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Gastroenterology International	Semiannual	6000	5500	469	430
Indian Journal of Anatomy	Quarterly	8500	8000	664	625
Indian Journal of Anesthesia and Analgesia	Bi-monthly	7500	7000	586	547
Indian Journal of Cancer Education and Research	Semiannual	9000	8500	703	664
Indian Journal of Communicable Diseases	Semiannual	8500	8000	664	625
Indian Journal of Dental Education	Quarterly	5500	5000	430	391
Indian Journal of Diabetes and Endocrinology	Semiannual	8000	7500	597	560
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Journal of Radiology	Semiannual	8000	7500	625	586
New Indian Journal of Surgery	Bi-monthly	8000	7500	625	586
Ophthalmology and Allied Sciences	Triannual	6000	5500	469	430
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International Journal of Forensic Sciences	Semiannual	10000	9500	781	742
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Dengue Trends in South India: A Five Years Study at a Tertiary Care Hospital

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Abstract

Introduction: Dengue is a fast emerging pandemic-prone viral disease in many parts of the world, accounting for nearly 390 million cases across the globe each year while India shares the largest burden of these cases. In India, the spike in cases of dengue was the highest during the last one decade i.e. from less than 60,000 cases in 2009, to 188,401 in 2017, which is nearly a 300 per cent increase.

Methodology: A hospital record-based study was undertaken to determine demographic and clinical profile of all confirmed dengue cases admitted to the teaching hospital of A.J. Institute of Medical Sciences & Research Centre, Mangaluru, during a period from 01 January 2014 to 31 December 2018.

Results: The study included 655 cases. Majority of them were males, (86.8%) and belonged to the age group of 15-44 years (79.3%). Admissions increased steadily from 2014 to 2016 and thereafter declined during 2017 and 2018. A total of 90 (13.7%) cases presented with platelet count <50,000/Cumm. Almost all cases, i.e. 631 (96.3%), presented with fever while headache 592 (90.3%), Myalgia 497 (75.9%) and retro-orbital pain 357 (54.5%) were other common symptoms. A total of 41 (6.2%) patients reported with neurological manifestations. There were 05 (0.7%) cases of DHF, 06 (0.9%) cases of DSS and 03 (0.4%) cases of ARDS. The management of cases was found to be satisfactory, as there was no fatalities.

Conclusion: The study brings out epidemiological trends and clinical presentation of dengue fever in this part of the country.

Keywords: Platelet count; Complication; Dengue fever; Disease; Incidence.

Introduction

Dengue is a mosquito-borne viral infection leading to flu-like symptoms which may occasionally develop into potentially fatal complications i.e. severe dengue and dengue shock syndrome [1]. According to World Health Organization, dengue has shown a 30-fold increase over last five decades globally, while the number of reported cases have increased from 2.2 million in 2010 to over 3.34 million in 2016, resulting in nearly 20 000 deaths every year. As majority of cases are asymptomatic, the disease remains grossly under-reported [2-4].

Dengue is a major public health problem in India as well. The first epidemic of dengue in our country was reported from Calcutta in 1963 and subsequently the disease spread over southern parts of the country [5]. An outbreak of dengue in Delhi occurred in 1996 [6]. Now, dengue is endemic in the entire country with all four viral serotypes

in circulation. According to National Health Profile 2018, and National Vector Borne Diseases Control Programme, the severity of dengue has increased during the last two decades, while the year 2017 has recorded highest number of cases i.e. 188,401; as against less than 60,000 cases in 2009, scaling more than a 300 per cent increase over the period (Fig. 1). Looking at the state wise break down of dengue fever in India in the year 2017, West Bengal recorded highest number of cases i.e. 37746, followed by Tamil Nadu (23294), Kerala (19994) and Karnataka (17844). Besides, Tamil Nadu and Maharashtra also suffered highest number of casualties with 65 deaths each. In the year 2018, till 30th September 2018, there were a total of 40868 cases with 83 deaths, with Kerala contributing nearly 42% of the cases, which probably could be attributed to floods in the beginning of the year that left Kerala completely devastated [7-9].

The dengue fever has also shown a quantum jump in the Karnataka state, as have tripled in the last three years the number of dengue cases in the state has gone up from 5,077 in 2015 to 17,265 in the year 2017. According to experts, rapid urbanisation, extensive construction activities, poor sanitary conditions and migration of population are primarily responsible for the rapid rise of dengue in the state during this period [10].

Though, clinical presentation of dengue fever has generally been uniform in the country, yet several atypical presentations have been reported in recent outbreaks. Presently, information on dengue fever is limited while cases are grossly under-reported. Understanding the epidemiology of dengue fever is important for policy makers as well as public health managers for its prevention and control. In the backdrop of above, present study was conceived and conducted to study the epidemiological trends and clinical features of dengue cases in this part of the country.

Materials and Methods

A hospital record-based study was conducted to determine the epidemiological trends and clinical features of all confirmed cases of dengue fever who were admitted to the teaching hospital of AJIMS & RC Mangaluru, from 01 January 2014 to 31 December 2018 and were found positive for Dengue NS1 Antigen and Dengue specific IgM and IgG antibodies. A total of 566 cases were included in the study. Relevant information about the selected study subjects was retrieved from their case sheets from medical records department (MRD) of the hospital and the data obtained was subsequently analysed.

Results

A total of 556 cases were included in the present study. Most of the cases i.e. 441 (79.3%) belonged to the age group of 15-44 years, while the lowest number of patients belonged to <5 yrs. age group i.e. 11 (1.9%). Majority of the cases i.e. 483 (86.8%) were males, while females constituted only a small number 73 (13.1%). Most of the patients (57.0%) were unskilled labourers, followed by semi-skilled workers (21.0%), skilled workers (11.5%), house wives (8.4%) while professional accounted for a small proportion. (1.9%). Further, 377 (57.6%) of these cases belonged to rural area while remaining 278 (42.4%) cases were from urban areas (Table 1).

On analysis of data, a steep rise was observed in the number of admissions from 2014 to 2016,

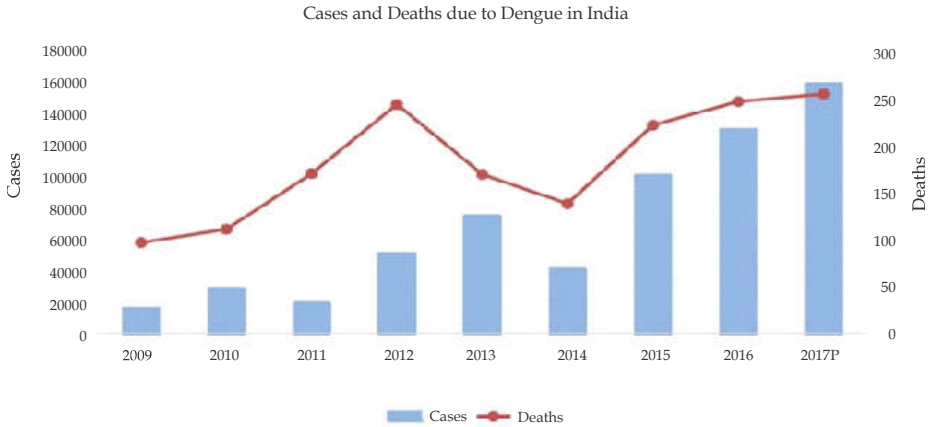

Fig. 1: Year wise breakdown of dengue cases in India from 2009 to 2017.

Source: Directorate of National Vector Borne Disease Control Programme, Dte. GHS, Ministry of Health & Family Welfare

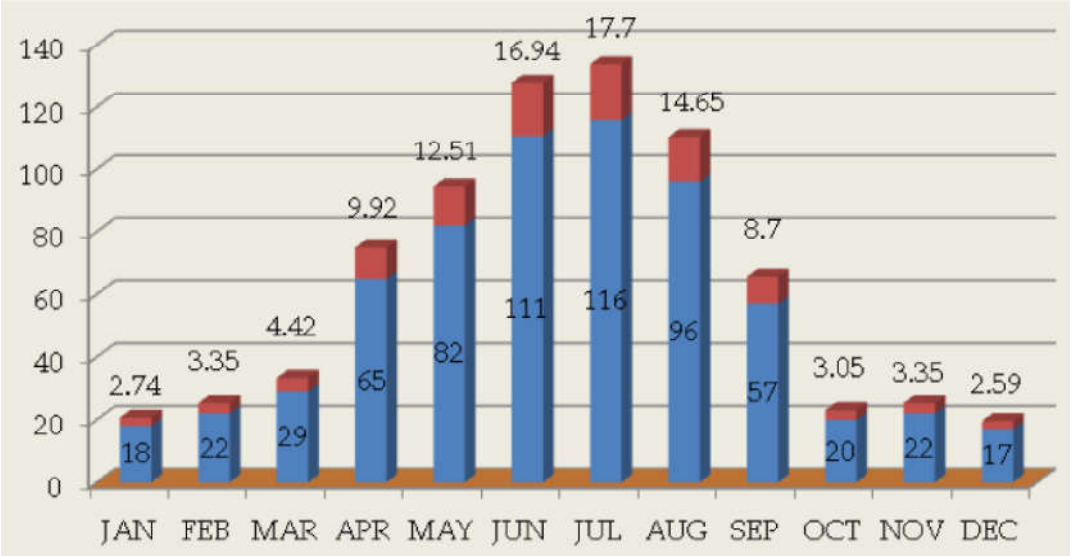

Fig. 2: Month wise breakdown of dengue cases (n=655)

Table 1: Socio-demographic profile of dengue cases (n=556).

Characteristics	Frequency	Percentage
Age Group in Yrs		
<05	11	1.9
05-14	24	4.3
15-44	441	79.3
45-60	53	9.5
>60	27	4.8
Gender		
Male	483	86.8
Female	73	13.1
Occupation		
Unskilled	317	57.0
Semi-Skilled	117	21.0
Skilled	64	11.5
Professional	11	1.9
House wives	47	8.4
Place of residence		
Rural	377	57.6
Urban	278	42.4

Table 2: Year wise breakdown of dengue cases (n=655).

Year	Frequency	Percentage
2014	71	10.83
2015	112	17.09
2016	233	35.57
2017	156	23.81
2018	83	12.67
Total	655	100

i.e. 71 (10.83%) in 2014, 112 (17.09%) in 2015, and 233 (35.57%) in 2016. However, after 2016, a decline was seen in admissions during 2017 and 2018 i.e. 156 (23.8%) and 83 (12.6%) cases respectively (Table 2).

During the study period, highest admissions, i.e. 116 (17.7%) were noted in the month of July, followed by June 98 (16.9%), August 96 (14.6%), May 82 (12.51%), April 65 (9.92%) while lowest incidence was reported during the month of December 17 (2.59%) (Fig. 2).

