

Burden Of Disease In Rural India: An Analysis Through Cause Of Death

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Abstract

Context: In last few decades, India has experienced the Improvements in the nutritional and health infrastructure, social development and eradication of major killer diseases. But inter-state, urban-rural, male-female inequalities are clearly viewed as a major public health challenge in this country.

Purpose: The paper aims to shed light on the health status of rural Indian population by utilizing data on 'survey of cause of death (rural)' for the period of 1966 to 1994.

Methods: To pursue this goal, data was mainly extracted from the 'Survey of Cause of Death (rural)' annual reports of Registrar General of India (RGI) from 1966 to 1994. Trends in major cause of death and their proportional shift over time are being analyzed using five-year moving average method. In order to reckon disease intensity region, disease ranking coefficient values are calculated for fourteen major states and grouped into three classes according to their magnitude. The study also provides the age standardized Mortality Rates of all major diseases across all major states.

Findings: The analysis indicates that poverty and unhealthy environment related causes are taking burdensome toll, mainly in the demographically backward states, notwithstanding the overall declining trend of infectious diseases. Accidents and injuries and diseases of central nervous system are shown a significantly increasing trend, where as coughs and fevers are on decline. Karnataka, Maharastra, Kerala states are found as low intensity disease states, while Assam, Utter Pradesh and Madhya Pradesh belongs t high intensity states.

Conclusions: Though national wide health plans have succeeded in reducing fatality of infectious diseases to a certain extent; there is however, a great need for improved and effective area-specific health programs to achieve the desired goals.

INTRODUCTION

Over the years, India has experienced epidemiological transition due to change in disease patterns, improvements in the nutritional and health infrastructure, eradication and control of major killer diseases and socio-economic development [1]. Even after more than five decades of self-governance, these health achievements are not withstanding. The burden of disease is still high due to large-scale poverty, developmental disparities between states, gender discrimination, growing aged population and failure of government policies [2]. Mortality and disability in this country is twice that of China and nearly three times higher than in developed countries. Looking at the disease adjusted life years (DALY), losses (268,953,000) of burden second only to that observed in Africa (325,198,000), a sizeable proportion of this burden is due to communicable diseases (50%) followed by Non-communicable diseases (33%) and injuries [3]. Health inequalities were observed widely across the country at the same time increasingly being viewed as a

major public health concern to meet the planned targets with noticeable inter-state differences in average per-capita spending on health [4].

Unfortunately, in rural India adequate attention has not been focussed at studying disease pattern, trend and its consequences along with the epidemiological transition. To test such hypotheses, paucity of adequate, accurate and appropriate statistical data on one hand and complex pathogenesis of some important diseases (like heart disease, cancer, diabetes mellitus) on other hand makes the analysis of disease pattern more complex. In this country of more than one billion, health indicators are often led to over-estimate in some instances and under-estimate in others. Lack of uniformity in assessments has always posed further difficulty for national and international comparisons. Major registration sources are neither reliable nor complete; good per cent of cases will go unregistered out of which only 10% of deaths are medically certified. But some sources like Survey of Causes of Death do reveal some interesting

pattern that may very well be true [6].

Keeping above points, this paper discuss about the trend of major causes of death groups and change in the ranking of different diseases over a period of time and to assess the intensity of diseases through disease ranking coefficient values for major states. It also provides, for the first time, the estimates of the distribution of Age-standardized mortality rate (ASMR) of major killer diseases in India. The analyses only confined to the data prior to 1994. More recent data on mortality requires a separate review because the tuberculosis incidence has changed due to the impact of HIV/AIDS after 1995. In addition, subsequent to 1995 some major Indian state boundaries were reclassified due to the proclamation of new states, which may have complicated comparisons.

METHODS AND MATERIAL

Data was mainly extracted from the "Survey of Causes of Death (rural)" annual reports of Registrar General of India (RGI) from 1966 to 1994 [5]. Despite of a few limitations like improper medical certification, high proportion of recorded cause of death as 'senility' and reclassification of disease groups overtime, SCD (Survey of Causes of Death) is by far the most reliable source of mortality statistics in rural areas of India. Earlier it was used to analyse accident and violence related mortality in 1970's and 1980's for international comparisons [6].

