CHALLENGES OF AGING AND DEVELOPMENT: GLOBAL PERSPECTIVES

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Abstract: Aging is an essential phenomenon among living organism. Rapidly ageing world represents both challenges and opportunities. The available data indicate that longer lifespan became more common recently in human evolution. During early phase of human origin, the average age of human being was 20-30 years. Currently the average life expectancy of human being for the world is 70 years. In this way, the life expectancy of humans is doubled or tripled. In spite that aging is associated with various morbid conditions; the life expectancy is increasing proportionately to the socio-economic development. Why? And what would be its consequences? The objective of this paper is to understand the process of aging across the nations, to elucidate the trend and extent of life expectancy around the globe and to find out the possible correlates of it using the regression and correlation analysis. The study is based on secondary information collected from Census reports, World fact sheet, Data sheet of population reference bureau (PRB), Human development report, Encyclopaedia Britannica, Wikipaedia and other reliable sources and websites, published and unpublished documents. The data on life expectancy at birth were gathered for 216 countries of the globe. The data on population structure and composition in form of proportion in major age groups 0-14 years, 15-64 years and 65+ years were obtained and young age dependency ratio (YADR), old age dependency ratio (OADR), total dependency ratio (TDR) and index of aging were calculated for the countries. The data on human development index was available for 183 countries. Similarly the data on gender inequality index was available for 143 countries. During upper Paleolithic period the life expectancy of Human being was 33 years, whereas, during 20th century it crossed 65 years. Currently it is 70 years for the world population. In many instances it varied considerably according to class and gender. There is wide variation among the countries around the globe. The lowest was estimated 47.8 years for Sierra Leon whereas highest 83.4 years was estimated for Japan. Further it varies among different groups of nation. It is higher in high-income countries (79.6 years) as compared to middle income countries (68.8 years) and low-income countries (58.4 years). In sub-Saharan Africa it is further lower (53.8 years). In comparison to males, the females have higher life expectancy. The difference varies between 0.1 to 11.9 years in 168 countries. At one end the increased life expectancy is an indicator of better socio-economic condition on the other hand it increasing new challenges with high proportion of aged people. Today more than 7.6 percent of total populations of world are aged (65+ years); in numbers it is 532 million. In some parts of the world, due to increasing life expectancy, the populations of aged individuals are increasing rapidly. The Japan is in top of the list of 183 countries with 22.7% population of 65+ years of age. In the bottom there are United Arab Emirates, Qatar and Sierra Leone respectively with 0.4%, 1.0% and 1.9% of aged population. In 2009, the United Nations estimated that there were 455,000 centenarians worldwide. The United States currently have the greatest number of centenarians of any nation, estimated at 70,490. This corresponds to a national incidence of one centenarian per 4,400 people. Japan has the second-largest number of

centenarians, with an estimated 47,756. To understand the process and correlates of aging the correlation and regression analysis computed which indicate that it have strong correlation with population structure and composition, fertility, mortality, migration and indices of development. It is apparent from present analysis that life expectancy is increasing all over the globe, though the magnitude of increment is declining. It means that the population of aged will also increase day by day along with socio-economic development and improvement in health care facilities. The increasing proportion of aged would need special attention and planning at different level so that our old age may be secured, insured and healthy.

Keywords: Aging, Centenarian, Development, Fertility, Migration.

INTRODUCTION

The phenomenon of aging is common among the living organism. Beyond that, the human being have desire to remain young and immortal. It is strange that no one wants to be aged but everyone wants to live long. The desire of human being to live long is provided wings by the advancement of medical science and technology and resulting into rapidly ageing world. This represents both challenges and opportunities. According to an estimate 70% of all older people now live in low or middle-income countries (http://www.who.int/ ageing/en/). The ageing of population represents an opportunity for societies. If older people can retain their health, and if they live in an environment that promotes their active participation, their experience, skills and wisdom will be good resource for societies. At the same time, where money is the scale of everything, old age people are considered as an economic liability and a social load. Therefore, in demography, the old age dependency ratio is devised. It is common that there are multiple sickness and general inability during old age. There may be long list of problems of aged people but commonly faced problem by old age are: Arthritis, Osteoarthritis, Osteoporosis, Blood Pressure, Diabetes, Obesity, Cardiac disorder, Stroke, Cancer, Renal disorder, Alzheimer's Disease, Mental Illnesses, Prostate enlargement, Tuberculosis, Ophthalmic disorders, skin related diseases and declining of immunity in general etc. After all these problems of aging and aged, the life expectancy is increasing all over the globe due to successive improvement in medical and health care as well as socioeconomic developments. Today most of the nations are blessed with the significant number of centenarians.

When Madame Jeanne Calment died at 122 years of age, gerontologists debated about her extraordinary longevity (Promislow, 1998). According to Westendorp and Kirkwood (1998) this Methushaelian lifespan may have been due to her single issue. Promislow (1998) used data from genealogies of British aristocracy to show that lifespan is negatively correlated with family size. Longevity is also correlated with demographic transition, around 1700 average family size started decreasing and longevity started increasing among the British aristocracy. It was postulated that the observed variation in longevity is hardly due to genetics (Gavrilova et. al, 1998 and Le Bourg, 1993).

Longevity is correlated between parents and offspring, suggesting a heritable basis to ageing; at the same time, it was found that the longevity is correlated between husband and wife. So, it is fair to assume that any correlation of longevity between spouses is due to a shared environment, rather than shared genes (Promislow 1998).

One explanation for evolution of ageing is that senescence followed by mortality provides a mechanism to guard against overcrowding (Wynne-Edwards 1962; Beutler 1986). Then, why life expectancy is increasing? And, what would be its consequences?

To understand the aging of human being two components are required: First, an explanation why ageing occurs at all, and second, special feature of human ageing. Hence, the first objective of this paper is to understand the process of aging across the nations, the second is to elucidate the trend and extent of life expectancy around the globe and the third objective is to find out the possible correlates of it. To achieve these goals data on life expectancy at birth for total population as well as males and females of 216 countries alongwith correlates were obtained form different sources are analyzed.

