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Original Research Article

Changing Trend in the Prevalence of Tuberculosis among the Population of Visakhapatnam District, Andhra Pradesh

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Abstract
Background and Introduction: *Tuberculosis burden continuous to be high even today despite the wide spread network of control measures started since 1962 with NTC. WHO sets the target of reducing the prevalence rate to ten per one lakh population. For the past few decades, MDR-TB has been a serious concern.*
Aims and Objectives: *In the present study, the aim is to study the prevalence rate among the population of Visakhapatnam District in Andhra Pradesh to compare it with the global trend and aim to reach the goal of END TB by 2025 of India's goal.*
Material and Methods: *The data for the present study is obtained with permission from the District Tuberculous Control Officer, Pedawaltair, Visakhapatnam, Andhra Pradesh. Total of 67,017 pooled case data, both old and new, from 2007 to Aug 2018 is gathered for the study to calculate prevalence rate among the population. The data is analysed on excel sheet and IBM SPSS software statistics is applied where-ever necessary. The prevalence rate is calculated using the **Bio-Statistics** formula by adding old cases to new cases divided by population at risk multiplied by one lakh.*
Results and Discussion: *The calculated prevalence rate of TB among the population of 42 – 47 lakh of Visakhapatnam District is variable with fluctuations giving the SEA-SAW shape in the graph and maintains a plateau when compared to the global trend of gradual fall by 20% reduction. Yet the prevalence rate of Visakhapatnam study by the present author and its team is lesser than that of global.*
Conclusions: *With the fast and extensive ramification of Gene-Xpert machines to diagnose TB and resistance, more number of cases can be diagnosed and plan the control measures to check TB by involving all possible organisations like the NGOs, TBAs, local leaders, traditional healers in remote areas, extensive utilisation of social media and by providing balanced nutrition with the help of the Anganwadi staff.*
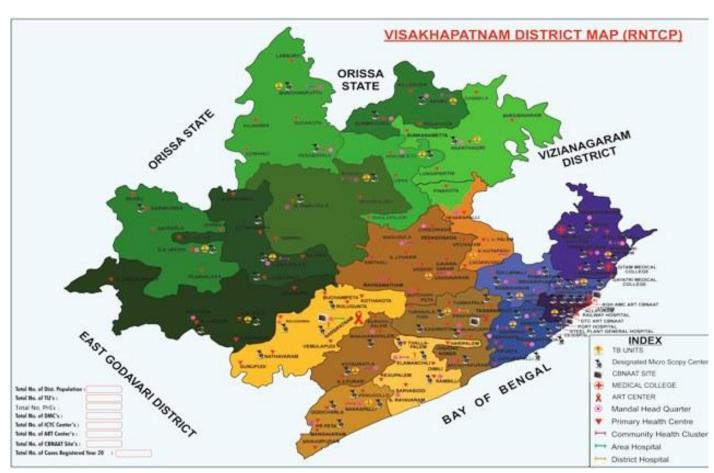**Keywords:** *GLOBAL, POPULATION, PREVALENCE, TB, WHO.*

Introduction

Tuberculosis is an infectious notifiable disease. One fourth of world's population is infected with TB. Quarter of TB & MDR-TB of the world is from India. As on Dec [12]2017, 4,35,000 people died of TB. Cure rate of MDR-TB is only 33%. As per 2016 report, of the global 10.4 million new cases of active TB, 4,90,000 are MDR-TB and 47% of it is from India, China, Russian federation.[1,7] WHO statistics for 2016 report - 2.79 million cases of TB, incidence of India is 211 per one lakh. National Tuberculosis Programme (NTP) was started in 1962. In 1997, RNTCP came into force with DOTS. In 2006 WHO came with "Stop TB Strategy" and in 2016 "End TB".[2,6] India accounts for 27% of the world's 10.4 million new TB cases, and 29% of the 1.8 million new TB deaths globally. India also accounts for 16 % of the estimated 4,80,000 new cases of multidrug-resistant TB. The [8]End TB strategy by WHO as per table 2 aims to end the global TB epidemic, with targets to reduce TB deaths by 95% and to cut new cases by 90% by 2035.