This paper is an attempt to bring out the health status of rural India (in its 14 major states) as reflected in the causes of death statistics, which has been either neglected or ignored by researchers. To reveal the trend of major causes of death groups, a five yearly moving average is calculated where the percentage figures show the average of five successive years. Significance test was carried out to test whether average percentage change (APC) significantly differs from null hypothesis 0; this shows change of the rate of increase or decrease.

In order to reckon disease intensity region, disease ranking coefficient values (R) [8] are calculated for fourteen major states and grouped into three classes according to their magnitude. Disease ranking coefficient of a state is the average of disease prevalence ranks of that particular state. Higher the value of ranking coefficient lesser is the disease burden. Disease intensity zone can be defined as an area having similar disease burden in type as well as in magnitude. Coefficient R1 is calculated separately considering equal weight to the ranks of three communicable disease groups ('coughs', 'fevers', 'digestive disorders') that

can be controlled with proper knowledge of health and hygiene along with health care facilities. High Disease Intensity Zone ($R < 5$) shows worst performance in controlling diseases preceded by Moderate Disease Intensity Zone ($R 5 - 10$) and Low Disease Intensity Zone ($R > 10$).

Salinity adjusted causes of death in 1991 is calculated where percent deaths in 60+ age group are converted to absolute figures for seven cause groups (excluding 'causes peculiar to infancy', 'maternal deaths', 'senility') in eleven states and summed up to get total deaths at 60+ age. For Assam, Harayana and Kerala age wise death distribution are not available and thereby these states have been excluded from the analysis. Then Deaths in 'senility' are distributed among seven cause groups based on their share of 60+ deaths in respective causes. For prevalence calculations, state wise population and their age distributions are borrowed from Census and Sample Registration Systems (SRS) respectively. Age Standard Mortality Rates (ASMR) was calculated using India's population as a standard.

RESULTS

The trend of major 'cause of death' reflects in Table-1 and Figure-1. The combined share of 'coughs', 'digestive disorders' and 'fevers' was more than half in 1960's, but it had diminished to one-third by 1994. The share of 'fever' alone dropped from 20% to 7% for the same period. Within India, death with 'fever' is quite high in Punjab, Madhya Pradesh and it is almost negligible in Karnataka and Maharashtra. However, the decline of deaths in other two groups namely coughs and digestive disorders are not so distinct. Among the deaths 'digestive disorders' accounted for 11% in the eastern states.

Figure 1

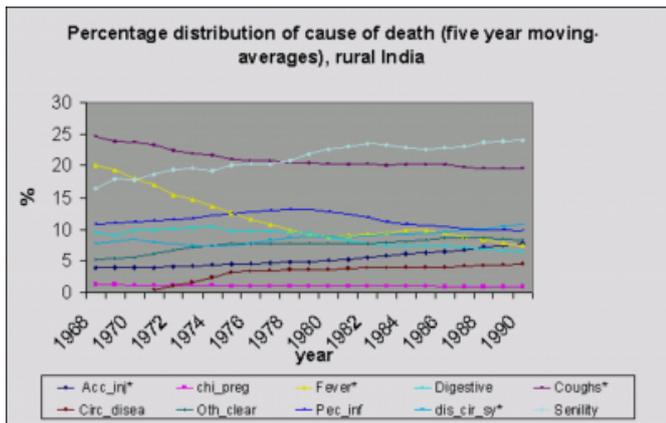
Table 1: Percentage distribution of 'causes of death' status (five yearly moving averages), rural India, 1964-94.

