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Disparity in the Pattern of Diseases between Developed and Developing Countries: Case of India and Canada

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Abstract:

During the last few decades, geographers have increasingly being paying serious attention to the differential spatial patterns of diseases and to understand the nature as well as the causes of disparity over space. One of the commonly accepted generalisations pertaining to the pattern of diseases over the World pertains to relatively higher prevalence of infectious and parasitic diseases in the developing countries like India and circulatory and degenerative diseases in developed countries, such as in Canada. Historically, communicable diseases were the main cause of death around the World. With improvement in medical science, health infrastructure and general public awareness, especially after the Wars, the pattern and incidence rates have underwent significant changes. Incidences of communicable diseases have declined in the developed countries, while the developing countries are yet to achieve a satisfactory target in this regard. On the whole, however, the WHO clearly shows that the global pattern of diseases is now shifting from infectious to non-infectious diseases.

India's health standards are relatively low as compared to those in the developed countries. An attempt has been made in the present paper to find out the disparity in the pattern of diseases prevailing in India and Canada and establish its linkages with the socio-economic conditions of the two nations.

Introduction :

The World Health Organization (WHO) had defined health in a broad sense in 1948 as the "state of complete mental and social wellbeing and not merely the absence of diseases or infirmity" (Park, 2009). Geographers consider health, "as a harmonious equilibrium between man and his (her) environment and disease as maladjustment of human organism to its total environment" (Mishra, 2007). In other words, health is the outcome of, or related to the physical and cultural environment whereas; disease is deviation from normal functioning of health.

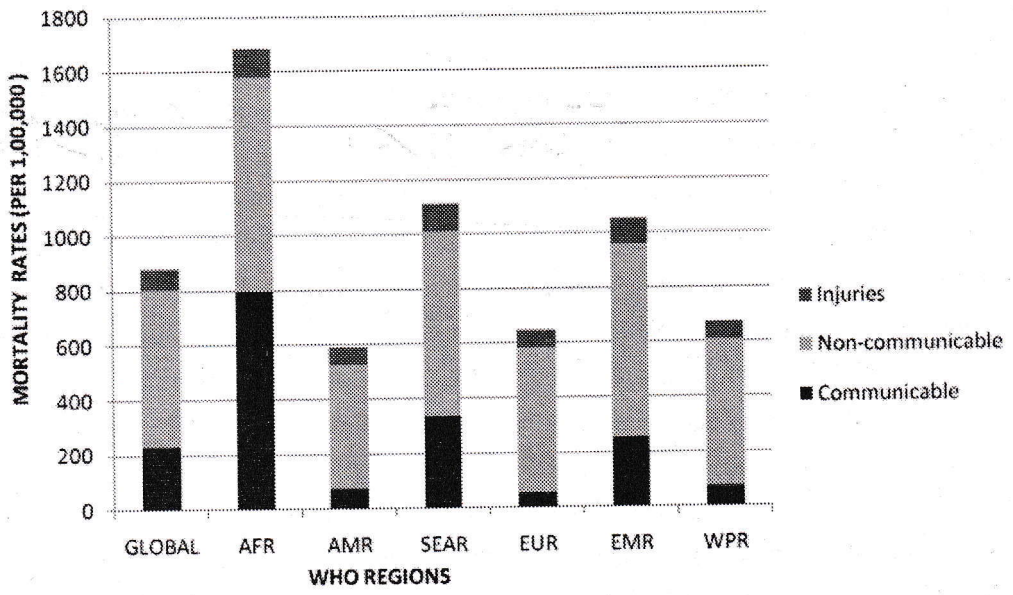
The WHO has divided the World into six geographical regions, viz. African Region (AFR), Regions of Americas (AMR), South-East Asia Region (SEAR), European Region (EUR), Eastern Mediterranean Region (EMR) and Western Pacific Region (WPR). According to the World Health Statistics (2011), average global life expectancy at birth is 68 years. While, life expectancy is high in the AMR (76) followed by the WPR (75), it is the lowest in the AFR (54). The three western regions of AMR, EUR and WPR register the minimum mortality rates. On the other end, health condition of infants, children and women is the worst in the AFR followed by the EMR and SEAR. The AFR records the highest infant mortality rate of 80 per 1,000 live births,

the highest under-five mortality rate of 127 per 1,000 live births, the highest maternal mortality ratio of 620 per 1,000 live births, the highest mortality rate from HIV/AIDS of 177 per 1,00,000 population, the highest mortality rate from malaria of 94 per 1,00,000 population and the highest mortality rate from Tuberculosis of 94 per 1,00,000 population. As compared to the AFR, the performance of the other regions including the SEAR and the EMR is far better.

