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Original Article

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Study of Knowledge, Attitude and Practices regarding Malaria Prevention

Amar Taksande*, Bharati Taksande, Rewat Meshram***, Amol Lohakare****, Aishwarya Jadhav*****

Abstract

Background: Malaria remains a major public health problem in most tropical countries, including India. *Objective:* To study the knowledge regarding malaria and the preventive measures practiced by the rural population attending a hospital. *Setting:* The Jawaharlal Nehru Medical College, Sawangi Meghe, Wardha, Maharashtra State. *Study Design:* Descriptive cross-sectional study concerning knowledge, attitude, and practice of malaria prevention over a period of 6 month. *Study population:* The population in this study was residents of Wardha District, Maharashtra State, India, who were living there for at least one year. Four hundred adults were interviewed using a pre-tested questionnaire regarding their knowledge, attitude and practices about malaria. *Results:* Four hundred respondents were successfully interviewed. Most (89%) of the respondents knew the causes of occurrence of malaria. Majority (60.75%) respondents knew about human to human spread occurs in malaria and 53.75% respondents knew that it's mainly transmitted by mosquito bites. Regarding symptoms of malaria, fever was the most consistent response (78.5%) followed by chills and shivering (49.5%). The knowledge of common breeding place for mosquitoes recognized was stagnant water by 56.75% respondents). Respondents attitude towards malaria seriousness, prevention and need for hospitalization and treatment for malaria was positive. Mostly 94.25% respondents strongly agreed that malaria is a serious illness. For prevention, 41.25% respondents were used mosquito mats/coils/liquid vaporizer, 31.5% used to clean the house and 19% used mosquito spray. Most of the respondent (57.75%) came to know about malaria through television. *Conclusion:* Knowledge about malaria is inadequate in persons residing in rural areas and proper health education is required for successful control of malaria.

Keywords: Central India; Malaria; Rural.

Introduction

Malaria is one of the major disease burdens among rural area and public health problem. It is an important cause of morbidity and mortality in the world with high incidence in south-east Asia region specially India, Bangladesh, Nepal, Sri Lanka, Thailand and Indonesia [1, 2]. It has been estimated that malaria causes more than 1 million deaths in individuals under 5 years old globally every year. [3,4]WHO has estimated that malaria was responsible for 10.6 million cases and 15,000 deaths in India in 2006. The National Vector Borne Disease Control Program of India reported ~1.6 million cases and ~1100 malaria deaths in 2009.

India's expansive geography and diverse climate supports ideal environments for sustaining malaria parasites and their vectors. In India, the major human malaria species are Plasmodium falciparum and P. vivax, P. malariae in the eastern India, while P. ovale appears to be extremely rare. Besides mosquitogenic condition in rural areas, poor knowledge and attitudes towards the disease is also the reasons for high endemicity. The Malaria outbreaks occur frequently in various parts of the country. Malaria is mostly unstable and the outbreaks are caused mostly by infection due to *P. falciparum*. The reasons for such outbreaks have been identified as improper surveillance and inadequate residual spray activities in rural areas, and anti-larval measures in urban areas [5].

The behavior of the human with reference to the cause, transmission, treatment and prevention of malaria not only helps in spread of the disease but

also results in the transmission of the disease within the community. Whereas the perceptions of the community relating to causation, transmission, prevention and treatment are the main socio-cultural factors that can influence malaria control [6-7]. Presently the story of success of malaria control programs relies on community perceptions and practices in the transmission, treatment and control of the malaria. Therefore, the present study was undertaken to assess the knowledge, attitudes and practices of a rural community on malaria.

Methodology

Study Setting

The present study was conducted from January 2012 to June 2012 in Jawaharlal Nehru Medical College, Sawangi Meghe, Maharashtra.

Study Design

A descriptive cross-sectional study *Study population:* Parents of every alternate other child seen at the pediatric ward were asked to take part in the study. The participants were residents of Wardha Districts, Maharashtra state, India, who were living there for at least one year. Participation in the study was voluntary and no incentives were provided. The protocol for the study was reviewed and approved by the Institutional Ethical Committee (IEC) of the JNMC, Deemed University, Wardha. *Sample size* of 385 was calculated {Representative sample of the population of the wardha district (1296157) with 95% confidence interval, 5% sample error, and assumption of 50% knowledge and attitudes prevalence}.

Data Collection

Face-to-face interview was based on a pre-tested questionnaire which included socio-demographic profile, knowledge about malaria symptoms, signs and transmission modes, attitudes and preventive practices against malaria and also the sources of information regarding malaria. Modified Kuppuswamy scale was used to ascertain the socio-economic status of the family. People who failed to respond to all questions or who left before completing the interview were excluded. All medical personnel including doctors, nurses and medical students were excluded from the study. Interviews were conducted by social worker who underwent training in interviewing techniques under professional supervision. To ensure reliability, the interviewers thoroughly discussed the questionnaires before collecting data. A positive attitude was assessed based on the ability of participants to give answers to the following questions as : (1) Malaria is a serious illness; (2) You are at risk of getting Malaria; (3) Malaria can be prevented; (4) Need for treatment and hospitalization for Malaria; and (5) Government has the prime responsibility to control mosquito breeding. Informed consent (verbal) was taken from all the respondents and confidentiality was ensured throughout the study.

Statistical Analysis

Data was analyzed using STATA program. Descriptive statistics for the collected data were recorded and results were shown in percentages.

Results

Out of total of 435 parents requested, 35 declined to participate in the study. Therefore, 400 respondents were successfully interviewed. Thirty nine percent respondents belonged to the age group of 30–44 years, 81.75% respondents were married and 64.25% respondents were metric passed. The socio-demographic details of the respondents are shown in Table 1. Most (89%) of the respondents knew the causes of occurrence of malaria. Majority (60.75%) respondents knew that human to human spread occurs in malaria and but 53.75% respondents knew that it's mainly transmitted by mosquito bites. Regarding symptoms of malaria, fever was the most consistent response (78.5%) followed by chills and shivering (49.5%). 55% respondents enumerated two symptoms of malaria (fever, chills/shivering), whereas only 11% respondents enumerated three symptoms (fever, chills and headache). With regards to knowledge of the preventive measures, respondents were generally aware of mosquito mats/ coils/liquid (67%), clean house (36.25%), spraying (24.5%), and mosquito nets (14%). Table 2 shows the data revealing the knowledge of cause of malaria, transmission, its symptoms and preventive measure.

Regarding knowledge about breeding, 84% respondents knew about breeding places of mosquitoes. The most common breeding place for mosquitoes recognized was stagnant water (56.75%). The most common resting place for mosquitoes recognized was dark places inside the houses (74%). Regarding the timing of mosquito biting habits, 69.5% respondents indicated that it is evening, while about

34.25% respondents thought it is at night. Table 3 shows the vector characteristics of malaria as per respondents. The attitudes of the respondents were assessed using a set of questions regarding prevention aspect of malaria. Ninety one percent respondents strongly agreed and agreed that malaria is a serious illness. Only 25.5% respondents strongly agreed and agreed that they are at risk of getting malaria, whereas 74.5% were not sure about the risk. Eighty three percent respondents strongly agreed and agreed that malaria can be prevented. Nearly ninety four percent respondents strongly agreed and agreed about need for treatment and hospitalization for malaria. Approximately ninety two percent respondents had a consensus that the government has the prime responsibility to control mosquito breeding. Table 4 shows the attitude of respondents towards malaria. Regarding personal protection against mosquito bite, 41.25% respondents were relying upon mosquito mats/ coils/liquid vaporizer, 31.5% respondents were used to clean the house and 19% were used to mosquito spray (Table 5). Preventive practices regarding malaria were consistent with the knowledge about these practices, with majority of the respondents relying mosquito mats/coils/ vaporizers. Regarding the source of information (Table 6) on malaria, 57.75% came to know about malaria through television followed by friends/ relatives (45.75%).

Table 1: Socio-demographic characteristics of study population (N=400)

Sex	**Percent**
Female	38.75
Male	61.25
Age (years)	
15–29	38.5
30–44	39
45–59	19.5
> 59	3
Marital Status	
Unmarried	18.25
Married	81.75
Education	
Graduate & Postgraduate	12.5
Undergraduate	16.25
Matric	64.25
Illiterate	9
Occupation	
Government /Non government employee	15
Clerical, Skilled Semi -skilled worker	33.25
Unskilled worker , Farmer, Laborer	29
Unemployed	22.75
Family Income Per Month (in Rs.)	
>10000	19.00
5000 -9999	38.25
1000 -4999	37.50
<999	5.25

Table 2: Knowledge on causes of malaria, its spread, symptom and preventive measure

Causes of Malaria*	**Percentage**
Mosquito bite	89
Dirty drinking water	9.75
Houseflies	5.75
Don't know	4.5

Unhygienic food	3.25
Human to human Spread?	
Yes	60.75
No	25.5
Don't know	16.25
Mode of spread	
Mosquito bite	53.75
Dirty drinking water	3.5
Unhygienic food	1.75
Houseflies	1.25
Don't know	1
Symptoms*	
Fever	78.5
Chills and Shivering	49.5
Headache	19
Joint and Muscular pain	11.5
Don't know	7
Nausea/Vomiting	3.75
Preventive Measures*	
Mosquito Mat/Coil/Liquid Vaporizer	67
Cleaning House	36.25
Mosquito Spray	24.5
Mosquito Net	14
Window & Door Screen	11.25
Don't know	9.75
Cleaning of garbage/trash	8
Use of Smoke to drive away mosquitoes	3.5
Prevent Water Stagnation	2.75

* Multiple responses

Table 3. Knowledge of vector characteristics of malaria

Common breeding site*	**Percent**
Stagnant water	56.75
Other	23
Running Water	21.75
Don't know	16
Garbage/Trash	14.5
Plants/Vegetation	6.75
Common resting site	
Dark places inside the house	74
Dirty places/areas	42
Don't know	14
At edges of stream	11.25
Others	8
Most frequent mosquito bite time*	
Evening	69.5
Night	34.25
Don't know	17.75
Day time	17.25
Morning	8.5

* Multiple responses

Table 4: Attitude of respondents towards malaria

	Strongly Agree(%)	**Agree (%)**	**Disagree (%)**	**Strongly disagree (%)**	**Not sure (%)**
Malaria is a serious illness?	76	18.25	2	0.75	3
You are at risk of getting Malaria	8.75	16.75	18.25	5.25	51
Malaria can be prevented	59.25	24	6.25	3.25	7.25

Need for treatment & hospitalization	42	50.5	3	0.75	3.75
Government Responsibility of controlling breeding mosquito	26.25	56	5.25	3.75	8.75

Table 5: Personal preventive measure against malaria

Preventive Measures*	Percent
Mosquito Mat/Coil/Liquid Vaporizer	41.25
Cleaning House	31.5
Mosquito Spray	19
Window & Door Screen	17
None	11.75
Mosquito Net	10.75
Prevent Water Stagnation	8.5
Cleaning of garbage/trash	6
Use of Smoke to drive away mosquitoes	3.25

* Multiple responses

Table 6: Source of their information regarding malaria

Source of information*	Percent
Television	57.75
Friends & Neighbors	45.75
Health personnel	34.25
Schools	29.25
Radio	26.25
Banners	24.5
Newspapers / Magazines	22
Brochures	14

* Multiple responses

Discussion

The outcome from surveys on knowledge, attitude and practices are applicable to improve malaria control programs, and to identify indicators for a program's effectiveness. Most of the respondents (89%) implicated mosquito bite as a possible cause. Klein RE et al [8] reported that more than 90% of the respondents knew that mosquitoes transmit malaria. Around 61% respondents believed that malaria spread from human considering it as contagious diseases whereas only 53.75% respondents knew that it occurred because of bite of infected mosquitoes. This awareness in the present study is higher than the study done by Yeneneh H et al. [9] Vundule C et al[10] reported that 13% respondents found that eating raw vegetables and drinking dirty water were probable causes of malaria and 45% respondents did not answer correctly about causes of malaria; whereas, in our study, 4.5% respondents did not know the cause of malaria. 93% respondents had knowledge of at least one of the classical symptoms. Other studies have shown[11,12] that respondents have an idea about 2 to 3 symptoms of malaria. In our study, three most common symptoms enumerated by respondents were fever, chills and headache. Govere Jet al [13] shows the similar findings. Lack of knowledge on additional symptoms (anemia and convulsions) of malaria in children could lead to delay in seeking appropriate care from health facilities. 90.25% respondents believed that malaria is preventable. Ongore D et al [14] found that 51.9% respondents answered mosquito net as the prime preventive measure from mosquito bites and 10.2% respondents said that they personally use mosquito net. Datta et al [15] documented that absence of preventive measures like mosquito net may lead to high incidence of malaria in the area compared to the area where these measures are being practiced.

Deressa W et al [16] reported that the mosquitoes are mainly believed to bite human at night (73.2%), breed in stagnant water (71%) and rest in dark places inside houses during daytime (44.3%). Stagnant water was the main mosquito breeding site in agreement with the study done by Klein RE et al. [8] Regarding knowledge about breeding places of mosquitoes, 56.75% respondents answered correctly. Garbage thought to be a breeding place for mosquitoes was answered by 14.5% respondents. Rasania SK et al [12] found that 39.2% respondents

quoted garbage as the probable breeding place for mosquitoes. Mosquitoes rest mainly in dark places inside houses was mentioned by 74% respondents. The results of the present study are also consistent with the study done by Ongore D et al. [14] Respondents attitude towards malaria seriousness, prevention and need for hospitalization and treatment for malaria was positive. They realized the seriousness of the disease, methods of prevention and necessity of treatment.

88.25% respondents reported taking a preventive measure against malaria. This is contrary to a Van Geldermalsen et al [17] study where less than 50% respondents knew of an effective malaria preventive method but similar to the study conducted by the Ongore D et al [14] study, which reported that 72.2% respondents thought malaria was preventable. The use of Mosquito Mat/Coil/Liquid Vaporizer was commonly (41.25%) mentioned by the respondents. Yeneneh et al [9] reported that some participants did not practice any form of malaria preventive measure because of wrong ideas about its transmission similar to our finding (11.75%).

Anh NQ et al [18] reported number of sources of malaria education, including health staff (71%), television and radio (33% each), mass organizations such as the Vietnam Women's Union (26%), and teachers (9.5%). The important source of information about malaria was television mentioned by 57.75% respondents.Knowledge about clinical manifestations was satisfactory and this increased awareness of these clinical features of malaria might be due to increased access to media. However, the practice of the use of mosquito bed nets, knowledge of environmental measures and knowledge about vector was lower. Similar studies in different societies, especially in poor nations have almost similar results. [19-22].

In conclusion, most of the rural residents are familiar with the symptoms of malaria but are less aware of an association between mosquito and malaria. The effective information about malaria prevention, education about transmission of malaria and communication by health care providers will help the rural people to become aware about the malaria transmission and prevention.