Year	Acc**	ChiP	Fever**	Dgd	Coughs**	Dcns	Oth	Cpi	Dcs**	Senility
1968	3.9	1.3	20.1	9.6	24.7	NA	5.2	10.9	7.9	16.4
1969	4.0	1.3	19.3	9.0	23.9	NA	5.4	11.1	8.1	17.9
1970	4.0	1.2	18.0	9.8	23.8	NA	5.5	11.2	8.5	17.8
1971	3.9	1.2	17.0	9.8	23.3	0.5	6.1	11.4	8.0	18.6
1972	4.1	1.2	15.4	10.1	22.5	1.1	6.7	11.6	7.8	19.4
1973	4.2	1.2	14.7	10.3	21.9	1.7	7.1	11.8	7.5	19.6
1974	4.4	1.2	13.6	10.5	21.6	2.4	7.5	12.2	7.4	19.2
1975	4.5	1.1	12.6	9.8	21.0	3.2	7.9	12.5	7.3	20.1
1976	4.6	1.1	11.6	9.7	20.7	3.4	7.8	12.7	7.9	20.3
1977	4.7	1.1	10.8	9.7	20.7	3.5	7.8	13.0	8.4	20.2
1978	4.8	1.1	9.8	9.6	20.5	3.6	7.9	13.2	8.7	20.7
1979	4.8	1.1	9.2	9.4	20.4	3.6	7.9	13.1	8.8	21.8
1980	5.1	1.1	8.8	8.7	20.3	3.6	7.9	12.8	8.9	22.6
1981	5.2	1.1	9.1	8.3	20.2	3.8	7.9	12.4	8.9	23.1
1982	5.5	1.1	9.3	7.8	20.2	3.9	7.8	11.9	9.0	23.5
1983	5.8	1.1	9.5	7.5	20.3	3.9	8.0	11.2	9.3	23.3
1984	6.1	1.1	9.8	7.5	20.1	4.0	8.1	10.9	9.3	22.9
1985	6.3	1.1	9.8	7.5	20.2	4.0	8.4	10.6	9.4	22.6
1986	6.5	1.0	9.5	7.3	20.2	4.0	8.7	10.4	9.6	22.9
1987	6.7	1.0	8.9	7.1	20.2	4.2	8.7	10.1	9.9	23.1
1988	7.2	1.0	8.5	6.9	19.8	4.3	8.7	10.0	10.1	23.7
1989	7.5	1.0	7.9	6.6	19.6	4.4	8.6	10.0	10.5	23.9
1990	7.9	1.0	7.5	6.4	19.6	4.5	8.4	9.8	10.8	24.0
1991	8.3	1.1	7.3	6.5	19.4	4.4	8.5	10.0	10.9	23.7
1992	8.6	1.1	7.3	6.4	19.2	4.5	8.9	10.0	11.0	23.2

SOURCE: SURVEY OF CAUSES OF DEATH, RURAL, 1966-1994, (RO)
 Abbreviations: Acc- accident and injury, Chi- child birth and pregnancy, Dgd- digestive disorders,
 Dcns- diseases of central nervous system, Oth- other clear symptoms,
 Cpi- causes peculiar to infancy, Dcs- diseases of circulatory system
 ** Average Percentage change significantly differs from 0 at 95% confidence interval.

Figure 2

Figure 1:



Trend shows 'Coughs' is major cause of death in almost all the states in general; especially in UP and Rajasthan accounting one-third of deaths with no change over a period of time. Bronchitis and asthma maintained top rank over the two decades accounting more than 8% of total rural deaths in India (Table2) followed by TB of the lungs accounting 6.1% deaths, its rank been dropped slightly in the following decade.

Figure 3

Table 2: Percentage distribution of deaths by major cause of sub-groups and rank of major killer diseases