A perusal of age-standardized mortality rates (Fig. 1) by causes, reveals that the African Region again ranks at the top with the highest mortality rate from communicable diseases (798 per 1,00,000 population), non-communicable diseases (779 per 1,00,000 population) and injuries (174 per 1,00,000 population). The region is followed by the SEAR and EMR in this context. These regions are facing the dual burden of communicable and non-communicable diseases. Condition of the other regions in terms of mortality from communicable diseases is the minimum, varying between 51 to 74 per 1,00,000 population. In terms of mortality due to injuries, however, there is not much variation between the regions. However, for the purpose of detailed investigation, Canada and India have been selected in the present study as representative countries of the developed and developing group of countries respectively. Considering the difficulty of data availability, selection of any country of the AFR has been avoided in the present study.

Fig. - I

Age-Standardized Mortality Rate by Causes (2009)



Source: World Health Statistics 2009.

Objective :

The prime objective of the study is to analyze the disparity in the pattern of diseases between the developed and the developing countries in general and Canada and India in particular.

Sources of Data and Methodology :

The study is primarily based on secondary sources of data. For the purpose of the study, data on demographic structure and various indicators of health and diseases have been collected from various health reports and census records. For data on selected diseases pertaining to Canada and India the Organization for Economic Co-operation and Development (OECD) Health Data 2011 Report and World Health Statistics 2009 Report were consulted. The collected data have been tabulated using appropriate statistical techniques and cartographically represented.

Study Area :

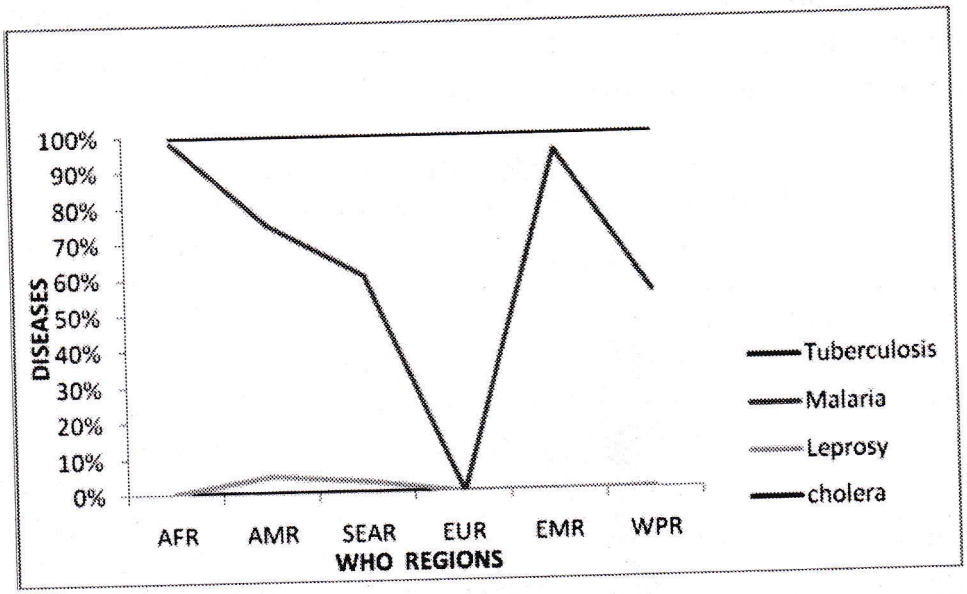
For the purpose of comparative study, India from among the developing countries and Canada from among the developed countries have been selected. In terms of WHO geographical regions, India is a developing country of SEAR and Canada is a developed country of the AMR. Canada is, one of the most developed countries. Located in northern portion of North America, Canada shares its borders with United States in the south and Alaska in the northwest. The expanse of the country stretches from the Atlantic Ocean in the east to the Pacific Ocean in the west. It is surrounded by the Arctic Ocean in the north. The country extends between 41° to 84° north latitude and 52° to 141° west longitude. Canada has the longest coastline of 2,02,080 kms. in the World. The country has a cold climate with temperatures dipping below minus 15 degrees, particularly in the continental areas during winter. The total population of the country is 34,688,000 and with a density of 3.3 persons per sq. km., which is one of the lowest in the World.