MATERIAL AND METHODS

This study is based on secondary information collected from Census reports, World fact sheet, Data sheet of population reference bureau (PRB), human development report, Encyclopaedia Britannica, Wikipaedia and other reliable sources. Initially the data obtained from different sources were cross checked for their reliability. The data on life expectancy at birth were gathered for 216 countries of the globe. The data on population structure and composition in form of proportion in major age groups 0-14 years, 15-64 years and 65+ years were obtained and young age dependency ratio (YADR), old age dependency ratio (OADR), total dependency ratio (TDR) and index of aging were calculated for the countries. The data on human development index was available for 183 countries. Similarly the data on gender inequality index was available for 143 countries. All the data were for the year of 2011. For

further editing all the data were entered into an excel worksheet, where the data is filtered. Some of the calculations were also made in excel worksheet. Thereafter the data is transferred to SPSS software for further calculation and analysis.

RESULT

It is evident from Table 1 that there is gradual increment in the life expectancy at birth, during early phase of human origin. During Paleolithic period it was 33 years, whereas during Neolithic period, it was merely 20 years. Here it should be noted that the agriculture was invented during Neolithic period; whereas during Paleolithic period, the human being was completely hunter gatherer. For medieval Britain, the life expectancy was estimated 30 years. During 1200 to 1500 A.D. the life expectancy increased to 43-50 years. In 20th century it crossed 65 years. Currently it is 70 years for the world population. Further it varies among different groups of nation. It is higher in Euro area (80.5 years) and high-income countries (79.6 years) as compared to middle income countries (68.8 years) and low-income countries (58.4 years). In sub-Saharan Africa it is further lower (53.8 years).

In Table 2, the countries of the world are arranged in descending order according to life expectancy at birth, population proportion as per age groups, dependency ratios and index of aging. Japan is in the top of the list of 183 countries with an average life expectancy of 83.4 years. As evident from table that there are 23 countries have life expectancy 80 or 80+ years, whereas 86 countries have life expectancy between 70 and 79.9 years. Similarly, 37 countries have life expectancy between 60 to 69.9 years, 28 countries have life expectancy between 50 to 59.9 years, and 9 countries are at bottom of the list those have life expectancies between 49.6 and 47.8 years.

In comparison to males, the females have higher life expectancy. The difference varies between 0.1 to 11.9 years in 168 countries. The highest difference is found for Russia (11.9 years), followed by Belarus, Lithuania, Ukraine and Estonia (10.3 years) all are European countries. In five countries viz. Qatar, Botswana, Zimbabwe, Swaziland and Lesotho the males have higher life expectancy than female and the difference is 0.7 to 1.9 years. These countries belong to African continent. As apparent from error bar diagramme the difference in life expectancy of females are significantly higher than males (Figure 1)

In some parts of the world, due to increasing life expectancy, the populations of aged individuals are increasing rapidly. The Japan is in top of the list of 183 countries with 22.7% population of 65+ years of age. Germany and Italy are in the second position with 20.4 %. In a total of 51 countries the proportion of aged is between 10-22.7%. In such countries the index of aging (aged/young) is also higher. In the bottom there are United Arab Emirates, Qatar and Sierra Leone respectively with 0.4%, 1.0% and 1.9% of aged population (Table 2).

In 2009, the United Nations estimated that there were 455,000 centenarians worldwide (United Nations 2010). The United States currently has the greatest number of centenarians of any nation, estimated at 70,490 on September 1, 2010. This corresponds to a national incidence of one centenarian per 4,400 people. Japan has the second-largest number of centenarians, with an estimated 47,756 as of September 2011 (The Telegraph 2012). Japan is expected to have 272,000 centenarians by 2050 (United Nations 1998) However, some sources suggest that the number could be closer to 1 million.

The life expectancy is increasing day by day all over the globe. It is doubled or tripled, in a short span of time (1960 to 2009) the average rate of increment was 3.4 (±1.98) years per decade. Although, it was not uniform during the span, the increment was highest (6.7 years) during 1960-70, after that it was gradually declined to 3.6, 2.5 and 1.8 years per decade. For further clarification, the change in annual increment per decade of life expectancy at birth of India and Japan is calculated which indicate that the annual increment in life expectancy per decade was higher during 1960-80, after that there was sharp decline and now it is almost constant (Figure 2) although the trend is declining. On the basis of existing trend it can be projected that the life expectancy of the world population would be near to 100 years by 2100, whereas at the same time it would be 110 years for Japanese.

To understand the trend of increase and its magnitude, a total of 10 countries form top and 10 countries from bottom of list were selected for regression analysis keeping 'life expectancy' as dependent and 'year (1960-2009)' as independent. Similarly, countries were grouped into Euro area, high income, middle income, low income, sub-Saharan Africa and World as a whole. The results of regression analysis are presented in Table 3. It is apparent that regression coefficient is highly significant and positive for 19 countries, world as a whole and group of countries. Although, its magnitude is lower for bottom countries, which already have lower life expectancy (46.7 to 48.9 years). The magnitude of increment of life expectancy during 1960 to 2009 was slow among these countries as compared to top 10 countries of higher life expectancies (81.1 to 82.9 years). For further elucidation the regression coefficient is plotted into bar diagramme (Figure 3) as well as life expectancy of group of countries viz. Euro area, high

income, middle income, low income, sub-Saharan Africa and World as a whole are plotted as line graph (Figure 4).

To find out the correlates and determinants of life expectancy a correlation analysis is computed between life expectancy and 15 variables of 183 countries as displayed in Table 4. These variables can be categorized into four major categories viz. population structure and composition, fertility, mortality, migration and development. Out of 15 variables 13 have high degree of significant correlation with life expectancy. Only two variables namely Net migration rate and sex ratio of total population have insignificant correlation with life expectancy.