1977	%	Rank	1987	%	Rank	1991	%	Rank
Accident & injury			Accident & injury			Accident & injury		
a. drowning	0.8	8	a. drowning	1.7	8	a. vehicular accident	2.15	9
b. accident from vehicles	0.6		b. vehicular accidents	0.9		b. suicide	1.87	
c. fall	0.4		c. suicide	0.5		c. poisoning	1.95	
Child birth & pregnancy			Child birth & pregnancy			Child birth & pregnancy		
a. bleeding of pregnancy	0.2		a. anaemia	0.2		a. bleeding of pregnancy	0.25	
b. post partum haemorrhage	0.2		b. congenital sepsis	0.7		b. anaemia	0.2	
c. eclampsia	0.7		c. abortion	0.7		c. toxemia	0.14	
Digestive disorders			Digestive disorders			Digestive disorders		
a. gastric infection	5	3	a. gastric infection	2.8	8	a. gastroenteritis	2.89	10
b. food poisoning	0.3		b. obesity/emaciation	1.8	10	b. acute abdomen	1.85	
c. cholera	0.3		c. acute abdomen	1.4		c. dysentery	1.03	
Respiratory			Respiratory			Respiratory		
a. bronchitis	11	1	a. bronchitis	9	1	a. bronchitis	3.75	1
b. TB of respiratory system	6.7	2	b. TB of respiratory system	5.9	2	b. TB of lungs	0.37	3
c. pneumonia	2	4	c. TB of lungs	0.5	3	c. pneumonia	4.5	5
Cardiovascular diseases			Cardiovascular diseases			Cardiovascular diseases		
a. phlogia	0.8		a. heart attack	5.6	4	a. heart attack	3.11	2
b. embolus of liver	0.4		b. anaemia	3.2	6	b. anaemia	2.96	3
c. congestive heart disease	0.4							
Fevers			Fevers			Fevers		
a. tuberculosis	1.2	5	a. typhoid	3.2	7	a. malaria	1.87	
b. malarial	1.2	5	b. malarial	1.8		b. typhoid	1.84	
c. dengue	1.7	7	c. malaria	11.4				
Tubercular deaths			Tubercular deaths			Tubercular deaths		
a. pneumonia	0.8	8	a. pneumonia	4.4		a. pneumonia	4.85	
b. infections to newborn	0.8	8	b. respiratory infections	1.9		b. respiratory infection	1.57	
c. meningitis	0.8	8	c. meningitis	1.4				
Other clear symptoms			Other clear symptoms			Other clear symptoms		
a. infections of urinary tract	0.5		a. cancer	2.5	9	a. cancer	3.89	6
b. hepatitis	0.5		b. malaria	1.8		b. malaria	1.59	
c. cerebral haemorrhage	0.4		c. cirrhosis of liver	0.9				
Not Available			Disorder of central nervous syst.			Disorder of central nervous syst.		
			a. meningitis	2.6		a. paralysis	3.63	7
			b. paralysis	0.6		b. convulsions	0.89	8
						c. meningitis	0.49	9

Over the last two decades, deaths due to 'accidents-injuries' have raised from 4% to 9%. Within the cause group of 'accidents and injuries', subgroup death due to drowning is going up (0.8% in 1971 to 1.05% in 1991), but its rank is descending after 1981 partly due to the rapid increase in vehicular accidents (0.6% in 1971 to 2.15% in 1991). Suicide is a new addition in 1991 among the first three fatal diseases under this group. 'Accidents and injuries' account a good share of death in Punjab, Uttar Pradesh and Maharashtra. Deaths associated with 'disorders of circulatory system' have increased by 3.1% over the study period and the fatality of this cause is high in Tamilnadu and Orissa followed by Punjab, Karnataka, Andhra Pradesh and Bihar. However the reasons may differ among the states as this group incorporates both heart attack and anemia. The most remarkable increase in this cause of death is exhibited by heart attack. Heart attack was not among the top ten fatal diseases in 1971, but moved to the second position in 1991 surpassing tuberculosis. Other important changes are exhibited by resurgence of malaria in 1980's, increase in the rank of vehicular accidents and cancers. Cancers accounts (except Bihar where jaundice surpasses cancer) for 15% of total deaths in Karnataka and Gujarat followed by Maharashtra (14%), Orissa and Andhra Pradesh (13%), Tamilnadu and Bihar (12%). Within the causes of infant deaths, pre maturity maintains its dominance with a steady increase in fatality (08% in 1971 to 4.85% in 1991). Another important point worth mentioning is the sharp increase in rank as well as the percentage share of paralysis. Demise in 'senility' as a cause of death is swelling steadily (from about 16% in 1968 to 23% in 1992).

The disease intensity has shown in Table- 3 & Table-5. In

total it is difficult to interpret it because of the diversity and complexity of major disease groups. Good performance of some states in reducing communicable disease burden is overshadowed by high prevalence of other cause groups. So one set of coefficient value R1 (only ranking values of fever+ cough+ digestive disorders) combining communicable and infectious disease groups and clubbed into three categories.