The above map of Visakhapatnam district shows the 20 + TU centers. The large Green (Light & Dark) shaded area indicates the tribal belt which contains 8 TU equal to rural 8 – caters to 14.42% of the total population, largest in the state of AP.

The Present Study deals with estimating the change in the trend of prevalence of tuberculosis among population in Visakhapatnam district of Andhra Pradesh. The data of TB case finding is obtained from the pooled data at the district TB control officer, Pedawaltair, Visakhapatnam with permission. The data is analysed at the Research center, GIMSR on excel sheet with the application of IBM SPSS statistics software. The limitations are: MDR-TB, diabetes, smoking, alcohol and other socio economic factors influencing the incidence of TB are not part of the study due to the non availability of data and it is not a prospective study. However, the prevalence in

vulnerable groups like MCH, HIV, and primitive tribal groups (PTG) are considered in the study. 2011 census– total AP population is 4,95,75,771 and Visakhapatnam is 42,90,589 (8.65 %). The district of Visakhapatnam has the highest tribal population (14.42 %) in AP state. The draft new national strategic plan (NSP) for TB elimination 2017 – 2025[9] is a trend setter in the fight against TB.

Biostatistics

Prevalence is calculated by adding old cases to new cases divided by population at risk multiplied by one lakh. Incidence and case fatality rate are also calculated. The data obtained is tabulated in multiple and the relevant health status indicators are calculated based on that and conclusions are drawn. It is useful in planning future health care delivery system for controlling tuberculosis.

Material and Methods

The case material for the present study is obtained from the Govt. of AP related District Tuberculous center with permission avail the TB data. From 2007 to 2014 (8 years), from 2015 to Aug 2018 (4 years) the collected data is compiled and tabulated in two separate excel sheets. Prevalence rate, incidence and case fatality rate (CFR) are calculated as per the bio-statistics formula based on [3]PARK'S & [5]Mahajan's methods in consultation with the institutional statistician and the professor of Community medicine. The total TB cases of both old and new is 67,017. Population at risk is estimated based on 2011 census by adding 5% enhancement every year till 2018. Further census report is awaited in the year 2021. [4]Prevalence rate is calculated per one lakh population. Relapses are included in incidence rate as a case appears after completion of treatment as per the direction of PARK'S manual. Every possible honest attempt is made not to alter the data as obtained from the DTCO center. There is a clear shift of TU network extension from 2015 when more of tribal TU centers are established over the previous years, almost doubled. Case finding is based on the traditional methods of clinical diagnosis, Smear examination and X-Ray chest primarily. Only since the year 2016, the CBNAAT (Gene-Xpert) has come into the diagnostic study, yet widely available from late 2018. The Rifampicin resistance in India for 2016 is clearly shown in table 3. The data from it also is part of the present case total. More detailed data analysis is made from 2015 to Aug 2018.

Table: 1

GLOBAL - INDIA TB BURDEN : 2017				
INDICES	GLOBAL		INDIA	
	CASES	RATE PER LAKH	CASES	RATE PER LAKH
INCIDENCE	1,04,00,000	140	27,90,000	211
DEATHS	16,74,000	22	4,35,000	33
HIV-TB CASES	10,30,000	14	87,000	6.6
HIV-TB DEATHS	3,74,000	5	12,000	0.9
MDR /RR CASES	6,01,000	8.1	1,47,000	11

INDIAN AVERAGE TB BURDEN - 217 PER ONE LAKH PER ANNUM.
END-TB TARGET - 10 CASES PER ONE LAKH PER ANNUM.
MDR TB - 2.84 % IN NEW CASES
 - 11.60% IN PREVIOUSLY TREATED CASES.

Table : 2

WHO GUIDELINES				
INDICES	MILESTONES		SDG	END TB
	2020	2025	2030	2035
REDUCTION IN NO. OF TB DEATHS	35%	75%	90%	95%
REDUCTION IN TB INCIDENCE	20%	50%	80%	90%
TB FAMILI'S CATASTROPHIC COSTS	0%	0%	0%	0%

SDG - Sustainable development goals.