India lies in the north-eastern hemisphere between 8°4′ to 37°6′ north latitudes and 68°7′ to 97°25′east longitudes. The Tropic of Cancer passes through the middle of the country. India lies in the tropical realm. With a total geographical area of 32, 872, 63 sq. kms., it accounts for 2.4 per cent of the Earth′s land area. India shares its boundaries with Pakistan and Afghanistan in the northwest, China, Nepal and Bhutan in the north, Myanmar and Bangladesh in the east. It is separated from Sri Lanka in the south by a narrow stretch of the Indian Ocean called Palk Strait. Indian coastline is 7,517 kms. long. Physiography of the country is highly diverse, with the mighty Himalayas in the north, south of which lies the vast stretch of the Indo-Gangetic Plains, the Central Indian Peninsular Plateau, the Coastal Plains and the two groups of Bay of Bengal and Arabian Sea Islands.

Results and Discussion :

It is seen that globally there is great disparity in the patterns of diseases. The type of diseases prevailing in developed countries is markedly different from those in the less developed countries. According to the WHO (2011), as far as communicable or infectious diseases are concerned, Malaria and Tuberculosis are the two major killer diseases in the world. WHO reports a total of 81,735,305 Malaria and 5,797,317, Tuberculosis cases in the World. As is evident from Fig. II, depicting selected infectious diseases for the year 2009 in all the six WHO regions, there is a 100 per cent case of Tuberculosis. This is followed by Malaria. The maximum number of (68,925,435) Malaria cases are reported from the AFR, while the AMR reports the least number (5,61,587) of such cases. Although the number of reported cases of the infectious disease, Leprosy, is very less, it is still prevalent in all the WHO regions. Although the percentage of Leprosy and Cholera cases are very less nearing zero per cent, the maximum number of Cholera cases has been reported from the AFR (2, 03,444) and the minimum from the WPR (2,739).

Fig. II
Selected Infectious Diseases (2009)



According to the WHO report, globally a total of 57 million deaths occurred in 2008, in which 36 million (63%) were due to the various non-communicable diseases, viz. Cancer, Diabetes, Cardiovascular Disease and Chronic Respiratory Diseases. Besides, out of the dead, approximately 80 per cent belonged to the low and middle income group of countries.

Although diseases have not changed significantly through human history, their patterns have. The developed world has shown changes in the pattern of diseases. There is a drastic decline in infectious diseases like Typhoid Fever, Tuberculosis, Polio and Diphtheria etcetera. On the other hand, however, there is an increase in the non-communicable diseases, such as