To find out the most appropriate determinants stepwise multivariate regression analysis computed. As apparent from Table 5 that there are four models; according to the first model, human development index accounts 83% variability in life expectancy. The Human Development Index (HDI) is a summary measure of human development in three basic dimensions: a long and healthy life, access to knowledge and a decent standard of living (Klugman, Rodriguez and Choi 2011). According to second model there are two predictors of life expectancy one is human development index and second is crude death rate, these both predictor account 89.8% variability, although crude death rate have inverse correlation with the human development index. According to third model beside above two the old age dependency ratio (OADR) is the third predictor and they together account 96% variability. According to fourth model the fourth predictor of life expectancy is crude birth rate and these predictors accounts 96.3% variability.

In the next step when these four predictors were removed from the analysis the remaining probable predictor gives six models according to which there are six predictors viz. Infant mortality rate, young age dependency ratio, sex ratio of aged (65+), total dependency ratio, aging index and sex ratio at birth. According to the first model, infant mortality rate (IMR) alone accounts 72.7% variability. According to second model infant mortality rate and young age dependency ratio together accounts a total of 78.8% variability on life expectancy. In successive models one by one each of remaining predictor added and ultimately these predictors account a total of 84.8% variability on life expectancy (Table 4).

For further analysis these six predictors were removed and remaining variables gives four models according to which total fertility rate, gender inequality index, sex ratio of total population and sex ratio of population belonging to 15-64 years of age accounts 82.1 to 87.5% variability in life expectancy (Table 4). Ultimately, the improvement in socio-economic and health facilities will further increase the life expectancy all over the globe. The increasing life expectancy will change the demographic structure. Fertility will decline to compensate the increasing life expectancy whereas mortality will decline as result of improving conditions of health and infrastructure.

DISCUSSION

To understand the aging of human being two components are required: first, an explanation why ageing occurs at all, and second, special feature of human ageing. In all species the germ line — that is, the lineage of reproductive cells that form the male and female gametes must be immortal (Weismann 1891; Kirkwood and Cremer 1982). Indeed, the central puzzle of gerontology is to explain why the soma—i.e. those parts of organism that are not germ line — is mortal, given that somatic and germ cells consist of the same basic materials (Williams 1957; Kirkwood 1987).

One explanation for evolution of ageing is that senescence provides a mechanism to guard against overcrowding (Wynne-Edwards 1962; Beutler 1986). In this way ageing is a programmed process under active genetic control and that genes have evolved specifically to cause it (Kenyon 1996). In the present analysis, there is high degree of significant and inverse correlation between life expectancy and fertility rates corroborate the hypothesis that senescence provides a mechanism to guard against overcrowding. With increasing life expectancy, the proportion of aged (65^{+}) is also increasing at the same time the proportion of younger individuals is decreasing due to reduction in fertility rate. In this way, population structure is changing. The reason behind increasing life expectancy is reduction in mortality rates through improvements in health, nutrition, and medical care. A healthy diet and vaccinations have greatly improved an individual's life expectancy, while an outbreak of disease, malnutrition, and social unrest may lower an individual's life expectancy. Hence there is high degree of inverse correlation between life expectancy and mortality rates, young age dependency ratio (YADR) and total dependency ratio (TDR).

The social and economic conditions of each country will undoubtedly affect its citizens, their lifestyles and decisions. Citizens of wealthier countries have access to modern medicine and medical facilities, the leisure to exercise, and meticulous regulation of sanitation and drinking water. Their life expectancies, therefore, naturally should be higher than those of less developed countries. However, this is not always the case. As the United Kingdom ranked 23rd and the United State of America ranked 43rd overall in terms

of life expectancy among all countries. Japan, Germany, Italy, Greece, Spain, Sweden, Switzerland and France all ranked above the United States.

CONCLUSION

There is no doubt that aging is a problem for an individual as well as for the society. An individual experience multiple sickness and general inability with growing age. Different medical aid is required for their better and healthy survival. As a result of improvements in health, nutrition, and medical care centenarians and super centenarians can be seen in many parts of the world. Life expectancy at birth had increased two to three folds and it will further increase with the improvement in medical and health sector. New researches in the field of human genome will further delay the death and increase life expectancy at birth. It is apparent from present analysis that life expectancy is increasing all over the globe, though the magnitude of increment is declining. It means that the population of aged will also increase day by day which need special attention and planning at different level so that our old age may be secured, insured and healthy.

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Table 1: Life expectancy at birth pre-historic and historic perspectives

Era/Year	**Life Expectancy at Birth (years)**
Upper Paleolithic	33
Neolithic	20
Bronze and Iron Age	26
Medieval Britain	30
1200-1300 A.D	43
1400-1500 A.D.	48
1500-1550 A.D.	50
1900	50.5
1960	52.6
1970	59.3
1980	62.9
1990	65.4
2000	67.2
2009	69.4

Table 2: Country wise life expectancy, population proportion in major age groups, dependency ratio and index of aging.

S.No.	Country	Continent	Life expectancy at birth (years) 2011	Life expectancy (f)	Life expectancy (m)	difference in female and male	Pop %<14 yrs	pop % 15-64 yrs	pop % 65+ yrs	YADR	OADR	TDR	Index of Aging
1	Japan	Asia	83.4	86.4	79.6	6.8	13.4	64.0	22.7	20.9	35.5	56.4	1.698
2	Germany	Europe	80.4	82.5	77.3	5.2	13.5	66.1	20.4	20.4	30.8	51.2	1.512
3	Italy	Europe	81.9	84.1	78.9	5.2	14.1	65.6	20.4	21.4	31.0	52.5	1.447
4	Latvia	Europe	73.3	78.1	68.3	9.8	13.8	68.4	17.8	20.3	26.0	46.3	1.285
5	Bulgaria	Europe	73.4	77.1	69.9	7.2	13.7	68.8	17.5	19.9	25.5	45.4	1.278
6	Greece	Europe	79.9	82.8	77.7	5.1	14.6	66.9	18.6	21.8	27.7	49.5	1.274
7	Austria	Europe	80.9	82.9	77.4	5.5	14.7	67.7	17.6	21.8	26.0	47.8	1.195
8	Portugal	Europe	79.5	81.8	75.8	6.0	15.1	66.9	17.9	22.6	26.8	49.4	1.187
9	Slovenia	Europe	79.3	82.3	75.8	6.5	13.9	69.6	16.5	20.0	23.6	43.6	1.184
10	Croatia	Europe	76.6	79.6	72.9	6.7	15.0	67.8	17.2	22.1	25.4	47.5	1.149
11	Spain	Europe	81.4	84.6	78.5	6.1	15.0	68.1	17.0	22.0	24.9	46.9	1.134
12	Hungary	Europe	74.4	77.9	70.1	7.8	14.7	68.8	16.5	21.4	24.0	45.4	1.123
13	Estonia	Europe	74.8	80.1	69.8	10.3	15.3	67.5	17.2	22.7	25.5	48.2	1.122
14	Hong Kong	Asia	82.8	85.9	79.7	6.2	11.5	75.8	12.7	15.2	16.8	32.0	1.107
15	Sweden	Europe	81.4	83.4	79.4	4.0	16.5	65.2	18.2	25.4	28.0	53.3	1.103
16	Switzerland	Europe	82.3	84.4	79.8	4.6	15.2	68.1	16.7	22.4	24.5	46.9	1.096