Table : 3

RIFAMPICIN RESISTANCE - IN INDIA - 2016	
NEW TB CASES	20%
IN PREVIOUSLY TREATED TB PATIENTS	67%
IN NOTIFIED TB PATIENTS	41%

Table : 4 CASE PROFILE DATA 2007 – 2014.

YEAR	AREA	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	FAILURE	TAD	OTHERS	TOTAL CASES
2007	URBAN	916	509	533	170	22	30	74	2254
	RURAL	1167	638	357	209	11	17	83	2488
	TRIBAL	478	137	46	42	9	7	4	723
Total :		**2561**	**1284**	**936**	**421**	**42**	**54**	**161**	**5465**
2008	URBAN	880	591	549	108	15	61	74	2278
	RURAL	1155	537	412	201	17	53	93	2468
	TRIBAL	486	246	98	68	13	16	4	932
Total :		**2521**	**1374**	**1059**	**377**	**45**	**130**	**171**	**5678**
2009	URBAN	894	535	434	170	16	26	75	2151
	RURAL	1199	633	410	254	28	60	94	2698
	TRIBAL	504	176	77	82	3	6	9	857
Total :		**2597**	**1344**	**921**	**506**	**47**	**92**	**178**	**5706**
2010	URBAN	852	593	426	200	25	30	90	2216
	RURAL	1191	651	431	211	35	43	121	2683
	TRIBAL	504	219	77	79	17	7	22	925
Total :		**2547**	**1463**	**934**	**490**	**77**	**80**	**233**	**5824**
2011	URBAN	921	521	438	199	26	34	104	2243
	RURAL	1232	556	386	222	44	44	124	2608
	TRIBAL	543	219	102	77	4	8	25	978
Total :		**2696**	**1296**	**926**	**498**	**74**	**86**	**253**	**5829**
2012	URBAN	877	426	489	143	11	21	117	2084
	RURAL	1294	573	391	175	20	32	116	2601
	TRIBAL	624	340	142	63	10	20	20	1219
Total :		**2795**	**1339**	**1022**	**381**	**41**	**73**	**253**	**5904**
2013	URBAN	947	397	494	165	20	25	89	2137
	RURAL	1284	463	370	171	12	27	115	2442
	TRIBAL	536	216	116	73	9	16	21	987
Total :		**2767**	**1076**	**980**	**409**	**41**	**68**	**225**	**5566**
2014	URBAN	946	404	478	247	28	29	127	2259
	RURAL	1347	527	382	248	15	32	107	2658
	TRIBAL	679	150	145	81	15	38	24	1132
Total :		**2972**	**1081**	**1005**	**576**	**58**	**99**	**258**	**6049**

Relapse= reporting TB after complete treatment.
Failure = Sputum +ve in the middle of treatment.
TAD = Treatment after default.

Table: 5 Case Profile Data 2015.

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	NEW TB CASES (Total) +VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED	C F R (CASE FATALITY RATE)
URBAN - 2015	VISAKHAPATNAM DT	6,34,319	435	130	244	91	900	141.9	997	157.17	25	2.5075226
	GAJUWAKA	6,40,888	242	90	101	75	508	79.26	547	85.36	5	0.9140768
	GOPALAPATNAM	4,12,850	288	119	134	60	601	145.6	638	154.53	10	1.5673981
	PENDURTHI	6,27,799	217	83	106	51	457	72.79	493	78.52	3	0.6085193
	ARILOVA	4,53,527	137	67	75	34	313	69.01	336	74.08	7	2.0833333
	TOTAL	27,69,383	1319	489	660	311	2779	101.7	3011	109.93	50	1.53617
RURAL - 2015	ANAKAPALLI	3,15,624	198	83	85	29	395	125.1	419	132.75	8	1.9093079
	CHODAVARAM	2,35,192	192	44	70	27	333	141.6	343	145.83	9	2.6239067
	K KOTAPADU	1,02,592	51	22	25	7	105	102.3	112	109.17	0	0
	KOTAVURATLA	1,29,389	106	39	12	15	172	132.9	178	137.56	1	0.5617978
	NAKKAPALLI	2,11,031	93	49	38	39	219	103.8	241	114.2	5	2.0746888
	NARSIPATNAM	3,49,770	213	76	31	22	342	97.77	351	100.35	4	1.1396011
	V- MADUGULA	2,21,730	30	7	8	1	46	20.74	48	21.64	0	0
	YELAMANCHILI	4,12,651	133	45	35	31	244	59.12	267	64.7	6	2.247191
	TOTAL	19,77,979	1016	365	304	171	1856	111.9	1959	118.03	33	1.5080705
TRIBAL -	ARAKUVALLEY	1,70,703	82	22	27	14	145	84.94	152	89.04	4	2.6315789

