Association with Incidence of Tuberculosis in Visakhapatnam District at 2012

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Abstract: *Tuberculosis (TB) is a leading cause of morbidity and mortality in developing countries. The incidence of disease has increased in developed countries and according to world health organization's every day in India more than 20000 people develop the disease and more than 1000 die from TB. As per 2011 census of India Andhra Pradesh is the third largest state. Our data based on 5896 subjects. Among which 47.40% are new sputum positive cases and males were more affected than female. The age groups from 35-44 and 45-54 are more prone TB bacteria. Young children below 14 years are less susceptible. We did not find any TB patients with HIV infection. In the winter Tuberculosis (TB) represents itself as a major health problem globally, data is gathered quarterly because of different incidence in cold seasons. The chi-square test explains no significance difference between age and sex. The Odds Ratio indicates males are 1.47 times more likely to develop tuberculosis than females. In other words, the risk of developing tuberculosis is 0.47 higher for males than females.*

Keywords: Tuberculosis Incidence, Odds Ratio, Chi-Square test, Visakhapatnam

1. Introduction

Tuberculosis (TB) is an airborne infectious disease and, with HIV/AIDS, the most important cause of adult mortality in the world (WHO). Because TB is airborne, control can have individual, local, regional and global impact. TB is a disease of poor as it is widely found in developing countries like India. The world health Organization (WHO) has declared tuberculosis is a global Emergency [1,2]. According to WHO statistics One out of three people in the world is infected with TB, with an estimated nine million new cases and two million deaths occurring yearly due to the disease. It is a leading cause of death among people who are HIV-positive. It affects the mostly economically productive age group comprising adults aged 15 to 54 years, with males being disproportionately affected. The male/female ratio of newly detected cases is 2:1.TB epidemic in Visakhapatnam could gradually worsen by variations in the quality and coverage of various TB control interventions, population demographics, urbanization, changes in socio-economic standards, HIV and, more recently, emerging drug resistance. TB is a serious public health problem in India. The prevalence of TB was estimated of the 8.6 million cases, 2.2 million cases occurred in India making India the world's highest tuberculosis burden country in 2012, within incidence rate of 62 new smear-positive cases per 100,000.there is regional differences in incidence of TB in Visakhapatnam. [3,4,5]

2. Study Area

Visakhapatnam district is a district in the Indian state of Andhra Pradesh. It is one of the nine coastal districts in the state. Andhra Pradesh is the third largest state in the country in terms of area and has a long coastal line bordering Orissa. In the recent National census in 2011 it had 23 districts with a population of 846. 66 million and population density of 308 per sq.km. The total population of Visakhapatnam Dist is 42,88,113 distributed in 11.2 thousand sq km area. Density of the population in Visakhapatnam District is 384. Visakhapatnam Growth (2001-2011) rate is 15.36%. Rural population is more (52. 48 Lakhs) when compared to urban population (47. 51 Lakhs) (Table-1). Among this population male literates are 75.47% and female literates are 60.0% there are 7 major towns in the Visakhapatnam districts. In all 7 towns 60.29 population lives in slum area. In Andhra Pradesh Visakhapatnam district is the first state with 57,007 number of scheduled Tribes among them 66.49 Hefts are Agricultural labors.

Table 1: Distribution of population by age groups in Visakhapatnam district (According to 2011 census)

	Rural Population		Urban Population	
	Male	Female	Male	Female
All ages	11,49,912	11,51,525	7,80,285	7,50,614
0-14	1,05,083	1,03,839	59,236	56,275 1
5-14	2,79,469	2,62,603	1,58,030	1,50,509
15-59	6,93,726	7,00,208	5,20,821	4,96,884
>60	71,634	84,875	42,198	46,946

3. Data Collection

These data were available as computer files with individual records for disease cases. Fields were comprised of characteristics regarding subject and disease, and included dates of sickness, diagnosis, the subject's age, gender, and address, severity of illness and date of death for mortality cases. The resident population denominators used to compute incidence rates were obtained from the Population and Housing Census of 1000 taken by the TB control office, Visakhapatnam. To simplify the effect of the location of residence when calculating incidence rates, smaller contiguous districts in each province were grouped together to form 11 super-regions.

