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Prevalence of HIV-1, HCV and HBV Infections among Inhabitants in Chennai City at Hi-tech Center, Tamil Nadu-India

Amirthalingam R[1☼], Pavalakodi VN[2]

1. Molecular Biologist, Dept. Molecular Biology, Hi-Tech Center, Chennai, T. Nadu, India
2. Senior Lecturer, Dept. Biochemist, Apollo Science College, Chennai, T. Nadu, India

☼Correspondence: Specialist, Department of Molecular biology, Hi-Tech Diagnostic Center, Chennai, T. Nadu, India.P.O.Box.600017; Email: amrithrgenes@yahoo.co.in

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ABSTRACT

Hepatitis B and C is causative agent of chronic liver diseases, hepatocellular carcinoma and liver failure. HIV is causative agent of acquired immunodeficiency syndrome. The principle of this study was to estimate the prevalence of hepatitis B, hepatics C and human immune deficiency virus (HIV) infected patients who have been screened by hi-tech center in cosmopolitans' City of Chennai in Tamil Nadu, India, during the years of January 2010 to November 2012. This analysis was performed on 310 HIV, 966 HBV and 271 HCV infected patients. All patients' serum/plasma samples were screened by primary and confirmatory method of real time polymerase chain reaction. Results were obtained for HIV, HBV and HCV infectivity data lines. As for HIV (310), 70.6% males and 29.4% females' population aged between 25-65 years. The highest risk groups were between 25 to 45 years for females and 25 to 50 years for males. As for HBV (966), 70.30% males and 29.70% females' population aged between 18 to 70 years. The highest risk groups were between 25 to 50 for females and 25 to 60 for males' population. As for HCV, (271) 74.64% males and 26.36% females' population aged between 25-70 years. The highest risk groups were between 35 to 70 for males and 40 to 70 for females' population. The HCV RNA quantification was higher in female age groups between 45 to 65 years than male patients. Overalls the male's populations were infected more than females' population in this city was highlighted.

Key words: Human Immunodeficiency virus, hepatitis B and C virus, RT-PCR

Abbreviation: Abbott Real Time Polymerase Chain Reaction

1. INTRODUCTION

India has 29 States and 7 Union Pradesh including capital Delhi with second topmost population in the world and 1, 21 billions in tally. The Indian National AIDS (Acquired Immune Deficiency Syndrome) control program has been recognized worldwide and it is in succession. This agenda is in progression to control the uninfected population from

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affected society and in same time charitable remedial support and public awareness to exaggerated population to save their life up to an extension. This organization conducting HIV sentinels surveillance (HSS) and HIV estimations at regular intervals and recently completed in the year of 2011.The better mind-set and newest epidemiological data from census 2011 and other information concerning high risk groups to understanding of Indian epidemic. This all process has been supported by national and international experts, epidemiologist, and demographers from National Institute of Medical Statistic, UNAIDS, WHO, CDC and other public health institutes of India. National HIV prevalence is estimate to have an adult aged between 15 to 49 years were 0.27% and among males and females is estimated at 0.32% and 0.22% respectively. End of 2011, 1.22% in Manipur has shown the highest prevalence of adult population among the states. Soon after, Andhra Pradesh (0.75%), Mizoram (0.74%), Nagaland (0.73%), Karnataka (0.52%), Goa (0.43%) and Maharashtra (0.42).In addition, Odessa, Gujarat, Tamil Nadu and Chandigarh have shown estimated adult HIV prevalence greater than national prevalence (0.27%). India has confirmed as an overall reduction of 57% in estimated annual new HIV infections among adult population during the last decade from 2.74 lakhs (0.41%) in 2001 to 1.16 (0.27%) laksh in 2011. Similar steady declined are observed among males and females at national level. Declining trends in adult HIV occurrence are continued in all the high prevalence states like Andhra Pradesh, Tamil Nadu (0.25%-TANSAC, 2012) Karnataka, Maharashtra, Manipuri and Nagaland. Total number of people living with HIV/AIDS in India is estimated to be 21 lakhs in 2011.Of these,7% of infected children's below 15 years aged, while 86% are in the age-group of 15-49 years. Of all HIV infections, 39% (8.16 lakhs) are among women. Approximately 1.48 lakhs HIV infected people died, 1.5 lakhs people life saved by anti-retroviral treatment since 2004 and it is estimated to avoid around 50,000 to 60,000 thousands deaths annually in the next five years .There are 39.5 million people were living with HIV in the world, of which approximately 20, 88,642 peoples were from India (2012) and 1, 16,456 were adult new HIV infection have been reported (Ministry of Health and Family welfare, 2012). In other side, Hepatitis B is a major health problem in India. An average projected carrier rate of hepatitis B virus in India is 2-4.7% with a sum collection of about 40 million carriers among the 2 billion hepatitis B virus infection globally (Abraham, 2012; Thyagarajan, 1996). Of the 25 million normal new infants born every year in India, it is expected that above 1 million infants could be life time risk of chronic HBV infection. Also, each year over 100,000 Indians die due to illnesses related to HBV infection (Dutta, 2008; WHO, 2012). In global prospect, it is estimated that the prevalence of hepatitis B virus antigen, countries are classified as having high (>8%), intermediate (2-7%), and low (<2%) hepatitis B virus epidemic conditions. State of high epidemic includes South East Asia, China, most of Africa, mainly of Pacific Islands, the Amazon basin and parts of the Middle East. The state of middle epidemic (2-7%) includes South Asia, Eastern and Southern Europe, Russia, Central and South America. On the other side, the regions with low epidemic (<2%) comprised USA, Western Europe and Australia (Te, 2010). Hence, India has been grouped in intermediate hepatitis B virus epidemic. As for hepatitis C, one in hundred persons in India might be infected by the virus and 12 million people suffering from this virus infection out of 170 million in the world (Global Alert, 2013). There are more than 96,000 people die every year in India and average prevalence radio between 1.8% to 2.5% (Economic Times report, 2013). Prevalence of hepatitis C virus has been estimated as higher (5.2%) in Punjab (Ajit Sood, 2012), Andhra Pradesh (1.4%, 2.02%, and 6.1%) (Ashis, 2008; Chandra, 2003; Khaja, 2006); 6% in Pondicherry among sexually transmittable diseases patients, 7.89% in Arunachal Pradesh and 71.2% in Mizoram among injection drug users (Phukan, 2001; Chelleng, 2008). The highest prevalence was observed in North Eastern State of India (North East India, 2013). The present study was to estimate the predominance of HIV, HBV and HCV infected patients in cosmopolitans' City of Chennai in Tamil Nadu, India.