Table 3: Common symptoms and complications among dengue cases (n=655)*

Symptoms	Frequency	Percentage
Fever	631	96.3
Headache	592	90.3
Myalgia	497	75.9
Retro-orbital Pain	357	54.5
Arthralgia	339	51.5
Skin Rash	179	27.3
Petechiae	163	24.8
Diarrhoea	87	13.2
Complications		
Neurological Manifestations	41	6.2
Haematuria	57	8.7
Pleural Effusion	09	1.3
DHF	05	0.7
DSS	06	0.9
ARDS	03	0.4

* Multiple responses

Table 4: Platelet count distribution of dengue cases(n=655)

Platelet count (mm^3)	Frequency	Percentage
< 25,000	29	4.4
25,000 - 50,000	61	9.3
50,000 - 100, 000	242	36.9
>100,000	323	49.3

Table 3 brings out that almost all cases, i.e. 631 (96.3%) suffered from fever, followed by headache 592 (90.3%), Myalgia 497 (75.9%), retro-orbital pain 357 (54.5%), arthralgia 339(51.5%), skin rash 179 (27.3%), petechiae 163 (24.8%), and diarrhea 87 (13.2%). A total of 41 (6.2%) patients also reported with neurological manifestations, confusion and other minor neurological symptoms. Further, 23 patients suffered from various complications, which included 9 (1.3%) cases of pleural effusion, 05 (0.7%) cases of DHF, 06 (0.9%) cases of DSS and 03 (0.4%) cases of ARDS. However, all cases were managed well and no fatality were reported. Average length of stay of these dengue cases in hospital was 6.65 days.

Table 4 brings out Platelet profile of subject dengue cases. Out of 655 patients 29 (4.4%) were found to be having platelet count below 25,000/ cumm, 61 (9.3%) patients had count between 25,000 and 50,000/cumm, 242(36.6%) patients had platelet count between 50,000 and 100,000 while remaining 323 (49.3%) patients had platelet count more than 100,000/cumm. The management of all cases was satisfactory, as there were no fatalities.

Discussion

In the present study, majority of the patients were males, (86.8%), while females accounted for a small number (13.1%). Maximum number of cases belonged to the productive age group of 15–44 years (79.3%) while most of them (57.0%) were unskilled labourers. These findings are similar to the studies carried out by Kumar A, et al., in Karnataka and Prakash Doke et al., in Maharashtra [11-12]. However, Bandyopadhyay Bhaswati, et al., in their study from Kolkata had different results and found most cases in the age group 11–30 years [13].

Year-wise breakdown of cases revealed a steady rise in admission rate from 2014 to 2016, followed by a decline in 2017 and 2018 i.e. 71 (10.83%) in 2014, 112 (17.09%) in 2015, 233 (35.57%) in 2016, 156 (23.81%) in 2017 and 83 (12.67%) in 2018. Similar findings were also reported by Jayashree D. Naik, et al., in their study from Maharashtra, who reported a steady increase in admissions of dengue cases from 38 to 78 over a period of four years from 2012 to 2016 and Kumar A. et al., in their study from Udupi, a neighboring district, who found an alarming rise in the hospitalization rate of dengue cases which increased nearly 66 times from 2002 (07 cases) to 2008 (466 cases) [11,14]. This may be attributed to the rapid and unchecked construction activities in the urban areas leading to manifold rise in breeding places. Further, lack of vector control measures on part of the public health authorities and movement of migrant population from neighboring states further compound the problem.

To identify the seasonal variations, a monthly analysis of all admitted cases was carried out which revealed an steep rise in admissions from April (9.9%), with peak in July (17.7%), followed by a gradual decline thereafter with lowest number of admissions in Dec (2.5%) & January (2.7%). The pre- monsoon increase in the number of admissions in April month may be attributed to increase in temperature and pre-monsoon showers which facilitate mosquito breeding. However, Bhardwaj LM, et al., in their study in Assam reported highest number of cases in the months of August-November [15]. Increase in dengue cases during the pre-monsoon and monsoon season has also been supported by similar studies from Kerala and Karachi [16-17]. These findings further suggest that control management measures are required to be undertaken well before the monsoon and should continue till the end of the season.

Clinical profile of study subjects brought out fever as the most common symptom (96.3%), while headache, myalgia, retro-orbital pain arthralgia, vomiting and diarrhea were other common presenting features. A small proportion of cases also presented with renal involvement (8.7%), neurological involvement (6.2%), and other complications (05.61%). Similar clinical profile with fever, headache and vomiting as the most common clinical features have also been observed in studies by Mandal et al., who found fever (100%) as most common symptoms followed by headache (62.16%), and some atypical features like trans - aminitis while Daniel et al., brought out fever (96.8%) and headache (72.2%) as the main clinical presentations [18-19]. Further, Seema A et al., in their study reported fever and rashes as main clinical features [20]. However, Bethell DB et al., in their study in peri-urban areas of Chandigarh found no specific pattern of fever among dengue cases and reported headache (52.6%), as the most common clinical feature followed by myalgia (63.1%), vomiting (26.3%), diarrhoea (21.05%) and macula-papular/ erythematous rashes (10.5%) [21].

Bleeding diathesis is a known feature in dengue fever owing to drop in platelet count and leakage from blood vessels. However, in the present study, although 13.7% patients had thrombocytopenia (platelet count <50,000 cumm); but only 0.7% patients presented with hemorrhagic manifestations. Jayashree D. Naik, et al., in their study reported

26.8% patients to be having platelet count < 50,000 and 7.66% patients with DSS. 14 In another study, Mandal et al., reported bleeding gums and malena among 13.51% patients; while 37.84% patients had a platelet count < 50,000/cmm [18]. In a Hyderabad based study by Khan AH, et al., only 5% patients had bleeding disorders, though 40% of the patients had low platelet counts [22]. Mittal H, et al., in their study reported a very high incidence of thrombocytopenia (92.6%) while bleeding diathesis was found in nearly half (48.8%) of the cases [23]. However, Ageep AK, et al., in their study in Sudan observed rather high and almost even percentage of bleeding episodes (93%) and thrombocytopenia (88%) [24].

Limitations

Present study had the limitations that are inherent to the record-based studies and include likelihood of some of the clinical and demographic features left out in the case sheets while writing the history, carrying out clinical examination and recording the investigations. The probability of exclusion of some positive may also not be ruled out as IgM remains negative for the first few days of fever. Further, there was also lack of information on meteorological data and vector control measures undertaken by local health authorities during study period.

Conclusion

Dengue fever is the fastest growing viral infection in the world causing huge morbidity and mortality. The decadal trends are disturbing. Importantly. World Health Organization aims at reducing mortality and morbidity by 2020 from dengue fever by 50% and 25% respectively. Needless to say, that with existing understanding of vector bionomics, strict epidemiological surveillance and integrated vector management; the WHO goal is achievable.

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Conflict of Interest: None

References

1. World Health Organisation. What is dengue?. https://www.who.int/ dengue control/ disease/ en/. Accessed on 12 May 2018.
2. World Health Organisation Dengue. http://www.searo.who.int /entity /vector_borne_tropical_diseases/data/data_factsheet/en/. Accessed on 12 May 2018.
3. World Health Organisation. Dengue and severe dengue. https://www.who.int/news-room / fact-sheets/detail/dengue-and-severe-dengue. Accessed on 12 May 2018.
4. Down to Earth. Number of dengue cases in 2017 was the highest in a decade. https:// www.downtoearth.org.in/news/health/number-of-dengue-cases-in-2017-was-the-highest-in-a-decade-60982. Accessed on 12 May 2018.
5. R.S. Sharma, Roop Kumari, P.K. Srivastava, Kalpna Barua, L S. Chauhan. Emergence of Dengue Problem in India – A Public Health Challenge. J. Commun. Dis. 2014;46(2):17-45.
6. Gupta E, Dar L, Kapoor G, Broor S. The changing epidemiology of dengue in Delhi, India. Virol J. 2006;3:92.
7. National Health Profile (NHP) of India- 2018. Central Bureau of Health Intelligence Directorate General of Health Services Ministry of Health & Family Welfare, Government of India WHO Collaborating Centre on Family of International Classifications (ICD-10, ICF & ICHI).
8. National Vector Borne Disease Control Programme. https: //www.nhp.gov.in /national-vector-borne-disease-control-programme_pg. Accessed on 12 May 2018.
9. Medibulletin. Kerala witnessed 42% of all dengue deaths this year. https:// medibulletin.com/kerala-witnessed-42-of-all-dengue-deaths-this-year/. Accessed on 12 May 2018.
10. Bangalore mirror. Karnataka ranks 3rd in the country on dengue map. https:// Bangaloremirror.indiatimes.com/bangalore/others/karnataka-ranks-3rd-in-the-country-on-dengue-map/articleshow/62921467.cms. Accessed on 12 May 2018.
11. Kumar A, Rao CR, Pandit V, Shetty S, Bammigatti C, Samarasinghe CM. Clinical Manifestations and Trend of Dengue Cases Admitted in a Tertiary Care Hospital, Udupi District, Karnataka. Indian Journal of Community Medicine: Official Publication of Indian Association of Preventive & Social Medicine. 2010;35(3):386-90.
12. Prakash Doke, Satish Pawar. Profile of dengue fever outbreaks in Maharashtra; Indian Journal of Community Medicine. 2000;25(4):(2010-12).
13. Bhaswati Bandyopadhyay, Indrani Bhattacharyya, Srima Adhikary et.al.: A Comprehensive Study on the 2012 Dengue Fever Outbreak in Kolkata, India. ISRN Virology. 2013;Volume 2013, Article ID 207580, 5 pages.
14. Jayashree D Naik, Sandesh V Kamble, Swapnil R Jain, Madhuri Pandurang Mathurkar, Jitendra R Dolare, Vivek Patil. A retrospective study of

disability profile of live leprosy patients in a district of Maharashtra. Int J Med Sci Public Health. 2016; 5(6):1178-82.

15. Lalit Mohan Bhardwaj, Swapnav Borthakur P. C. Bhattacharyya. Clinico- epidemiological study of dengue cases in a tertiary care hospital, Guwahati, Assam, India. Int J Adv Med. 2017;4(6):1605-12.
16. Kavitha R. Dengue fever: the rise and the establishment of a new disease in Kerala, India with special references to the capital, Thiruvananthapuram. J Acad Clin Microbiol. 2007;9:65–70.
17. Khan E, Siddiqui J, Shakoor S, Mehraj V, Jamil B, Hasan R. Dengue outbreak in Karachi, Pakistan, 2006: experience at a tertiary care center. Trans R Soc Trop Med Hyg. 2007;101:1114–19.
18. Mandal Sanjay Kumar, Ganguly Jacky, Sil Koelina, Chatterjee Sumanta, Chatterjee Kaushik, Sarkar Pankaj, Hazra Shatanik, Sardar Debasis. Clinical Profiles of dengue Fever in a Teaching Hospital of Eastern India. National Journal of Medical Research. 2013;3(2):173-76.
19. Rachel Daniel, Raja mohanan and AZ Philip. A study of clinical profile of Dengue fever in Kollam, Kerala, India. Dengue Bulletin. 2005;29:197-202.
20. Seema A, Singh V, Kumar S, Kumar A, Dutta S. The Changing Clinical Spectrum of Dengue Fever in the 2009 Epidemic in North India: A Tertiary Teaching Hospital Based Study. Journal of Clinical and Diagnostic Research. 2012;6(6):999-1002.
21. Bethell DB, Gamble J, lolc PP, Dung NM, Chan TH, Loan HT et al. Non-invasive measurement of microvascular leakage in patients with DHF. Clinic Infect Dis. 2001;32:243-53.
22. Khan AH, Hayat AS, Masood N, Solangi NM, Shaikh TZ. Frequency and Clinical Presentation of Dengue Fever at Tertiary Care Hospital of Hyderabad/ Jamshoro. JLUMHS. 2010 May-Aug;9(2):88-94.
23. Mittal H, Faridi MM, Arora SK, Patil R. Clinico-hematological profile and platelet trends in children with dengue during 2010 epidemic in north India. Indian J Pediatr. 2012;79(4):467- 71.
24. Ageep AK, Malik AA, Elkarsani MS. Clinical presentations and laboratory findings in suspected cases of dengue virus. Saudi Med J. 2006; 27(11):1711-13.