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A Clinico-Epidemiological Profile of Cases of Leptospirosis in a Tertiary Care Hospital

Saba Mohammed Mansoor*, Kumar Hemant, Poojari*****

Abstract

Introduction: Leptospirosis is an emerging global health problem. However, very little is known regarding its true incidence. Estimates indicate that more than 500,000 cases of Leptospirosis occur each year globally with 0.1 to 1 per 100 000 people living in temperate climates. The incidence can even rise to 100 or more per 100000 during outbreaks. Leptospirosis is endemic in many states in India which include Kerala, Tamil Nadu, Gujarat, Andamans, Karnataka, Maharashtra, Andhra Pradesh, Orissa, West Bengal, Uttar Pradesh, Delhi & Puducherry. The disease is also endemic in Mangalore and its surrounding areas. The present study has been under taken to study the epidemiological and clinical profile of Leptospirosis cases admitted during last six years i.e. from 2009 to 2014, in a tertiary care hospital in Mangalore. *Materials and Methods:* A record-based study was undertaken to determine the demographic and clinical profile of all Leptospirosis cases admitted from 01 January 2009 to 31 December 2014 to a teaching hospital in Mangalore. The clinical data including demographic parameters of all patients were retrieved from MRD and subsequently analyzed. *Results:* A total of 108 patients were admitted in the hospital from 01 Jan 2009 to 31 Dec 2014.Highest admissions, i.e. 28.70 % were noted in the month of September, while the lowest admissions were seen in the month of November, December and March. The majority of the patients were males, 82(75.92 %) while females constituted a small number 24.07%. A large number of patients suffered from deranged hepatic functions (34.25%), Acute Renal Failure (12.03%) ARDS (10.18%), Hemorrhages (5.55%) and Acute Myocarditis (3.07%). There were 16(14.81%) deaths mainly due to complications. *Conclusion:* Leptospirosis is more common during the monsoon. Common complications include renal failure and hepatic dysfunction. Death is due to multi-organ failure.

Keywords: Zoonotic; Endemic; Rashes; Complications; Morbidity.

Introduction

Leptospirosis is an emerging infectious zoonotic disease, with epidemic potential. It is caused by a bacterium *Leptospira interrogans* which has more than 200 serological variants [1]. It has been recognized as an important emerging global public health problem because of its increasing incidence in both developing and developed countries. Man usually acquires infection through direct contact with the urine of infected animals. The bacteria enter the body through cuts or abrasions on the skin, or through the mucous membranes of the mouth, nose and eyes. Human -to-human transmission is rare. The disease has a wide clinical spectrum varying from mild influenza like illness to fulminant and often fatal presentation with multi-organ involvement. Out of all patients infected with Leptospira, 40% seroconvert asymptomatically; of the remaining 60%; 90% suffer the milder an-icteric form and 10% the severe icteric form [2]. The classic presentation of Leptospirosis is a biphasic illness, with complications occurring in the second phase. Important causes of death include renal failure, cardiopulmonary failure, and widespread hemorrhage[3]. The disease with multiorgan involvement carries a poor prognosis and is more common in patients in whom there has been a delay in the initiation of treatment.

Estimates indicate that more than 500,000 cases of Leptospirosis occur each year globally. The majority of reported cases have severe manifestations,

for which mortality is greater than 10% [4]. However, very little is known regarding its true incidence. It is estimated that 0.1 to 1 per 100 000 people living in temperate climates are affected each year and the incidence can even rise to 100 or more per 100 000 during outbreaks [5].

Leptospirosis was considered earlier a rare disease in India, and had been grossly under reported and under diagnosed due to a lack of awareness and appropriate laboratory diagnostic facilities in most parts of the country [6]. However, since 1980's the disease has been consistently reported from various states especially during monsoon months [7]. The disease is endemic in Kerala Tamilnadu, Gujarat, Andamans, Karnataka, and Maharashtra. It has also been reported from Andhra Pradesh, Orissa, West Bengal, Uttar Pradesh, Delhi & Puducherry [8]. According to State Health Directorates, during the year 2013 highest number of cases (2887) were reported from Tamil Nadu, maximum deaths (38) were recorded in Gujarat, while in Karnataka there were 355 cases and 10 deaths, though actual number of cases as well as deaths could be much higher [9].

Leptospirosis is endemic in Mangalore and its surrounding areas [10]. The present study has been under taken to study the epidemiological as well as clinical profile of Leptospirosis cases admitted during last six years i.e. 2009 to 2014, in a tertiary care hospital in Mangalore (Karnataka).

Materials and Methods

A record-based retrospective observational study was undertaken to determine the demographic and clinical profile of all patients who were admitted from 01 January 2009 to 31 December 2014 to the teaching hospital of AJIMS&RC, Mangalore, Karnataka; and were found positive by immunoglobulin M enzyme linked immunosorbent assay (IgM ELISA) for Leptospira. A total of 108 patients were included in the study. Details of the patient pertaining their age, gender, clinical features, investigations, complications and outcome were recorded on a pro forma after retrieving their records from MRD department of the hospital and were subsequently analyzed.

Limitations: Present study has the limitations that are inherent to any record-based study and these include likelihood of many manifestations having been missed in the case sheets. There is also a probability of inclusion of some false negatives cases as some infections such as dengue may rarely show a false positive for LEPTO IgM. There was also lack of information on rainfall and other meteorological data for the period of study.

Results

A total of 108 patients were admitted in the hospital from 01 Jan 2009 to 31 Dec 2014.During the period of study, highest admissions, i.e. 31 (28.70 %) were noted in the month of September, followed by August 20 (18.51%), July 14 (12.96%), while the lowest admissions were seen in the month of November, December and March i.e. 02 each (1.85 %)[Fig-1]. The majority of the patients were males, 82(75.92 %) while females constituted a small number 26 (24.07%). Maximum numbers of cases belonged to the age group of 30–44 years, i.e. 37(34.25 %), while the numbers of cases among under fourteen were only 02 (1.85 %). Most of the cases i.e. 59 (54.62%) were unskilled laboureres. (Table-1).

Table 1: Socio-Demographic Profile of Patients (N=108)

Characteristics	Number	Percentage
Age Group in Yrs		
<14	02	1.85
15-29	21	19.44
30-44	37	34.25
45-59	34	31.48
>60	14	12.96
Gender		
Male	82	75.92
Female	26	24.07
Occupation		
Unskilled	59	54.62
Semi -Skilled	21	19.44

Skilled	08	7.40
Professional	02	1.85
House wives	18	16.66

Year wise analysis of admission data, revealed maximum admissions were made in the year 2011, i.e.24 (22.22 %), while the succeeding years showed a relative decline with lowest admissions in 2013 i.e. 14(12.96%). However, the highest death rate (28.57%) was also recorded during 2013 [Table-2]. Average duration of stay of these dengue cases in hospital was 14.65 days. As seen in [Table-3], fever was present in all cases, i.e. 108 (100.00 %), followed by myalgia 97(89.81%), abdominal pain 87(80.55%), headache 69(63.88%) while 44(40.74%) had rashes. Jaundice was seen in 37 (34.25 %) patients while 29(26.85%) patients suffered from oliguria and 19(15.74%) cases had complaints of breathlessness. A large number of patients suffered from various complications.The main complications were deranged hepatic functions (34.25%), Acute Renal Failure (12.03%) ARDS (10.18%), Hemorrhages (5.55%) and Acute Myocarditis (3.07%) were accounted for most of the deaths. (Figure-2)

A large number of patients 67(62.03%) were found to be anemic while 33(30.55%) patients showed raised blood urea levels. A total of 41 patients (37.96 %) suffered from thrombocytopenia i.e. platelet count below 100,000/cumm. Biochemical and hematological parameters of patients have been given in Table-4. All cases were managed well and responded to the treatment, while a small percentage i.e.16 (14.81%) resulted in fatality.

Table 2: Year wise admission and deaths

Year	Admissions	Deaths
2009	19	3(15.78%)
2010	16	2(12.50%)
2011	24	4(16.66)%
2012	17	1(5.88%)
2013	14	4(28.57%
2014	18	2(11.11%)

Table 3: Main symptoms among patients (*N*=108)

Symptoms	Number	Percentage
Fever	108	100
Myalgia	97	89.81
Vomiting	74	68.51
Headache	69	63.88
Abdominal pain	87	80.55
Skin Rash	44	40.74
Orbital Pain	67	62.03
Jaundice	37	34.25
Oliguria	29	26.85
Breathlessness	17	15.74

Table 4: Biochemical parameters of patients (N=108)

Parameters	Number	Percentage
Anaemia (Hemoglobin <11.0 g/dl)	67	62.03
Leucocytosis (>11000/mcl)	43	39.81
Thrombocytopenia (<100,000/mcl)	41	37.96
Blood urea (>40 mg/dl)	33	30.55
S. Creatinine (>1.5 mg/dl)	26	24.07
Raised Serum-Bilirubin	41	37.96
Raised Liver Enzymes	47	43.51

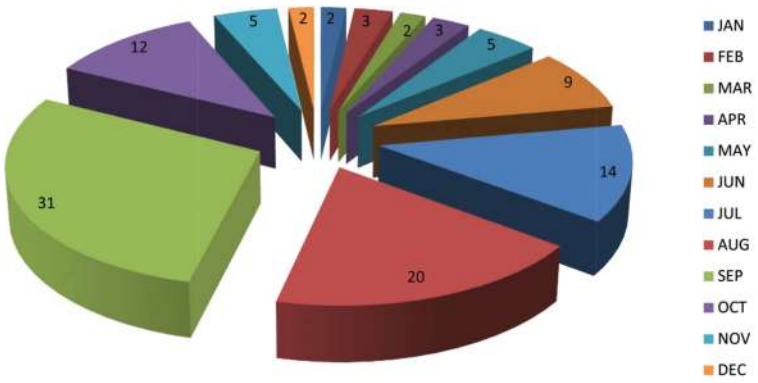

Fig. 1: Pie Diagram Showing Month Wise Breakdown of Cases

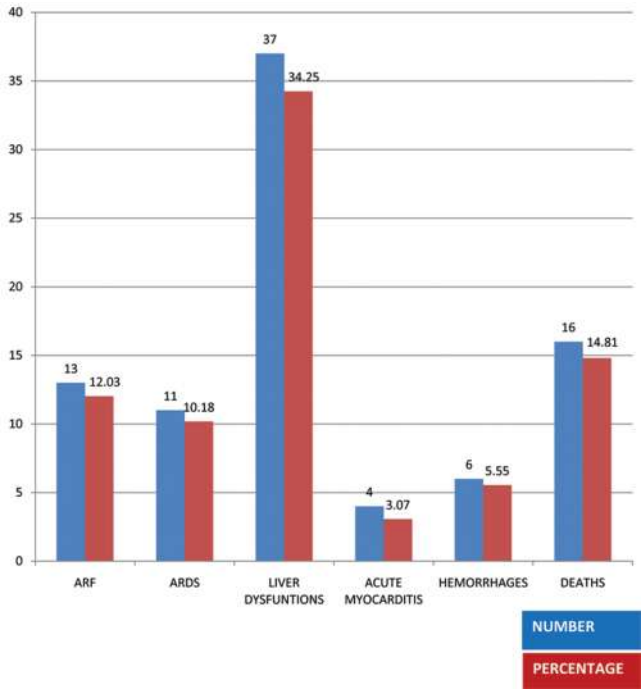

Fig. 2: Main Complications/Deaths Among Patients (*N*=108)

Discussion

The term Leptospira (Greek 'leptos'=fine and Latin 'spira'=coil) is used for diseases caused by all Leptospira regardless of serotype. Although it is endemic in many rural and urban slum communities, little is actually known about the true disease burden and consequently, the disease has been neglected [11]. In India, it was first reported from the Andaman Islands in 1929, and since then it has affected all parts of country [12]. The spectrum of disease ranges from subclinical infection to severe syndromes including multiorgan failure and death. It is emerging as an important public health problem in India with many states already showing significant endemicity. Studies suggest that Leptospirosis accounts for about 12.7% of cases of acute febrile illness responsible for attendance at hospitals [13]. Natural disasters and poor sanitary conditions predispose to outbreaks.

On analysis of demographic data, it was observed that the majority of the patients were males, (72.92%), while females constituted only a small number (24.07%). Maximum number of cases belonged to the productive age group of 15–44 years (53.70 %),. Further, the majority of the cases (54.62%) were from low socio-economic strata belonging to unskilled labour class. [Table-1]. Bhardwaj P. et al [14] in their study of "Risk factors of Leptospirosis at Surat" also reported that most affected people belonged to the productive age group, where more than two third of the cases were in the age group 15 to 34 years and

belonged to low socio-economic class. Parmar G et al [15] in another study on "Socio-demographic, clinical and laboratory profile of Leptospirosis cases at Simmer" also reported similar findings where they found (70%) patients belonged to the age group of 20-50 years, while 63% of these were laboureres/ farmers. Similar results were also been observed by Patil V C et al [16] in their study from western Maharashtra who reported (78.26%) patients as farmers and (21.73%) as laboureres with (91.30%) males and (8.6%) females with mean age of 32 years. High incidence of Leptospirosis among laboureres and farmers can be attributed to their occupational exposure to rodents and other mammals while working bare feet in fields, coupled with frequent injuries, abrasions and cuts in lower extremities making them even more vulnerable.

It is thus seen that Leptospirosis generally affects the population in productive age group belonging to low socio-economic class, especially laboureres and farmers; leading to loss of income to the affected household nearly for duration of 2-3 weeks thereby further adding to the economic misery and burden of the involved people. Age distribution is comparable to other similar studies [17-22]; while male preponderance is not seen in some other studies [23].

To identify the seasonal variations of the disease, a month wise analysis of all admissions was carried out. Highest admissions were recorded during the month of September (28.70%) followed by August (18.51%) and July (12.96%); which are basically monsoon months [Fig-1].This implies that Leptospira multiplies where water remains stagnant for longer periods after the rains, and since farmers/laboureres walk barefoot, the risk of Leptospirosis in this population increases even further. In another study on "Clinical profile and outcome of Leptospirosis at tertiary care centre in western Maharashtra" Patil V C et al [16] reported (17.39%) cases in the month of July, (21.73%) in August, and (26.08%) in September, while they found (78.26%) of these were farmers and (21.73%) were laboureres. Sethi S et al [24] in their study on "Increasing Trends of Leptospirosis in Northern India" found maximum cases in the months of July-September. They found most of the patients (70%) were young adults in their 2nd, 3rd, and 4th decades of life. Major epidemiological risk factors observed by them included wet environmental living conditions, lack of protective footwear, working in farm lands, contact with animals and history of unprotected contact with dirty stagnant water. Similar observations were also made by Sehgal SC [25] in his study in Port Blair, Andaman and Nicobar Islands on "Epidemiological patterns in Leptospirosis". The correlation between occurrence of Leptospirosis cases and the monsoon season is clearly evident in this study and is further supported by similar findings by many other researchers [26-30].