4. Results and Discussion

The data was taken from Jan to Dec which was divided into 4 quarters. For four quarters a total number of 5896 cases were collected. Among them 2795(47.4%) cases were new sputum positives and 1022 cases were reported as extra pulmonary.

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Table 2: Prevalence and incidence of TB in Visakhapatnam district during 2012

Period	Total No. of cases observed	Total No. of new smear positive cases	Total No. of New smear Negative cases	No. of new extra pulmonary cases	*Others*
1st Quarter	1368	654(47.8%)	300(21.9%)	219(16.0%)	**0 (0%)**
2nd Quarter	1483	697(46.9%)	342(23.06%)	283(19.08%)	**1(0.06%)**
3rd Quarter	1509	727(48.17%)	346(22.9%)	257(17.03%)	**1(0.06)**
4th Quarter	1536	717(46.67%)	351(22.85%)	263(17.12%)	**2 (0.13)**
Total	5896	2795	1339	1022	**4**

In the 4th quarter more number of cases was reported. This is may be due to immediate occurrence of winter period. In the winter Tuberculosis (TB) represents itself as a major health problem globally [6]. The incidence of disease has increased in developed countries and according to world health organization's every day in India more than 20000 people develop the disease and more than 1000 die from TB[7,8,9,10].

In all the quarters male were more affected than female (Table-3). This is because of their smoking habits and they are habituated to split on roads. Generally the mode of transmission is through inhalation of droplets from infected persons. (Rarely 0.07% (4 cases were TB infection in other parts) among the total number of new smear positive cases (2795). 72.7% (2032) were male and female were only 27.3% (763).

Table 3: Influence of sex on TB during 2012 in the Four Quarters

Quarter	Total No. of New smear positive cases	Male	Female
1	654	468(71.55%)	186(28.44%)
2	697	490(70.30%)	207(29.69%)
3	727	544(74.82%)	183(25.17%)
4	717	530(73.91%)	187(26.08%)
Total	2795	2032	763

Influence of age is also significant. More number of new sputum positive cases was recorded in the age group of 35-44 years & 45-54 years with 20.6% and 21.61% respectively. In the age group of above 65 new sputum positive cases were only 5.36 %. In case of younger children below the 14 years. New sputum positive cases were almost rare i.e. only 1.1%. In an overall observations no of cases were increased with the advancement of age and it was with the increased age group (Table-4)

Table 4: Influence of Age on TB during 2012

Period	Age 0-14	Age 15-24	Age 25-34	Age 35-44	Age 45-54	Age 55-64	Age >65y	TOTAL
I	08	126	122	140	126	94	38	
II	10	141	120	131	159	96	40	
III	07	107	149	164	162	104	34	
IV	06	128	143	141	157	104	38	
TOTAL	31 (1.10%)	502 (17.96%)	534 (19.1%)	576 (20.6%)	604 (21.61%)	398 (14.23%)	150 (5.36%)	2795

We also examined the sex wise distribution of New smear positive pulmonary TB cases in various age groups(Table-5).Males were more prone to TB at the age group of 35-44 and 45-54 with 22.6% and 23.8% respectively. In females 15-24 age group is exhibited more number of new sputum positive. Tb cases with 31.84%. In male 0-14 age groups shows very low nocases where as in female it was slightly higher (3.01%)[11]

In 15-24 age group number cases were increased rapidly (31.84) when compared to males (12.74). it was almost double. This because of the malnutrition. Un hygienic environment neglect of girl child etc., plays crucial role. The numbers of TB cases were low in female with age group of above 65 years (3.01) when compared to males. In males the occurrence of TB was almost greater (6.25%) than Females (3.01%). In the remaining age groups i.e. 0-14, 15-24 the number of TB cases were double in Female when compared to males.