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Assessment of Job Satisfaction Level among Doctors: A Comparative Study of Public and Private Hospitals in Punjab, India

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Abstract

Introduction: A proficient doctor spends more time in understanding the emotions of the patients, which may be helpful for the better treatment. Doctor's role is to promote patients welfare, not their own. Medical professionalism and training honors stoic acceptance of duty and eschew humming.

Objective: To find out the level and the factors affecting the job satisfaction among doctors.

Method: A cross-sectional study was done among doctors in 2015 by using a simple random technique and using the standard Minnesota satisfaction questionnaire. Considering a minimum prevalence of job satisfaction among physicians to be 40% from previous studies, power of 80% and an allowable error of 10%, the sample size was rounded off to 150 with a total of 75 government and 75 private doctors. It was a cross-sectional hospital based study. Data was collated and analysed using chi-square tests and association between the variables was taken out.

Result: Majority of the doctors were males and the association between gender and satisfaction level however, was not significant statistically. Most of the doctors were in the age group of 30-40 years and Physicians in the age group of 30-40 years were found to be more satisfied significantly. Majority of them had 2-4 years of experience.

Discussion: Most of the studies proved that when doctors were satisfied with their jobs the quality of care improves and also satisfied employees likely to be more innovative and devoted to their employers. The present study showed that doctors in Punjab were satisfied in Government hospitals more than in Private hospitals. High factors of significant association were ability utilization, advancement, authority, co-workers, creativity, independence, moral value, recognition, security, social service, supervision, variety and working conditions.

Conclusion: Hence, job satisfaction, as a matter of fact, plays an important role in the ultimate output of a physician, whether be it in terms of quality of patient care or quantity in patient treated. The determination of job satisfaction factors and their impact on organizational performance is very important in the health care system. Improving performance can significantly improve the quality and efficiency of patient care.

Keywords: Job Satisfaction; Physician; Quality of job.

Introduction

Job satisfaction figures significantly in any discussions on management of human resources. Job satisfaction refers to a person's feeling of satisfaction on the job, which acts as a motivation to work. It is not the self-satisfaction, happiness or self-contentment but the satisfaction on the job [1,2].

Job satisfaction has many dimensions. Commonly noted facets are satisfaction with the work itself, wages, and recognition, rapport with supervisors and coworkers, and chance for advancement. Each dimension contributes to an individual's overall feeling of satisfaction with the job itself, but different people define the "job" differently [3,4].

Spector (1997) presented three reasons to clarify the importance of job satisfaction. First, organizations can be directed by humanitarian values. Based on these values they will attempt to treat their employees honorably and with respect. Job satisfaction assessment can then serve as an indicator of the extent to which employees are dealt with effectively. High levels of job satisfaction could also be a sign of emotional wellness or mental fitness. Second, organizations can take on a utilitarian position in which employees' behavior would be expected to influence organizational operations according to the employees' degree of job satisfaction/dissatisfaction. Third, job satisfaction can be an indicator of organizational operations. Assessment of job satisfaction might identify various levels of satisfaction among organizational departments and, therefore, be helpful in pinning down areas in need of improvement [5].

According to Maslow's view of individual needs, job satisfaction is said to exist when an individual's needs are met by the job and its environment. The hierarchy of needs focuses on five categories of needs arranged in ascending order of importance. Physiological, safety, belongingness and love are the lower-level needs in the hierarchy. The higher-level needs are esteem and self-actualization. When one need is satisfied, another higher-level need emerges and motivates the person to do something to satisfy it. A satisfied need is no longer a motivator [6].

The study of job satisfaction became more sophisticated with the introduction of Herzberg's motivator-hygiene theory. This theory focuses attention upon the work itself as a principal source of job satisfaction. To Herzberg the concept of job satisfaction has two dimensions, namely intrinsic and extrinsic factors. Intrinsic factors are also known as motivators or satisfiers, and extrinsic factors as hygienes, dissatifiers, or maintenance factors. The motivators relate to job content (work itself) and include achievement, recognition, work itself, responsibility and advancement. The hygienes relate to job context (work environment) and involve, for example, company policy and administration, supervision, salary, interpersonal relations, and working conditions. Motivators are related to job satisfaction when present but not to dissatisfaction when absent. Hygienes are associated with job dissatisfaction when absent but not with satisfaction when present [7,8].

Doctor's job satisfaction plays an important role for the patient satisfaction by providing quality of care and also reduces doctor shortages. Physician satisfaction is a public health issue [9]. A proficient doctor spends more time in understanding the emotions of the patients, which may be helpful for the better treatment [10]. Medical professionals, regardless of the place or work are exposed to a web of factor, including workload, time pressure, changing attitude toward doctors on the part of patients and the attrition of professional autonomy [11-14].

Job satisfaction surveys give management an indication of general levels of satisfaction in an organization. The surveys can act as a safety valve, an emotional release, a chance to get things off their chest for some employees whereas for others it gives employee a reason to feel better towards management. It can also help to discover the causes of indirect productivity problems, such as absenteeism or turnover and poor quality of work. A survey can help management to assess training needs and effectiveness of organizational reward system and one of the best use of job satisfaction survey is in the evaluation of the impact of organizational changes on employee attitudes.

Thus the present study was carried out with the main objective of trying to find out the level of job satisfaction among doctors working in government and private hospitals in Punjab, India and their association with demographic variables. It also attempts to identify the barriers and the enablers in the work process of physicians and suggest measures for inducing greater satisfaction in their work area, which will directly or indirectly have a bearing on patient treatment too. It would determine the job satisfaction and their association with demographic variables among doctors of government and private institutions in Punjab.

Methods

The state of Punjab lies in northern part of India with a population of 28,884,179. It is one of the developed states in the country in terms of health indicators and has 22 districts in total. The state was divided to 4 regions (east, west, north and south) and 15 districts were chosen by a stratified random sampling. A list of the health care institutions was prepared for each district and 1 government and 1 private hospital were chosen from each district; which had the highest patient load, was > 30 bedded

and had tertiary level care. Similarly, 5 doctors each from the government and private set-up were chosen by a simple random sampling. Considering a minimum prevalence of job satisfaction among physicians to be 40% from previous studies, power of 80% and an allowable error of 10%, the sample size was rounded off to 150 with a total of 75 government and 75 private doctors. It was a cross-sectional hospital based study with 100% response rate [15, 16].

Data collection was done using the individual data sheet for collecting general information about the respondent and the Minnesota Satisfaction Questionnaire (MSQ) was specifically used as the study tool which covers 20 dimensions of job relating to job satisfaction on a Likert scale format.

The MSQ scales which represent the twenty dimensions of the job in alphabetical order are as follows:

1. *Ability utilization* - The chance to do something that makes use of abilities.
2. *Achievement* - The feeling of accomplishment one gets from the job.
3. *Activity* - Being able to keep busy all the time.
4. *Advancement* - The chances for advancement on this job.
5. *Authority* - The chance to tell other people what to do.
6. *Organizational policies and practices* - The way organizational policies are implemented.
7. *Compensation* - Feelings about pay in contrast to the amount of work completed.
8. *Coworkers* - How one gets along with coworkers.
9. *Creativity* - The opportunity to try one's own methods.
10. *Independence* - The opportunity to work alone.
11. *Moral values* - The opportunity to do things that do not run counter to one's own conscience.
12. *Recognition* - Being recognized for a job well-done.
13. *Responsibility* - The freedom to implement one's judgment.
14. *Security* - The way a job provides for steady employment.
15. *Social service* - Being able to do things in service to others.
16. *Social status* - Having respect for the community.
17. *Supervision-human relations* - The relationship between supervisors and employees.
18. *Supervision-technical* - The technical quality of supervision.
19. *Variety* - The opportunity to do different things.
20. *Working conditions* - Physical aspects of one's work.

All the participants were requested to fill questionnaire at their convenient time and return back. The use of these procedures resulted in a response rate of 100 percent. All scores on the Individual Data Sheets and the MSQ were entered in the SPSS data base, and data pertaining to the objectives of this study were generated accordingly. Computer generated data to assess the frequencies of response for each of the 5 response options on the MSQ Likert Scale was analyzed. The 5 options and the assigned weight for each were:

1. Very Dissatisfied (VD)
2. Dissatisfied (D)
3. Neither Satisfied nor Dissatisfied Satisfied nor Dissatisfied (N)
4. Satisfied (S)
5. Very Satisfied (VS)

Confidentiality and anonymity was maintained during the procedure. Informed consent was obtained from the participant. The participation was purely voluntary. Necessary ethical approval was collected from M.M. Institute of Management, M.M. University, Mullana-Ambala.

Results

The cross-sectional study which was done among 150 doctors; 75 from government and 75 from private hospitals had majority of doctors who were married, belonged to 30-40 years age group, had 2-4 years of work experience and were permanent job holders.

Majority of the doctors were males i.e. 101 and females i.e. 49. The association between Gender and Satisfaction level was not found to be statistically significant ($p>0.05$). Majority of the doctors were in the age group of 30-40 years i.e. 89. The association between Age and Satisfaction level was found to be statistically significant ($p<0.05$). Physicians in the age group of 30-40 years were found to be more satisfied. Majority of the doctors had 2-4 years of experience i.e. 46. The association between Experience and Satisfaction level was not found to be statistically significant ($p>0.05$). Majority of the doctors were married i.e. 108.

The association between Marital and Satisfaction level was not found to be statistically significant (p>0.05). Majority of the doctors were permanent i.e. 112. The association between Job status and Satisfaction level was not found to be statistically significant (p>0.05).