In present study the most common symptom was fever (100%) which was present in all cases, followed by, muscle pain (89.81%), abdominal pain (80.55%) vomiting (68.51%), headache 63.88%), rash (40.74%), jaundice (34.25%), oliguria (26.85%) and breathlessness (15.74%). Similar symptoms were also observed by Parmar G et al [15] in their study of "Socio-demographic, clinical and laboratory profile of Leptospirosis cases at, Surat" wherein they found (100%) cases had fever, (79.1%) muscle pain,(54.1%) headache,(50%) oliguria, while (25%) patients reported with jaundice. In another study by Chauhan et al [23] in sub Himalayan regions of North India, (100%) patients reported with fever, followed by headache (92%) and muscle pain (77%). Similar findings have also been reported by Prasad R. et al [17] and Margarita et al [18] in their studies. However, Atora BD et al [19] in their study on "Leptospirosis in Santo Tomas University Hospital" reported fever, chills, myalgia, and headache as the most common symptoms.

The most common physical findings in this study were pallor, muscle tenderness, icterus, hepatomegaly and conjunctival suffusion; which is comparable with the studies done by, Parmar G et al [15], Chauhan et al [23], Villanueva et al [19] as well as many other studies [19,20]. In present study, anemia was found in (62.03%) of the cases, followed by raised liver enzymes (43.51%), leucocytosis (39.81%) increased serum bilirubin (37.96%) azotemia (32.55%) and thrombocytopenia (37.96%) . Study done by Parmar G et al [15] and Margarita et al [18] also reported similar findings in their studies. In another study by Chauhan et al [23] leukocytosis, azotemia and deranged liver functions were most common findings. However, in a study by Atora et al [19], haematuria, albuminuria and leucocytosis were more common findings.

In this study 13(12.03%) patients developed Acute Renal Failure, out of which 7 underwent dialysis ,11 (10.18%) patients developed ARDS, 4(3.07%) developed Acute Myocarditis while 6 (5.55%) showed evidence of hemorrhages. Parmar G et al [15], in their study also found Acute Renal Failure (66.3%) and ARDS (33%) as the most common complications. Renal failure was also found as the most common complication by Margarita et al. [18] Sulit [31] also reported after a "Review of cases of Leptospirosis admitted to a hospital in Philippines",

that Acute Renal Failure is nearly an essential feature of the disease. However, in contrast, Lal Sohan et al [32] in their study in Andhra Pradesh found no patient of Leptospirosis having jaundice or oliguria. All patients admitted in the hospital were managed well. However, 16 (14.61%) patients could not be saved.

In our study mortality rate was found to be (14.81%) . Similar mortality rates have been reported by Parmar G et al, [15] (16%), Margarita et al, [18] (11%) and tudy 16 (14.81%), while a high mortality rate (42%) was reported by Sulit [31]. However, much lower mortality rates(4.34%) were reported by Patil et al [16] in their study of "Clinical profile and outcome of Leptospirosis at tertiary care centre in western Maharashtra" .

Conclusion

Leptospirosis is an important emerging public health problem in India. Keeping in view with its high mortality, fulminant course and epidemic potential, medical professionals and the general public, especially those at risk of exposure, need to be educated about the disease and the need to seek early medical intervention. Poor socioeconomic and environmental conditions and occupational habits of people are main determinants of the incidence of the disease in our country. To coordinate and direct global research and action against human Leptospirosis, the World Health Organisation (WHO) has established "Leptospirosis Burden Epidemiology Reference Group" (LERG) to develop tools to estimate disease burden and suggest measures for its prevention and control to its member states. Needless to say that with the present understanding of the eco-epidemiological and cultural characteristics of community, dedicated control programs, and strong surveillance system Leptospirosis is preventable.

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Original Article

Comparison between Childhood and Adult Tuberculosis in Kollam District Tuberculosis Centre: A Retrospective Study

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Abstract

Introduction: Prevalence of childhood TB has been reported to be between 3% and 25 % in different countries. It remains under reported in developing countries like India due to diagnostic difficulties, poor reporting and recording system. *Objectives:* (1) To compare the differences between adult and pediatric TB in terms of disease type, category and outcome of treatment. (2) To determine whether childhood TB was an important predictor of adverse outcome following treatment under the RNTCP. *Methods:* Study design: Retrospective record based study. *Study Area:* This record based study was done at District Tuberculosis center in Kollam. *Sample Size:* All the TB cases from 2012 January to December 2012 of all age groups, which were registered in the district TB Centre, were selected. There were total 605 patients registered. *Results:* Out of total 605 tuberculosis patients, 549(90.7%) were adults and 56(9.3 %) were pediatric. In adult age group 394 (71.8 %) were males and 155 (28.2%) females. Among the pediatric age group, 35(62.5%) were males and 21(37.5%) were females. Pediatric age group had 53 (94.65%) cases under pulmonary disease type and 3 (5.4%) were extra pulmonary. Similarly in adults 476 (86.7%) were pulmonary and 77 (14.1%) extra pulmonary tuberculosis. This difference was statistically significant (P 0.043). All pediatric age groups were treated under category 1, while among the adults 476 (86.7%) were treated under category 1. *Conclusion:* There were differences in the clinical presentation of TB among children and adults. In case of treatment outcomes, pediatrics age group had better outcome than adults.

Keywords: Childhood; Pulmonary; Tuberculosis.

Introduction

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and remains a leading public health problem worldwide. The global incidence of TB is rising. Majority of which is contributed by developing countries like India. Disseminated disease in children and pulmonary disease in adult constitute two major epidemiological and clinical forms of TB.

In India, every day, more than 5,000 people develop tuberculosis and nearly 1,000 people die, resulting in 2 deaths every 3 minutes from TB, but these can be prevented with proper care and treatment. TB patient can be cured and the battle against TB can be won [1].

Prevalence of childhood TB has been reported to be between 3% and 25 % in different countries. It remains under reported in developing countries like India due to diagnostic difficulties and poor reporting and recording system. Most cases of tuberculosis in children are sputum smear negative and they are considered to be minor contributors to the transmission of disease [1].

In the absence of clear-cut guidelines the diagnosis of childhood TB during the initial years of RNTCP in India was difficult. Management was physician specific and un-standardized. Pediatric medicine, where either proprietary or doses had to be reconstituted from adult medicines supplied under program [2].

The present study was done to compare the differences in clinical presentation, treatment outcome of new smear positive cases between childhood and adult TB and to determine if childhood TB was an important predictor of adverse outcome following ATT treatment under RNTCP.

Aims and Objectives

1. To compare the differences between adult and pediatric TB in terms of disease type, category and outcome of treatment.
2. To determine whether childhood TB was an important predictor of adverse outcome following treatment under the RNTCP.

Methodology

Study Design: The present study is a retrospective record based study.

Study Area: This record based study was done at District Tuberculosis center in Kollam.

Sample Size: All the TB cases from 2012 January to December 2012 of all age groups, which were registered in the district TB Centre, were selected. There were total 605 patients registered.

Selection Criteria

We selected all the TB cases from 2012 January to December 2012 with all age groups which were registered. There were total of 605 patients registered.

The diagnosis of pulmonary TB in children and adults were done according to the RNTCP guidelines. Categorization and treatment were in accordance with the RNTCP guidelines and under direct observation of the field level workers of the government healthcare system.

In this present study, a child was defined as being 14 years or less in age as specified by the RNTCP definition. Cure, treatment completed, default, death, failure, and transferred out were also been defined in accordance to the RNTCP guidelines [3].

Data on age, sex, diseases type, disease classification, category of treatment, human immunodeficiency virus (HIV) status, as recorded in the TB register of the Tuberculosis centre between January 2012 and December 2012, were collected for analysis.

Further data was entered in excel sheet and analyzed using SPSS software.

Results

On analyzing the research outcome, we found that among the total 605 tuberculosis patients 549 (90.7%) were adults and 56 (9.3 %) were pediatric. In the adult age group 394 (71.8 %) were males and 155 (28.2 %) were females. Among the pediatric age group, 35 (62.5%) were males and 21 (37.5%) were females (Table 1).

Regarding the disease type, pediatric age group had 53 (94.65%) cases under pulmonary disease type and 3 (5.4%) were extra pulmonary. Similarly in adult age group 476 (86.7%) were under pulmonary and 77 (14.1%) had extra pulmonary tuberculosis. This difference was statistically significant as p value is 0.043 (Table 1).

The study of relationship between age and category of treatment revealed that 100% of pediatric age group were treated under category 1, while among the adult age group 476(86.7%) were treated under category 1 and 73 (13.3%) were treated under category ll. More adults were categorized under category ll than children and the difference was found to be statistically significant as the p value is 0.001 (Table 1).

The results between the age group and treatment outcome, found that all 56 (100.0%) of the pediatric age group had overall favorable outcome (cured and treatment completed) that is 1(1.8%) were cured and 55 (98.2%) were treatment completed. None of them were default, failure or death, while among the adult age group, out of 471 (85.8%) favorable outcome, 276 (50.4%) were cured and 195 (35.6%) were treatment completed. Overall adverse outcome when taken together were seen in 78 (14.2%) out of this 27 (4.9%) were default, 22 (4.0%) failure, 27 (4.9%) were dead and 2 (0.2)% were transferred out.

The relationship between age and disease classification showed that among adults, 342 (62.3%) were sputum smear positive and 207 (37.7%) were sputum smear negative Tuberculosis. Similarly in pediatric age group, 2 (3.5%) were sputum smear positive and 54 (96.5%) were sputum smear negative. Among the 549 adult cases, 7(1.3%) were HIV positive and 542 (98.7%) were HIV negative & among the 56 (100.0%) pediatric cases, all were HIV negative (Table1).

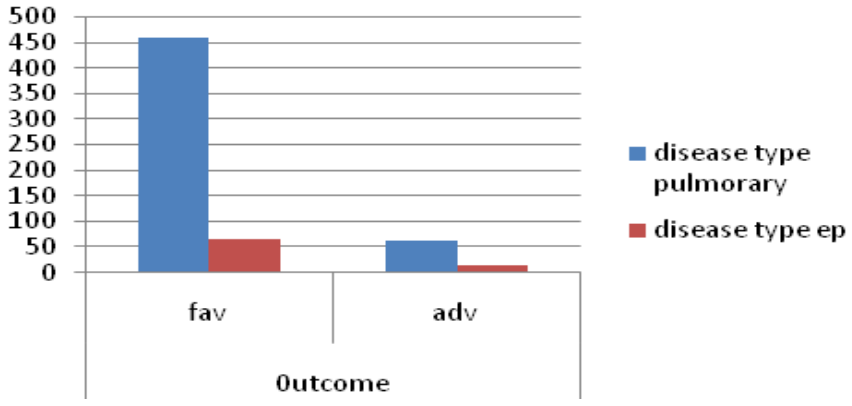
The association between disease type in pediatric and adult TB was statistically significant (p=0.043). The association between disease type and outcome shown that 471(87.8%) of the pulmonary type had favorable outcome while 64 (12.5%) had adverse outcome. And among the extra pulmonary, 66 (82.5%) had favorable outcome and 14 (17.5%) had adverse outcome. This difference statistically, significant with p value 0.128 (Table 2, Graph 1).

Table 1: Comparison between adults and pediatric Tuberculosis

	Pediatric		Adult		total	%
Age	**No**	**%**	**No**	**%**		
Male	35	62.5	394	71.8	429	70.9
Female	21	37.5	155	28.2	177	29.1
Disease type						
Pulmonary	53	94.6	472	85.9	525	86.8
Extra pulmonary	3	5.4	77	14.1	80	13.2
Category						
I	56	100	476	86.7	532	87.9
II	0	0	73	13.3	73	12.1
Disease classification						
Smear positive	2	3.5	342	62.3	344	56.8
Smear negative	54	96.5	207	37.7	261	43.1
HIV status						
Positive	0	0	7	1.3	7	1.2
Negative	56	100	542	98.7	598	98.8
Favorable outcome	56	100	471	85.8	527	87.1
Cured	1	1.8	276	50.4	277	45.8
Treatment completed	55	98.2	195	35.6	250	41.3
Adverse outcome	0	0	78	14.2	78	12.9
Default	0	0	27	4.9	27	4.5
Failure	0	0	22	4.0	22	3.6
Died	0	0	27	4.9	27	4.5
Transferred out	0	0	2	0.2	2	0.3
Total	56	9.3	549	90.7	605	100

Table 2: Relationship between disease type and outcome of treatment

Disease type	Outcome		Total	P value
	Favorable	Adverse		
Pulmonary	461 (87.8%)	64 (12.2%)	525	0.128
Extrapulmonary	66 (82.5%)	14 (17.5%)	80	
Total	527	78	605	



Graph 1: Relationship between disease type and outcome of treatment

Discussion

The proportion of childhood cases in the present study was 9.3% of the total registered cases of TB; while the national average was 7% for 2011 [4]. It was higher than that found in other studies from India [5] and other countries in the region [6], the total number of childhood TB cases registered under the RNTCP is a reflection of the program related low notification of cases.

The guidelines for diagnosis of childhood TB established by the RNTCP in conjunction with the IAP are more useful for the diagnosis of TB in children capable of providing sputum for microscopy. But younger children can rarely expectorate sputum, making diagnosis difficult [7]. In addition, many children are diagnosed and treated outside the government health care settings and are not registered under the RNTCP.

Differences in childhood and adult tuberculosis- The higher notification of males in both the groups reflects either a differential access to healthcare or biological reasons [8] causing a reduced incidence of TB in females. Gender based differences in the notification pattern under the RNTCP have been seen in other studies. The proportion of male patients among childhood TB cases in the present study, were much higher than reported in other studies on childhood TB from India [9].

In the present study, 89.1 % TB cases were 'new', that is, never treated or treated for less than 1 month with anti-tubercular drugs before registration. In their study on childhood TB cases from Delhi, found that 93.1% of childhood TB cases were new, with the remainder being retreatment TB cases. Ninety percent of childhood TB cases from a record based study in Ahmadabad [10] were new cases. They reported a significantly higher number of relapses in adult TB cases compared to cases from the childhood patients from a rural hospital in Ethiopia [11].

TB and HIV-The prevalence of HIV co-infection among patients with TB in the present study (1.1%) is much lower than that found in studies on outpatient and inpatients TB cases at the All India Institute of Medical Sciences (AIIMS) or those reported form sub-Saharan Africa [12, 13]. This low prevalence of HIV confection in patients with TB probably reflects the low level (0.31%) of HIV prevalence in the state of Kerala.

Outcome on treatment under the RNTCP, success rates of TB treatment have been seen to be similar among childhood and adult cases of TB [14]. The finding of the present study reveal that childhood TB was significantly related to favorable treatment outcome.