17	Ukraine	Europe	68.5	74.9	63.8	11.1	14.2	70.3	15.5	20.2	22.0	42.2	1.088
18	Lithuania	Europe	72.2	78.6	67.5	11.1	14.9	69.1	16.1	21.5	23.2	44.8	1.080
19	Czech Republic	Europe	77.7	80.1	74.2	5.9	14.0	71.1	14.8	19.7	20.9	40.6	1.059
20	Finland	Europe	80.0	83.1	76.5	6.6	16.5	66.2	17.2	25.0	26.0	51.0	1.042
21	Belgium	Europe	80.0	82.4	77.2	5.2	16.9	65.7	17.4	25.7	26.5	52.2	1.034
22	Romania	Europe	74.0	77.1	69.7	7.4	15.2	69.9	14.9	21.7	21.3	43.1	0.982
23	United Kingdom	Europe	80.2	82.1	78.1	4.0	17.4	66.0	16.6	26.3	25.1	51.4	0.955
24	Malta	Europe	79.6	82.2	77.7	4.5	15.0	71.0	14.1	21.1	19.8	40.9	0.939
25	Bosnia and Herzegovina	Europe	75.7	77.9	72.7	5.2	15.0	70.9	14.0	21.2	19.8	41.0	0.933
26	Poland	Europe	76.1	80.1	71.5	8.6	14.8	71.6	13.6	20.7	19.0	39.7	0.921
27	France	Europe	81.5	84.5	77.8	6.7	18.4	64.8	16.8	28.3	25.9	54.2	0.914
28	Denmark	Europe	78.8	80.8	76.5	4.3	18.0	65.5	16.5	27.5	25.1	52.6	0.914
29	Belarus	Europe	70.3	76.4	64.7	11.7	15.0	71.4	13.6	21.0	19.0	40.0	0.904
30	Netherlands	Europe	80.7	82.7	78.5	4.2	17.7	67.0	15.3	26.4	22.9	49.3	0.865
31	Georgia	Asia	73.7	76.8	69.7	7.0	16.6	69.1	14.3	24.0	20.7	44.7	0.865
32	Canada	North America	81.0	83.0	78.4	4.6	16.4	69.5	14.1	23.6	20.3	44.0	0.860
33	Russia	Europe	68.8	74.7	62.8	11.9	15.0	72.2	12.8	20.8	17.7	38.6	0.851
34	Serbia	Europe	74.5	76.4	71.1	5.3	17.6	68.1	14.3	25.9	21.1	46.9	0.815
35	Slovakia	Europe	75.4	78.7	71.3	7.4	15.1	72.8	12.1	20.8	16.6	37.4	0.799
36	Luxembourg	Europe	80.0	82.7	77.6	5.1	17.7	68.4	13.9	25.8	20.4	46.2	0.788
37	Norway	Europe	81.1	83.1	78.6	4.5	18.7	66.6	14.7	28.1	22.0	50.2	0.784
38	Cuba	North America	79.1	80.8	76.8	4.0	17.3	70.3	12.4	24.6	17.6	42.3	0.715
39	Australia	Australia & Oceania	81.9	83.9	79.3	4.6	19.0	67.6	13.4	28.1	19.9	48.0	0.708
40	Moldova	Europe	69.3	72.5	64.9	7.5	16.7	72.2	11.2	23.1	15.5	38.6	0.669
41	Barbados	North America	76.8	79.7	73.3	6.5	17.4	71.2	11.4	24.4	16.0	40.5	0.657
42	Cyprus	Asia	79.6	81.4	77.1	4.3	17.8	70.7	11.6	25.1	16.4	41.5	0.651
43	United States	North America	78.5	80.6	75.7	4.9	20.1	66.9	13.1	30.0	19.5	49.6	0.650
44	Montenegro	Europe	74.6	76.6	71.8	4.9	19.2	68.3	12.5	28.1	18.2	46.4	0.649
45	New Zealand	Australia & Oceania	80.7	82.4	78.3	4.0	20.5	66.5	13.0	30.8	19.6	50.4	0.635
46	Uruguay	South America	77.0	79.8	72.6	7.3	22.5	63.7	13.8	35.3	21.6	56.9	0.611
47	Iceland	Europe	81.8	83.3	79.7	3.6	20.8	67.2	12.0	31.0	17.9	48.9	0.577
48	Armenia	Asia	74.2	77.0	70.5	6.5	20.2	68.7	11.1	29.4	16.2	45.6	0.551
49	Ireland	Europe	80.6	81.9	77.2	4.7	21.2	67.1	11.7	31.6	17.4	49.0	0.551
50	Singapore	Asia	81.1	83.7	79.0	4.7	17.4	73.6	9.0	23.6	12.2	35.9	0.518
51	Thailand	Asia	74.1	77.3	70.4	6.8	20.5	70.6	8.9	29.1	12.6	41.7	0.433
52	Albania	Europe	76.9	80.0	73.7	6.3	22.7	67.7	9.7	33.5	14.3	47.8	0.426
53	Argentina	South America	75.9	79.3	71.8	7.5	24.9	64.5	10.6	38.5	16.4	54.9	0.426
54	China	Asia	73.5	74.8	71.4	3.4	19.5	72.4	8.2	26.9	11.3	38.2	0.421
55	Chile	South America	79.1	81.9	75.8	6.1	22.1	68.6	9.3	32.2	13.5	45.7	0.418
56	Israel	Asia	81.6	83.5	79.7	3.8	27.2	62.3	10.4	43.7	16.7	60.4	0.382
57	Trinidad and Tobago	North America	70.1	73.1	66.1	7.0	20.6	72.4	7.0	28.4	9.6	38.0	0.338
58	Sri Lanka	Asia	74.9	77.7	71.6	6.2	24.9	67.0	8.2	37.1	12.2	49.3	0.328
59	Mauritius	Africa	73.4	76.6	69.4	7.2	21.9	71.2	6.9	30.7	9.7	40.4	0.315
60	Azerbaijan	Asia	70.7	73.4	67.4	5.9	20.9	72.6	6.6	28.8	9.0	37.8	0.314
61	Bahamas, The	North America	75.6	78.2	71.9	6.2	22.5	70.6	6.8	31.9	9.7	41.6	0.303
62	Tunisia	Africa	74.5	76.5	72.5	4.0	23.5	69.6	7.0	33.7	10.0	43.7	0.296
63	Lebanon	Asia	72.6	74.4	70.1	4.3	24.8	67.9	7.3	36.5	10.7	47.2	0.294
64	Kazakhstan	Asia	67.0	73.5	63.6	9.9	24.5	68.7	6.8	35.6	9.9	45.5	0.277
65	Brazil	South	73.5	76.4	69.3	7.1	25.5	67.5	7.0	37.7	10.4	48.0	0.275