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	NEW TB CASES (Total) +VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED	CFR
2015	ANANTHAGIRI	84,797	76	12	14	12	114	134.4	129	152.12	2	1.5503876
	CHINTHAPALLI	1,50,689	99	14	27	13	153	101.5	160	106.17	5	3.125
	G K VEEDHI	70,702	62	5	4	10	81	114.6	85	120.22	1	1.1764706
	HUKUMPETA	68,462	44	23	11	2	80	116.9	97	141.68	0	0
	PADERU	2,76,330	125	35	40	17	217	78.52	242	87.57	3	1.2396694
	MUNCHINGPUT	1,08,961	79	5	17	4	105	96.36	119	109.21	2	1.6806723
	K D PETA	84,438	72	21	10	13	116	137.4	119	140.93	2	1.6806723
	TOTAL	10,15,082	639	137	150	85	1011	108.1	1103	118.37	19	1.6355564
GRAND TOTAL :		57,62,444	2,974	991	1,114	567	5,646	107	6073	115	102	1.5599323

Table : 6 Case Profile Data 2016

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	NEW TB CASES (Total) +VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED	C F R (CASE FATALITY RATE)
URBAN - 2016	VISAKHAPATNAM DT	6,34,319	387	129	281	53	850	134.00	930	146.61	14	1.51
	GAJUWAKA	3,95,513	230	69	102	69	470	118.83	510	128.95	5	0.98
	GOPALAPATNAM	3,08,822	191	40	82	38	351	113.66	373	120.78	3	0.80
	PENDURTHI	3,86,178	214	85	101	66	466	120.67	502	129.99	3	0.60
	ARILOVA	4,53,527	246	91	202	56	595	131.19	622	137.15	9	1.45
	TOTAL	21,78,359	1268	414	768	282	2732	123.67	2937	132.70	34	1.07
RURAL - 2016	ANAKAPALLI	3,37,354	207	57	71	30	365	108.19	390	115.61	7	1.79
	CHODAVARAM	3,04,067	203	40	70	34	347	114.12	370	121.68	7	1.89
	K KOTAPADU	1,02,592	71	17	44	10	142	138.41	153	149.13	2	1.31
	KOTAVURATLA	1,29,389	99	38	20	10	167	129.07	176	136.02	2	1.14
	NAKKAPALLI	2,11,031	100	61	48	36	245	116.10	286	135.53	1	0.35
	NARSIPATNAM	3,03,410	239	60	45	20	364	119.97	374	123.27	4	1.07
	YELAMANCHILI	2,01,620	85	44	43	24	196	97.21	219	108.62	2	0.91
	TOTAL	15,89,463	1004	317	341	164	1826	117.58	1968	127.12	25	1.21
TRIBAL - 2016	ARAKUVALLEY	76,367	48	16	25	9	98	128.33	108	141.42	0	0.00
	ANANTHAGIRI	84,797	104	16	28	28	176	207.55	180	212.27	1	0.56
	CHINTHAPALLI	79,987	84	13	16	16	129	161.28	129	161.28	1	0.78
	G K VEEDHI	70,702	107	7	1	13	128	181.04	129	182.46	0	0.00
	HUKUMPETA	68,462	51	28	12	2	93	135.84	115	167.98	0	0.00
	PADERU	98,007	74	36	30	8	148	151.01	169	172.44	1	0.59
	MUNCHINGPUT	1,09,861	92	35	30	17	174	158.38	194	176.59	3	1.55
	K D PETA	84,438	97	20	14	13	144	170.54	147	174.09	0	0.00
	TOTAL	6,72,621	657	171	156	106	984	54.125	1171	173.56	6	0.43
GRAND TOTAL :		44,40,443	2,929	902	1,265	552	5,542	98	6076	144.46	65	0.90

Table : 7 Case Profile Data 2017.