The present study is one of the very few studies that report data on the community-wide profile and treatment outcome of TB patients aged less than 15 years registered and treated under routine program conditions in India. The program defined treatment completion rate was >95%, which is reassuringly similar to treatment outcomes reported by other hospital-based studies [15 - 17]. This suggests that the treatment strategy adopted by RNTCP in treating children with TB disease has been effective. In this respect, the study findings however identify certain priority areas that need to be addressed by the National and State health authorities.

The program defined treatment completion rates were similar among those treated with doses that were less than or in accordance the WHO recommendations. The anti-TB drug dosages and the regimens were formulated by RNTCP in consultation with the Indian Academy of Pediatricians, based on the treatment guidelines recommended by WHO in 2003 [9, 2]. However, WHO subsequently increased the dosages per kilogram recommended for children in its later revision of the treatment guidelines [18].

The total no of pediatric cases as such is very less compared to the number of adult cases. This may be because TB in children is difficult to diagnose due to the lack of specialized pediatric departments and the non-availability of chest X-ray, aspiration cytology and culture facilities for diagnosis. Children attending these centers remain undiagnosed. Younger children can rarely expectorate sputum making the diagnosis difficult. In addition many children are diagnosed and treated outside the government healthcare settings and are not registered under RNTCP. Also antituberculous drugs, based on weight bands, supplied under the RNTCP, do not have provisions for children with bodyweight less than 6 kg. These children are prescribed proprietary medicines even after being diagnosed by the physician at the government health facilities.

Conclusions

As measured by program defined treatment outcomes, childhood TB patients in Kollam District Tuberculosis Centre, across all groups notified under the RNTCP, which follows WHO TB, treatment guideline definitions, have high treatment completion rates. The demographic and clinical profile of registered childhood TB patients shows that they are mostly aged 1-5 years and with program

defined non-serious forms of TB. The registration of childhood TB under the RNTCP was low. There were differences in the clinical presentation of TB among children and adults. In case of treatment outcomes, pediatric age group had better outcome, signifying the effectiveness of the RNTCP regimens in the treatment of childhood TB. Childhood TB was not a significant predictor of adverse treatment outcome either independently or after adjusting for other factors.

Recommendations

Further studies are needed:

i. To assess the reasons for the low proportion of childhood TB case notifications, identify and implement strategies to reach out to the cases missed by the program.

ii. To assess the accuracy of diagnosis and treatment clinical response in various demographic and clinical subgroups.

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Review Article

Drug Resistant Tuberculosis; Threats, Challenges and Control Strategies in India

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Abstract

Emerging cases of multi drug resistant tuberculosis and extensively drug resistant TB cases pose serious threat to TB control efforts. The systematic review of burden of drug resistant tuberculosis, challenges regarding diagnosis and treatment is presented in this article. In India prevalence of acquired drug resistance is comparatively more than primary drug resistance. The diagnosis of XDR-TB has enormous implications both for the individual and the community. The choice of anti-TB drugs is limited and the ones available are too expensive and too reactogenic.Treatment outcome is mostly disappointing and case-fatality rate is very high in drug resistant truberculosis.

Therefore prompt adherence to DOTS regime, ensuring nationwide access to dignostic and treatment facilities under RNTCP, integrated TB control activities by private and public sector, political commitment ,promoting research and development of national guidelines and policies will definitely help to combat manmade disaster of drug resistant tuberculosis.

Keywords: Drug Resistant Tuberculosis; Challenges; Control.

Introduction

Tuberculosis (TB) remains a major global health problem. India is highest TB burden country in terms of absolute number of incident cases that occur each year. As with all infectious diseases, the more severe the drug-resistance profile, the more difficult it becomes to successfully treat the patient. Multi drug-resistant tuberculosis (MDR-TB) is among the most worrisome elements of the pandemic of antibiotic resistance because TB patients that fail treatment have a high risk of death [1-4]. Extensively drug resistant (XDR-TB) is a severe and serious form of MDR-TB, which responds very poorly to MDR TB treatment. Emerging cases of multi drug resistant tuberculosis and extensively drug resistant TB cases pose serious threat to TB control efforts.

Definitions-Multi drug-resistant tuberculosis (MDR-TB) is defined as a disease due Mycobacterium tuberculosis that is resistant to isoniazide and rifampicin. The term 'extensively drug-resistant tuberculosis' XDR-TB is defined as resistance to at least Isoniazid and Rifampicin (i.e. MDR-TB) plus resistance to any of the fluoroquinolones and any one of the second-line injectable drugs(amikacin, kanamycin, or capreomycin). The term was coined in 2006 by scientists of the Centers for Disease Control and Prevention (CDC), USA [5].

Methodology

The current study is a systematic review of published English-language literature on epidemiology, diagnosis, treatment approaches and outcomes of drug resistant tuberculosis .

Using Pubmed and google databases, articles published in peer-reviewed journals and other authentic literature were searched for terms describing *M. tuberculosis,* drug resistance. Potentially relevant articles were retrieved and each study included was systematically reviewed.

Burden of MDR and XDR TB

In world MDR-TB and XDR TB-Various surveys of drug resistant TB conducted in the world clearly indicate rising trend in the prevalence from 1.1% (1999-2002) to 3.5% (2014)for primary drug resistance and from 7% to 20% for acquired drug resistance [6-9].

Globally, an estimated 3.5% (95% CI, 2.2–4.7) of new cases and 20.5% (95% CI, 13.6–27.5) of previously treated cases had MDR-TB. In 2013, there were an estimated 480,000 (range: 350,000–610,000) new cases of MDR-TB worldwide, and approximately 210,000 (range: 130,000–290,000) deaths from MDR-TB. Drug resistance surveillance data show that an estimated 480 000 people developed MDR-TB in 2013 and 210 000 people died. Extensively drug-resistant TB (XDR-TB) has been reported by 100 countries in 2013 [10].

In India prevalence of MDR among new cases has varied between 0.5% to 5% and the primary MDR has remained more or less constant over the years. The acquired drug resistance varied from 25% to 69% in India [6-17].

Table 1: Prevalence of MDR TB in India

Year	Prevalence of primary drug resistance	Prevalence of acquired drug resistance
1999-2002	0.5%	25%
2002	2.8%	69%
2004	2.4%	2.2%
2005	0.7%	17.2%
2008	13.2%	25.5%
2009	2.4%	17.4%
2012	2.1%	15%
2013	2.1%	15%
2014	2.2%	15%

Though these prevalence figures are small in terms of percentages and proportions these rate translates into large absolute numbers [18].

WHO has recognized 58 countries in terms of both the burden and the geographic spread of XDR TB and India is one of those countries [19]. XDR TB has been reported in India by isolated studies with non representative and highly selected samples. In a review of 16 publications on XDR TB cases, a total of 598 cases of XDR-TB have been documented. These reports have originated from 10 tertiary care centres in nine cities, distributed widely in the country. Therefore, the data have no representative value for epidemiological assessment [20,23].

Threats

The diagnosis of XDR-TB has enormous implications both for the individual and the community. The choice of anti-TB drugs is limited and the ones available are too expensive and too reactogenic. Treatment outcome is mostly disappointing and case-fatality rate is very high [24].

Challenges in Diagnosis and Treatment

(1) Although clinical treatment failure is indicative of drug resistance, the diagnosis of MDR-TB and XDR-TB requires the isolation of bacterium and antimicrobial drug susceptibility testing (DST). Therefore, the probability and sensitivity of XDR-TB case-detection in a community are dependent on the coverage and quality of microbiological support services for the diagnosis of MDR TB and XDR TB. Many laboratories with culture facilities for /M. tuberculosis/ may not conduct DST even for first line anti-TB drugs to diagnose MDR-TB. When MDR organisms are detected, DST for second line drugs is unlikely to be conducted, being cumbersome and expensive. (2) Insufficient public sector MDR and XDR TB diagnosis and treatment services-Public sector option for free diagnosis and treatment of MDR TB become available since past few years only (3) Delay in confirmation of diagnosis-Average time taken from identification as MDR TB suspects to DST confirmation report is 45.49 days and this large gap increases transmission and amplifies the magnitude of MDR TB [25]. (4) Poor quality of TB and MDR TB laboratory diagnosis in the private sector-TB is often diagnosed with serology, which frequently mis-diagnoses TB. Recently the use of TB serological testing is banned in India [26]. Drug-susceptibility testing from very few private laboratories has been subject to accreditation of quality. (5) Under reporting-Patients properly diagnosed with TB and MDR TB in private laboratories are not notified to public health authorities, who would be able to take actions to confirm diagnoses, offer supportive services, and offer free treatment to patients from public sources or at least supervise the quality of care in the private sector. (6) Irrational use of Anti-TB drugs - Widespread irrational and irresponsible use and prescriptions, as with all schedule H drugs, provision without prescription is widespread and pharmacists are not required to maintain records of provision that could be used to identify patients with possible TB or MDR TB. Furthermore, second-line anti-TB drugs are widely available in the private sector and used inappropriately, even in drug sensitive TB where such drugs are not required [27]. (7) Lack of valid ,sensitive epidemiological data regarding magnitude of MDR TB and XDR TB. (8) Outcome related challenge -As per recent individual patient data , 48%MDR TB and only one third XDR TB cases has successful outcome [28]. (9) Program related challenge-Drop outs and non traceable patients. (10)

Treatment is expensive and requires 24-30 months for completion [29].

Control Strategies

(1) MDR Prevention through sustained high-quality DOTS implementation. The implementation of a good quality DOTS programme will prevent the emergence of MDR and XDR-TB in the community

(2) Rapid diagnostic tests-Conventional PCR based Line Probe assay and GeneXpert tests endorsed by RNTCP should be widely available.[30]

(3) Strengthening of laboratory services for adequate and timely diagnosis. As of January 2012, diagnosis of XDR TB can only be confirmed at 3 laboratories in India, which are quality-assured for second-line anti-TB drug susceptibility testing of flouroquinolones and injectables. These are the National Reference Laboratories (NRL) of TRC/NIRT Chennai, NTI Bangalore and LRS Institute, New Delhi.Urgent development of national policy and guidelines and innovative design for early diagnosis and case management of XDR-TB.

(4) A national registry of XDR-TB will allow every institution to report cases as soon as they are detected.

(5) The bacilli isolated from each case should be collected and verified in a reference laboratory. Therefore, a number of reference laboratories should be established and networked so that the facility is readily accessible. For patients in whom drug resistance is suspected, diagnosis of MDR-TB should be done through culture and drug susceptibility testing from a quality-assured laboratory.

(6) All relevant investigations to be performed prior to treatment initiation. Preferably the standardized regimen as recommended in the national DOTS-Plus guidelines should be used. If results of second line DST from an accredited laboratory are available, an individualized regimen may be used in such patients after obtaining a detailed history of previous anti-TB treatment [31].

(7) While on treatment, precautions necessary to prevent transmission to members of family and to healthcare workers in contact should be applied.

(8) There is also an urgent need for effective infection-control measures within clinics and hospitals. This must be implemented in every hospital co-ordinated by hospital infection control committees.

(9) Integration of MDR and XDR TB activities with general TB control activities.10) Surveillance of MDR and XDR TB , development and implementation of sound TB control policies [32].

(11) In order to inhibit the development of MDR and XDR-TB, better diagnostic algorithm needs to bedesigned and popularized [33-34].

(12) Scaling up of the DOTS Plus program now known as programmatic management of drug resistant tuberculosis [35].

(13) Addressing XDR-TB in India will be a formidable challenge. The strategy of RNTCP has been to minimize the development of MDR-TB by standardized drug regimens and consequently reduce the emergence of XDR bacilli. The target is to detect and treat at least 30,000 cases of MDR-TB annually, free of charge, from 2012-2013 onwards [36].

(14) Regulation of private sector-Unless TB treatment in private sector is effectively regulated, the problems of MDR- and XDR-TB will remain largely unrecognized.

Conclusion

Drug resistant tuberculosis is an enmerging man-made threat globaly and in India.

Lack of access to rapid and quality dignostic services, expensive and cumbersome treatment, treatment drop outs and outcome failures are the challanges which need to be faced. Its emergence can be prevented by prompt diagnosis and effective use of first line drugs in every new patient. Laboratory drug-susceptibility testing (DST) capacity and access to rapid diagnostics need to improved. Programmatic management of M/XDR-TB must be scaled up as per target set by global plan. Proper use of second-line drugs must be ensured to cure existing MDR-TB, to reduce its transmission and to prevent XDR-TB. Effective implementation of RNTCP, regulation and involevement of private sector in TB control activities, promoting research and surveliance activities, political commitment are the mainstays to prevent and control drug resistant tuberculosis.

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Revised Rates for 2016 (Institutional)

Title	Frequency	Rate (Rs): India	Rate ($):ROW
Dermatology International	2	5000	500
Gastroenterology International	2	5500	550
Indian Journal of Agriculture Business	2	5000	500
Indian Journal of Anatomy	3	8000	800
Indian Journal of Ancient Medicine and Yoga	4	7500	750
Indian Journal of Anesthesia and Analgesia	2	7000	700
Indian Journal of Anthropology	2	12000	1200
Indian Journal of Biology	2	4000	400
Indian Journal of Cancer Education and Research	2	8500	850
Indian Journal of Communicable Diseases	2	8000	800
Indian Journal of Dental Education	4	4500	450
Indian Journal of Forensic Medicine and Pathology	4	15500	1550
Indian Journal of Forensic Odontology	2	4500	450
Indian Journal of Genetics and Molecular Research	2	6500	650
Indian Journal of Law and Human Behavior	2	5500	550
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Review Article

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Strengthening Dengue Sentinel Surveillance: The Need of the Hour

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Abstract

Dengue is one of the leading arboviral diseases in the world. During the recent years the epidemiology of dengue has undergone significant changes with more frequent epidemics and spread to non endemic areas. Many reports have shown that the reported cases of dengue are a gross underestimate of the actual number of incident cases. Inadequate infrastructure for surveillance is one of the main causes of this underestimation. This also leads to inadequate and delayed response during the time of epidemics. This review looks at the status of sentinel surveillance in India. It is found that the average number of sentinel sites is only 1 per 5 lakh persons in least populous states and 1 per 25 lakhs in most populous states. This review advocates for strengthening the sentinel surveillance system by increasing the number of sites of surveillance, building capacity of personnel and close monitoring and evaluation of the surveillance sites.

Keywords: Dengue; NVBDCP; Sentinel Surveillance.