Table 5: Age wise distribution of TB in different sexes

Gender	Age 0-14	Age 15-24	Age 25-34	Age 35-44	Age 45-54	Age 55-64	Age >65y	Total
M	8(0.39)	259(12.74)	372(18.30)	459(22.58)	483(23.76)	324(15.94)	127(6.25)	2032
F	23(3.01)	243(31.84)	162(21.23)	117(15.33)	121(15.85)	74(9.69)	23(3.01)	763

Influence of HIV on TB HIV is major contributing factor to the increased case defection rate of TBO. It is estimated that approximately 4, 24,000 cases of multidrug resistant tuberculosis (MDR- TB) occurred in 2004[12,13,14]. Accordingly the new stop TB strategy and the global plan to stop TB 2006-2015 include MDR Tb management as a basic component of TB control so we also conducted studies on retreatment cases. Among the total number of 71 retreatment cases the percentage of TAD cases were more 9.65%. (Table- 6) 51.76% cases were relapses, Failure cases were very low i.e. 5.57% only. The number of other cases was 33.02%.

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Table 6: Occurrence of Retreatment cases in different time periods

Period	Relapse	Failure	TAD	others
1	115	04	22	54
2	74	10	14	62
3	90	13	14	61
4	102	14	21	66
Total	381(51.76%)	41(5.57%)	71(9.65%)	243(33.02%)

HIV is major contributing factor to the increase case detection rate of TB observed over the past few years of the prevalence of HIV countries to increase the incidence of tuberculosis[15,16,17,18] it will continue to rise as well . Approximately 10million people are estimated to be co-infected with M.tuberculosis [19] and HIV . Hence, we have also conducted survey on TB patients with HIV to our knowledge we did not find any case of the registered TB cases , no cases were found with HIV positive before or ending the treatment.

5. Statistical Methods

In our study we calculated chi-square test. It gives there is no association between males and females. And also explained no significance difference between age and sex.

Odds Ratio

Odds Ratio (OR) is one measure used in epidemiological studies to investigate the association between the exposure and the corresponding disease. OR is the ratio of the odds of disease among exposed people to the odds of disease among unexposed. Odds represent the ratio of the probability of an event to its complement. In the numerical instance, the exposure (i.e. Sex status) is treated as a risk factor since OR is larger than 1, which indicates a positive association between the exposure and the disease (i.e. the Risk effect). If we have OR smaller then 1, then the exposure is said to have a protective effect on the disease and that exposure is treated as a protective factor. Obviously, OR equivalent to 1 indicates no association [20]. In our study we calculated odds ratio is 1.4689. The result indicates males are 1.47 times more likely to develop tuberculosis than females. In other words, the risk of developing tuberculosis is 0.47 higher for males than females.

Population stress, socioeconomic condition and cultural changes ultimately bring about changes in the human environment. Making it a paradise for infection agents. Such stress on environment contaminates air, water, soil and food this affecting a health. Climatic, socioeconomic, educational and environmental sanitary condition may influence the prevalence and severity of Mycobacterium infections. Information regarding prevalence of TB infection in south India (Visakhapatnam, North Andhra Pradesh) is lacking. Hence a new vista has been opened to assess the occurrence and clinical significance of Tuberculosis.

6. Conclusion

TB is a chronic infective disease which is one of the most important health problems all over the world. The incidence of disease has increased in developed countries and according to world health organization's every day in India more than 20000 people develop the disease and more than 1000 die from TB. TB is a serious public health problem in India. This paper presented an incidence of tuberculosis in Visakhapatnam district by age and sex wise. This review of tuberculosis incidence gives the how many members are affected by TB. Odds Ratio (OR) is one measure used in epidemiological studies to investigate the association between the exposure and the corresponding disease. The result indicates males are 1.47 times more likely to develop tuberculosis than female.

7. Acknowledgement

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