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EPTB +VE	RELAPSES	NEW TB CASES (Total) +VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED	C F R (CASE FATALITY RATE)
URBAN - 2017	VISAKHAPATNAM DT	6,38,672	285	108	267	68	728	113.99	794	124.32	10	1.26
	GAJUWAKA	3,98,227	215	74	114	41	444	111.49	471	118.27	0	0.00
	GOPALAPATNAM	3,10,936	127	65	87	37	316	101.63	325	104.52	2	0.62
	PENDURTHI	3,88,827	192	50	90	44	376	96.70	409	105.19	4	0.98
	ARILOVA	4,56,637	214	86	174	69	543	118.91	573	125.48	6	1.05
	TOTAL	21,93,299	1033	383	732	259	2407	108.545	2572	115.56	22	0.78
RURAL - 2017	ANAKAPALLI	3,39,668	205	51	96	26	378	111.29	407	119.82	13	3.19
	CHODAVARAM	3,06,151	176	29	82	18	305	99.62	322	105.18	5	1.55
	K KOTAPADU	1,03,297	65	25	36	8	134	129.72	139	134.56	0	0.00
	KOTAVURATLA	1,30,278	107	26	25	10	168	128.96	171	131.26	3	1.75
	NAKKAPALLI	2,12,480	85	45	48	30	208	97.89	243	114.36	6	2.47
	NARSIPATNAM	3,05,492	233	50	66	20	369	120.79	385	126.03	5	1.30
	YELAMANCHILI	2,03,002	109	28	45	23	205	100.98	231	113.79	2	0.87
	TOTAL	16,00,368	980	254	398	135	1767	112.75	1898	120.71	34	1.59

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EP TB +VE	RELAPSES	NEW TB CASES (Total)+VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED NA	CFR
TRIBAL - 2017	ARAKUVALLEY	76,892	58	14	33	10	115	149.56	119	154.76	0	0.00
	ANANTHAGIRI	85,379	87	18	35	18	158	185.06	162	189.74	0	0.00
	CHINTHAPALLI	80,535	81	5	11	14	111	137.83	114	141.55	2	1.75
	G K VEEDHI	71,188	76	8	2	18	104	146.09	104	146.09	1	0.96
	HUKUMPETA	68,933	61	20	11	16	108	156.67	121	175.53	0	0.00
	PADERU	98,681	84	32	42	7	165	167.21	185	187.47	0	0.00
	MUNCHINGPUT	1,10,617	104	32	34	1	171	154.59	180	162.72	1	0.56
	K D PETA	85,017	87	28	16	24	155	182.32	159	187.02	0	0.00
	TOTAL	6,77,242	638	157	184	108	979	56.125	1144	168.11	4	0.41
GRAND TOTAL :		44,70,909	2,651	794	1,314	502	5,153	92	5614	134.80	60	0.93