HIV/AIDS:
HIV is human immune deficiency virus infecting through sexual intercourse and blood transfusion. AIDS is acquired immune deficiency syndrome caused by HIV.

2. SCOPE OF STUDY

The study might be useful to policy maker, scientific society, public awareness, management of diseases and scenario.

2.1. Material

The realistic study was comprised 310 HIV, 966 HBV and 271 HCV infected patients including males and females, during the years of 2010 to 2012. All of the patients were clinically examined by medical specialist from different area of Chennai and screened by hi-tech center for further laboratory confirmation. Specimens were collected from all patients and refrigerated until the sample process. This sample was utilized for detection of viral antigens, HIV&HCV RNA and HBVDNA. The viral antigens have been detected through enhanced chemiluminescence immune assay.

CLIA:
Chemiluminecence Immune Assay is a method of antigens and antibodies detection

2.2. Methods

2.2.1. HBV DNA Extraction

According to the Abbott manufacture guideline HBV DNA extracted. In briefly, added 500µl of patients' serum and controls sample to 2ml lysis tube containing 150µl of working mLysis DNA buffer and incubated at 58C° in dry bath.400µl of diluted proteinase K solution was added in all lysis tube without disturbance of incubation and vortexes.

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Comparison:
The Abbott real time polymerase chain technology is genomic based diagnostic service and it ability to detect a specific genotype which is more important to know of pathogenic and antiviral treatment management than other assays. The data which was given in this research work is so accurate because of RNA and DNA based analysis when compare with immune based assay. Also, the police maker might utilize this data to get accurate statement for management of financial plan in diseases.
Content:
The entire message was taken from different types of internet open access journal.

Further incubated at 58C° for 15 minutes. Added 2ml of mLysis DNA containing internal control solution to each lysis tubes and further 40 µL *m*Microparticles$_{DNA}$ added to each tube and inverted three times, incubated at 58C° for 15 minutes. Placed all lysis tubes in magnetic capture stand for 2minutes and discarded solution without disturbance of micro particle. Washed several time with help of wash buffer-1(800µl), 2(700µl), and 3 (800-500µl) discarded with help of magnetic capture stand then DNA was eluted with help of elution buffer(110 µl) after incubated 12 minutes at 80C°. Finally 50 µl of eluted DNA sample was mixed with 50µl pre-prepared master mix in 96 plates and loaded in analyzer (m2000rt).