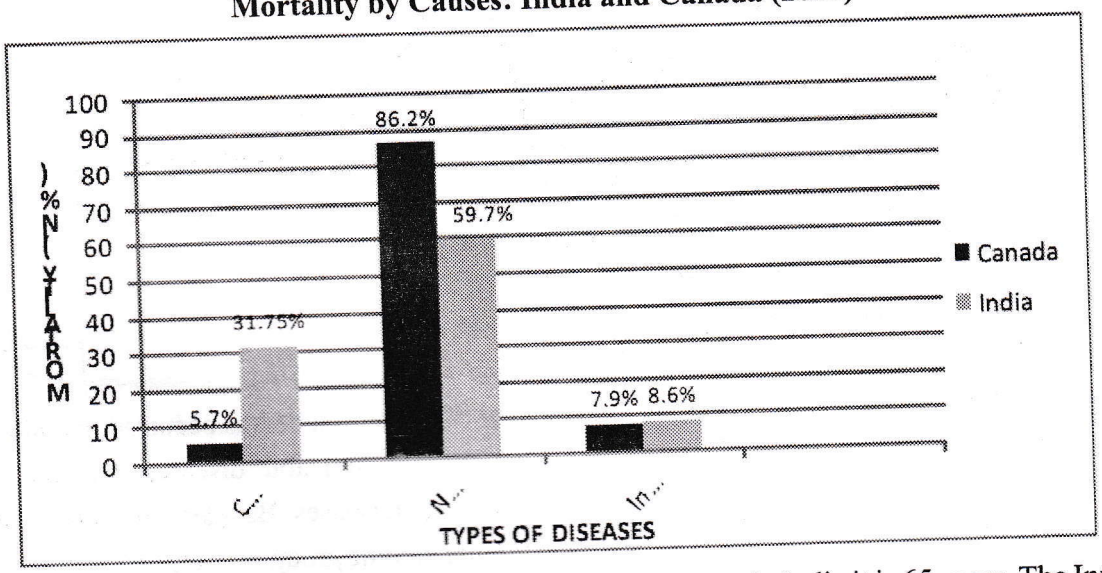
Heart Diseases, Cancer and Diabetes in the developed countries. The disease pattern in the developing countries is totally different. Forty per cent the deaths in the developing countries occur due to infectious, parasitic and respiratory diseases as compared to 8 per cent due to the same causes in the developed countries. There is also an increase in new health problems like Cancer, Diabetes, Hypertension and accident etcetera (Park, 2009).

According to the World Health Statistics of the WHO Report (2009), most of the mortality in Canada is due to the non-communicable type of diseases. The mortality rate of non-communicable diseases is 346 deaths per 1,00,000 population as compared to 685 Mortality deaths per 1,00,000 population in India. Also with respect to communicable diseases, Canada excelled over India with only 23 deaths per 1,00,000 population as against 363 per 1,00,000 population in India. Mortality due to injuries is 32 and 99 deaths per 1,00,000 population in Canada and India respectively.

As is evident from Fig. - III, most of the people die due the non-communicable diseases and very less die due to the communicable diseases in Canada, while in India both types of diseases seem to be active. India is going through a period of both epidemiological and demographic transition. It would not be wrong to suggest that, most of the population is still affected by communicable diseases and the disease pattern is shifting from the communicable type of diseases to non-communicable type of diseases.

Fig. - III

Mortality by Causes: India and Canada (2009)



Life Expectancy at birth is 81 years in Canada, whereas in India it is 65 years. The Infant Mortality Rate of 50 deaths per 1,000 live births in India is ten times higher than that of Canada (5 deaths per 1,000 live births). Under-five mortality rate in India is 66 deaths per 1,000 live births which is only 5 deaths per 1,000 live births in Canada. From these statistics, it is clear that the

condition of infants and children is worst in India as compared to Canada. India, with a Total Fertility Rate (per women) of 2.7 as against 1.6 of Canada is rather more susceptible to the problems of infants and children. Maternal Mortality is also a big problem in most of the developing countries including India. It has a Maternal Mortality rate of 230 deaths per1,00,000 live births which is very high as compared to 12 deaths per 1,00,000 live births in Canada.

The present paper focuses on the some of the indicators of health and diseases of India and Canada to show the disparity between the two countries.

Life Expectancy :

Life Expectancy is the number of years a person is expected to live. Life Expectancy of population living in Canada is 80.1 years, whichis longer than 64.1years in India (2009 year) Which has increased to 82 years and 65 years in Canada and India respectively in 2011 year (World Health Statistic, 2013). This may be due to difference in the standards of living and the health care facilities in the countries – the situation being favorable in case of Canada in comparison to India.

Infant Mortality :

Infant mortality rate in Canada is 5.3 deaths per 1000 live births which is much lower than 50.3 in India (2009). In fact, it is one of the serious problems in most of the developing and less developed countries; mostly due to lack of adequate health facilities and under-nourished mothers especially, the women's from scheduled tribes/caste and women's from the backward classes have poor diets. (NFHS-2, 1998-99).