Table : 8 CASE PROFILE DATA 2018

AREA	TB UNIT	POPULATION AT RISK	NEW SPUTUM +VE	NEW SPUTUM -VE	NEW EP TB +VE	RELAPSES	NEW TB CASES (Total)+VE	INCIDENCE	TOTAL CASES (OLD & NEW)	PREVALENCE	PATIENTS DIED NA	C F R (CASE FATALITY RATE)
URBAN - Oct 12th 2018	VISAKHAPATNAM DT	6,38,672	170	77	225	34	506	79.23	545	85.33		0.00
	GAJUWAKA	3,98,227	89	43	69	27	228	57.25	235	59.01		0.00
	GOPALAPATNAM	3,10,936	64	44	66	24	198	63.68	204	65.61		0.00
	PENDURTHI	3,88,827	116	30	71	18	235	60.44	246	63.27		0.00
	ARILOVA	4,56,637	93	75	149	23	340	74.46	365	79.93		0.00
	TOTAL	21,93,299	532	269	580	126	1507	67.011	1595	70.63	0	0.00
RURAL - Oct 12th 2018	ANAKAPALLI	3,39,668	75	42	71	21	209	61.53	227	66.83		0.00
	CHODAVARAM	3,06,151	86	15	32	13	146	47.69	148	48.34		0.00
	K KOTAPADU	1,03,297	27	12	22	2	63	60.99	65	62.93		0.00
	KOTAVURATLA	1,30,278	51	25	16	6	98	75.22	103	79.06		0.00
	NAKKAPALLI	2,12,480	51	49	18	4	122	57.42	135	63.54		0.00
	NARSIPATNAM	3,05,492	105	44	43	19	211	69.07	229	74.96		0.00
	YELAMANCHILI	2,03,002	60	25	36	9	130	64.04	148	72.91		0.00
	TOTAL	16,00,368	455	212	238	74	979	62.28	1055	66.94	0	0.00
TRIBAL - Oct 12th 2018	ARAKUVALLEY	76,892	38	7	8	3	56	72.83	56	72.83		0.00
	ANANTHAGIRI	85,379	53	13	19	8	93	108.93	95	111.27		0.00
	CHINTHAPALLI	80,535	47	4	11	7	69	85.68	73	90.64		0.00
	G K VEEDHI	71,188	43	0	0	0	43	60.40	43	60.40		0.00
	HUKUMPETA	68,933	22	23	6	0	51	73.98	55	79.79		0.00
	PADERU	98,681	26	37	15	8	86	87.15	94	95.26		0.00
	MUNCHINGPUT	1,10,617	38	23	15	3	79	71.42	83	75.03		0.00
	K D PETA	85,017	42	19	4	9	74	87.04	84	98.80		0.00
	TOTAL	6,77,242	309	126	78	38	513	30.25	583	85.50	0	0.00
GRAND TOTAL :		44,70,909	1,296	607	896	238	2,999	53	3,233	74.36	0	0.00

Table : 9

YEAR	SEX/AGE	0-14	15-24	25-34	35-44	45-54	55-64	65 AND ABOVE	TOTAL
	NEW SMEAR+VE PTB AGE/SEX ANNUAL DISTRIBUTION								
2015	MALE	20	244	344	436	522	344	173	2083
	FEMALE	36	248	178	146	116	109	58	891
	M + F TOTAL	56	492	522	582	638	453	231	2974
2016	MALE	13	246	350	401	492	366	158	2026
	FEMALE	30	216	191	155	167	101	43	903
	M + F TOTAL	43	462	541	556	659	467	201	2929
2017	MALE	6	218	305	403	467	362	179	1940
	FEMALE	14	174	134	128	125	94	42	711
	M + F TOTAL	20	392	439	531	592	456	221	2651
2018	MALE	7	137	231	290	334	218	113	1330
	FEMALE	9	135	118	109	96	73	34	574
	M + F TOTAL	16	272	349	399	430	291	147	1904
TOTAL MALE :		46	845	1230	1530	1815	1290	623	7379
TOTAL FEMALE :		89	773	621	538	504	377	177	3079
TOTAL MALE & FEMALE :		135	1618	1851	2068	2319	1667	800	10458

Table : 10

		GENDER DISTRIBUTION OF PTB & EPTB AND THE RATIO			
YEAR	SEX	PTB	EPTB	EPTB %	PTB : EPTB
2015	MALE	2672	547	20.47	4.88 : 1
	FEMALE	1293	567	43.85	2.28 : 1
	TOTAL	3965	1114	28.10	3.56 : 1
2016	MALE	2587	635	24.55	4.07 : 1
	FEMALE	1244	630	50.64	1.97 : 1
	TOTAL	3831	1265	33.02	3.03 : 1
2017	MALE	2441	683	27.98	3.57 : 1
	FEMALE	1004	631	62.85	1.59 : 1
	TOTAL	3445	1314	38.14	2.62 : 1
2018	MALE	1860	706	37.96	2.63 : 1
	FEMALE	917	643	70.12	1.43 : 1
	TOTAL	2777	1349	48.58	2.06 : 1