2.2.2. RNA Extraction (HIV/HCV)

According to the manufacture guideline RNA was extracted. In detail, 100 µl of mMicroparticles was added to each pre labeled lysis tubes containing 2.4ml of mLysis solution and then 700µl of plasma and controls samples was added. Mixed 5 times the samples container with help of disposable pipette and incubated at 55C° in dry bath for 20 minutes. All samples tube kept at magnetic stand for 2 minutes, after discard all lysate solution without any disturbance of micro particles and increase the temperature at 75C°. Later on discarded lysate solution from each tubes and transfer all tube from magnetic stand to non-magnetic stand. Washed 2 times with 700ul of wash buffer1 and transferred to magnetic stand for 2 minutes for each wash after gentile aspiration then transfer to non magnetic stand. Again samples washed 2 times with wash buffer 2 and transferred to magnetic stand for one minute for each wash after gentile aspiration then transfer to non magnetic stand. RNA was eluted by using elution buffer stage one(25µl) and incubated at 75C° for 20 minutes then return to the non magnetic rack. The final step of RNA was carried out by second stage elution buffer mixed well then transfer to magnetic stand for one minute then transfer eluted RNA to sterile tubes. For amplification, 50µl RNA sample from each patient's serum and 50µl of pre-prepared master mix were mixed in 96 well plates and loaded into the system.

2.2.3. Quantification

There are two types of fluorescent dyes were utilized in this amplification. The one is called reporter dye is relative with HIV-1 polymerase gene amplification and second dye is called quencher is concerned with termination of gene amplification at each end of cycling. The probe might be hybridized to the test target sequence and detaching from the quencher dye permitting RNA detection. This reaction happened individually for control and test target in each cycle. As for RNA quantification, it need a calibration curve of quality control and target, which was supplied by Abbott company as readymade and each test kit needed to calibrate in each run of amplification. Finally, it must be saved the calibrated result for next run with every new kits and results might be releases automatically as RNA viral load to monitor at the end of amplification.

3. RESULTS

The confirmed cases of HIV RNA, HBV DNA and HCV RNA have been incorporated in this study. As for HIV, total of 310 were confirmed cases and out of this 70.6% were males and 29.4% of female's population. The highest risk groups were between 25 to 45 years for females and 25 to 50 years for males. It seems that the life span might be undersized because of deficiency of immunity by over activation of virus in infected patients. For HBV, 70.30% males and 29.70% females' population aged between 18 to 70 years. The highest risk groups were between 25 to 50 for females and 25 to 60 for males' population. It seems that generally HBV infected population having more life span up to 65 years. For HCV, 74.64% males and 26.36% females' population aged between 25-70 years. The highest risk groups were between 35 to 70 for males and 40 to 70 for females' population. The HCV RNA quantification was higher in female age groups between 45 to 65 years than male patients. Overalls the male's populations were infected more than females' population in this city was highlighted (Figure 1). Hence, the highest infectivity (966) was observed in HBV population during the period of 2010 to 2012 followed by HIV (310) and HCV (271) respectively (Table 1). Due to a relationship in the risk factors and the way of transmission, public awareness and education would go a long way in restriction the prevalence of this infection. Hence, the diseases duration and the use of the anti-viral therapy could not be estimated. This may be due to the fact that the patients who were attending the hospital or other medical care provider were most likely from an improved socioeconomic condition. In this study there was co-infection observed among all infected population. Also need to concentrate more on public awareness to prevent the higher prevalence in scientific manor.

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Table 1
Age groups and infectivity radio of among population (2010-2012)

Age groups	HIV		%		HBV		%		HCV		%	
Gender	M	F	M	F	M	F	M	F	M	F	M	F
10-20y	1	0	0.3	0.0	16	13	1.65	1.35	3	0	1.1	0.0
21-30y	55	33	17.80	10.65	160	90	16.56	9.31	25	4	35.21	1.4
31-40y	84	42	27.0	13.55	208	103	21.53	10.66	37	4	13.65	1.4
41-50y	52	16	16.77	5.16	140	45	14.50	4.65	48	13	17.70	4.80
51-60y	21	0	6.77	0.0	100	26	10.35	2.70	56	40	20.66	14.76
61-70y	6	0	1.93	0.0	55	10	5.70	1.0	29	12	10.70	4.2
Total	310		70.6	29.4	966		70.30	29.70	271		74.64	26.36