The satisfaction level amongst doctors working in government and private sector was significantly varying with Ability Utilization, Advancement, Authority, Co-Workers, Creativity, Independence, Moral value, Recognition, Security, Social service, Supervision (human relations), Supervision

Table 1: Association of Socio demographic characteristics with satisfaction level of study population

	Satisfied	Dissatisfied	p value
Gender			
Male	97	4	0.539
Female	48	1	
Age			
20-30 yrs	33	0	0.043
30-40 yrs	85	4	
40-50 yrs	24	0	
50-60 yrs	3	1	
Experience			
0-2 yrs	32	1	0.972
2-4 yrs	45	1	
4-6 yrs	41	2	
6-8 yrs	5	0	
8-10 yrs	3	0	
>10 yrs	19	1	
Marital			0.156
Single	42	0	
Married	103	5	
Job status			
Permanent	108	4	0.78
Contract	37	1	

Table 2: Different Factors of Job Satisfaction and Satisfaction level: Government

Sr. No.	Factors	VD	D	N	S	VS	p value
1	Ability utilization	0	1	48	15	11	.013
2	Achievement	0	4	30	15	26	.325
3	Activity	1	15	19	20	20	.390
4	Advancement	1	15	33	9	17	.001
5	Authority	0	4	26	29	16	.003
6	Company policies and practices	2	4	38	15	16	.288
7	Compensation	0	10	25	20	20	.449
8	Coworkers	1	14	15	27	18	.019
9	Creativity	2	15	32	18	8	.000
10	Independence	1	10	14	31	19	.000
11	Moral values	0	22	15	20	18	.000
12	Recognition	4	14	37	12	8	.000
13	Responsibility	1	12	26	22	14	.360
14	Security	2	7	14	25	27	.000
15	Social service	5	7	12	22	29	.000
16	Social status	1	9	22	17	26	.103
17	Supervision (human relations)	2	22	31	12	8	.000
18	Supervision-technical	3	12	37	13	10	.000
19	Variety	0	10	42	16	7	.000
20	Working conditions	3	15	39	7	11	.000
21	General Satisfaction	0	5	27	35	8	.055

*VD- very dissatisfied, D- dissatisfied, N- neither satisfied nor dissatisfied, S- satisfied, VS-very satisfied

Table 3: Different Factors of Job Satisfaction and Satisfaction level: Private

Sr. No.	Factors	VD	D	N	S	VS	P value
1	Ability utilization	0	2	28	24	21	.013
2	Achievement	0	5	38	16	16	.325
3	Activity	2	11	29	19	14	.390
4	Advancement	0	2	25	16	32	.001
5	Authority	1	5	47	17	5	.003
6	Company policies and practices	0	10	36	12	17	.288
7	Compensation	1	7	33	14	20	.449
8	Coworkers	1	13	33	14	14	.019
9	Creativity	0	0	30	32	13	.000
10	Independence	0	14	40	20	1	.000
11	Moral values	0	4	26	43	2	.000
12	Recognition	1	1	29	6	38	.000
13	Responsibility	0	10	28	15	22	.360
14	Security	4	11	41	8	11	.000
15	Social service	1	16	34	13	11	.000
16	Social status	1	8	32	22	12	.103
17	Supervision(human relations)	0	3	23	28	21	.000
18	Supervision-technical	2	3	18	22	30	.000
19	Variety	0	0	30	39	6	.000
20	Working conditions	0	0	28	10	37	.000
21	General Satisfaction	0	0	35	28	12	.055

*VD- very dissatisfied, D- dissatisfied, N- neither satisfied nor dissatisfied, S- satisfied, VS-very satisfied

(technical), Variety, Working condition ($p<0.05$). The association between Achievement, Activity, Company policies, Compensation, Responsibility, Social status, General Satisfaction and type of institution was not found to be statistically significant ($p>0.05$) (Tables 1-3).

Discussion and Conclusion

In this study we found age, education, experience and satisfaction level of health workers was not statistically significant and is in concordance with the findings of Jayasuriya [17]. Though other researchers have concluded that employees' job satisfaction generally and in health-care organizations is shown to be correlated with age, gender, marital status, number of children, educational level and work experience [18-23].

The result of this study revealed that the level of satisfaction among health workers and gender, designation, marital status was not statistically significant. This finding is similar with the results of primary health care givers and contradictive by previous literature.

Most of the studies proved that when doctors were satisfied with their jobs the quality of care improves and also satisfied employees likely to be more innovative and devoted to their employers. Studies showed direct relationship between employee satisfaction and patient satisfaction [24]. In addition medical outcome has been linked to doctors' satisfaction, including behaviour, patient faithfulness to medication, patient satisfaction and quality of care [25].

Dissatisfaction may lead to more job turnover and dissatisfied primary care doctors were likely to express difficulty in caring for patients and are less able to provide quality of care to patients. Moreover, they are likely to have dissatisfied patients and patient dissatisfaction is related with bad health outcome [26].

Employees' job satisfaction and their assurance have always been important issues for health care administrators. After all, high levels of absenteeism and staff turnover can affect the administrators' bottom lines, as temps, recruitment, and retaining take their toll [27]. Satisfied employees tend to be more creative, innovative, and devoted to their employers, and recent studies have shown a direct correlation between staff satisfaction and patient satisfaction in health care organizations [28]. The traditional model of job satisfaction focuses on all the feelings that a person has about his/her job [29]. However, what makes a job satisfying or dissatisfying does not depend only on the nature of the job, but also on the expectations that persons have of what their job should provide [30].

Our study has shown the association between age and satisfaction level compared to the study done by Eman Sharaf et al. in Bahrain [31].

Our study showed that doctors in Punjab were satisfied in Government hospitals, but were neither satisfied nor dissatisfied in Private hospitals. Line of authority is very clear in government sector and all the workers are accountable to their immediate seniors, so satisfaction level with this aspect of job is higher in government hospitals whereas in private hospitals to make their employees more satisfied with job, it is suggested that they should also go for decentralization of power.

In our study highly associated factors were ability utilization, advancement, authority, co-workers, creativity, independence, moral value, recognition, security, social service, supervision (human relations), supervision (technical), variety, working conditions. Government hospitals have better defined job responsibilities for their workers than private hospitals, where job responsibilities are ill defined. This causes dissatisfaction among employees, so it is suggested that private sector should redefined and reallocate job responsibilities so that workers are more clear about the expectation of the institution and they will be able to deliver better services. Moreover, private hospitals give credit to performance of their workers and promote them to higher positions more easily than employers in government set up. In government hospitals promotion is based on seniority, not on the basis of skills and target accomplishment. In order to improve this aspect of job satisfaction government hospitals must reconsider their promotion policies.

There was however, no association with the factors such as achievement, activity, company policies, compensation, responsibility, social status, general satisfaction. spector, found that the highly satisfying variables were supervision, nature of work, co-workers and communication. The factors showing less satisfaction were promotion, rewards, fringe benefits, working conditions and compensation [32]. Organizational policies should be clear so that workers can work in a better environment and have lesser interpersonal conflict and it is necessary to arrange regular staff meetings that allow staff at all levels to discuss concerns and difficult issues and support each other to solve encountered problems.

The determination of job satisfaction factors and their impact on organizational performance is very important in the health care system. Improving performance can significantly improve the quality and efficiency of patient care. In view of the fact that there are insufficient numbers of health care workers in worldwide, employee satisfaction should be given great importance by researchers, policy makers and administrators, making it imperative for administrators to understand the factors significantly impacting their organization's performance.

The study has brought certain features regarding the job satisfaction of government and private hospital employees. The prominent areas of satisfaction among government hospital employees are job responsibilities, independence, line of authority, organizational policies and practices, compensation, interpersonal relations, job security and social service where as in private hospital areas of satisfaction are ability utilization, promotion on performance basis, creativity, good working conditions, recognition for doing a good job, supervision-technical, variety in job. The employees of government hospital are dissatisfied mainly due to lack of infrastructure, lack of promotion opportunities, and lack of recognition. The prominent areas of dissatisfaction in private hospital is in terms of benefits (like pension, insurance policies), interpersonal relations and job security.

The limitation of the study concerns the nature of the measures used. The measures included in this research were based on the perceptions of the participants. Therefore, the potential for data inaccuracies due to item misrepresentation or predisposition to certain responses on the part of participant does exist. Subject's perception about job satisfaction was voluntary and was conducted at limited government and private hospitals. They may not represent staff working in the other settings of the country. The instrument used in this study was first employed in Punjab. Even though content was validated and reliability was tested by a pilot test, their conceptual structures had not yet been determined in Punjab context.

References

1. Ibid, Willa M. Bruce and J. Walton Blackburn (1992), Pp. 15-18. 32- Ibid, p.17.
2. Iiacqua J.A., Schumacher P., & Li H.C. Factors contributing to job satisfaction in higher education. Education. 1995;116(1):51-61.
3. McNeese-Smith, D. K. (1996), Increasing employee productivity, job satisfaction, and organizational commitment. Hosp Health Serv Adm. 1996 Summer;41(2):160-75
4. Mirza S Saiyadain. Human Resource Management, Tata McGraw-Hill publishing Company Limited, New Delhi, 1996.p.28.
5. Spector P.E. Job satisfaction: Application, assessment, causes, and consequences, Thousand Oaks, CA: Sage Publications, Inc. 1997.

6. Maslow A.H. Motivation and personality, New York: Harper & Brothers Publishers. 1954.
7. Herzberg F., Mausner B., & Snyderman B. The motivation to work (2nd ed.). New York: John Wiley & Sons. 1959.
8. Herzberg F. Work and the nature of man, New York: Thomas Y. Crowell Publishers. 1966.
9. Kreitner Robert and Angelo Kinicki. Organizational Behavior, Third Edition, Richard D. Irwin. INC, USA, 1995.p.159.
10. Ramesh Kumar Miryala, Shailaja Thangella. Job Satisfaction Amongst Doctors. The IUP Journal of Management Research. 2012;11(2):68-87.
11. Landon BE, Reschovsky JD, Pham HH, Blumenthal D. Leaving medicine: the consequences of physician dissatisfaction. Med Care. 2006;44:234-42.
12. Kamien M. Staying in or leaving rural practice: 1996 outcomes of rural doctors' 1986 intentions. Med J Aust. 1998;169:318-21.
13. Scott A, Gravelle H, Simoens S, et al. Job satisfaction and quitting intentions: a structural model of British general practitioners. Br J Industrial Relations. 2006; 44:519-40.
14. DeVoe J, Fryer GE, Straub A, et al. Congruent satisfaction: is there geographic correlation between patient and physician satisfaction? Med Care. 2007; 45:88-94.
15. Alemshet Yami et al. Job Satisfaction And Its Determinants Among Health Workers in Jimma University Specialized Hospital, Southwest Ethiopia. Ethiop J Health Sci. 2011;21:19-27.
16. Abida Sultana et al. Level of Job Satisfaction in Doctor. Journal of Rawalpindi Medical College. 2009;13(2):95-97.
17. Rohan Jayasuriya et al. Rural health workers and their work environment: the role of inter-personal factors on job satisfaction of nurses in rural Papua New Guinea, BMC Health Services Research. 2012.
18. Lyons KJ, Lapin J, Young B. A study of job satisfaction of nursing and allied health graduates from a Mid-Atlantic university. J Allied Health. 2003;32:10–17.
19. Mahmoud AL-Hussami, RN. A Study of Nurses' Job Satisfaction: The Relationship to Organizational Commitment, Perceived Organizational Support, Transactional Leadership, Transformational Leadership, and Level of Education. European Journal of Scientific Research. 2008;22(2):286-95.
20. Mosadeghrad AM, Yarmohammadian MH. A study of relationship between managers' leadership style and employees' job satisfaction. Int J Health Care Qual Assur Incorp Leadership Health Serv. 2006;19:11-28.
21. Seo Y, Ko J, Price JL. The determinants of job satisfaction among hospital nurses: a model estimation in Korea. Int J Nurs Stud. 2004;41:437–46.
22. Al-Ahmadi HA. Job satisfaction of nurses in Ministry of Health Hospitals in Riyadh. Saudi Med J. 2002;23:645–50.
23. Ali Mohammad Mosadeghrad, Ewan Ferlie and Duska Rosenberg. A study of the relationship between job satisfaction, organizational commitment and turnover intention among hospital employees.Health Services Management Research. 2008;21:211–27.
24. Kalantan KA, Al-Taw eel AA, A Ghani H. Factors Influencing Job Satisfaction among Primary Health Care Physicians in Riyadh, Saudi Arabia.Ann Saudi Med. 1999;19(5):424-6.
25. Haas JS, Cook EF, Puopolo AL, et al. Is the Professional Satisfaction of General Internists Associated with Patient Satisfaction? J Gen Intern Med. 2000;15:122-8.
26. Grebowski D, Paschan D, Dichr P, et al. Managed Care, Physician Job Satisfaction, and the Quality of Primary Care. J Gen Inten Med. 2005;20(3):271-7.
27. Lu K.Y., Lin P.L., Wu C.M., Hsieh Y.L., Chang Y.Y. The relationship among turnover intentions, professional commitment and job satisfaction of hospital nurses. Journal of Professional Nursing. 2003;18(4):214–19.
28. Al-Aameri A.S. Job satisfaction and organizational commitment for nurses. Saudi Medical Journal. 2000;21(6):231-35.
29. Lu H., While A., & Barriball K. Job satisfaction among nurses: a literature review. International Journal of Nursing Studies. 2005;42(2):211-27.
30. Spector P.E. Job satisfaction: Application, assessment, causes, and consequences, Thousand Oaks, CA: Sage Publications, Inc. 1997.
31. Eman Sharaf, Nahla Madan, Awatif Sharaf. Physician Job Satisfaction in Primary Care. Bahrain Medical Bulletin. 2008;30;2.
32. Spector PE. Job Satisfaction, Application, Assessment, Causes and consequences. 1st edition, Thousand Oaks, California: SAGE publications, 1997.