Introduction

Dengue is an arboviral disease which has the potential for becoming a pandemic with nearly half of the world population at risk of the disease. Over the last fifty years, the global incidence has shown a thirty fold increase [1]. An estimate done recently shows that nearly 390 million cases of dengue occur every year with 96 million of those cases manifesting clinically [2]. In India, dengue cases have been reported for over 200 years [3]. Based on previous reviews it is found that the epidemiology of dengue has undergone significant change and the disease has spread to rural areas and North Eastern parts of India [4]. Epidemics have become more frequent and cases have been imported to non-endemic areas as well. Lakshadweep remains the only Union Territory (UT) which has not reported any case from 2007. The reported number of cases in the year 2014 is 40,579 and the incidence was nearly 3/lakh population. The case fatality rate has come down to a range of 0.2-0.4. A review has shown that though the incidence based on reported cases is 3/100,000 population, the estimated incidence would be 53/100,000 to 58.83/100,000 and the case load in hospitals would be as high as 7 lakh cases [4]. This shows that there is gross under reporting of dengue cases.

Key Messages

1. Sentinel surveillance is the key to improve reporting of cases and preparedness for response in case of epidemics.
2. Only 1 sentinel surveillance site per 5 lakh population in least populous states of India.
3. Only 1 sentinel surveillance site per 25 lakh population in most populous states of India.
4. Urgent need to increase sentinel surveillance sites.

Sentinel Surveillance

The present problem with dengue epidemics in the country is delayed identification of the epidemic, which leads to a response from the health system that is inadequate and often late. A sentinel surveillance system is the answer to this problem. Surveillance is not mere collection of data, but collection of actionable data i.e. data which on analysis would provide details that would help in prevention and control. The objectives of sentinel surveillance systems are usually (1) early detection

of an epidemic (2) monitor trends of disease (3) provide actionable data that initiates preventive and control measures and (4) evaluation of national programs [5-7].

After the 1996 dengue epidemic, the sentinel surveillance of dengue was started in India in 110 hospitals located in various states and UTs [8]. The present number of sentinel surveillance sites is 499, but even today we are facing problems of under reporting and inability to identify epidemics in a timely manner. Some of the reasons for under reporting are the differential availability of infrastructure for sentinel surveillance, ambiguity about the case definition of dengue, incomplete reporting and inadequate monitoring.

Status of Sentinel Surveillance in India

The long term action plan for Dengue and Chikungunya released by the National Vector Borne Disease Control Programme (NVBDCP) has clarified the definition of dengue to be used for surveillance[8]. By triangulating data from NVBDCP and Census data (2011), the reported incidence of dengue per lakh population and case fatality rate (CFR) were calculated [9,10]. Using the data on number of sentinel sites and the number of sentinel sites/ lakh population, the reported incidence of dengue for India as on September 2015 is 2.29 per lakh population and the CFR is 0.22. The number of sentinel sites throughout the country is 499 (September 2015), but the distribution is not equitable [11].

Figure 1 and 2 describe the number of sentinel sites per lakh population in a state/UT. Figure 1 shows those states/UTs with a population of less than or equal to one crore and Figure 2 shows states/UTs with a population of more than 1 crore. For the purpose of this article let us call those states with a population of <=1 crore as least populous states/ UTs and those with a population of more than 1 crore as most populous states/UTs.

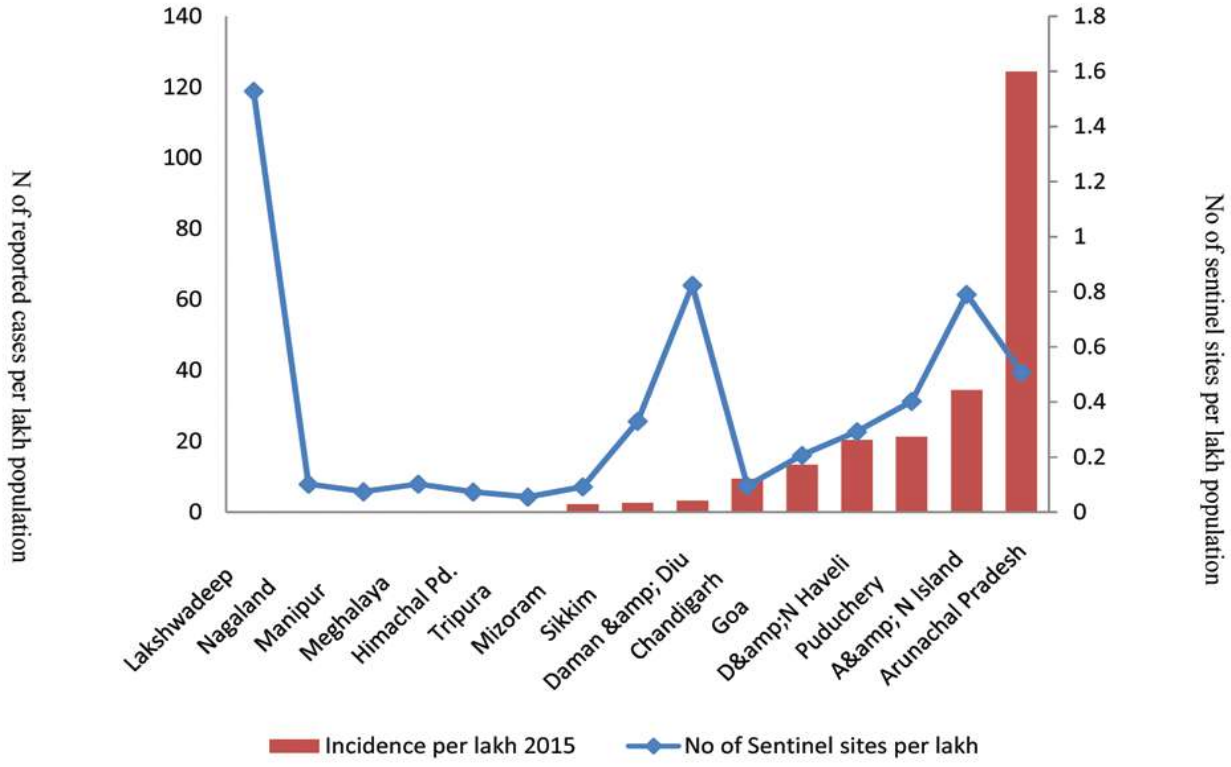

Fig. 1: Sentinel sites per lakh population among group 1 states/UTs (with a population <= 1 crore)

Figure 1 shows that there are 15 states/UTs which have a population of less than 1 crore and 7 of them (50%) have at least 1 sentinel site for a population of 5 lakhs. Among the 21 states with a population of more than 1 crore we find that with the exception of Delhi, all the other states have less than one sentinel surveillance site for every 10 lakh persons. (Figure 2).

It is found that the median reported incidence among least populous states is 2.6/ lakh population (IQR: 0.1-20.4 /lakh population) and that of the most populous states/UTs is 1.5/lakh population (0.3-.9/lakh population).

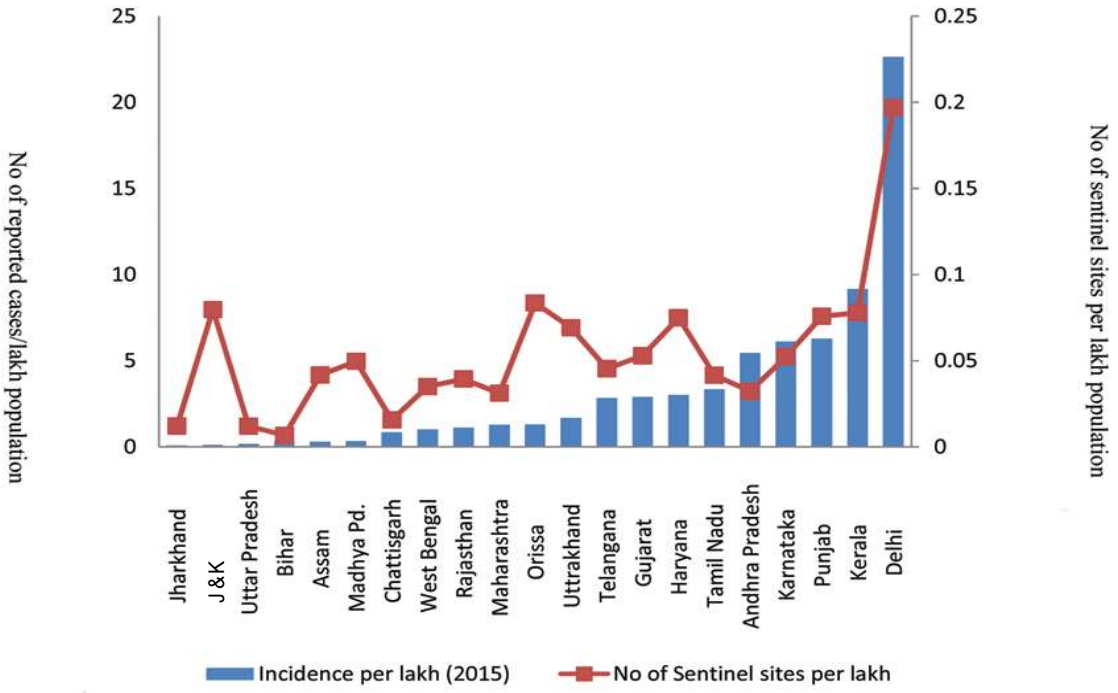

Fig. 2: Sentinel sites per lakh population among group 2 states/UTs (with a population > 1 crore)

Discussion and Conclusion

Dengue is a mosquito borne illness that has been reported in India for the last 200 years. Over the years the epidemiology has undergone significant changes. Bhat et al reported an estimate of nearly 38.5 million overt dengue cases in India [2]. Amarasinghe et al calculated the crude incidence to be nearly 58 per lakh population [4], but the reported number of cases are very less when compared to the estimated cases. In the year 2014 nearly 40,000 cases were reported and in 2015 nearly 22,000 cases were reported as of September 2015.

A three-pronged long term strategy for control and prevention of dengue in India is being implemented by the National Vector Borne diseases Control Program (NVBDCP), under which there is: (i) early case detection and management including epidemic preparedness and rapid response, (ii) integrated vector management and (iii) supporting interventions such as human resource development, behavior change communication, operational research, supervising and monitoring and inter-sectoral convergence. However the sentinel surveillance system can be further strengthened so that adequate response is mounted for dengue epidemics [5].

In India, on an average, there is 1 sentinel surveillance site per 5 lakh population in the least populous states/UTs and only 1 sentinel surveillance site per 25 lakh population in the most populous states/UTs. There is an urgent need to address this lack of infrastructure. Apart from the lack of infrastructure, literature also reports the existence of inadequate reporting, lack of trained manpower and shortage of testing kits in the sites [4,8]. Addressing these issues in the sentinel surveillance system would go a long way in improving our preparedness to tackle dengue epidemics and would also reduce mortality and morbidity due to this disease.

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Review Article

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Poliomyelitis Post-Eradication Issues: Time to Finish

Vikas Bhatia*, Swayam P. Parida**

Abstract

Poliomyelitis is an acute enteroviral disease which can result in Acute Flaccid Paralysis in infants and children. Two highly efficacious and safe vaccines are available for prevention of Polio. The 41st World Health Assembly adopted universal resolution to eradicate polio by 2000. This led to the launch of Global Polio Eradication Initiative (GPEI). Through Routine Immunization and Supplementary immunization Activity (SIA), number of polio cases reduced by 99%, between 1988 to 2013. Four WHO Regions have been certified as polio free. Development of Vaccine-derived Poliovirus from use of attenuated Oral Polio Vaccine halted the progress of polio eradication. The other challenge is importation of Wild Poliovirus due to International travel. The "Emergency Committee" of WHO under International Health Regulation (2005) considered this spread of Polio as Public Health Emergency of International Concern (PHEIC) and formulated certain guidelines for the respective countries. The end phase of Polio eradication needs focused and vigorous effort from all sectors.

Keywords: Poliomyelitis; VDPV; International Travel.

Introduction

Historically, Poliomyelitis dates back to 14th century BC in Egypt [1]. Global efforts have been made to eradicate Poliomyelitis from the world. National Governments, WHO and many International and National Organizations joined hands to achieve a goal which could save billions of dollars and millions of lives. In last two decades we have almost reached to the finishing line. India has been listed among certified successful nations. However seven countries have been listed by WHO, where OPV certification is mandatory for complete eradication [2]. The article highlights the timeline, challenges and International efforts being taken to reach the historical milestone in Public Health.

Timeline for Poliomyelitis

The first Inactivated Polio Vaccine (IPV) was licensed in 1955. Afterwards live attenuated (Sabin) vaccine, monovalent and the trivalent Oral Polio Vaccine (OPV)was licensed in 1961 and 1963, respectively.

The 41stWorld Health Assembly adopted universal resolution to eradicate polio by 2000. It followed the foundation for "Global Polio Eradication Initiative (GPEI)". It was a collaborative effort between various National Governments, World Health Organization (WHO), Rotary International, US Centre for Disease Control and Prevention (CDC) and partners including Bill and Melinda Gates Foundation, etc. After launch of GPEI number of polio cases reduced by 99% i.e., cases decreased from 3, 50,000 in 1988 to only 416 cases in 2013. In 2014 only three countries remained with Wild PolioVirus (WPV) transmission and they are Pakistan, Afghanistan and Nigeria. After 2012, no Polio case has been reported from Nigeria [3,4].

America was the first WHO region to be certified as Polio free in 1994. Then the other two WHO regions i.e., the Asia Pacific and the Europe became Polio free in year 2000 and 2002, respectively. In Jan, 2011 the last polio case was detected in India and in Feb, 2012 India was removed from the WHO list of countries with persistent WPV circulation. In 27th March 2014 WHO South-East Asia region was declared free of Polio. In 1999, type 2 WPV was eradicated from world and since 2012 no case of WPV 3 was seen [5,6].

In 2007, Advisory Committee on Polio Eradication (ACPE) recommended monovalent P1 & P3 or bivalent P1P3 in Supplementary Immunization Activities (SIAs) instead of trivalent OPV (tOPV). The immunogenicity was higher in mono and bivalent vaccine, as the interference exerted by P2 was removed [7]. In 2013 Polio Eradication and Endgame Strategic Plan 2013-2018 has been developed in view of significantrisk of failure in eradication activities. The new plan was adopted in Global Vaccine Summit in Abu Dhabi, UAE. The aim was to eradicate all poliocases both Wild and Vaccine Derived Polio Virus (VDPV) [8].

Challenges

Re-emergence of Polio epidemic in previously Polio free countries due to International travel

In recent years some cases of paralytic poliomyelitis cases are seen in previously Poliofree countries. The "Emergency Committee" convened by Director General of WHO, under International Health Regulation on 28th April 2014, reported that international spread of Polio to date in 2014 is an "extraordinary event" and is considered as Public Health Emergency of International Concern (PHEIC) [9]. It was seen that 60% of total polio cases is due to International travel. Majority of the cases were contributed by adult travellers.In year 2013, out of 416 total cases, 160 were reported in endemic countries and rest occurred in previously Polio free areas due to International travel.