Table : 11

CHANGING TREND OF TB PREVALENCE FROM 2007 TO 2018 - VISAKHAPATNAM DISTRICT IN ANDHRA PRADESH		
YEAR	POPULATION AT RISK	CASES OLD & NEW	PREVALENCE
2007	4069450	5465	134.29
2008	4112740	5678	138.06
2009	4155178	5706	137.32
2010	4202021	5824	138.60
2011	4240606	5829	137.46
2012	4318579	5904	136.71
2013	4349045	5566	127.98
2014	4351557	6049	139.01
2015	5762444	6073	115
2016	4440443	6076	144.46
2017	4470909	5614	134.8
2018	4470909	3233	74.36

Table: 12

AGE DISTRIBUTION - RETREATMENT CASES 2015 - 2018						
YEAR	AGE (0 - 14)			AGE > 15		
	NEW CASES	RETREAT MENT	PERCENTAGE	NEW CASES	RETREAT MENT	PERCENT AGE
2015	306	14	4.58	5770	982	17.02
2016	302	9	2.98	5784	971	16.79
2017	238	14	5.88	5376	841	15.64
2018	254	12	4.72	4502	618	13.73

Table: 13

CASE PROFILE (2015 - 2018) - RETREATMENT			
YEARS	NEW CASES	RELAPSES & %	RETREATMENT RELAPSES, FAILURES, TREATMENT DEFAULT etc.) & %
2015	4787	567 (11.84)	984 (20.56)
2016	5106	552 (10.81)	980(19.19)
2017	4759	502 (10.55)	955(20.07)
2018	3126	367 (11.74)	542(17.34)

Table : 14

TB HIV - QUARTER/YEAR WISE TOTAL SCREENED/TOTAL +VE DATA				
YEAR	QUARTER	TOTAL REGISTERED	HIV +VE	%
2015	1	1452	128	8.82
	2	1531	124	8.10
	3	1537	108	7.03
	4	1540	110	7.14
TOTAL :		6060	470	7.77
2016	1	1615	127	7.86
	2	1559	106	6.80
	3	1439	88	6.12
	4	1470	109	7.41
TOTAL :		6083	430	7.05
2017	1	1471	105	7.14
	2	1369	111	8.11
	3	1360	98	7.21
	4	1412	83	5.88
TOTAL :		5612	397	7.08

2018	1	1618	136	8.41
	2	1521	49	3.22
	3	1610	95	5.90
	4	NA	NA	-
TOTAL :		**4749**	**280**	**5.84**
GRAND TOTAL :		**22504**	**1577**	**6.94**

Table: 15

TB-HIV CO-INFECTION CASE PROFILE			
YEAR	**TOTAL TB CASES SCREENED FOR HIV**	**HIV +VE**	**PERCENTAGE**
2015	6060	464	7.66
2016	6083	430	7.07
2017	5612	397	7.07
2018	4749	280	5.90

Results

From the tabulated data, as per table 7,8 & 11 it is obvious that the prevalence rate among the people of Visakhapatnam ranges from 115 to 144 per lakh and in most of the years there is only a marginal difference of less than 5 (ranging from 134 to 139 per one lakh). Overall, the rate maintained a plateau over a decade yet reported low prevalence. Males out number females by 2.4 : 1.0 ratio and most of the cases occurred in the age group of 35 to 54 with the least reported in extremes of age for PTB cases – this is for the period 2015 to 2018 as per table 9 & 10, the same the case with EPTB cases also but with short difference of ratio of 2:1. There is not much rural - urban difference in prevalence rate but higher rate is reported in tribal areas as per table 4,5,6. Most unfortunate is the retreatment category which is from 14 – 20% of new cases including relapses and in children below 14 years it is less than 5% as per table 12 & 13. The TB HIV case load for the period 2015 to Aug 2018. As per table 14 & 15 shows no increase in trend when compared to the national average are other sources of data. The overall HIV positivity is less than 7% (5.84 – 8.82) in most of the cases barring few. As per table 1, the global HIV TB report of 2017 and the rate is 14 per lakh and for India it is 6.6.