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I **Dinesh Kumar Kashyap**, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-

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Study of Immunodeftcieny Degree (CD 4 count) as a Predictor of Pulmonary Tuberculosis at a HIV Sentinel Surveillance Center, Ahmednagar

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Abstract

Diagnosing tuberculosis in Human Immunodeficiency Virus (HIV) infected person is a major public health challenge. An integral component of the World Health Organization (WHO) strategy for reducing the burden of HIV related TB disease is intensified case finding (ICF) for TB among HIV infected person. (Maher et al., 2005) (World Health Organization; 2004, Intrim policy).

Aim: To study the changes/ variations in CD4 count of HIV positive patients with pulmonary tuberculosis.

Study design: It was a retrospective, analytical study.

Materials and methods: The study was conducted by collecting and assessing data of past 3 year of HIV positive individuals in civil hospital of Ahmednagar (HIV sentinel surveillance) with pulmonary tuberculosis fulfilling the inclusion and exclusion criteria.

Data analysis: The collected data was compared amongst each other and descriptive statistics like mean, median, mode and proportion was used. Inferential statistics had application of student t test variably.

Study place: The study was conducted in civil hospital of Ahmednagar (HIV sentinel surveillance) with permission from Civil surgeon (Dr. Sonawane) and Nodal officer of Anti Retroviral Treatment (ART) (Dr. Ingle).

Results and Conclusion: Total patients in HIV Sentinel Surveillance Center in the year 2016, 2017, 2018 were 3062. Out of 3062 HIV positive patients, 1528 were females and 1531 were males and 4 where transgender. Maximum number of HIV positive patients where seen in the age group of 31-40. Amongst these 251 patients died on ART and 154 stopped treatment or transferred out. 285 patients out of the total were coinfective with tuberculosis infections. Amongst them 58 died whilst on ART. 1.81/1.4 is the male is to female ratio of the co-infected patients. 0 transgender patients were co-infected. The comparison between baseline CD4 to La-test CD4 was variable. It mainly depended on the age of the patient and how they reacted to the ART as individuals. Anti-Retroviral Therapy helps in increasing the immunity of the patient, therefore helping in controlling the severity of pulmonary tuberculosis.

Keywords: Ahmednagar district; HIV sentinel surveillance; Tuberculosis; CD4 Cell Count; Co-infection; Human Immunodeficiency Virus (HIV); Acquired Immunodeficiency Syndrome (AIDS); Oppor- tunistic Infection.

Introduction

The helper subset of T cells is defined phenotypically by the presence on its surface of the CD4 molecule which serves as the primary cellular receptor for HIV [1].

Worldwide, TB is the most common opportunistic infection affecting HIV-seropositive individu- als, [2] and it remains the most common cause of death in patients with AIDS [3]. HIV/TB infection is a bidirectional interaction of the deadly virus and bacteria. TB disease appears when the immune response is unable to stop the growth of mycobacteria.

During HIV infection, IFN-γ production is decreased dramatically which leads to an increased risk of developing reactivation or reinfection by M. tuberculosis in these HIV/TB patients [4].

TB may similarly negatively impact the natural history of HIV infection. Several studies have indicated that TB co-infection increases the risk of HIV progression and death, particularly in persons with untreated HIV disease [5,6]. The effect of TB on HIV disease progression is hypothesized to be attributable to increased immune activation [7] And increased expression of the CCR5 and CXCR4 coreceptors on CD4 cells [8].

The aim of this study is to relate CD4 cell count with pulmonary tuberculosis. This knowledge gave us the idea of disease burden of the society and the basic epidemiology of these diseases in the rural community.

Objectives

1. To find out changes/variations in CD4 count of HIV positive patients.
2. Assessment of CD4 count in HIV positive patients at the time of detection of pulmonary tuberculosis.
3. To provide assessment of severity of pulmonary tuberculosis in HIV patients with respect to age and CD4 count.

Aim: To study the changes/ variations in CD4 count of HIV positive patients with pulmonary tuberculosis.

Research question

1. Does CD4 count vary in HIV positive patients with pulmonary tuberculosis?
2. Does variation in CD4 count predict the severity of pulmonary tuberculosis?

Research hypothesis

CD4 count does vary in HIV positive patients with pulmonary tuberculosis and it helps in prediction of severity of pulmonary tuberculosis.

Review of literature

Approximately 60-30% of HIV infected patients with TB have pulmonary disease [1]. Screening of all HIV positive patients for TB and all HIV suspected TB positive patient as per our national programs has increased the rate of diagnosis of co infected patient helping to institute early therapeutic management of such patient and increased survival rate [9]. A study showed (17%) prevalence of pulmonary tuberculosis among HIV positive patients, of which 87 (50.58%) were males and 85 (48.42%) were females. Low CD4 count (< 50/µl) had statistically significant associati- on with HIV/TB coinfection as compared to HIV infection only ($p < 0.0001$) [10]. The age distribution suggests an increase in seroprevalance of HIV with rising age: prevalence was 0.51% in 15-24 years group, 1.55% in 25-34 years group and 1.66% in the 35 years and more groups [11]. HIV co-infection is significantly greater in middle-aged (35-64 years) compared to young adult (15-34 years) TB patients [12]. The overall prevalence of pulmonary tuberculosis was 16.66%. Coinfection was found to be higher in males than females (male: female = 9:6), and the age group of 31-40 yrs were predominantly coinfected. Among 15 diagnosed pulmonary tuberculosis cases, 9 (60%) patients (7 males & 2 females) had CD4 count below 200 cells/µl and 6 patients (40%) (2 males & 4 females) had CD4 count above 200 cells/µl. The study shows total 16.66% TB prevalence in HIV positive patients and rate of tuberculosis is found to be more in patients with CD4 count less than 200 (60%) [13].

Material and Methods

Study design: It is a retrospective, analytical study.

Feasibility criteria: All patients HIV positive patients visited at civil hospital of Ahmednagar (HSS) in the past 3 years.

Inclusion criteria:

a) All patients showing ELISA positivity for HIV.
b) All HIV positive patients who were treated or visited civil hospital, Ahmednagar in the past 3 years.
c) All patients who got their CD4 count carried out in civil hospital, Ahmednagar.
d) All HIV positive individuals who had pulmonary tuberculosis.

Exclusion criteria:

a) All new cases of HIV individuals occurring from day of commencement of the project.
b) Patients of extra pulmonary tuberculosis.
c) Patients with other respiratory problems.
d) Patients with incomplete data.

Sample size:

The sample size of the study involved all patients fulfilling the inclusion and exclusion criteria in past 3 years of patient data from the date of approval of the project by ICMR.

Type of study: Retrospective, analytical study.

Place of study: This study was conducted in the civil hospital of Ahmednagar (HIV sentinel surveillance) with the due permission of the concerned authorities.

Method of obtaining sample size: The required sample size was obtained by collecting data of past 3 years at civil hospital, Ahmednagar (HSS).

Time utilizing calendar:

Activities	Time Recquired
Collection of data	1 month
Analysis of data	15 Days
Formulation of paper	15 Days
Total Time:	2 Months

Amendment of protocol:

No change in the study procedure was effected without the mutual agreement of investigator, guide and ethical committee.

Conftdentiality:

The identity of candidate generated in the study was not disclosed. The remaining data was available only to the investigator involved in the study and to the regulatory authorities. Break in the confidentiality is possible only after detail review by the investigator and with the permission of the ethical committee. Information will be disclosed to the concerned person/authority under special circumstances like severe unreported untoward reactions.

Ethical clearance:

Ethical approval certificate is obtained from P.D.V.V.P.F's medical college, Ethical Committee.

Results

HIV positive:

Total patients in HIV Sentinel Surveillance Center in the year 2014,2015,2016 were 3062.

Female : 1528

Males : 1531

Transgender: 4.

Patients in the age group of 1-18: 296.

19-30: 554.

31-40: 1137.

41-50: 1051.

51-60: 288.

61-70: 144.

71-80: 26.

81-95: 4.

Out of 3062 patients, 1617 are alive on ART, 251 Died, 154 stopped ART treatment or transfer- red out.

Coinfectives:

Total 285 out of 3062 are TB patients. Total patients in,

2014 :155

2015 :124

2016 : 9 (Till 4th feb 2016).

Age group of 1-18: 11

19-30: 34

31-40: 128

41-50: 78

51-60: 19

61-82: 12.

Out of 285 patients in ART with TB+HIV 131 are alive on ART, 58 dead, 21 stopped treatment of transferred out.

Males: 181.

Females: 104.

Transgender: 0.

Drop outs:

Patient 12754, stopped treatment without doing CD4 count, therefore dropped out of study. 4 died in pre ART without latest CD4 count.

Twenty (20) initiated ART but died during ART

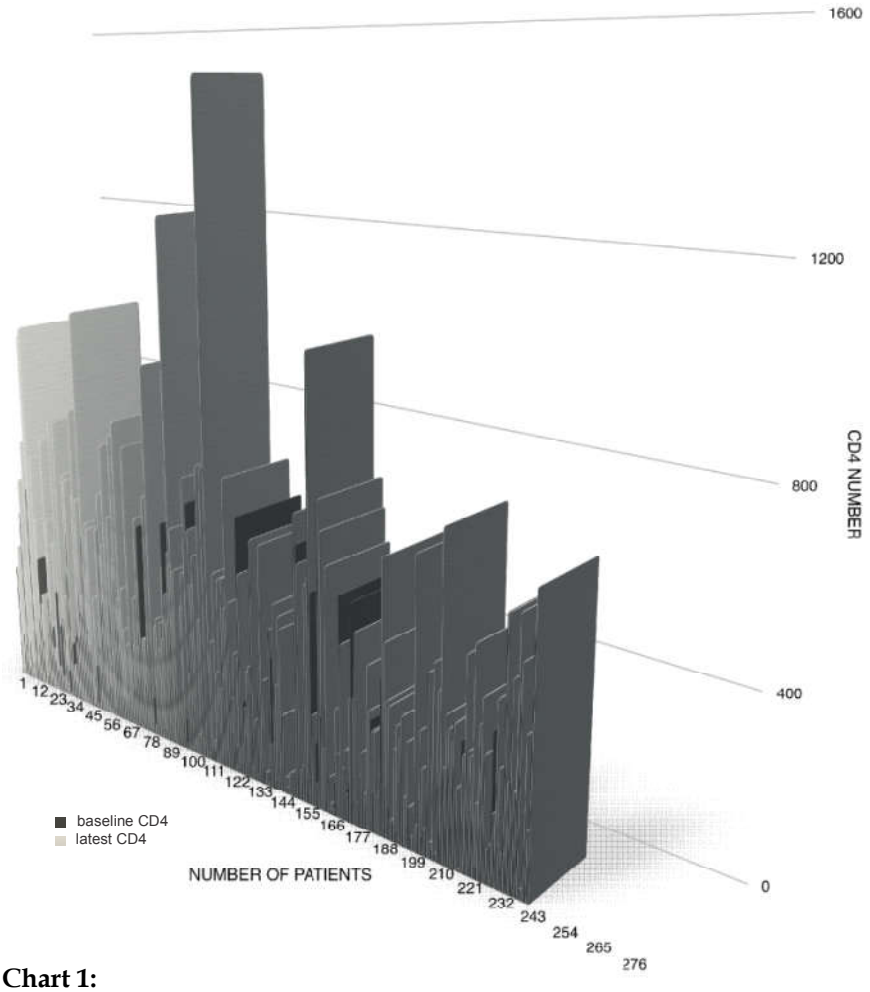

Chart 1:

without latest CD4. 5 transferred out without latest CD4.