The result of further spread is serious. There are certain Polio free countries where the routine immunization services have been compromised due to continuous civil war and political unrest. If Polio virus enters these countries due to international travel then it will be difficult to gain back the previous Polio free status. Over and above this situation will affect the entire world. If one child becomes infected then it could result in as many as 2, 00,000 new cases every year. Hence all countries of the world remain at threat till complete cessation of virus transmission [3,5].

WHO has categorised countries in to (a) States currently exporting WPV (Pakistan, Cameroon, and the Syrian Arab Republic) and (b) States infected with wild poliovirus but not currently exporting (Afghanistan, Equatorial Guinea, Ethiopia, Iraq, Israel, Somalia and Nigeria). The Emergency Committee has recommended following measures should be adopted by countries currently exporting WPV.

1. Officially declare at the level of head of the state that the interruption of poliovirus transmission is a national public health emergency.
2. All residents and long term visitors (> 4 weeks) should receive a dose of OPV / IPV 4weeks to 12 months prior to International travel.
3. Travellers urgently going out (< 4 weeks) and unimmunized, will receive a dose of OPV by the time of departure.
4. All such International travellers should possess International Certificate of Vaccination and Prophylaxis (ICVP).
5. These criteria should be in place till (a) at least 6 months have passed without any exportation, (b) documentation of high quality Polio eradication activity being undertaken in these countries [10].

Measures taken by India

In response to the possible import of WPV, the Ministry of Health & Family Welfare, Govt. of India has adopted WHO recommendations. It is mandatory that all travellers going out or coming from seven Polio endemic countries should receive one dose of OPV. They should receive one dose of OPV at least 4 weeks prior to departure to India, irrespective of age and immunization status. The International Certificate for Prophylaxis against Polio is a must before applying for entry VISA in to India. Govt. of India, has updated the list of Polioendemic countries. They are:

1. Polio endemic countries: Pakistan, Afghanistan, Nigeria.
2. Countries with Polio virus circulation after importation: Kenya, Syria, Somalia and Ethiopia [11].

Emergence of Vaccine-derived Polio Virus

The OPV is very safe and effective vaccine. This live attenuated vaccine on rare occasions can mutate into circulating vaccine-derived poliovirus (cVDPV). It can cause paralysis and death of the host and has the ability to spread to others causing epidemic. Low immunization rates, poor hygiene and high population density are the main reason for cVDPV [12,13]. Type 2 strain is responsible for 80% cVDPV cases. Total 9 cases have been detected in the African Region between Jan to July 2015.

Strategies to decrease development of cVDPV are:

1. Maintaining a high coverage of Polio vaccination

through Routine Immunization (RI) activities.

2. Short term: Switching from trivalent to bivalent OPV as Type 2 strain is responsible for majority cVDPV. Introducing IPV which will boost immunity and prevent development of cVDPV when OPV is simultaneously administered.
3. Long term: Cessation of OPV use and continued IPV use after WPV transmission has stopped [14].

Approach in Future

Both OPV and IPV are safe and efficacious and both have got distinct role to end polio from earth. OPV is essential for eradication measures and IPV is required to eliminate the risk of cVDPV. As part of the Polio Eradication Endgame, all countries will stop OPV use and transition to IPV. With support from the GPEI and Global Alliance for Vaccine and Immunization (Gavi), the remaining OPV using countries will introduce at least one dose of IPV into their routine immunization programs by the end of 2015 [14,15].

Sequential Schedule of vaccination will be followed in RI. Initially from only OPV to OPV and IPV combined schedules will be taken up. One to two doses of IPV followed by equal doses of OPV will be provided. Combined schedule reduces chances of cVDPV and provides high intestinal immunity. At the end the combined schedule will be replaced by only IPV. IPV will stop all cases of VDPV and VAPP. Thus further transmission will be stopped and the world will achieve the Polio eradication status. India will introduce IPV in RI in last quarter of 2015 and will switch from trivalent (tOPV) to bivalent (bOPV) by early 2016 [16].

Now at the crossroads of Polio eradication, we need to consolidate gains by maintaining 100% immunization with Polio vaccine preferably IPV. Adults also need a booster with IPV to ensure victory over Polio. Eradication of Polio will benefit the world by saving US $ 40-50 billion over next 20 years. The benefit is more in developing countries. It was estimated that 10 million people are now walking who would otherwise have affected by Polio in absence of vaccines.

Conclusion

Till date four WHO Regions have been certified as polio free where 90% of global population reside. The final leap to achieve polio eradication seems difficult and extended, but it needs focused effort from all stakeholders. Intensified SIAs are required to remove Wild Poliovirus from the remotest corners of the last endemic countries and it should be supported by robust surveillance throughout the world to detect traces of Polio infection [2]. Countries should follow the WHO guidelines regarding Polio vaccination during International travel to prevent re-establishment of infection in Polio Free states. OPV should be phased out and IPV should take precedence in countries already achieved Polio eradication status. World as a nation will win the battle against this crippling disability.

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Original Article

Maternal and Neonatal Tetanus Elimination: Another Feather in the Cap for India

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Abstract

Maternal and Neonatal Tetanus (MNT) has been a grave problem all over the world, including India, for centuries. To combat this problem Maternal and Neonatal Tetanus Elimination (MNTE) initiative was launched by UNICEF, WHO and UNFPA, in 1999. MNT is defined as less than one NT case per 1000 live births in every district. Maternal tetanus is assumed to be eliminated once NT elimination is achieved. To achieve the goal Government of India applied a mix of strategies which included universalising vaccination of pregnant women attending antenatal care with Tetanus Toxoid; promoting institutional delivery by providing cash incentives; capacity building by training more skilled birth attendants and strengthening the health care delivery systems; and intensive behaviour change communication to reduce harmful cord care practices.

The goal of MNTE was targeted to be achieved by 2009, which was further extended to 2015. The first MNTE validation was done by WHO in 2003/2004. The last validation survey was conducted in April 2015 which confirmed that maternal and neonatal tetanus is reduced to less than one case per 1000 live births in all 675 districts of the country. Finally on 15th May 2015, WHO declared India free of maternal and neonatal tetanus. However, intensive efforts should be implemented to maintain the status of elimination so that the significant public health milestone that India has achieved is sustained.

Keywords: Maternal; Neonatal; Tetanus; Elimination.

Introduction

Maternal and Neonatal Tetanus (MNT) has been a grave problem all over the world, including India, for centuries. This was due to unclean delivery practices by untrained persons and unhygienic umbilical cord care. Mortality rate of tetanus is very high and hence this was one of the most common causes of maternal and neonatal mortality.

In 1988, according to WHO estimates, about 787,000 newborns died of neonatal tetanus (NT), and the estimated annual global NT mortality rate was approximately 6.7 NT deaths per 1000 live births [1]. This was clearly a grave public health concern, which set a global alarm strong enough to call for curbing this problem.

Maternal and Neonatal Tetanus

Maternal tetanus is defined as tetanus during pregnancy, or within 6 weeks of the end of pregnancy, whether pregnancy ended with birth, miscarriage, or abortion. Neonatal tetanus is the occurrence of tetanus in the first 28 days of life [2].

The incubation period of tetanus is usually 3–21 days, and may range from 1 day to more than a month. The average incubation period for neonatal tetanus is shorter than that of non-neonatal tetanus. About 90% of neonates with tetanus develop symptoms in the first 3–14 days of life, mostly on days 6–8 [2].

Tetanus is characterised by muscle rigidity and painful muscle spasms due to action of tetanus toxin on excitatory motor neurons. Both maternal and neonatal tetanus progress to generalised tetanus and have similar courses. The rigidity usually begins in the masseter muscles. As disease severity increases, it extends throughout the body and muscle spasms begin. The onset period, or time from first symptom to first spasm, is usually 1–3 days, ranging from few hours to 5 days. Onset and disease progression are more rapid in neonatal tetanus than in non-neonatal tetanus, often taking hours instead of days [2].

Neonatal tetanus mortality was almost 100% in community-based surveys in the 1980s. Mortality is lower with proper hospital care. Low birth weight increases the risk of death. Overall case fatality rate for patients admitted in hospital with non-neonatal tetanus in developing countries is 8–50%. Mortality increases with age. Maternal tetanus has been associated with higher mortality and women with tetanus after abortion have especially high mortality. A history of previous tetanus immunisation, even if taken a long time back or if the course has not been completed, is associated with longer incubation periods, milder disease and decreased mortality than with no previous immunisation [2].

Maternal and Neonatal Tetanus Elimination

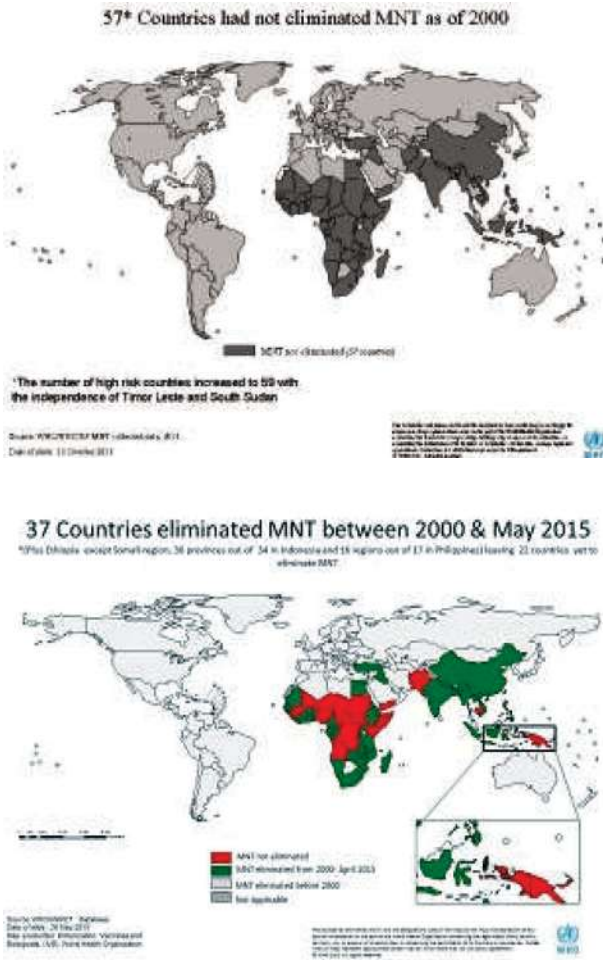
The definition of Maternal and Neonatal Tetanus Elimination (MNTE) as a public health problem is defined as less than one NT case per 1000 live births in every district. This definition also has been adopted as a proxy for the elimination of maternal tetanus and hence maternal tetanus is assumed to be eliminated once NT elimination is achieved [1,2].

The problem of MNT has been addressed by international agencies and strategies for its prevention, control and finally elimination, have been implemented worldwide. In the year 1974 WHO launched the Expanded Program on Immunization (EPI) addressing the common vaccine preventable diseases of children. A few years later tetanus toxoid vaccination of pregnant women to prevent neonatal tetanus was included in EPI. To combat the substantial burden of neonatal tetanus in developing countries, the 1989 World Health Assembly (WHA) adopted a resolution to eliminate neonatal tetanus by 1995, through enhancing availability of tetanus toxoid, promoting clean deliveries, and improving surveillance [2]. In 1990 World Summit for Children listed neonatal tetanus elimination as one of its goals, and the goal was again endorsed by the 44th World Health Assembly in 1991. However, implementation of the recommended MNTE elimination strategies was slow and hence the target date for MNT elimination was postponed to the year 2000. In 1999, Maternal and Neonatal Tetanus Elimination Initiative was launched by UNICEF, WHO and UNFPA, reinforcing the goal of MNT elimination as a public health problem. Following this the Initiative was re-constituted and elimination of maternal tetanus by 2005 was added to the goal. The target date was subsequently shifted to 2015 [1].

Progress towards global Maternal and Neonatal Tetanus Elimination

According to data collected by the UNICEF/ WHO/UNFPA, there were 57 countries that had not achieved MNTE in 1999. However, as Timore Leste and South Sudan gained independent status this number increased to 59 countries. India was included in this list. Significant progress was made since then and many countries achieved the status of elimination. As of May 2015, MNT remains a major public health problem in 22 countries. India has been declared free of neonatal tetanus and removed from the list [1].

Global status of MNTE in 1999 and 2015



Source: WHO, Immunization, Vaccines and Biologicals, Maternal and Neonatal tetanus (MNT) elimination; Progress towards global MNT elimination.

Maternal and Neonatal Tetanus Elimination in India

Vaccination in India started before independence with the small pox, the first vaccine being given in 1802. DPT, DT and TT vaccines became available in

India during the period 1920-1939. A national vaccination program was formally launched by the Government of India as the Extended Program on Immunization in 1978 with inclusion of BCG, OPV, DPT and Typhoid-Paratyphoid vaccines. Tetanus toxoid for pregnant women was added to EPI in 1983. Some major changes were made in the program and it was renamed as Universal Immunisation Program (UIP) in 1985, which subsequently became part of Child Survival and Safe Motherhood Program in 1992 and subsequently Reproductive and Child Health program in 1997. In 2005 UIP became a part of the overall umbrella health program, the National Rural Health Mission.3

In response to the global call for elimination of maternal and neonatal tetanus, India initiated and implemented measures for achieving the goal i.e. a rate of less than 1 case per 1000 live births in every district. Globally, year 2005 was set as target year for neonatal tetanus elimination. For India this goal was targeted to be achieved by 2009, which was further extended to 2015. The first MNTE validation was done by WHO in 2003/2004[3]. With all efforts the neonatal deaths came down from more than 80,000 in 1990 to less than 500 deaths per year in 2013 and 2014. According to WHO Nagaland in northeast India was the last state to achieve MNTE, after a validation survey conducted in April 2015. The validation confirmed that maternal and neonatal tetanus is reduced to less than one case per 1000 live births in all 675 districts of the country. Finally on 15th May 2015, WHO declared India free of maternal and neonatal tetanus [4,5].

Strategies for Maternal and Neonatal Tetanus Elimination in India

To achieve the goal, the Government of India applied a mix of strategies which included universalising vaccination of pregnant women attending antenatal care with Tetanus Toxoid; promoting institutional delivery by providing cash incentives; capacity building by training more skilled birth attendants and strengthening the health care delivery systems; and intensive behaviour change communication to reduce harmful cord care practices.