		America											
66	Jamaica	North America	73.1	75.3	70.0	5.3	29.1	63.1	7.8	46.0	12.4	58.5	0.270
67	Costa Rica	North America	79.3	81.6	76.7	4.9	24.9	68.6	6.5	36.3	9.5	45.8	0.262
68	Grenada	North America	76.0				27.5	65.3	7.2	42.2	11.0	53.3	0.261
69	Saint Lucia	North America	74.6	76.9	71.7	5.3	25.9	67.4	6.7	38.4	10.0	48.4	0.261
70	Saint Vincent and the Grenadines	North America	72.3	74.1	69.9	4.2	26.5	66.7	6.8	39.7	10.2	49.9	0.256
71	Vietnam	Asia	75.2	76.6	72.7	3.9	23.6	70.4	6.0	33.5	8.5	42.1	0.254
72	Iran	Asia	73.0	74.4	70.7	3.7	22.9	71.8	5.2	31.9	7.3	39.2	0.228
73	Panama	North America	76.1	78.5	73.3	5.2	29.0	64.5	6.6	44.9	10.2	55.1	0.228
74	Turkey	Asia	74.0	75.8	71.2	4.6	26.4	67.7	6.0	39.0	8.8	47.8	0.227
75	Suriname	South America	70.6	73.4	66.8	6.6	28.6	65.0	6.5	44.0	9.9	53.9	0.226
76	Mexico	North America	77.0	79.0	74.1	4.9	29.1	64.6	6.3	45.1	9.8	54.9	0.218
77	El Salvador	North America	72.2	76.4	66.9	9.5	32.0	61.0	7.0	52.4	11.4	63.8	0.218
78	Ecuador	South America	75.6	78.3	72.4	5.9	30.3	63.4	6.2	47.8	9.8	57.7	0.206
79	Indonesia	Asia	69.4	70.1	66.9	3.2	27.0	67.4	5.6	40.1	8.2	48.3	0.205
80	Peru	South America	74.0	76.2	71.0	5.3	30.0	63.9	6.1	46.9	9.5	56.4	0.203
81	Dominican Republic	North America	73.4	75.8	70.2	5.6	31.0	62.7	6.3	49.5	10.0	59.5	0.202
82	Maldives	Asia	76.8	77.3	75.2	2.1	26.6	68.2	5.2	39.0	7.7	46.7	0.197
83	Morocco	Africa	72.2	73.9	69.4	4.5	28.0	66.5	5.5	42.1	8.3	50.4	0.196
84	Colombia	South America	73.7	77.0	69.6	7.4	28.7	65.6	5.6	43.8	8.6	52.3	0.195
85	Venezuela	South America	74.4	77.0	71.0	5.9	29.5	64.9	5.6	45.4	8.6	54.0	0.190
86	Cape Verde	Africa	74.2	77.5	69.8	7.7	31.8	62.3	5.9	51.0	9.5	60.5	0.186
87	Algeria	Africa	73.1	74.1	71.2	2.9	27.0	68.4	4.6	39.6	6.7	46.3	0.170
88	Fiji Islands	Australia & Oceania	69.2	72.0	66.3	5.7	29.0	66.1	4.8	43.9	7.3	51.2	0.166
89	Bhutan	Asia	67.2	68.5	64.7	3.8	29.4	65.8	4.8	44.7	7.3	52.0	0.162
90	India	Asia	65.4	66.3	63.3	3.0	30.6	64.5	4.9	47.4	7.6	55.1	0.161
91	Egypt	Africa	73.2	74.7	70.9	3.8	31.5	63.4	5.0	49.7	7.9	57.6	0.160
92	Malaysia	Asia	74.2	76.1	71.6	4.4	30.3	64.9	4.8	46.7	7.3	54.1	0.157
93	Tonga	Australia & Oceania	72.3	74.9	69.2	5.7	37.5	56.7	5.9	66.1	10.4	76.5	0.157
94	South Africa	Africa	52.8	52.4	50.8	1.6	30.1	65.2	4.6	46.2	7.1	53.3	0.154
95	Paraguay	South America	72.5	74.2	70.0	4.2	33.5	61.4	5.1	54.7	8.3	63.0	0.152
96	Uzbekistan	Asia	68.3	71.0	64.7	6.3	29.4	66.3	4.4	44.3	6.6	50.9	0.148
97	Mongolia	Asia	68.5	72.0	63.9	8.0	27.6	68.3	4.1	40.4	6.0	46.4	0.148
98	Kyrgyzstan	Asia	67.7	73.2	65.2	8.0	30.0	65.5	4.4	45.9	6.8	52.6	0.147
99	Bangladesh	Asia	68.9	68.9	67.8	1.1	31.3	64.1	4.6	48.8	7.2	56.0	0.147
100	Libya	Africa	74.8	77.2	72.0	5.2	30.4	65.3	4.3	46.6	6.6	53.2	0.142
101	Turkmenistan	Asia	65.0	69.0	60.7	8.3	29.2	66.6	4.1	43.9	6.2	50.0	0.141
102	Brunei	Asia	78.0	80.2	75.5	4.7	26.2	70.2	3.6	37.3	5.1	42.4	0.136
103	Nicaragua	North America	74.0	76.6	70.4	6.2	34.5	60.9	4.6	56.6	7.6	64.1	0.134
104	Samoa	Australia & Oceania	72.4	75.3	69.0	6.2	37.8	57.1	5.0	66.2	8.8	75.0	0.133
105	Bolivia	South	66.6	68.2	63.8	4.4	36.1	59.2	4.7	60.9	7.9	68.8	0.130