10 LFU without latest CD4. 1 Stopped treatment.

4 patients have no status of treatment.

After calculating the dropouts, the total number of patients comes up tp be, 241 out of 285.

In chart 1 the comparison of baseline CD4 with Latest CD4 of HIV positive is shown. The grey markers are the latest CD4's and the black markers are the baseline CD4's.

The comparison between baseline CD4 to Latest CD4 was variable. It mainly depended on the age of the patient and how they reacted to the ART as individuals. Anti-Retroviral Therapy helps in increasing the immunity of the patient, therefore helping in controlling the severity of pulmonary tuberculosis.

Discussion

In a research done by Brenda E. Jones, et al. the relationship of manifestation of tuberculosis to CD4 count in 97 HIV positive patients was studied and reviewed upon. The conclusions where as follows, (Extrapulmonary tuberculosis was found in 30 (70%) of 43 patients with ≤ 100 CD4 cells/ µL, 10 (50%) of 20 patients with 101 to 200 CD4 cells/µL, seven (44%) of 16 patients with 201 to 300 CD4 cells/µL, and five (28%) of 18 patients with > 300 CD4 cells/µL (p = 0.02). Mycobacteremia was found in 18 (49%) of 37 patients with ≤ 100 CD4 cells/ µL, three (20%) of 15 patients with 101 to 200 CD4 cells/µL, one (7%) of 15 patients with 201 to 300 CD4 cells/ µL, and none of eight patients with > 300 CD4 cells/µL (p = 0.002).) [14].

These findings suggest that CD4 cells play a central role in limiting the severity of tuberculosis. Among HIV-positive patients, median CD4

lymphocyte counts in those with extrapulmonary tuberculosis (198/µL; n=67) was lower, but not significantly so, than among those with pulmonary tuberculosis (257/µL; n=180) [15].

Upper zone infiltrate typical of PTB reactivation was present in 18 patients. This pattern was associated with early HIV infection (mean CD4+ T-cell count 389) and had 78% positive predic- tive value for identifying patients with > 200 CD4+ T-lymphocytes/µL. Pleural effusion was present in 32 patients and occurred over a wide intermediate range of CD4+ T-cell counts (mean 185). Lower or midzone infiltrates, adenopathy, interstitial pattern or normal radiograph occur- red in 136 patients and were associated with advanced HIV disease (mean CD4+ T-cell count 105) [16].

If total lymphocyte count was excluded, depressed CD4 cell counts were significantly associated with low serum albumin levels, extensive pulmonary disease, low body-mass index, and low hematocrit.

Among the HIV-seropositive patients, those with disseminated tuberculosis (median CD4 = 79 x 10(6) cells/l) and those with pulmonary tuberculosis who had radiographic evidence of mediasti- nal or hilar adenopathy (median CD4 = 45 x 10(6) cells/l) had the most severe CD4 depletion, whereas those with localized extrapulmonary tuberculosis (median CD4 = 242 x 10(6) cells/l) and those with pulmonary tuberculosis without adenopathy (median CD4 = 299 x 10(6) cells/l) were less severely immunosuppressed [17].

No association was found between development of PR and baseline CD4 count or CD4 response to HAART [18].

TB incidence during the study was highest among patients with baseline CD4 cell counts < 100 cells/µl and those with World Health Organization (WHO) clinical stage 3 or 4 disease (5.71 and 3.88/100 person-years, respectively) [19].

Summary

a) This study gave insight about the changes seen in CD4 count in HIV positive individuals.

b) It helped in predicting the severity of pulmonary tuberculosis in HIV positive individuals.

c) Anti-Retroviral Therapy helps in increasing the immunity of the patient, therefore helping in controlling the severity of pulmonary tuberculosis.

References

1. Harrisons principles of internal medicine (19th edition), edited by AIDS Control and Prevention (AIDSCAP) Project of Family Health Internal, The Fran- cois-Xavier Bagnoud Center for Public Health and Human Rights of the Harvard School of Public Health, UNAIDS. The Status and Trends of the Global HIV/AIDS Pandemic. Final Report July 5-6, 1996.
2. Raviglione MC, Snider DE, Kochi A. Global epidemiology of tuberculosis: morbidity and mortality of a worldwide epidemic. JAMA. 1995;273:220-26.
3. Ottenhoff Tom H.M, Kumararatne Dinakantha, Casanova Jean Laurent. Novel human immunodeficiencies reveal the essential role of type-1 cytokines in immunity to intracellular bacteria. Immunology Today 1998 Nov;19(11): 491–94. doi:10.1016/ S0167-5699(98)01321-8. Retrieved 7 December 2015.Lisa Goozé, MD, and Charles L. Daley, MD. tuberculosis and HIV. http://hivinsite. ucsf.edu/ (accessed 16th july 2016).
4. López-Gatell H, Cole SR, Hessol NA, et al. Effect of tuberculosis on the survival of women infected with human immunodeficiency virus. Am J Epidemiol. 2007 May 15;165(10):1134-42.
5. Vanham G, Edmonds K, Qing L, et al. Generalized immune activation in pulmonary tuberculosis: co-activation with HIV infection. Clin Exp Immunol. 1996 Jan;103(1):30-4.
6. Wolday D, Tegbaru B, Kassu A, et al. Expression of chemokine receptors CCR5 and CXCR4 on CD4+ T cells and plasma chemokine levels during treatment of active tuberculosis in HIV-1-coinfected patients. J Acquir Immune Defic Syndr. 2005 Jul 1;39(3):265-71.
7. Lata B. Galate, Rajesh P. Karyakarte, Nitin Ambhore and Pradnya Gajbhiye. Prevalence of HIV-TB Coinfection and Study of its Epidemiological Variant among Patients Attending ICTC and RNTCP Center of Government Medical College & Hospital, Akola in Maharashtra, India. International journal of current microbiology and applied sciences. 2015;4(9):744-48.
8. Purushottam A Giri, Jayant D Deshpande, and Deepak B Phalke. Prevalence of Pulmonary Tuberculosis Among HIV Positive Patients Attending Antiretroviral Therapy Clinic. North American journal of Medical Science. 2013;5(6):367-70.
9. S.K. Jain, J.K. Aggarwal, S. Rajpal and U. Baveja. Prevalence of Hiv Infection among Tuberculosis Patients in Delhi - A Sentinel Surveillance Study. Ind. J. Tub. 2000;47:21-26.
10. Long R, Boffa J. High HIV-TB coinfection rates in marginalized populations: evidence from Alberta in support of screening TB patients for HIV. Can Journal Public Health. 2010;101(3): 202-04.

11. Nadeemaktar Jamadar, Mohammed Arifulla K. Pulmonary Tuberculosis Coinfection Among Hiv Infected Patients: A Hospital Based Study From Bijapur, Southern India. JEMDS. 2015;4(16): 2725-30.
12. Sir Stanley Davidson. HIV infections and AIDS.. In: Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston (eds.) Davidson's Principles and Practice of Medicine. 21th ed. england: Churchill Livingston Elsevier; 2010.p.39.
13. Jones B, Young S, Antoniskis D, Davidson P, Kramer F, Barnes P. Relationship of the Manifestations of Tuberculosis to CD4 Cell Counts in Patients with Human Immunodeficiency Virus Infection. American Review of Respiratory Disease. 1993;148(5):1292-1297.
14. Ackah A, Digbeu H, Daillo K, Greenberg A, Coulibaly D, Coulibaly I et al. Response to treatment, mortality, and CD4 lymphocyte counts in HIV-infected persons with tuberculosis in Abidjan, Côte d'Ivoire. The Lancet. 1995;345(8950):607-10.
15. Post F, Wood R, Pillay G. Pulmonary tuberculosis in HIV infection: Radiographic appearance is related to CD4+ T-lymphocyte count. Tubercle and Lung Disease. 1995;76(6):518-21.
16. Jones B, Oo M, Taikwel E, Qian D, Kumar A, Maslow E et al. CD4 Cell Counts in Human Immunodeficiency Virus-Negative Patients with Tuberculosis. Clinical Infectious Diseases. 1997;24(5):988-91.
17. Shafer RW, Chirgwin KD, Glatt AE, Dahdouh MA, Landesman SH, Suster B. HIV prevalence, immunosuppression, and drug resistance in patients with tuberculosis in an area endemic for AIDS. AIDS (London, England). 1991 Apr;5(4):399-405.
18. Breen RA, Smith CJ, Bettinson H, Dart S, Bannister B, Johnson MA, Lipman MC. Para- doxical reactions during tuberculosis treatment in patients with and without HIV co-infec- tion. Thorax. 2004 Aug 1;59(8):704-7.
19. Lawn SD, Badri M, Wood R. Tuberculosis among HIV-infected patients receiving HAART: long term incidence and risk factors in a South African cohort. Aids. 2005 Dec 2;19(18):2109-16.

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Zika Virus: An Emerging Threat

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Abstract

One of the potential threats to public health microbiology in 21st century is the increased mortality rate caused by Zika virus (ZIKV), a mosquito-borne flavivirus. The severity of ZIKV infection urged World Health Organization (WHO) to declare this virus as a global concern. The emergence of ZIKV, a mosquito borne Flavivirus like dengue (DEN) and chikungunya (CHIK), in Brazil in 2014 and its spread to various countries have led to a global health emergency. Aedesaegypti is the major vector for ZiV. Fast dissemination of this virus in different geographical areas possess a major threat especially to regions where the population lacks herd immunity against the ZIKV and there is abundance of Aedes mosquitoes. In this review, we focus on current global scenario, epidemiology, biology, diagnostic challenges and remedial measures for ZIKV considering the Indian perspective. There is an urgent need to understand why Zika virus has shifted from being a virus that caused mild illness to unforeseen birth defects as well as autoimmune-neurological problems.

Keywords: Zika; Emerging; Virus; India.

Introduction

The vector borne viral diseases have become one of the major threats to the human population world-wide. Industrialization, urbanization deforestation with man material and movement had been associated with change in vector ecology; which results in dispersal of vector to different geographical region and cause morbidity and mortality.

Zika virus is an emerging alarming disease is one among them, transmitted through the bite of an infected vector i.e. Aedes mosquito which also transmit infection like dengue and chikunguniya [1].

Zika virus Morphology

Zika virus is a positive-sense single stranded RNA virus belonging to flaviviridae family related to dengue, yellow fever, Japanese encephalitis, Westnile fever with a 10.7 kb genome encoding a single polyprotein that is cleaved into 3 structural and 7 non-structural proteins [2].