Classification of district/PHC by status of neonatal tetanus control: [6]

- High Risk
  - NNT Mortality Rate>1/1000 Live Births Or
  - TT2 Coverage < 70% Or
  - Attended Deliveries < 50%
- Control
  - NNTMortality Rate>1/1000 Live Births And
  - TT2 Coverage > 70% Or
  - Attended Deliveries > 50%
- Elimination
  - NNTMortality Rate<1/1000 Live Births And
  - TT2 Coverage > 90% Or
  - Attended Deliveries > 75%

Implementation of Strategies for Maternal and Neonatal Tetanus Elimination: [6]

- Coverage levels with two doses or a booster dose of TT in pregnant women was increased and sustained.
- Proportion of deliveries by trained personnel was increased and skilled birth attendants' training intensified.
- Disposable delivery kits were supplied to ensure clean practices for domiciliary deliveries.
- Essential newborn care, including cord care, was implemented to reduce risks of neonatal tetanus.
- Surveillance system was strengthened and follow-up action was promptly undertaken in areas from where cases were reported.
- Extensive Information Education Communication activities were carried out in the community to promote clean deliveries with special focus in areas from where cases were reported and in areas where the proportion of deliveries by untrained personnel was high.

Five Clean Practices followed during delivery

- ✓ Clean surface for delivery
- ✓ Clean hands of the attendant
- ✓ New blade for cutting the cord
- ✓ Clean cord tie
- ✓ No applicant on the cut stump of the cord

Programs and Schemes to Implement the Strategies

The National Rural health Mission was launched in 2005 as an umbrella program incorporating the major national programmes. In 2013 it was converted to the National Health Mission that incorporated both

rural and urban components within it. The NHM includes the Reproductive, Maternal, Newborn, Child Plus Adolescent Health Program, as well as several schemes that contribute towards MNTE [7].

- *Reproductive, Maternal, Newborn, Child Plus Adolescent Health Program (RMNCH+A)*

  It provides a package of services for maternal health that includes early registration of pregnancy, two doses of tetanus toxoid or one booster dose, institutional delivery and delivery by skilled birth attendants, and safe abortion services by increasing facilities for MTP. It also includes proper cord care and clean cord stump without any applicant, as part of the package of services for newborn care [8].

- *Janani Suraksha Yojana (JSY)*

  It is a safe motherhood intervention under NHM which provides cash assistance to pregnant women from Below Poverty Line (BPL) families for better diet. Cash assistance is linked to antenatal care during pregnancy, institutional care during delivery and immediate post-partum period in a health centre [7].

- *India Newborn Action Plan (INAP)*

  Its six pillars of interventions include some components that contribute to MNTE. These are antenatal care; care during labour and child birth; and immediate newborn care [8].

Conclusion

After achieving polio free status and being removed from WHO's list of polio endemic countries India has once again added a feather to its cap by achieving elimination levels of maternal and neonatal tetanus. This was possible through government's commitment towards the goal and extremely hard team work of all levels of health care providers. The community also has contributed to this achievement by accepting and utilising the services.

Tetanus has been targeted for elimination as it cannot be eradicated like small pox and polio. This is because the tetanus spores are present in the environment and may continue to transmit the infection. Hence intensive efforts should be implemented to maintain the status of elimination so that the significant public health milestone that India has achieved is sustained.

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Review Article

A Review on Kala Azar

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Introduction

Kala-azar first noticed by western Doctors in 1824 in Jessore, India (now Bangladesh) where it was initially thought to be a form of malaria. Kala-Azar is derived from 'KALA' which means black in Sanskrit and Urdu word AZAR means disease. The disease is named for the darkening of the skin on extremities and abdomen that is a symptom of the Indian form of the disease. The agent of the disease was also first isolated in India by Scottish doctor William Leishman who observed the parasite in spleen smears of soldier who died of the disease in Dumdum, Calcutta, India and hence the name Dumdum fever and Irish Physician Charles Donovan, they working independently and published simultaneously hence the species was named Leishmania Donovani.

Geographic Distribution

Leishmaniasis is endemic in large areas of the tropics, subtropical regions including Africa, Central and South Asia and the Mediterranean region. More than 90% of cases occur in five countries namely India, Bangladesh, Brazil, Nepal and Sudan. Among the South East Asian Region, 200 million people in Bangladesh, India and Nepal are at risk of Kala azar; largely in rural communities with an estimated 100,000 new cases each year. This is 20% of global incidence. The disease is endemic in 52 districts in India, 12 districts in Nepal and 45 districts in Bangladesh. The situation is worsening due to the occurrence of asymptomatic cases Post Kala-azar dermal leishmaniasis (PKDL), under nutrition, and Kala azar/HIV infection. This is the second largest parasitic killer in the World after malaria responsible for estimated 2-4 lakhs infections each year worldwide. The parasite migrates to the internal organs such as liver, spleen and bone marrow and if left untreated, always results in the death.

Epidemiology of Visceral Leishmaniasis (VL)

Agents

Leishmania donovani is the causative agent of Kala azar. Leishmania tropica is the causative agent of Cutaneous leishmaniasis (oriental sore) and L.braziliensis is the causative agent of mucocutaneous lesions. The life cycle is completed in two different hosts- humans and sand flies, in the former, it occurs in an amastigote form which is round, non-motile form called "leishmania bodies" and in the latter as a,spindle-shaped, flagellated motile form called promastigote. Dogs, jackals, foxes, rodents and other mammals are the animal reservoirs. In India kala Azar is considered to be non-zoonotic infection and man is the only reservoir.

Host Factors

There are an estimated 500,000 new cases of VL and more than 50,000 deaths from the disease each year. Migration, lack of control measures and HIV-VL co infection are the three main factors driving the increased incidence of VL.

Age: Children are mostly affected particularly infants below the age of one year and the peak age is 5-9 years.

Sex: Males are affected twice than females

Population: Migrants, labourers and tourists between endemic and non-endemic areas can result in the spread of infection.

Socio-economic status: It usually affects the poorest of the poor.

Occupation: The disease is strongly associated with occupation.Those who are working in farms, forestry, mining and fishing have a great risk of being bitten by sand-flies.

Immunity: HIV Positive, immunocompromised patients are at risk.During recovery phase of Kala-azar there is impairment of cell mediated immunity. Recovery from Kala-azar and oriental sores gives a lasting immunity. High prevalence during and after rains and generally confined to rural areas where breeding of sand flies exist compared to urban areas .It breeds in cracks and crevices in the soil and buildings, tree holes etc. Overcrowding, ill-ventilation and accumulation of organic matter in the environment facilitate transmission. Kala-azar is transmitted from person to person by the bite of sand fly. It may also take place by contamination of the bite wound or by contact when the insect is crushed during the act of feeding. After infective blood meal it becomes infective in 6-9 days(extrinsic incubation period). Transmission has also occur through blood transfusion, contaminated syringes and needles.

Clinical Presentation of VL

Incubation period is generally 2-6 months; range is 10 days to 2 years. Following this, VL patients present signs and symptom of persistent systemic infection including fever, fatigue, weakness, loss of appetite and weight loss and parasitic invasion of the blood and reticuloendothelial system such as enlarged liver, spleen and lymph nodes. Fever is usually associated with rigor and can be intermittent. Fatigue and weakness are worsened by anemia, which is caused by persistent inflammatory state, hypersplenism and sometimes by bleeding.There may be nausea,vomiting and sometimes diarrhoea. Darkening of skin of the face, hands, feet and abdomen is common in India (kala-azar usually mentioned as black sickness). PKDL appears several years after cure of Kala azar. The lesions consist of multiple nodular infiltrations of the skin usually without ulceration. As the disease advances splenomegaly can increase, causing abdominal distension, and pain which is sometimes increased by concomitant hepatomegaly. Signs and symptoms of bacterial co- infection such as pneumonia, diarrhoea or tuberculosis can confuse the clinical picture at the time of initial diagnosis. Symptoms often persist for several weeks to months before patients either seek medical care or die from bacterial co-infections, massive bleeding or severe anemia. Cutaneous leishmaniasis is characterised by painful ulcers in the parts of the body exposed to sand fly bites such as legs, arms or face. More cases are reported last year from Kerala.

Diagnosis

The gold standard for diagnosis is visualisation of the amastigotes in splenic aspirate or bone marrow aspirate. The presence of the parasite LD bodies in the aspirates of liver, spleen, bone marrow, lymph nodes or in the skin is the classical confirmatory test for Visceral Leishmaniasis or Cutaneous Leishmaniasis. Bone marrow biopsy is also recommended. Aldehyde test of Napier is a simple test widely used in India for the diagnosis of Kala-azar. The test usually becomes positive 2-3 months after onset of the disease and reverts to negative 6 months after cure. This test is good for surveillance but not for diagnosis. Serological testing is much more frequently used in areas where leishmaniasis is endemic. Of the numerous serological test available, Direct Agglutination Test (DAT), rk39 dip stick test, ELISA and the Indirect fluorescent antibody test are considered most suitable. The rkd 39 –rapid diagnostic test is based on the recombinant k39 protein. The test is simple to perform and yields result within five minutes. The test should not be used in Kala azar relapse, reinfection and HIV co infection cases. In highly endemic areas, not everyone who becomes infected will actually develop clinical disease. Indeed, up to 32% of the healthy population may test positive, but not require treatment. Likewise,Patients with abnormal immune systems (HIV infection) will have false-negative results. Blood and urine examination is also carried out. In blood ,there will be reduction in the number of WBC and Platelets (Pancytopenia) anemia, and reversed albumin-globulin ratio with grately increased IgG. There will be increased ESR values and urine of VL patient shows the presence of low- molecular- weight carbohydrate antigen which is promising for initial results.

Treatment Strategies

It relies on specific anti leishmanial drugs and management of any concomitant bacterial or parasitic infections, anemia, hypovolemia and malnutrition. The pentavalent antimonials like sodium stibogluconate and meglumine antimoniate were used for the treatment of VL for many years. Conventional Amphotericin B has replaced antimonial as the first line of treatment because it is having side effects like cardiac arrhythmias and pancreatitis.

Treatment Guidelines

First Line Drug

SSG (Sodium stibogluconate) 20 mg/kg body weight daily IM/IV for 20 days. Maximum 850 mg per day.

Miltefosine 100 mg daily in two divided doses for 4 weeks (2.5 mg/kg body wt/day in two divided doses) forage above 12 years and 50 mg for below 12 years.

Second Line Drug

Amphotericin-B 1 mg/kg body weight, intravenous infusion daily or alternate days for 15-20 infusions. SSG and Miltefosine failure, then Liposomal Amphotericine B is considered as the best existing drug against VL and is used as a first-line treatment in Europe and United states.

Kala azar Control Strategies

The current control strategies for VL rely on reservoir and vector control, the use of insecticide-impregnated materials and active case detection and treatment.

Reservoir Control

Since man is the only reservoir of kala azar in India, active and passive case detection and treatment of those found to be infected may be sufficient to abolish the human reservoir and control the disease. House to house surveys and mass surveys may be undertaken in endemic areas for early detection of cases.

Vector Control

Sand flies are the vectors which is responsible for the transmission of cases. It lays eggs on moisture sand. Hence, indoor residual spraying with DDT is considered to be more effective. Residual IRS of houses and animal shelters and all other resting places up to a height of 6feet (2metres) from floor level was shown to be efficacious in India where the vector is restricted to areas in and around the home. DDT (two rounds per year) at the rate of 1-2 per sq metre is considered sufficient to control transmission. Spraying should be preceeded by an assessment of susceptibility. Any sign of resistance in vector should lead to an immediate change in insecticide. BHC should be kept as a second line of defence. Spraying should be repeated at regular intervals to keep down the density of sand flies. For long lasting results, insecticidal spraying should be combined with sanitation measures, viz., elimination of breeding places(eg.Cracks in mud stone walls, rodent burrows, removal of firewood, bricks or rubbish around the houses), location of cattle sheds and poultry at a fair distance from human dwellings and improvement of housing and general sanitation. Insecticide-impregnated bed nets could concomitantly prevent VL and other vector borne diseases such as malaria and Japanese encephalitis.Early diagnosis and treatment This is essential for both individual andfor the community. Adult patients with severe anemia, malnutrition and long duration of illness are at an increased risk for death. Untreated patients act as a reservoir for parasites and contribute to disease transmission in anthraoponotic VL areas. So it is considered an essential component of VL control.

Prevention

There are no vaccines or preventive drugs for VL. The most effective method is to protect from sand flies to decrease the risk of being bitten. These precautionary measures are suggested. Outdoors: Avoid outdoor activities especially from dusk to dawn, when sand flies generally are the most active. Minimize the amount of exposed skin by wearing long-sleeved shirts, long pants and socks. Apply insect repellents especially those containing chemical DEET(N, N-diethylmetatolumide) Indoors: Sand flies are much smaller than mosquitoes and therefore can get through smaller holes. So staying in well-screened areas and insecticide spraying in living areas are preferred. Insecticide repellants in the form of lotions, creams for temporary protection and keeping the environment clean.

Kala azar Elimination Program

A centrally sponsored programme was launched in 1990-91. This has brought down the incidence and death rate of the disease by 75% by the year 2002. In 2002 National health policy was revised and this envisages Kala azar elimination by the year 2010. For attaining this goal programs were carried out for improving the health status of vulnerable groups and risk population living in kala azar endemic areas of India. It also aims to reduce the annual incidence of kala-azar to less than one per 10,000 population at the sub district level preferably by 2010, towards elimination of Kala-azar in South and East Asia Region by 2015.

The strategies for kala-azar elimination includes enhanced case detection and complete treatment using PK39 rapid diagnostic kits and oral Miltefosine for treatment, interruption of transmission through vector control, Capacity building, monitoring, supervision and evaluation of ongoing programs, communication for behavioural impact and IEC activities. Moreover formulate research guidelines on prevention and control of kala-azar.

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Short Communication

Nutritional Issues in HIV/AIDS: An Overview of Reviews to Inform Evidence

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Abstract

This short communication was addressed to explore the nutritional issues in people living with HIV/AIDS through a descriptive overview of published reviews. Human immunodeficiency virus (HIV) infection and its ensuing Acquired immunodeficiency syndrome (AIDS) poses a significant bio-psychosocial impact on the person, society and nation which directly or indirectly influences food intake and procurement leading to malnutrition and nutritional deficiencies, or HIV enteropathy. Appropriate understanding of the nutritional issues in HIV/AIDS would enable healthcare providers to equip themselves with adequate knowledge and skills to explore dietary patterns of people living with HIV/AIDS in order to effectively improve their quality of life.

Keywords: Nutritional Immunology; Dietary Immunology; Clinical Nutrition; HIV/AIDS.

This short communication was addressed to explore the nutritional issues in people living with HIV/AIDS through a descriptive overview of published reviews.

Anabwani and Navario [1] illustrated the important additive role of nutritional and micronutrient deficiencies in immune degradation and impaired development in children of Botswana, South Africa, and Uganda. The authors recommended a careful implementation of antiretroviral drugs, complemented by simultaneous efforts to ensure proper nutrition among HIV-infected children.

Bacon [2] emphasized that nutritional therapy preserves body weight, particularly lean body mass and this is important since people with HIV disease are prone to weight loss with an understanding that nutrition and diet also play an important role in regulating the immune system.