Another problem which is common to most of the developing and less developed countries is low birth weight of less than 2,500 gms. While around 27.6 per cent of the infants are borne underweight in India, in Canada it is estimated at only about 6.0 per cent. It has been observed that majority of the under-weight children are born to mothers who consume excessive alcohol, have poor nutrition, low Body Mass Index (BMI) and belong to the lower socio-economic category.

Communicable Diseases:

Malaria : Malaria is a typical problem of the developing and tropical countries. Malaria was one of the killer diseases during early of 19th century, in almost all the parts of developed and less developed countries. Due the improvement and advancement in the medical science, it has drastically declined in developed countries, while it still prevails widely in most of the other countries. India had a malaria rate of 1.9 per 1,00,000 population at 2009, whereas there are no cases of malaria reported from Canada.

Tuberculosis : Tuberculosis (TB) which affects the lungs is one of the major diseases of the developing and less developed countries. Mortality rate due to TB in India was 23 deaths per 1,00,000 population as compared to only 0.2 deaths due to the same in Canada (2009). In fact,

India ranks first in the World with respect to this disease. Globally, the TB case detection is done under the DOTS (Directly observed treatment, short course) approach. TB is a disease of the poor. Majority of the Tuberculosis cases are reported from the migrant labourer, slum dweller and tribal segment of the population, which generally suffer from malnutrition, poor living conditions and overcrowding. In India the Tuberculosis cases are more in the males than females (Ibid.).

HIV/AIDS : AIDS or Acquired Immune Deficiency Syndrome is normally caused as a result of HIV (human immuno deficiency virus) infection and can manifest itself as a number of diseases, such as TB and Pneumonia, as the immune system is no longer able to defend the body. HIV/AIDS continues to be a major public health problem in the world, especially in developing and less developed countries. Mortality from HIV/AIDS in Canada is <10 as compared to 14 deaths per 1,00,000 population in India. However, HIV/AIDS incidence in Canada is 6.6 higher than India, where 1.1 per million people is affected (OECD Health Data, 2011).

Non-Communicable Diseases :

Cardiovascular Diseases : A cardiovascular disease is one of the major causes of mortality in all the developed countries. Smoking, obesity, consumption of alcohol increases the risk of cardiovascular diseases. Cardiovascular disease includes all diseases related to heart like stroke, atherosclerosis and high blood pressure. The mortality rate of cardiovascular disease in Canada is 131deaths per 100,000 population, which has been declining in the recent decades. India however surpasses Canada with 382 deaths per 1, 00,000 population, despite a lower incidence rate.

Cancer : This is the second leading cause of the mortality in Canada. Canadian mortality rate due to Cancer was 135 deaths per 1,00,000 populations with an incidence rate of 296.6 per 1,00,000 populations (2009). India reported lower mortality rate of 100 deaths per 1,00,000 populations and incidence rate of 98.5 per 1,00,000 populations than Canada during the same period. Cancer is one of the chronic diseases of the developed countries and developing countries. Obesity, smoking, fat rich diet, and physical inactivity are risk factors for different forms of cancer.

Diabetes : Diabetes is another chronic disease in most of the countries and it is rapidly increasing all over the World. It is characterized by the high level of glucose in the blood. In Canadian population, diabetes prevalence is 9.1 per cent, which is higher than that of India, where it is 7.8 per cent among adults aged more than 20 years of age. Persons suffering from diabetes are always at the greater risk of developing cardiovascular diseases.

Suicide : Suicide is, intentional killing of oneself. Mortality from suicide occurs during the crisis periods associated with disturbed personal relationships, excessive consumption of alcohol and drugs, unemployment and clinical depression etcetera. It is observed that both Canada and India registered an almost identical mortality rate due to suicide with 10.2 and 10.5 deaths per 1,00,000 populations in 2009.

Non-Medical Determinants of Health :

Tobacco Consumption : Tobacco consumption among the adults is responsible for about one in ten deaths worldwide equating to 6 million deaths each year. It is seen that 16.25 per cent of population aged 15 and over are regular smokers in India, which is higher than 10.7 per cent in Canada. Consumption tobacco in Canada greater in the lower socially and economically lower strata of its population in which the prevalence and intensity of smoking is higher. The habit of tobacco consumption in Canada is on the decline from 22 in 1999 to 16 per cent in 2009 (OECD Health Data, 2011).