The E protein is a major virion surface protein that is involved in receptor binding and membrane fusion. Loss of the N154 glycosylation site in the E protein may be associated with adaptation to mosquito vectors and thus facilitate transmission [3].

The recent spread of zika virus may also be associated with mutations in the E and NS1 genes may be the cause of increased virulence of ZIKV [4].

Historical overview

In Uganda, April 1947, during the Rockefeller Foundation's initiative for research on yellow fever virus in Zika forest; a Rhesus monkey infected with an arthropod borne virus was isolated, identified and named as a Zika virus due to its origin in Zika forest. However in 1952 based on serological study indicated that human beings could also infected with Zika virus disease [5]. Africa, the Americas, Asia and the Pacific countries such as Uganda, Tanzania, Egypt, India, Malaysia, the Philippines, Thailand, Vietnam, have been recorded the ZIKAV disease outbreaks [1]. A summary of ZIKV history and previous outbreaks is shown in Table 1.

Table 1: History of zika virus discovery and epidemic

1947	ZIKAV first discovered
1952	ZIKAV first human infection in Nigeria
2007	First epidemic in Yap island, Micronesia (49 Cases confirmed)
2013	Second epidemic in French Polynesia (>400 laboratory confirmed cases)
2014	New Caledonia
2015	South America (>1.5 million cases)

Phylogenetic studies indicated that there are two lineage of ZIKV; one is Asian and other is African; [2] both emerged from East Africa. The Asian lineage originated during the virus's migration from Africa to Southeast Asia, where it was first detected in Malaysia. From there, ZIKV spread to the Pacific Islands, separately to Yap and French Polynesia, and then to New Caledonia, Easter Island, and the Americas. On February 1, 2016, WHO declared Zika a Public Health Emergency of International Concern, requiring a coordinated international response. Zika virus disease has the potential for further international spread given the wide geographical distribution of the mosquito vector, lack of immunity among population and highrate of international travel.The whole world is concerned over spread of ZiV virus disease over many geographical regions [6].

India is also at high risk for the spread of Zika virus disease because of the favorable climatic condition for the spread and growth of virus, overcrowding, lack of sanitation and hygiene as well as India as it hosts over 67,000 travelers and visitors from area where there is an active circulation of the virus [6]. In the Indian subcontinent is the detection of antibodies against ZiV (16.8% prevalence) mostly in the Bharuch district of the Bombay State, Gujarat and Nagpur in 1952-54, which could be a result of cross reactivity with other flavi-viruses as dengue was found prevalent in these areas [7].

There is active Zika virus transmission in India as reported on Jan 7th 2019 by IAMAT. The December 2018 Level 2 Travel Alert, Practice Enhanced Precaution, says Public health officials in India have reported an unusual increase in the number of confirmed Zika cases in Rajasthan and surrounding states. Rajasthan recorded its first case of Zika virus infection after a woman tested positive in Jaipur, on September 22, 2018. Rajasthan is a northwestern Indian state of approximately 68 million people, bordering the country of Pakistan.

Director General of Indian Council of Medical Research (ICMR) Dr Balram Bhargava in his communication also provided data on human and vector surveillance for Zika virus disease in India. The communication was successful in ensuring modification of the travel advisory on March 27, 2019. The status of India has now been changed from 'ongoing outbreak' to 'current or past transmission but no current outbreak', the ICMR in an official statement said. It said that the Zika virus strain isolated from Rajasthan matches with the Brazilian Zika strain associated with outbreaks and microcephaly or Congenital Zika Syndrome (CZS). The ICMR-NIV Pune has initiated mice/animal studies to understand the potential of this virus to cause microcephaly or CZS.

Is Zika Virus still a risk?

Real-time data on Zika Virus out breaks and transmission is often not available. This is because most people who become infected with Zika Virus do not show signs or symptoms. In some countries, reliable reporting and monitoring systems that track virus transmission may not be available. As a result, it is not always possible to convey a country's current level of risk, but travelers should take precautions where risk exists.

Transmission and Pathogenesis

Like most Flaviviruses, the primary route of transmission of Zika virus is the bite of the infected female Aedes mosquito, which are daytime biter butcan bite at night time also. Aedesaegypti and Aedes Albopictus was identified as the two main vectors as it feeds on blood from infected individuals and trans-mitting the virus to healthy ones [8].

Other mode of transmission includes sexual transmission, blood transfusions and maternal fetal transmission during all trimester of pregnancy. There are no confirmed cases of ZIKV transmission through breast milk to offspring as well as in health care settings. However, the health care personnels

are advised to protect themselves from potential exposure, like percutaneous exposure (needle prick or cut with a sharp object), or exposure of non-intact skin (skin that is chapped or abraded) or mucous membranes (blood, body fluids, secretions and excretions) [9].

There is vertical transmission also - the virus can be passed on from the Aedesaegypti mosquito to its offspring [10]. The virus incubation period is between three and twelve days after the mosquito bites the infected human [11]. It is believed that most of the arboviruses are brought to replicate within skin dendrites before spreading to the regional lymph node and then to the blood stream [12]. The virus spend as Intrinsic incubation period of 4 to 5 days within the human host, infecting another vector during blood feeding where it spend extrinsic incubation period of 8 to 12 days and disseminates to the vector's saliva to infect another host.

Clinical picture and diagnosis

The infection in humans causes a spectrum of illnesses which can range from asymptomatic or mildly symptomatic to fatal neurological illness, starting with mild fever, muscles and small joint pain, retro-orbital headache, and conjunctivitis, maculopapular rash, neurological symptom like Gullian Barre Syndrome (temporary paralysis that sometimes result in chocking and death), macular pigment mottling and loss of foveal reflex associated with microcephaly and intracerebral calcifications in new born [13]. The symptoms of zika virus disease are similar with diseases caused by other flaviviruses, such as dengue and chikungunya, so the clinical evaluation not enough. So the diagnosis relies on the basis of laboratory test which can differentiate between the viruses (serological and molecular methods).

The serological test detecting zika virus specific IgM and neutralizing antibodies in the patient's serum by ELISA technique is an effective method, but the cross reactivity with antibodies to other arboviruses decreases the specificity of this technique [14]. So the specific diagnostic method (e.g. molecular diagnosis using real time reverse transcriptase Polymerase chain Reaction) are required. RT-PCR testing can be done on serum collected within 1 to 3 days of symptom onset or on saliva samples collected during the first 3 to 5 days or on urine samples in first 2 weeks of symptom onset.A positive RT-PCR assay along with clinical diagnosis confirms zika infection but do not rule out if test comes negative [15].

Treatment and prevention strategies

At present no approved vaccine and antiviral drugs available for the treatment of Zika virus disease, so the management available for cases presenting to health system are only supportive treatment which includes bed rest, fluids to prevent dehydration and medicines such as acetaminophen to reduce fever and pain. The aim of drug development is primarily to reduce viral load, reduce symptoms, and protect the unborn fetus from neurological sequelae [16]. Since of the symptoms causes by arboviral disease are almost similar so it is important to differentiate from dengue and chikungunya for valuable and prompt treatment; as aspirin and other non-steroidal anti-inflammatory drugs cannot used in dengue because of risk of bleeding/hemorrhage in such patients [17].

As no specific treatment available against zika virus disease, so the preventive measures should be set up before hand, as well as strengthening the health system which plays a very crucial role in this.

Vaccines provides a cost-effective method of preventing the various diseases and it is very essential to development of a safe and efficacious vaccine against the ZIKAV disease as it is associated with quick spread and various complication amongst population including pregnant females and newborn babies. Various academic institutions and pharmaceutical companies are working to develop different types of vaccines for ZIKV including purified inactivated vaccine, live attenuated vaccines, DNA vaccines, and viral vectored vaccines [18]. Many more candidate vaccines are under consideration and at various stages of development (Phase I clinical trials and larger Phase II and III trial) [19].

Other preventive measures includes vector control is most efficient preventive strategy to control ZIKV spread through effective removal of breeding sites of mosquitoes and also reducing mosquito-human interactions. The other measures which includes the using of mosquito nets, mosquito repellants use of physical barriers such as screen, wearing clothes that cover maximum parts of the body, avoid collection of water in pots, utensils, buckets, tires and cover open water tanks as Aedesaegypti mosquitoes breeds in standing water. The most vulnerable group such as young children, sick and elderly may not be able to protect themselves and hence should be given special attention.According to CDC guidelines, all

pregnant women or women planning pregnancy should avoid travelling to the affected countries where Zika virus transmission occurs. For women with a history of travel to infected areas, they should be examined for ZIKV infection as well as Dengue and Chikungunya due to the similar geographical distributions of these viruses. A pregnant women with symptoms or those with ultrasound evidence of microcephaly should be tested for ZIKV infection using RT-PCR and the pregnant women with established diagnosis of ZIKV should perform serial ultrasound every 3 to 4 weeks with referral to higher center for further management [24]. Because of the potential risk associated with Zika virus infection during pregnancy, CDC guideline also recommended sexual abstinence or use of barrier method like condom for men who are residing or recently returning from an area with active ZIKV transmission [20].

ZIKV is most likely spread from the travelers and tourist also for e.g. in 2016, Singapore announced its first ZIKV infection in May, with the virus imported by a 48-year-old man who had travelled to Brazil [21]. Travelers and tourists returning from endemic areas for ZIKAV, proper screening, monitoring and precaution measures should be implemented. If the fibril illness within two weeks of returning from an affected country should report to the nearest health facility so that suitable measures to combat the spread of virus can be taken [22].

The way forward and Recommendations

Zika virus has posed an Alarming situation worldwide in the sector of health and public as well as economic sectors. Many anti-viral drugs and candidate vaccines has been come up with promising effect, as they are under phase II and phase III Clinical trial and available soon in market. A pan-caspase inhibitor, was the most potent anti-cell-death compound and it demonstrated neuroprotective activity for human neuronal progenitor cells, but did not suppress ZIKV replication [23]. FDA-approved hepatitis C virus (HCV) anti-viral, sofosbuvir, inhibited ZIKV replication and infection in tissue culture as well as protected mice from ZIKV-induced death [24].

As ZIKV more dangerous for pregnant women so it is important to do improved research on ZIKV disease association with neurological manifestation, association of ZIKV with sexual transmission as well as other mode of transmission. But several ethical issues has been associated with that. Strengthening of the appropriate surveillance systems (entomological and ecological) would create the more effective vector control programme, which includes improved mobile and wireless services, create an effective understanding of the epidemiology including the potential interaction of ZIKV infection with other flaviviral diseases, create effective diagnostic test, therapeutic agents and vaccine for patients as well as of healthcare workers. This would help to create improved preventive strategies to combat against ZIKV disease.

Conclusion

Hence, Establishment of suitable surveillance systems, execution of appropriate control measures is the crucial in controlling an out break of ZIKV. At the same time, it is recommended to emphasis, on the development of diagnostic tests, effective treatment options and vaccine approaches against Zika virus Disease.