Butensky [3] opined that nutrition was not only an important component of health but also the levels of specific nutrients could affect disease expression in HIV. The author in this review thus suggestedthe important role for micronutrients in the treatment of HIV disease which could affect the overall outcomes and quality of life of these patients.

Colecraft [4] said, "HIV/AIDS was associated with biological and social factors that affect the individual's ability to consume and utilize food and to acquire food, and these biological and social factors lead to poor nutritional status and weight loss, which are an important cause of morbidity in individuals infected with HIV, resulting in a poor quality of life; with weight loss being an important predictor of death from AIDS".

Hendricks et al [5] discussed the implications for food-based dietary guidelines (FBDGs) for HIV-exposed and -infected children and also investigatedthe nutritional consequences of HIV infection and nutritional requirements along with programs and guidelines to address undernutrition and micronutrient deficiency in these children. The authors found that more than 50% children were underweight and stunted, while more than 60% had multiple micronutrient deficiencies.

Keithley et al [6] outlined the benefits of nutritional interventions in HIV as follows; "Effective management of HIV-infected patients with nutritional alterations would result in fewer secondary infections and hospital admissions, better clinical outcomes, and lower healthcare costs."

Lindegren et al [7] listed that the integration of HIV/AIDS and maternal, neonatal, child health and

nutrition services (MNCHN), including family planning (FP) was a key strategy to reduce maternal and child mortality and control the HIV/AIDS epidemic. The authors evaluated the impact of integrating MNCHN-FP and HIV/AIDS services on health, behavioral, and economic outcomes through a systematic search of Cochrane Central Register of Controlled Trials (CENTRAL), Cumulative Index to Nursing and Allied Health Literature (CINAHL), EMBASE, MEDLINE (via PubMed), and Web of Science / Web of Social Science. The authors included twenty peer-reviewed articles representing 19 interventions and found that "most studies integrated FP with HIV testing or HIV care and treatment. Overall, HIV and MNCHN-FP service integration was found to be feasible across a variety of integration models, settings and target populations. Nearly all studies reported positive post-integration effects on key outcomes including contraceptive use, antiretroviral therapy initiation in pregnancy, HIV testing, and quality of services."

Mittal [8] explained that a HIV infected child has increased caloric needs, with multiple factors interfering with adequate nutritional intake. There is a need for nutritional support to maintain optimum nourishment during the symptomatic period, in order to prevent further deterioration of the nutritional status during acute episodes of infection, and to improve the nutritional status during the stable symptom free period.

Smitand Tang [9] emphasized assessment of nutritional status including any combination of biochemical and body composition measurements, dietary intake assessment, and metabolic tests in order to identify metabolic, endocrine, and gastrointestinal (MEG) disorders in IV drug abusers. The authors reviewed conference abstracts and found, "The most commonly reported methods for dietary intake included 24-hour recalls, food records, and food frequencies. The commonest methods used for measuring body composition included height, weight, bio-impedance, and dual-energy X-ray absorptiometry (DEXA). Biochemical measurements included various blood nutrients, lipids, and albumin."

Suttajit [10] opined, "The nutritional problems in HIV/AIDS contribute to health and death in HIV+/AIDS patients by inducing weight loss, lean tissue depletion, lipoatrophy, loss of appetite, diarrhea, and the hypermetabolic state thereby increasing risk of death. "Studies consistently showed that serum antioxidant vitamins and minerals decrease while oxidative stress increases during AIDS progression. Probiotics or lactic acid bacteria and prebiotics are sometimes given on the presumed basis that they help maintain integrity of mucosal surfaces, improve antibody responses and increase white blood cell production."

Velasco-Benítez [11] classified the HIV infection based upon several digestive, hepatic, and nutritional manifestations in children, according to the Centers for Disease Control and Prevention. Early recognition of HIV enteropathy and appropriate management should be incorporated into nutritional care practices of infected HIV children.

Walseket al [12] summarized,"etiologies of HIV-associated nutritional deficiencies, reviewed important components of nutrition assessment (including nutrition-related side effects of approved medications commonly used in HIV disease), provided an overview of common nutritional problems and interventions, and listed some available nutritional resources".

Human immunodeficiency virus (HIV) infection and its ensuing Acquired immunodeficiency syndrome (AIDS) poses a significant biopsychosocial impact on the person, society and nation which directly or indirectly influences food intake and procurement leading to malnutrition and nutritional deficiencies, or HIV enteropathy. Appropriate understanding of the nutritional issues in HIV/AIDS would enable healthcare providers to equip themselves with adequate knowledge and skills to explore dietary patterns of people living with HIV/AIDS in order to effectively improve their quality of life.

Although palliative care is the mainstay therapeutic approach for terminally ill patients with HIV/AIDS, researchers and clincians need to be aware of the questionable under-reporting in palliative care journals [13] in order to improve the quality and quantity of science on HIV/AIDS and diet/nutrition.

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Revised Rates for 2016 (Institutional)

Title	Frequency	Rate (Rs): India	Rate ($):ROW
Dermatology International	2	5000	500
Gastroenterology International	2	5500	550
Indian Journal of Agriculture Business	2	5000	500
Indian Journal of Anatomy	3	8000	800
Indian Journal of Ancient Medicine and Yoga	4	7500	750
Indian Journal of Anesthesia and Analgesia	2	7000	700
Indian Journal of Anthropology	2	12000	1200
Indian Journal of Biology	2	4000	400
Indian Journal of Cancer Education and Research	2	8500	850
Indian Journal of Communicable Diseases	2	8000	800
Indian Journal of Dental Education	4	4500	450
Indian Journal of Forensic Medicine and Pathology	4	15500	1550
Indian Journal of Forensic Odontology	2	4500	450
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Original Article

Pain in People with HIV/AIDS: An Update

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Abstract

This review article addressed the emphasis on pain in people living with HIV/AIDS (PLWHA) through a literature overview. There was a high prevalence of pain in PLWHA, associated with psychiatric comorbidities and post-traumatic stress disorder, thus adversely impacting quality of life. Treatments including anti-retroviral therapy, analgesic therapy when provided along a multidimensional approach, together with alternative therapies would combat pain in PLWHA. The evidence presented in this study included assessment studies that reported about pain in PLWHA and treatments for pain in PLWHA. Despite the under-reporting of HIV/AIDS in palliative care literature, researchers and clinicians need to realize the under-estimation and under-treatment of pain in PLWHA along a multidisciplinary biopsychosocial model to improve their health-related quality of life.

Keywords: Palliative Immunology; Immuno-anesthesiology; Immuno-analgesia; HIV/AIDS.

This review article addressed the emphasis on pain in people living with HIV/AIDS (PLWHA) through a literature overview.

Prevalence

Nair et al [1] assessed the prevalence of pain in 140 HIV/AIDS patients and the type, site, severity, management of pain and impact of pain on quality of life in an ART centre. The following findings were reported; "About 66.7% in-patients and 24.5% out-patients complained of pain. Of the 52 patients who reported pain, 32% reported neuropathic pain and 68% reported noci-ceptive pain. Headache was most common followed by pain in the soles of feet and low back. Only 26.9% received any form of analgesic. Pain severity significantly affected the quality of life.

Prevalence, Intensity, Associated factors, and Effect

Namisangoet al [2] determined the prevalence, intensity, associated factors, and effect of pain among 302 adult ambulatory HIV/AIDS patients. The following results were reported; "Forty-seven percent reported pain in the 7 days prior to the survey and pain was a symptom at the time of diagnosis for 68%. 53% reported mild pain, 20% reported moderate pain while 27% reported severe pain. Gender was not associated with pain intensity, but reduced functional performance, increasing number of symptoms, advanced HIV disease, physical symptom distress (MSAS-SF), and number of health comorbidities were significantly associated with pain intensity. Increasing pain intensity was associated with greater functional ability impairment (BPI functional interference index) and poorer QOL. Pain is a common symptom among ambulatory HIV/AIDS patients and has a debilitating effect on QOL".

Validity of Measures

Pappas et al [3] investigated the construct validity of measures of reported pain, pain control, symptoms and symptom control and had following findings; "The HIV persons who reported chronic illness were much more likely to report pain and symptoms compared to those not chronically ill. When controlling for the degrees of pain, pain control did not differ between the chronically ill and non-chronically ill.

Pain as a Symptom

Wahab and Salami [4] studied the frequency of pain as a symptom and determined the body regions often affected among a cohort of patients attending the antiretroviral (ARV) clinic in 79 respondents. The study had the following findings: "Pain was present in 22 (27.8%) of the respondents. The major regions affected by pain were lower limbs (40.9%), head and neck (31.8%), and abdomen (31.8%). Only 40% of those with moderate to severe pain intensity reported being on any form of analgesia".

Pain Experience

Laschinger and Fothergill-Bourbonnais [5] used a phenomenological design to explore the experience of pain caused by HIV from 21 men and 1 women through open-ended interviews. "The phenomenon of pain was understood under four themes: physical pain, painful losses, the pain of not knowing, and social pain."

Pain in Women

Gray and Berger [6] explained that women experienced pain differently from men due to biological, psychological, and social factors. Knowledge of HIV-related pain into either nociceptive or neuropathic; prescribing concomittant medication or antidepressants, the weak public health infrastructure with its limited human resources and inadequate drug supplies are the issues that make high-quality palliative and end-of-life care virtually impossible.

Psychiatric Aspects

Douaihyet al [7] discussed the psychiatric components and their impact on pain in the HIV population. Psychological assessment issues, psychosocial barriers to treatment, and psycho-therapeutic approaches need to be understood so that an integrated, flexible, and interdisciplinary team approach model could be implemented for treating HIV/AIDS-related pain.

Douaihy et al [8] discussed mood, anxiety, and substance abuse assessments; barriers to care; and psychiatric treatments in the context of HIV-AIDS-related pain and provided recommendations for an interdisciplinary comprehensive approach to managing pain in HIV disease.

Post-traumatic Stress Disorder (PTSD)

Smith et al [9] assessed the relationship of PTSD to pain intensity and pain-related interference in 145 HIV-infected persons suffering from persistent pain. "On average, participants reported being exposed to 6.3 different types of trauma over the course of their lifetime, of which receiving an HIV diagnosis was rated as being among the most stressful. Over half (53.8%) had features of PTSD and those with PTSD reported higher pain intensity and greater pain-related interference in performance of daily activities (i.e., working, sleeping, walking ability and general activity), and affect (i.e., mood, relations with other people, enjoyment of life) over time than those who did not.

Impact of Pain

Sibanda [10] examined studies on socioeconomic, cultural, political, and psychological factors determining high-risk sexual behaviors leading to heterosexual HIV infection in the African context. The author contended that "the focus of HIV/AIDS prevention programs should be on a myriad of socioeconomic, cultural, political, and behavioral factors instead of just on women and prostitutes—groups that have the least negotiating power within the context of sex and reproduction in a patriarchal society such as Zimbabwe."

Biopsychosocial Model

Marcus et al [11] reviewed the literature on pain in HIV/AIDS, including prevalence, patho-physiology, substance abuse, treatment issues, and psychosocial contributions and explained, "In light of the high prevalence of pain among individuals with HIV/AIDS, attention is paid to the negative psychosocial impacts of pain in this population and to psychosocial barriers to optimal HIV/AIDS-related pain treatment". The author conceptualized HIV/AIDS pain as chronic pain and subsequently, a biopsychosocial model of chronic pain assessment and treatment is applicable along a multidimensional framework.

Pain Management

O'Hara and Czarniecki [12] emphasized the need for improved understanding on pain in HIV-infected children and the need to overcome disease-related, pain-related and treatment-related myths so that effective analgeisc prescription for children according to the World Health Organization guidelines on the use of analgesics according to a pain ladder.

Pharmacologic Management

Breitbartand McDonald [13] expressed concern over the underuse of opioid analgesics. The authors

suggested comprehensive measure of pain symptoms followed by a multifaceted program utilizing a combination of pharmacologic, psychotherapeutic, cognitive-behavioral, anesthetic, neurosurgical, and rehabilitative(physical interventions, such as bed rest, massage, ultrasound, and transcutaneous electrical nerve stimulation) approaches.

Drug Therapy

Harding et al [14] identified drug availability and prescribing practices in 12 sub-Saharan African countries and examined the barriers and potential facilitators for use of opioids and other drugs in their cross-sectional survey of facilities within ministries of health in 12 African countries. The study had following findings; "Of 62 responding facilities, problems were reported in accessing named nonopioids, with a small number of facilities unable to dispense them. Less than half the facilities were currently prescribing opioids of any strength. Further problems were identified in terms of the availability and supply continuity of named antiemetics and anxiolytics. The data identified a number of systemic problems, suggesting that opioid supply issues are similar to less controlled drugs, such as antiemetics. Among competent authorities, there was no agreement on whether further popioid expansion was possible. Integration of data from care facilities and competent authorities highlighted a disparity in the understanding of the availability of specific drugs, with competent authorities naming drugs that were not listed by any responding facility in their respective country".

Palliative Care

Coughlan [15] listed the barriers facing PLWHA for obtaining adequate pain relief and palliative care that include few care and support services, lack of recognition and acknowledgement of pain in HIV/AIDS by health care professionals, widespread stigma and discrimination especially towards vulnerable groups such as injecting drug users, government regulatory mechanisms which make access to opioids even more difficult for the care services which have developed and a lack of understanding of or advocacy for pain relief and palliative care in the literature on HIV/AIDS care and support.

Newshan and Sherman [16] explained the assessment and management of pain, fatigue and weakness, dyspnea and cough, anorexia and weight-loss, nausea and vomiting, sleep disorders, dry mouth, diarrhea, itching, and fever and night sweats.

Hypnosis

Langenfeldet al [17] studied the effects of hypnosis-based pain management approach on AIDS-related pain symptoms in 5 adult patients using a A-B time-series analysis design. The study found that all 5 patients showed significant improvement on at least 1 of the 3 dependent variables as a result of the hypnotic intervention. Four of the 5 patients also reported less pain medication use during the treatment phase.

Competing Therapeutic Goals

Taylor [18] explained the utility of Un'anga (the traditional system of health and healing), as an alternative model for the diagnosis and management of illness. The author opined,"Through the use of highly charged symbols and ritualized communication, n'angas (traditional healers) seek to transform patients' understandings and experiences of HIV-related illness".

There was a high prevalence of pain in PLWHA, associated with psychiatric comorbidities and post-traumatic stress disorder, thus adversely impacting quality of life. Treatments including anti-retroviral therapy, analgesic therapy when provided along a multidimensional approach, together with alternative therapies would combat pain in PLWHA.

The evidence presented in this study included assessment studies that reported about pain in PLWHA and treatments for pain in PLWHA. Despite the under-reporting of HIV/AIDS in palliative care literature, researchers and clnicians need to realize the under-estimation and under-treatment of pain in PLWHA along a multidisciplinary biopsychosocial model to imprpve their health-related quality of life.

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