Figure 4

Table 3: Disease ranking coefficient of major states of India, 1991

States	R	R1
AP	5.88	8.33
Assam	6.31	3.33
Bihar	6.25	5.66
Gujarat	8.25	8.83
Haryana	10.5	9.67
Karnataka	8.25	11.0
Kerala	9.88	13.33
MP	4.56	1.33
Maharashtra	10.38	11.33
Orissa	4.5	5.0
Punjab	8.38	8.67
Rajasthan	1.05	5.67
Tamil Nadu	7.13	9.17
UP	6.25	3.67

note: R- coefficient considering disease ranking values of ten causes
R1- values of fevers coughs+ digestive disorders
Source: 'survey of causes of death'. 1991

Figure 5

Table 4: Communicable disease intensity zone (I)

HDIZ	MDIZ	LDIZ
Assam	Bihar, Orissa, Rajasthan	Kerala
Madhya Pradesh	Andhra Pradesh, Gujarat	Karnataka
Uttar Pradesh	Hararyana, Punjab,	Maharashtra
	Tamil Nadu	

abbreviations:
HDIZ- high disease intensity zone, MDIZ- medium disease intensity zone, LDIZ- low disease intensity zone
Source: 'survey of causes of death'. 1991

Figure 6

Table 5: age distribution of prevalence rate of major killer diseases in India, 1994 (per 100000)

A: bronchitis and asthma	0 to 4	5 to 14	15 to 44	45-59	60+
India	33	4	13	87	763
AP	8	3	6	42	510
Bihar	0	12	28	86	523
Gujarat	16	0	21	115	1018
Hararyana	17	0	12	96	1077
Karnataka	32	3	9	81	1522
Kerala	0	0	6	54	1061
MP	18	3	12	124	816
Maharashtra	6	0	6	60	795
Punjab	0	9	7	71	381
Rajasthan	43	4	18	63	772
Tamil Nadu	17	0	18	36	558
UP	131	3	16	202	687
lc: heart attack	0 to 4	5 to 14	15 to 44	45-59	60+
India	1	2	27	81	432
AP	0	1	31	71	493
Bihar	0	0	0	0	0
Gujarat	0	0	43	98	650
hararyana	0	3	33	78	260
Karnataka	0	7	38	87	487
Kerala	20	5	35	163	1074
Maharashtra	0	0	23	75	305
Punjab	0	2	51	117	642
Rajasthan	9	5	18	66	183
Tamil Nadu	4	0	51	93	967
c: tuberculosis of the lung	0 to 4	5 to 14	15 to 44	45-59	60+
India	2	6	43	85	192
AP	2	1	27	80	245
Bihar	0	12	46	124	178
Gujarat	0	0	83	128	203
hararyana	6	3	26	72	306
Karnataka	16	26	29	61	197
MP	0	0	94	116	311
Maharashtra	5	4	31	40	74
Rajasthan	0	12	50	117	212
Tamil Nadu	0	0	13	40	216
UP	0	14	72	146	243

Figure 7

d: Pneumonia	0 to 4	5 to 14	15 to 44	45-59	60+
India	245	12	18	7	48
Bihar	339	11	2	0	13
Hararyana	410	6 ⁸⁸	3	0	45
MP	360	21	7	6	27
Maharashtra	118	6	2	2	9
UP	483	37	10	21	132
e: cancer	0 to 4	5 to 14	15 to 44	45-59	60+
India	2	2	18	58	238
AP	2	1	14	47	216
Gujarat	0	0	36	87	508
Hararyana	6	3	10	60	351
Karnataka	0	0	23	129	371
Kerala	0	5	13	141	553
Maharashtra	4	4	14	55	185
Punjab	4	2	11	25	224
Rajasthan	0	3	8	22	277
Tamil Nadu	0	0	16	43	233
Paralysis	0 to 4	5 to 14	15 to 44	45-59	60+
India	1	2	7	37	330
AP	0	1	4	36	626
Bihar	0	10	17	71	267
Karnataka	0	3	2	56	430
Kerala	0	0	2	32	771
MP	0	4	8	43	381
Maharashtra	0	0	7	19	209
Tamil Nadu	0	0	3	36	603

Source: Based on 'Survey of Causes of Death' 1994.