Graph : 1

RED LINE ------ TB PREVALENCE GLOBAL (2000 – 2016)

BLACK LINE ------ TB PREVALENCE VISAKHAPATNAM, AP (2007 – 2018)

The above spot/line graph of frequency polygon shows the trend in the distribution of prevalence over a period of 2000 – 2016 globally and 2007 – Aug 2018. The above redline of the graph shows gradual descent of prevalence from 183/lakh in the yr 2000 to 140/lakh in the year 2016 as per the WHO global report i.e. a reduction by 20% with the midpoint at 2007 with 165/lakh prevalence.

Whereas the black line below the redline of the graph shows SEA-SAW appearance indicating fluctuating prevalence rate in the population of Visakhapatnam in Nov'18 by the DTCO & GITAM combined study. The dip in 2015 is not due to sudden change in the prevalence but due to the alteration in tuberculous units' allotted population where in more tribal units have come into effect with change of share in population and the average of prevalence of rural, urban and tribal.

Yet the overall prevalence rate of Visakhapatnam is less than that of global when India aims at "End TB" by 2025 and the WHO aims to fulfil the same target by 2030. Hence it is an indication of favourable signs to achieve the goal set by India a head of Global. The data and the graph are well calculated without alteration and in consultation with the bio-statistician and the professors of community medicine of different medical colleges.

Discussion

Low level of present prevalence need not necessarily indicate the low TB case load in the population. With improved motivation and people well aware of health due to media propaganda, the TB and also HIV prevalence have received a downward trend. With the participation of private doctors in the notification process, more number of TB cases can be identified and diagnosed, the prevalence rate may go up. Intensive effort with wide application of molecular diagnostic tests to diagnose cases can result in hike in prevalence rate. In tribal areas, the incidence and the prevalence rate for the years 2015, 2016, 2017 and Aug 2018 are 108 – 118, 54 – 173, 56 – 168, 30 – 85 respectively. Hence, even the largest tribal prevalence rate of Visakhapatnam is not higher than that of Indian average. The increasing trend in 2016 & 2017over the previous year's indicates case identification of more number of TB due to more TU and CBNAAT. However surveillance has to be maintained continuously.

Conclusion

As per the conclusions drawn from the tables 4 to 15 the low prevalence rate reported in Visakhapatnam can surely result in reaching the goal of END-TB by 2025 with the prevalence rate of 10 per one lakh population in the forth coming **7** years with about 15 to 17% annual reduction. TB-HIV co-infection is a matter of concern which will also come down as HIV-AIDS has already experienced considerable reduction. Co-morbid conditions like smoking bronchitis, alcoholism, auto immune disorders, anaemia & malnutrition provoking TB reactivation has to be kept in mind by all the practicing doctors. One glaring mistake in the control of TB is that the private, public, corporate, NGOs feel is as the responsibility of government machinery only. Air pollution control is one missed area that influences TB reactivation to a great extent. As long as the nutrition, anaemia, Ill-temperate habits, poor housing, illiteracy are not kept under check, TB cannot be controlled fully.

Future Perspective

In [10]future, more number of TB cases can be notified and diagnosed due to the intensification of RNTCP field work and the extended ramification of latest molecular diagnostic Gene-Xpert/RT-PCR in most of the TU centers. Even private corporate hospitals can purchase Gene-Xpert machines to diagnose more number of EPTB cases. It is a distant dream to expect all nongovernmental hospitals and private clinics to send samples of all presumptive TB cases to Government aided diagnostic centers. However government agencies can supervise them. Infact, the real burden of TB arises not from faulty notification but from slow socio economic,[11] educational and climate changes. Modern methods of health education can bring radical change. The methods of propagation already adopted with regards to the control of population by family planning, HIV-AIDS and epidemics like Cholera & Diarrhoea which received downward trend can

also be adopted for the control of TB for lasting results.

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