References

1. Zika virus| WHO fact sheet. Available at: http:// www.who.int/mediacentre/factsheets/ zika/en/. Last updated: Sep 6, 2016.
2. A. Enfissi, J. Codrington, J. Roosblad, M. Kazanji, D. Rousset, Zika virus genomefrom the Americas, Lancet. 2016;387(10015):227–28.
3. Faye O, Freire CC, Iamarino A, Faye O, de Oliveira JV, Diallo M, et al. Molecular evolution of Zika virus during its emergence in the 20th century. PLoSNegl Trop Dis. 2014;8(1):e2636.
4. Chan JWF, Choi GKY, Yip CCY, Cheng VCC, Yuen KY. Zika fever and congenital Zika syndrome: An unexpected emerging arboviral disease. Journal of Infection. 2016;72:507-24. Available at: www. elsevierhealth.com/journals/jinf.
5. Dick GW. ZiV. II. Pathogenicity and physical properties. Trans R Soc Trop Med Hyg. 1952;46: 521-34.
6. Khanna J, Verma S, Gupta M. C. Zika Virus In India: Emerging Trends.World J of Pharmacy and Pharmaceuticals Sciences. 2017;6(8):436-45.
7. Smithburn KC, Kerr JA, Gatne PB. Neutralizing antibodies against certain viruses in the sera of residents of India. J Immunol. 1954;72:248-57.
8. E.B. Hayes. Zika virus outside Africa, Emerg. Infect. Dis. 2009;15(9):1347–50.
9. Centers for Disease Control and Prevention. Available at: https://www.cdc.gov/zika/ transmission/.
10. Thangamani S, Huang J, Hart CE, Guzman H, Tesh RB. Vertical Transmission of Zika Virus in

Aedesaegypti mosquitoes. The American Journal of Tropical Medicine and Hygiene. 2016 Nov;95(5): 1169–73.

11. Transmission of Zika Virus by Aedes Mosquitoes - Zika Virus Net. Available at: www.zikavirusnet.com/transmission.html.
12. A.H. Fagbami, Zika virus infections in Nigeria: virological and seroepidemiological investigations in Oyo State. J. Hyg. Lond. 1979;83(02):213–19.
13. B.D. Foy, K.C. Kobylinski, J.L. Chilson Foy, B.J. Blitvich, A. Travassos da Rosa, A.D. Haddow, et al., Probable non-vector-borne transmission of Zikavirus, Colorado, USA, Emerg. Infect. Dis. 2011;17(5):880–82.
14. R.S. Lanciotti, O.L. Kosoy, J.J. Laven, J.O. Velez, A.J. Lambert, A.J. Johnson, et al. Genetic and serologic properties of Zika virus associated with an epidemic, Yap State, Micronesia, 2007, Emerg. Infect. Dis. 2008;14(8):1232–39.
15. Zikavirus|WHO. Available at:http://www.wpro.who.int/mediacentre/factsheets/ fs_05182015_zika/en/. Last updated: Jan, 2016. 30.
16. Salam A.P., Rojek A., Dunning J., Horby P.W. Clinical Trials of Therapeutics for the Prevention of Congenital Zika Virus Disease: Challenges and Potential Solutions. Ann Intern Med. 2017 May 16;166(10):725-32. [CrossRef] [PubMed].
17. Treatment| Zika virus | CDC. Available at: https://www.cdc.gov/zika/symptoms/ treatment.html. Updated on: May 1, 2017.
18. Barouch D.H., Thomas S.J., Michael N.L. Prospects for a Zika Virus Vaccine. Immunity. 2017;46:176–82. [CrossRef] [PubMed].
19. T. Oduyebo, Update interim guidelines for health care providers caring forpregnant women and women of reproductive age with possible Zika virus exposure—United States. MMWR Morb Mortal Wkly Rep. 2016;65:30–3.
20. A.M. Oster, Interim guidelines for prevention of sexual transmission of Zikavirus—United States. MMWR Morb Mortal Wkly Rep. 2016;65:120–21.
21. Centers for Diseases Control and Prevention (CDC). Zika virus in Southeast Asia [Online]. Available from: https://wwwnc.cdc.gov/travel/page/zika-virus-southeast-asia [Accessed on October 21, 2016].
22. Mutebi JP, Hawley WA, Brogdon WG. Protection against Mosquitoes, Ticks, & Other Arthropods. Centre for Disease Control and Prevention. Available at: https://wwwnc.cdc.gov/travel/yellowbook/2018/the-pre-travel-consultation/protection-against-mosquitoes-ticks-other-arthropods.
23. Xu M., Lee E.M., Wen Z., Cheng Y., Huang W.K., Qian X., Tcw J., Kouznetsova J., Ogden S.C., Hammack C. et al. Identification of small-molecule inhibitors of Zika virus infection and induced neural cell death via a drug repurposing screen. Nat. Med. 2016;22:1101–07. [CrossRef] [PubMed].
24. Bullard-Feibelman K.M., Govero J., Zhu Z., Salazar V., Veselinovic M., Diamond M.S., Geiss B.J. The FDA-approved drug sofosbuvir inhibits Zika virus infection. Antivir. Res. 2017;137:134–40. [CrossRef] [PubMed].

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West Nile Fever: A Re-emerging Threat to Public Health

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Abstract

Introduction: West Nile Virus infection is a self-limited illness that can cause neuro-invasive illness including encephalitis & meningitis.

Problem Statement: The first isolate of West Nile Virus was found in 1937 in Uganda. Recently in March 2019, a 7 year old boy was detected of West Nile Fever in Kerala's Malappuram district who died of cardiac arrest following the complications.

Prevention and control: One of the most efficient method of preventing West Nile infection is to raise awareness of risk factors among people and educate them about what steps they can take to reduce their exposure to the virus.

Keywords: West Nile Fever; Epidemic; India; Re-emerging Threat; Prevention.

Introduction

West Nile Fever has re-emerged in the recent times and has become a threat to public health. This self-limited infection can cause neuro-invasive disease like encephalitis & meningitis [1].

Many of the seasonal epidemics related to WNV have been reported in Europe and North America. This association is related to changing environmental conditions like rising temperatures which ultimately reflects upon the geographical pattern of the area [2].

In India, WNV has been isolated from human beings, frugivorous bat, domestic pigs and mosquitoes (Culex). The geographical patterns and the topography are laying the way to the re-emergence of the virus. Therefore, it is crucial to study the present status of WNV in Indian setup so that adequate early measures can be taken.

Problem Statement

It was first isolated during 1937 in the West Nile district of Uganda from a patient suffering from mild illness. Similar cases have been recorded from many areas of Middle East, Africa and South west Asia.

In USA, in 2019, 49 states have reported cases of West Nile virus in humans, birds, and mosquitoes. Out of 2544 cases reported, 63% were of neuroinvasive illness and 37% were non – neuro invasive [3].

In India, 1952, Banker reported the isolation of West Nile antibodies in humans [4]. This was supported by Smith burn *et al.* with the detection of WNV neutralizing antibodies. As per the report of National Health Portal of India, May 2011, the presence of WNV was detected in clinical specimens at the time of the outbreak of acute encephalitis syndrome in Kerala. Recently in March 2019, case

of WNV was reported in Kerala's Malappuram district in a 7 year old boy who died of cardiac arrest following the compications [5].

Epidemiology of the disease

WNV belongs to family Flaviviridae which also contain many other viruses like Zika, Dengue, Yellow Fever [6].

Kunjin virus is another similar type of Virus which is now categorized as a subtype of WNV [7]. WNV exists in nature in a bird-mosquito cycle. Mosquitoes act as principle vectors for this virus.

Mammals, primarily horses and humans are unable to contribute to the transmission cycle and thus are considered dead end hosts. The virus can also be transmitted through infected blood, tissues, and organs and also through placenta or breast milk.

The incubation period of WNV is found to be 2 to 15 days before onset of illness. The period of communicability for WNV is 6 - 7 days before onset of clinical symptoms.

Clinical features

Majority of West Nile Fever cases are reported to be asymptomatic, whereas in symptomatic patients, cases range from mild febrile illness to meningoencephalitis [8].

Patient can present in the form of nausea, vomiting rash, chills, abdominal pain, muscle weakness, photophobia, movement disorders and confusion.

Risk of getting neurofebrile illness raises manifold with increasing age along with any medical condition predisposing to immunosuppression. The differential diagnosis of West Nile Fever should always be considered whenever a child reports with meningo-encephalitis during the season of increased breeding of mosquito [9].

Treatment Strategies

Conservative treatments have proven not to be very effective in the treatment of West Nile Fever. Intravenous Immunoglobulins can help in recovery of patients but due to time lag in administering antibodies, usefulness of administering these is questionable.

Vaccines

Candidate Vaccines for WNV are in various stages of development, hence no efficacious vaccine is yet available for the community.

Prevention and control

The most effective way to reduce infection in humans is to raise awareness of risk factors and educate them about measures they can take to reduce their exposure to the virus.

Since, mosquito bite is the major risk factor for the occurrence of disease, hence vector control is most efficient preventive strategy to control WNV spread through effective removal of breeding sites of mosquitoes and also reducing mosquito-human interactions. The other measures include using of mosquito nets, mosquito repellants, use of physical barriers such as screen, wearing clothes that cover maximum parts of the body, light-colored clothing, avoid collection water.

Entomological surveillance plays a very crucial role in identifying mosquito species which can transmit WNV.

Conclusion

WNV can lead to the occurrence of large number of cases with neuro-febrile illness. Though it can affect all age groups, yet elderly and immunocompromised people are at maximum risk.

Entomological surveillance of the virus can help provide measures to prevent and control the spread of the fatal disease. These measures will not only help address the risks associated with West Nile virus but will add to our preparedness for all domestic and exotic mosquito borne pathogens.

References

1. Yeung MW, Shing E, Nelder M, Sander B. Epidemiologic and clinical parameters of West Nile virus infections in humans: a scoping review. BMC Infect Dis. 2017 Sep 6;17(1):609.
2. West Nile virus [Internet]. [cited 2019 Apr 7]. Available from: https://www.who.int/news-room/fact-sheets/detail/west-nile-virus.
3. Preliminary Maps & Data for 2018 | West Nile Virus | CDC [Internet]. 2019 [cited 2019 Apr 7]. Available from: https://www.cdc.gov/westnile/statsmaps/preliminarymapsdata2018/index.html.

4. Sandhu T, Sidhu D, Sandhu G. West nile virus: Do we need its surveillance and control program in Punjab State of India? Indian J Community Med. 2010;35(2):211.
5. Seven-year-old boy dies of West Nile Virus in Kerala's Malappuram [Internet]. [cited 2019 Apr 7]. Available from: https://www.downtoearth.org.in/news/health/seven-year-old-boy-dies-of-west-nile-virus-in-kerala-s-malappuram-63631.
6. Lustig Y, Sofer D, Bucris ED, Mendelson E. Surveillance and Diagnosis of West Nile Virus in the Face of Flavivirus Cross-Reactivity. Front Microbiol [Internet]. 2018 Oct 11;9. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6194321/.
7. Gray TJ, Burrow JN, Markey PG, Whelan PI, Jackson J, Smith DW, et al. West Nile Virus (Kunjin Subtype) Disease in the Northern Territory of Australia—A Case of Encephalitis and Review of All Reported Cases. Am J Trop Med Hyg. 2011 Nov 1;85(5):952–6.
8. Drebot MA, Artsob H. West Nile virus. Can Fam Physician. 2005 Aug 10;51(8):1094–9.
9. Drebot MA, Artsob H. West Nile virus. Update for family physicians. Can Fam Physician Med Fam Can. 2005 Aug;51:1094–9.

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[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347-55.

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[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3-9.

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[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792-801.

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[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

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[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

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[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O,

Kidd EAM, editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

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[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

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