		America											
106	Guyana	South America	69.9	72.5	66.1	6.4	33.6	62.1	4.3	54.1	6.9	61.0	0.128
107	Botswana	Africa	53.2	52.2	53.8	-1.6	32.6	63.4	4.0	51.3	6.3	57.6	0.123
108	Haiti	North America	62.1	62.6	60.3	2.2	35.9	59.7	4.4	60.2	7.4	67.6	0.122
109	Gabon	Africa	62.7	62.9	60.8	2.1	35.5	60.2	4.3	58.9	7.2	66.1	0.122
110	Pakistan	Asia	65.4	65.8	64.1	1.7	35.4	60.3	4.3	58.6	7.1	65.8	0.122
111	Cambodia	Asia	63.1	63.4	60.8	2.6	31.9	64.3	3.8	49.6	5.9	55.5	0.119
112	Honduras	North America	73.1	74.9	70.2	4.7	36.8	58.9	4.3	62.4	7.3	69.7	0.117
113	Nepal	Asia	68.8	68.8	67.3	1.5	36.2	59.6	4.2	60.7	7.0	67.7	0.115
114	Lesotho	Africa	48.2	45.9	47.4	-1.4	37.4	58.3	4.3	64.1	7.4	71.5	0.115
115	Belize	North America	76.1	77.1	74.2	2.9	35.0	61.0	4.0	57.4	6.5	63.9	0.113
116	Zimbabwe	Africa	51.4	47.5	49.4	-1.9	38.9	56.9	4.2	68.3	7.4	75.7	0.108
117	Syria	Asia	75.9	77.1	74.1	3.0	36.9	59.2	3.9	62.4	6.7	69.1	0.107
118	Jordan	Asia	73.4	74.6	71.8	2.8	37.5	58.6	3.9	64.0	6.7	70.7	0.104
119	Guatemala	North America	71.2	74.2	67.1	7.1	41.5	54.2	4.3	76.6	8.0	84.5	0.104
120	Bahrain	Asia	75.1	75.6	74.2	1.3	20.0	77.9	2.1	25.7	2.6	28.4	0.103
121	Philippines	Asia	68.7	71.7	64.9	6.7	35.4	60.9	3.6	58.2	6.0	64.1	0.103
122	Namibia	Africa	62.5	62.2	61.0	1.2	36.4	59.9	3.7	60.8	6.1	66.9	0.101
123	Micronesia, Federated States of	Australia & Oceania	69.0	69.4	67.8	1.6	36.5	59.8	3.7	61.1	6.1	67.3	0.100
124	Ghana	Africa	64.2	64.3	62.5	1.9	38.6	57.6	3.8	67.0	6.6	73.6	0.099
125	Central African Republic	Africa	48.4	48.4	45.4	3.0	40.4	55.6	4.0	72.6	7.1	79.7	0.098
126	Saudi Arabia	Asia	73.9	74.8	72.6	2.2	30.3	66.7	3.0	45.5	4.4	49.9	0.097
127	Sao Tome and Principe	Africa	64.7	85.9	80.2	5.7	40.3	55.8	3.9	72.2	6.9	79.2	0.096
128	Kuwait	Asia	74.6	75.4	73.6	1.8	26.7	70.8	2.5	37.7	3.5	41.3	0.094
129	Tajikistan	Asia	67.5	70.3	63.8	6.5	37.0	59.5	3.5	62.1	5.8	68.0	0.094
130	Oman	Asia	73.0	75.3	70.8	4.4	27.2	70.3	2.5	38.6	3.6	42.3	0.094
131	Cote d'Ivoire	Africa	55.4	55.1	53.1	2.1	40.9	55.3	3.8	74.1	6.9	80.9	0.093
132	Djibouti	Africa	57.9	58.6	55.7	2.9	35.8	60.9	3.3	58.8	5.4	64.2	0.092
133	Congo (the Democratic Republic)	Africa	48.4	57.8	55.4	2.4	40.6	55.7	3.7	72.8	6.6	79.4	0.090
134	Vanuatu	Australia & Oceania	71.0	72.6	68.6	3.9	38.2	58.3	3.5	65.6	5.9	71.5	0.090
135	Sudan	Africa	61.5	62.6	59.1	3.5	40.1	56.3	3.6	71.1	6.3	77.5	0.089
136	Swaziland	Africa	48.7	47.5	48.2	-0.7	38.4	58.2	3.4	65.9	5.8	71.7	0.087
137	Cameroon	Africa	51.6	51.6	49.6	1.9	40.6	55.9	3.5	72.6	6.3	78.9	0.086
138	Togo	Africa	57.1	57.7	54.8	3.0	39.6	56.9	3.4	69.6	6.0	75.6	0.086
139	Guinea-Bissau	Africa	48.1	48.8	45.9	3.0	41.3	55.4	3.3	74.6	6.0	80.6	0.081
140	Ethiopia	Africa	59.3	59.7	56.6	3.1	41.5	55.2	3.3	75.1	6.0	81.2	0.080
141	Solomon Islands	Australia & Oceania	67.9	68.5	65.7	2.7	39.7	57.1	3.2	69.6	5.5	75.1	0.079
142	Nigeria	Africa	51.9	51.8	50.2	1.6	42.8	53.8	3.4	79.6	6.3	85.9	0.079
143	Guinea	Africa	54.1	54.8	51.6	3.1	42.9	53.8	3.3	79.8	6.2	86.0	0.078
144	Qatar	Asia	78.4	77.6	78.3	-0.7	13.5	85.5	1.0	15.8	1.2	17.0	0.077
145	Iraq	Asia	69.0	71.9	64.5	7.4	43.2	53.6	3.3	80.6	6.1	86.7	0.076
146	Burundi	Africa	50.4	50.8	48.1	2.7	37.9	59.3	2.9	63.9	4.8	68.7	0.075
147	Mozambique	Africa	50.2	50.4	48.2	2.1	44.1	52.6	3.3	83.8	6.3	90.1	0.075
148	Equatorial Guinea	Africa	51.1	51.9	49.3	2.6	39.2	57.9	2.9	67.8	5.0	72.9	0.074
149	Madagascar	Africa	66.7	67.8	64.7	3.1	43.1	53.8	3.1	80.2	5.8	86.0	0.073
150	Papua New Guinea	Australia &	62.8	64.2	60.0	4.2	39.1	58.2	2.8	67.1	4.8	71.9	0.071