Alcohol consumption : Alcohol consumption is also one of the health risk factors. Alcohol consumption leads to numerous harmful health and social consequences, such as increased risk of heart stroke, vascular diseases, liver cirrhosis and certain cancers. Canada registered per capita 8.2 liters of alcohol consumption in the population aged 15 years and over, which is higher than that of India, where it is only 0.7 liters for the same age group. This could be because of religious and cultural restrictions in the Indian society.

Obesity : Obesity is also one of the non-medical indicators of health in the world. It is seen that prevalence of obesity in the adults is 24.2 per cent in Canada while it is only about 2.1 per cent in India. Obesity is one of the serious diseases in the developed countries. The main cause of obesity is related with lack of exercise, be inactive and life style. Obesity leads to different health problems, hypertension, high cholesterol, diabetes and musculoskeletal diseases among population.

Health Work force :

Availability of health work force is one of the most important requirements for delivering health services. Health work force comprises of Doctors, Gynecologists, Psychiatrists and Nurses etcetera. Canada has a total of 2.4 practicing doctors per 1,000 population with which India very poorly compares with only 0.7 per 1,000 populations. Similarly, on an average there are 9.4 nurses per 1,000 populations in Canada, while their counterparts in India number only 0.9 per 1000 population. The provision of hospital beds in Canada is 3.3 per 1,000 populations, figuring much higher than 0.5 per 1000 population in India. It is estimated that Canada's total health expenditure was 9.8 per cent of its GDP (2009), in comparison to that of 4.2 per cent of India. The total expenditure by the Indian Government on the health sector is thus extremely low.

Table - I : Mortality Rates in India and Canada (per 1,00,000 Population)

Type of Diseases	Canada	India
Communicable	23 (5.7)	363 (31.7)
Non-Communicable	346 (86.2)	685 (59.7)
Injuries	32 (7.9)	99 (8.6)
Total	401 (100.0)	1,147 (100.0)

From the above discussion and analysis it is clear that the condition of health and disease in India and Canada are totally different from each other. Perusal of the changes in the condition of health and diseases in India reveals gradual changes from 1951 to 2000, particularly between pre-liberalization to post-liberalization periods. Liberalization policy was accepted by the Government of India in the year 1991, which permitted free flow of ideas, technology and finance etcetera from the all over the world. This has directly helped the country's development in almost every field. Among different demographic changes in India, through the years 1951 to 2000, Life Expectancy at birth has increased from 36 years to 64 years. Crude Birth Rate has declined from 40.8 to 26.1 live births per 1,000 populations. Crude Death Rate has also declined from 25.0 to 8.7 deaths per 1,000 population. Infant Mortality Rate also decreased, from 146 to 70 deaths per 1,000 live births (Table - III).

Table - IV depicts the epidemiological shifts over the years in India. It is clear that the incidence of some of the most dreadful diseases has decreased drastically during this period. Some of the killer diseases like Malaria are gradually getting controlled. The number of malaria affected cases has reduced from 75 million to 2.2 million during these 50 years period. Number of Leprosy cases has also reduced from 38.1 to 3.7 cases per 1,000 populations. Small Pox, Guinea Worm diseases have totally been eradicated from the country, while only a few cases of Polio is reported from all over the country, indicating progress in its case (Table - IV).

Improvement of health infrastructure viewed in terms of Sub-Centre/Primary Health Centre, Dispensaries and Hospitals, Doctors and nursing personnel during the same period of reference also seems to be quite impressive in the country.

All these changes seem to have been taking place through the processes of liberalization, urbanization, development and improvement of the infrastructural facilities and socio-economic conditions, development and advancement in the medical sector and also due to success of different Health and Immunization Programmes viz. Measles, DTP3 (3doses of diphtheria-tetanus-pertusis vaccine), HepB3 (3 doses of hepatitis B vaccine), Hib3 (3 doses of haemophilus influenza type B vaccine).