High disease intensity zone (HDIZ) indicates poor performance in dealing with communicable diseases. Madhya Pradesh, Uttar Pradesh and Assam belong to this group with poorest coefficient value (1.33) of the first state, followed by Assam (R1 3.33) and Uttar Pradesh (R1 3.67). Moderate disease intensity zone (MDIZ) embraces eight states with variations of disease intensity. For example, Bihar, Orissa, Rajasthan have R1 value less than 6, hence their disease burden is slightly less than the HDIZ. While Haryana and Tamil Nadu manifest fair performance in this

respect as their coefficient value is near to 10. Kerala, Maharashtra and Karnataka fit into the best group, that is, low disease intensity zone with R-values of 13.33, 11.33 and 11 respectively.

The top ten fatal diseases in 1994 have accounted for 57.2% of the total reported deaths excluding 'senility'. It can be observed that (table -5) prevalence of bronchitis and asthma is remarkably high among 60+ population, especially in the states of Karnataka, Gujarat, Harayana, Madhya Pradesh, Maharashtra and Rajashtan having prevalence more than the national average. TB of the lung affects mainly the older segment of the population, especially in Harayana, followed by Madhya Pradesh and Andhra Pradesh. In age groups 15-59, dominance of TB is more than the national average in the states of Bihar, Gujarat, Madhya Pradesh, Rajasthan and Uttar Pradesh. Cancer and Paralysis burden is also high among the elderly and it shows highest prevalence in Kerala. Pneumonia however affects children and aged populations.

DISCUSSION

To assess the burden of disease in rural India, various data sets that are available were very carefully evaluated in a critical and explanatory nature. When comparing the estimates, it should be kept in mind that how subgroups under different causes of death category are mixed up and changed over a period of time. The recent data required a separate analysis due to the impact of HIV/AIDS (a separate analysis is required), reclassification of state boundaries. Only the data available before 1995 was considered for this analysis with an aim to sketch a broad picture of the level, trend and regional variation in mortality in three decades.

In the early sixties, fevers, coughs and diarrhea together contributed more than 50 percent of life losses. Droughts, famines coupled with epidemics like influenza accounted for higher number of deaths [9,10]. After independence, the fatality of infectious and communicable diseases has started declining with several intervention projects; the remarkable reduction of 'fevers' is mainly due to the implementation of malaria control programmes (1953, 1958, 1977) and filarial control programmes (1955) and also due to imported medical technology from the developed world and wide spread of DDT as a control measure of vector [11,12]. However, diseases related to poverty, poor hygiene and unhealthy environmental conditions are declining but still predominant in rural India.

Communicable diseases are still taking a high toll in demographically backward states, the flattening trend of

three major communicable cause groups at the latter part of the study period definitely emphasises the fact that nation wide health programmes can reduce the fatality of a disease up to a certain level. Further reduction was depending on the improvement in health infrastructure, micro level planning for improvements in sanitation, availability of safe drinking water and healthy living conditions. According to the 1991 census, only 9.48% rural households were covered under the rural sanitation programme despite of many schemes introduced by the national government [13], which means still these basic amenities are dreams for several Indians.

Asthma-bronchitis, TB of the lung and pneumonia are accounting heavy toll among the communicable diseases. About one-third of rural population use wood as fuel for cooking (Census of India, 1991) and coupled with poor ventilation and bad-housing conditions may be the cause for prevalence of asthma- bronchitis. TB prevalence is 130.8 per 100,000 in India as one of the major killers in rural India, while the world average is only 59.7 [14]. This may be attributed mainly to lack of early detection, awareness, stigma about disease to pursue the treatment and lack of sincere efforts by the state governments. Reduction of TB has a negative relation with poverty. It was estimated that 52.2% population in rural India are below international poverty line, that is, below \$1 per day during the study period in 1992 [15], which is root cause of ignorance, poor sanitation, malnutrition, irregular treatment due to high cost of drugs [16,17]. A large scale analysis from National Family Health Survey health in 1992-93 [18] clearly shows that more than half of the women age 30 years and older suffer with risk of active tuberculosis. This may be attributable to bad cooking sources and household smokes and suggests that the use of biomass fuels for cooking substantially increases the risk of tuberculosis in India.