		Oceania											
151	Tanzania	Africa	58.2	57.5	55.8	1.7	44.7	52.1	3.1	85.7	6.0	91.8	0.070
152	Benin	Africa	56.1	57.1	53.4	3.7	43.7	53.3	3.0	82.0	5.7	87.7	0.070
153	Mauritania	Africa	58.6	59.6	56.3	3.4	39.9	57.4	2.7	69.5	4.7	74.1	0.068
154	Malawi	Africa	54.2	52.7	52.7	0.0	45.8	51.1	3.1	89.7	6.0	95.7	0.067
155	Zambia	Africa	49.0	48.2	47.4	0.8	46.4	50.6	3.1	91.7	6.0	97.7	0.066
156	Liberia	Africa	56.8	56.5	54.5	2.0	43.5	53.7	2.8	81.0	5.2	86.2	0.064
157	Comoros	Africa	61.1	61.6	58.9	2.7	42.6	54.7	2.7	77.9	5.0	82.9	0.064
158	Timor-Leste	Asia	62.5	62.5	60.6	1.8	46.2	50.9	2.9	90.9	5.8	96.6	0.063
159	Chad	Africa	49.6	50.3	47.5	2.8	45.4	51.7	2.9	87.9	5.6	93.5	0.063
160	Kenya	Africa	57.1	56.9	54.8	2.1	42.5	54.9	2.7	77.3	4.8	82.2	0.062
161	Rwanda	Africa	55.4	56.0	53.4	2.5	42.6	54.7	2.7	78.0	4.9	82.8	0.062
162	Eritrea	Africa	61.6	62.9	58.3	4.6	41.6	55.9	2.5	74.4	4.4	78.8	0.060
163	Yemen	Asia	65.5	66.1	63.2	2.9	44.2	53.2	2.6	83.1	4.8	87.9	0.058
164	Congo (Republic)	Africa	57.4	49.4	46.3	3.1	46.3	51.1	2.7	90.6	5.2	95.9	0.058
165	Senegal	Africa	59.3	59.7	57.6	2.0	43.7	53.9	2.4	81.0	4.5	85.5	0.055
166	Angola	Africa	51.1	51.7	48.9	2.9	46.6	50.9	2.5	91.4	4.9	96.3	0.053
167	Uganda	Africa	54.1	53.7	52.5	1.2	48.4	49.1	2.5	98.7	5.1	103.8	0.052
168	Gambia, The	Africa	58.5	59.0	56.7	2.3	44.0	53.8	2.2	81.7	4.0	85.7	0.049
169	Burkina Faso	Africa	55.4	55.5	53.5	2.0	45.3	52.4	2.2	86.4	4.2	90.7	0.049
170	Afghanistan	Asia	48.7	48.1	47.8	0.3	46.4	51.3	2.2	90.5	4.4	94.9	0.048
171	Mali	Africa	51.4	51.6	49.5	2.1	47.2	50.6	2.2	93.1	4.3	97.5	0.047
172	Niger	Africa	54.7	54.3	53.4	0.9	49.0	48.8	2.2	100.3	4.5	104.8	0.045
173	Sierra Leone	Africa	47.8	47.6	46.4	1.2	43.0	55.1	1.9	78.0	3.4	81.4	0.044
174	United Arab Emirates	Asia	76.5	77.3	75.5	1.8	17.0	82.5	0.4	20.6	0.5	21.2	0.025
175	Andorra	Europe	80.9										
176	Liechtenstein	Europe	79.6										
177	Dominica	North America	77.5										
178	Seychelles	Africa	73.6	77.9	68.4	9.5							
179	Saint Kitts and Nevis	North America	73.1										
180	Antigua and Barbuda	North America	72.6										
181	Palau	Australia & Oceania	71.8										
182	Kiribati	Australia & Oceania	68.1										
183	Laos	Asia	67.5										
		Min	**47.8**	**45.9**	**45.4**	**-1.9**	**11.5**	**48.8**	**0.4**	**15.2**	**0.5**	**17.0**	**0.0**
		Max	**82.8**	**85.9**	**80.2**	**11.9**	**49.0**	**85.5**	**18.6**	**100.3**	**28.0**	**104.8**	**1.3**
		Average	**69.3**	**71.0**	**66.5**	**4.5**	**29.3**	**63.4**	**7.3**	**48.5**	**11.1**	**59.6**	**0.4**
		SD	**9.6**	**10.8**	**9.5**	**2.6**	**10.5**	**6.9**	**5.0**	**22.5**	**7.0**	**18.1**	**0.4**

Table 3: Regression Analysis of life expectancy and time (1960-2009) among top and bottom ten countries and selected regions of the world.