Table - III

India: Demographic Changes over Time

Demographic Aspects	Years		
	1951	1981	2000
Life Expectancy at Birth	36.7	54.0	64.6*
Crude Birth Rate per 1,000 population	40.8	33.9**	26.1**
Crude Death Rate per 1,000 population	25.0	12.5**	8.7**
Infant Mortality Rate per1,000 Live Births	146	110	70**
Population (in millions)	361	683	1027

*Registrar General of India, ** Sample Registration System.

Table - II
Iindicators of Health in Canada and India (2009)

Sr. No.	Indicators of Health	Canada (2009)	India (2009)
1	Life Expectancy (in years)	80.7	64.1
2	**Mortality** (Age standardized rates per 100,000)		
	(a) Cardiovascular disease	131	382
	(b) Cancer	135	296
	(c) HIV/AIDS	<10	14
	(d) Suicide	10.2	10.5
	(e) Infant mortality (Deaths per 1000 live birth.)	5.3	6.23
3	Infant low birth weight (% of newborns weighing less than 2500g)	6.0	27.6
4	Cancer incidence rates (Age standardized rates per 100,000 population)	296.6	98.5
5	Diabetes prevalence(in % ,adult aged 20-79 years)	9.2	7.8
6	AIDS incidence (New cases per million population)	6.6	1.1
7	HIV prevalence (in %)	0.20	0.2
8	Malaria	0.0	1.9
9	Tuberculosis	0.2	23
Non - Medical determinants of Health			
1	Adult population smoking daily (% of population aged 15yrs and over)	16.2	10.7
2	Alcohol consumption (Liters per capita of population aged 15yrs and over)	8.2	0.7
3	Prevalence of obesity among adult (%)	24.2	2.1
Health work force			
1	Practicing Doctors (per 1000 population)	2.4	0.7
2	Gynecologists and obstetricians (per 1,00,000 population)	14.1	-
3	Nurses (per 1000 population)	9.4	0.9
4	Hospital Bed (per 1000 population)	3.3	0.5
Health Expenditure (on Health as % GDP)		9.8	4.2

Source: OECD Health Data 2011, World Health Statistics 2009.

Table - IV
India: Epidemiological Shifts over Time

Diseases	Years		
	1951	1981	2000
Malaria (cases in millions)	75	2.7	2.2
Leprosy (case per 1,000 population)	38.1	57.3	3.7
Small pox (number of cases)	>44,89	Eradicated	N.A
Guinea Worm (number of cases)	N.A	>39,792	Eradicated
Polio	N.A	29,709	265

Table - V
India: Development of Health Infrastructural Facilities over Time

Health Infrastructure	Years		
	1951	1981	2000
Sub-Centre/Primary Health Centre	725	57,363	1,63,181*
Dispensaries and Hospitals(All)	9,209	23,555	43,322**
Doctors	61,800	2,68,700	5,03,900+
Nursing Personnel	18,054	1,43,887	7,37,000#

*1999 Rural Health Survey, **95-96 Central Bureau of Health Investigation, +1998-99 Medical Council of India, # 1999 Indian Nursing Council. Source: National Health Policy, 2002.

Conclusion

Overall it can be concluded that, there is great disparity between Canada and India in terms of the pattern of diseases and health facilities. It is observed that, most of the mortality and morbidity cases in India are due to communicable or infectious type of diseases like Malaria, Tuberculosis, HIV/AIDS (Human Immunodeficiency Virus Infection/Acquired Immune Deficiency Syndrome), Infant Mortality etcetera, from which the lower and poorer section of its population generally suffers. Due to poor living conditions, lack of proper sanitation, health care facility and financial ability, the poorer segment of India's population remains prone to communicable as well as non-communicable type of diseases. In Canada, most of the diseases

are of non-communicable or degenerative type of diseases, such as Cardiovascular, Diabetes and Cancer etcetera, which is more related to the life style, lack of exercise and eating habit. Mortality in Canada due to non-medical factors like smoking, alcohol consumption and obesity, is very high than in India. It is however clear that in both the countries mortality and morbidity due to non-communicable type of diseases is higher in proportion.

In the final analysis it can be said that health status and type of diseases of in Canada and India are different. India is having a dual burden of communicable and non-communicable diseases mostly due to serious loop holes in the health care system, which needs to be taken care of. There is an urgent requirement to improve the health care infrastructure and delivery system in India.

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