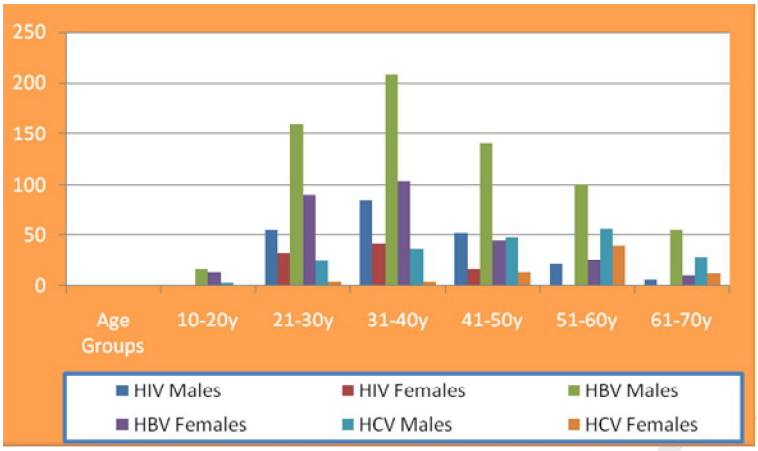

Figure 1
Prevalence of HIV, HBV and HCV infections in Chennai

4. DISCUSSION

The Government of India estimates that about 2.40 million Indians are living with HIV (1.93-3.03 million) with an adult prevalence of 0.27% in 2011. Children less than15 years account for 3.5% of all infections, though 83% are in 15-49 years age group. Out of this entire estimate, 39% (930,000) are among women population. In India, sexual transmission is responsible for 87.4% of reported HIV cases and HIV prevalence is high among sex workers. There are four high prevalence South Indian states among Indian states like Andhra Pradesh (500,000), Maharashtra (420,000), Karnataka (250,000) and Tamil Nadu (150,000) accounts 55% of all HIV infection in the Nations. Another 22% of HIV infection in Indian states like West Bengal, Gujarat, Bihar and Uttar Pradesh (>100,000) and in additional 23% of infection were been estimated in others parts of India. Higher incidence states show an understandable moribund movement in adult HIV infection. HIV infectivity rate has decreases significantly in Tamil Nadu from 0.58% to 0.25% during the years of 2007 to 2011. Hence, low prevalence states of Chandigarh, Orissa, Kerala, Jharkhand, Uttarakhand, Jammu& Kashmir, Arunachal Pradesh and Meghalaya show rising HIV infection in adult population since last four years. The HIV prevalence as per HSS 2010 is: females' sex workers 2.61%; men having sex with men 5.01%; injection drug users 5.91%; and transgender 18.80% (www.worldbank.org, 2012). The present study was enlighten the radio of HIV infection was higher in male (70.6%) than female (29.4%) infected population. There were no age's groups below 18 years and infants in HIV infected population. It seems that the public awareness and education regarding HIV infection was given by state government jointly with aid of central government of India to bring too decline. Hepatitis viruses are estimated to be among the top ten causes of death in India. As for hepatitis C, more than 12 million people infected in total population of India and every hundred normal population there is one person might be getting infection. The highest prevalence rate were been observed in same states like Arunachal Pradesh (7.89%) (Phukan, 2001), 5.2% in Punjab (Ajit Soot, 2012), 2-6% in Pondicherry among sexual transmittable diseases persons (Ashis, 2008), 1.4%, 2.02%, & 6.1% in Andhra Pradesh (Chandra, 2003; Khaja, 2006), 0.75 to 1.4% in Tamil Nadu (Chandrasekaran, 2000), 0.7 to 0.9% in West Bengal (Phukan, 2001) and injection drug users (IDUs) is high in Mizoram among Indian states (Chelleng, 2008). In present study, 271 HCV positive cases were confirmed. Of this 74.64% were males and 26.36% were females' population and it lest accountable when correlative with others stages.

As for HBV, an average estimation is 2-4.7% in India with near 40 million carriers and accounts for 10-15% of complete pool of hepatitis B carrier around the world (Dutta, 2008). Very high levels of hepatitis B virus infection have been reported in the Nicobares tribe-23.3%, Shompen tribe-37.8%, and Jarawa tribe-65% at Andaman and Nicobar Islands (Murhekar, 2003 & 2000). Also in Arunachal Pradesh have high rate of infection was 21.2% in Idu Mishmi tribe (Biswas, 2007). In present study, a total of 966 hepatitis B viruses have been screened and find out that 70.30% were males and 29.70% were females infected population. Overall study was highlighted that hepatitis B virus infectivity radio was high in Chennai population then HIV and hepatitis C virus. So, for this reason, government needs to take action against this viral infection.

RT-PCR:
Real time polymerase chain reaction is molecular technology for genes amplification including HIV polymerase gene.

5. CONCLUSION

From January 2010 to Nov-2012, a total of 310 HIV-1, 966 HBV and 271 HCV cases were confirmed by RT-PCR and took for brief estimation among Chennai population. The highest prevalence and risk groups were highlighted among viral infections.

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SUMMARY OF RESEARCH

1.Clinically confirmed and self medical checkup cases were included in the study. Sample of infected patients were received from different city of Chennai and Tamil Nadu.
2.All of the specimens were primarily screened through enhanced chemiluminescence immune assay as quantitative levels.
3.Finally, most of the specimens which were confirmed as positive by primary screening and confirmatory assay of Abbott Real Time Polymerase Chain Reaction qualitative and quantitative analysis for treatment purpose.

FUTURE ISSUES

Accurate screening is always safe for public life because of up hold self confident in normal life. Hence, infected people might be getting better treatment and cure of diseases. Saving of human life from above the viral infections means that saving of country economic as well as status among nations. Prevention is better than the cure is the principle of medicine.

DISCLOSURE STATEMENT

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