdan Ahmed Pasha. Substantial designing of the study and acquisition, analysis and interpretation of the data along with drafting the final manuscript.
3. Adeel Ali Memon. Substantial designing of the study and acquisition, analysis and interpretation of the data along with drafting the final manuscript.
4. Ujala Nadir Shah. Contribution to the acquisition of the data, analysis along with the drafting the final version.