Deaths due digestive disorders seen reduction but diarrhoea remains one of the major killers of infants and young children and a formidable challenge to the health system as the suggestive measures of preventing diarrhoea is greeted with scepticism and a certain disinterest in India [19]. The main causes of diarrhoea and other digestive diseases as identified are stale, dirty food, soiled drinking water and climatic conditions. Respiratory infection and fever as well as dirty drinking water, all of which accompany monsoons, is believed to be conducive to digestive disorders in rural areas.

Affluence, progressive aging of population (more older

people), upward socio-economic conditions and changed life styles caused increase in chronic and non-communicable diseases, which is showing an overall upward trend—a typical characteristic of the second phase of epidemiological transition [20]. While the infectious disease decline from 56% in 1999 to 25% by 2020, on other hand non-communicable diseases projected to increase from 29% in 1990 to over 57% in 2020 [21]. The most remarkable increases among the non-communicable diseases are observed in heart attacks, cancer and paralysis. The possible reasons for the rising trend of cancer may be increase in life expectancy, more accurate medical diagnosis, rise in tobacco use, pan masala, alcohol consumption, air and water pollution and excessive use of pesticides. India is one among the first few countries in tobacco consumption, Smoking Cigarette consumption per adult is one of the highest in India, that is, 236 per adult in 1990-92, much higher than the world average [22].

High prevalence of respiratory and non-communicable diseases is not only because of the increase in the proportion aged but also for higher death rates in these diseases among population. In a few years, health issues of aged people are definitely going to put our country in trouble, if necessary steps are not taken at the infantile stage. Heart attack is prevalent among the aged people especially in Kerala. The total number of the aged (65+ years) has increased from 20 million in 1951 to 57 million in 1991 and in 2001 the figure touched 76 million [23]. It is also likely to be due to changing cultural factors, like diet and stress.

Increase in proportion death in vehicular accident and suicide is a point to ponder. Analysis of Bhat [6] clearly indicates that deaths in vehicular accidents are rising because of increase in motor vehicles per population. According to World Health Organisation's report (World Health Report, 1996), from 1971 to 1991 an increase of 277% fatalities due to traffic accidents in India. India has 20 times higher fatality rates compare to any developed country, perhaps the higher accident rate in the world (World Health Report, WHO, 1999). The rate of increase of two-wheeler is much steeper than other vehicles and two wheelers are more prone to accidents than other motorised vehicles. Suicide deaths in the early reproductive period among women are a matter of concern. Of the various causes, victims commit suicide according to National Crime Records (1996) are illness, family problems together accounting 40% of total suicidal deaths [24]. Rest of the factors are love affairs, poverty, and failure in exams and dowry disputes. Hanging, consumption of insecticides and poisons are very frequent means of

suicide in India. Many of the women choose to die by successful termination of life are self-immolation, followed by drowning, by consuming sleeping pills and poisons. More gender related issues are emerging in the polity recently, empowerment of women and mobilisation of men to change their attitudes towards females of the family are the urgent need in the context of rising trend of suicide.

Though there is minor concern about adequate quality of the data, it cannot be ignored that the findings of this attempt will help the health planners of India to identify the dominance, intensity and variation of prevalence of diseases and to adopt necessary steps for improving the health status at macro and micro level. From January 1999, the survey of cause of death was integrated with the SRS (Registrar General of India, 1999). It is understood that the SCD-Rural guidelines have been extended to the SRS-COD component. The elimination of the symptom record (SCD-Rural Form-7) has been a major departure from the SCD-Rural design.

CONCLUSIONS

In summary, the two major implications that need to be considered, steps should be taken to improve detection and treatment of diseases at the field level and to examine the feasibility of area specific programmes to combat killer diseases. The new revaluations like globalization and internationalization of health care industry and redistribution of health services may create a new links among corporations, international organizations, government, communities, and families. A comprehensive health policy should address the tension between 'living longer' on the one hand and health-related 'quality of life' on the other to achieve the health targets.

CORRESPONDENCE TO

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AC contributed with data collection, compilation of data sources, design, data analysis, and first draft. AVR involved in data analysis, significance tests, methodology, standardized rates, references and final version and submission.

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