Countries	R^2	B±SE	df	F-value	t-value	P-value
Top ten countries with highest life expectancy						
Japan	0.967	0.3±0.008	48	1364.7	36.9	0.001
Hong Kong SAR, China	0.993	0.3±0.004	48	6227.5	78.9	0.001
Switzerland	0.995	0.2±0.002	48	8521.5	92.3	0.001
Australia	0.983	0.2±0.005	48	2748.1	52.4	0.001
Spain	0.986	0.2±0.004	48	3280.2	57.2	0.001
Iceland	0.984	0.2±0.003	48	2833.7	53.2	0.001
Italy	0.996	0.3±0.002	48	12622.8	112.3	0.001
Sweden	0.989	0.2±0.003	48	4358.6	66.0	0.001
Singapore	0.996	0.3±0.003	48	11191.9	105.7	0.001
France	0.998	0.2±0.002	48	20345.0	142.6	0.001
Bottom ten countries with lowest life expectancy						
Chad	0.626	0.2±0.019	48	78.5	8.8	0.001
Zimbabwe	0.219	-0.2±0.052	48	13.1	-3.7	0.001
Afghanistan	0.993	0.3±0.004	48	6359.5	79.7	0.001
Swaziland	0.049	0.07±0.049	48	2.4	1.5	0.001
Zambia	0.210	-0.1±0.029	48	12.4	-3.5	0.001
Congo, Dem. Rep.	0.732	0.1±0.009	48	128.5	11.3	0.001
Guinea-Bissau	0.994	0.2±0.003	48	8130.2	90.1	0.001
Sierra Leone	0.546	0.2±0.028	48	56.4	7.5	0.001
Central African Republic	0.256	0.1±0.034	48	16.1	4.0	0.001
Lesotho	0.0	0.004±0.048	48	0.007	0.08	0.934
World	0.927	0.282±0.014	33	407.3	20.1	0.001
Euro area	0.998	0.2±0.002	33	14649.6	121.0	0.001
High income	0.997	0.2±0.002	33	12137.1	110.1	0.001
Middle income	0.901	0.3±0.020	33	292.6	17.1	0.001
Low income	0.964	0.3±0.010	33	848.3	29.1	0.001
Sub-Saharan Africa (all income levels)	0.852	0.2±0.015	33	184.6	13.5	0.001

Table 4: Pearson correlation between life expectancy and its probable determinants among 183 countries all over the world

	Life expectancy at birth years 2011	Aging Index	YADR	OADR	TDR	Crude Death Rate	Infant Mortality Rate	Crude Birth Rate	Total fertility rate 2011	Net Migration Rate per 1000	Sex ratio at birth 2011	Sex ratio 15-64	Sex ratio 65 and above	Sex ratio Total Population	Human Development Index HDI 2011	Gender Inequality Index 2011
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)	1	00.614**	-0.815**	0.634**	-0.758**	-0.637**	-0.871**	-0.853**	-0.821**	0.136	0.471**	0.175*	0.083	0.09	0.902**	-0.799**
(2)		1	-0.748**	0.972**	-0.532**	0.162*	-0.592**	-0.738**	-0.641**	0.144	0.376**	-0.113	-0.374**	-0.269**	0.708**	-0.796**
(3)			1	-0.715**	0.956**	0.299**	0.787**	0.966**	0.950**	-0.202**	-0.503**	-0.170*	0.098	-0.044	-0.878**	0.843**
(4)				1	-0.479**	0.149*	-0.599**	-0.726**	-0.625**	0.088	0.364**	-0.181*	-0.408**	-0.328**	0.719**	-0.798**
(5)					1	0.438**	0.737**	0.909**	0.931**	-0.217**	-0.480**	-0.289**	-0.047	-0.193*	-0.801**	0.710**
(6)						1	0.516**	0.353**	0.414**	-0.087	-0.230**	-0.356**	-0.484**	-0.398**	-0.425**	0.224**
(7)							1	0.828**	0.797**	-0.093	-0.404**	-0.163*	0.007	-0.064	-0.854**	0.784**
(8)								1	0.953**	-0.150*	-0.481**	-0.121	0.121	-0.003	-0.897**	0.834**
(9)									1	-0.091	-0.494**	-0.104	0.083	-0.003	-0.834**	0.762**
(10)										1	-0.014	0.408**	0.321**	0.379**	0.204**	-0.233**
(11)											1	0.043	-0.01	0.015	0.420**	-0.401**
(12)												1	0.696**	0.981**	0.183*	-0.079
(13)													1	0.770**	-0.027	0.125
(14)														1	0.069	0.04
(15)															1	-0.882**
(16)																1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 4: Stepwise multivariate regression analysis keeping life expectancy as dependent.

Model	Predictor		R^2	B±SE	df	F-value	t-value	P-value
1	Human Development Index		0.830	51.4±1.9	141	683.4	26.1	0.001
2	Human Development Index		0.898	44.6±1.6	141	610.6	26.4	0.001
	Crude Death Rate			-0.8±0.08	141		-9.6	0.001
3	Human Development Index		0.960	15.2±2.2	141	1100.8	6.6	0.001
	Crude Death Rate			-1.6±0.08	141		-21.0	0.001
	Old age dependency ratio			0.7±0.04	141		14.6	0.001
4	Human Development Index		0.963	10.3±2.6	141	882.2	3.8	0.001
	Crude Death Rate			-1.6±0.07	141		-21.2	0.001
	Old age dependency ratio			0.6±0.04	141		13.8	0.001
	Crude Birth Rate			-0.1±0.03	141		-3.1	0.002
After removal of above variables								
1	Infant mortality rate (IMR)		0.727	-0.2±0.01	141	372.5	-19.3	0.001
2	Infant mortality rate (IMR)		0.788	-0.17±0.02	141	258.2	-8.3	0.001
	Young age dependency ratio			-0.18±0.02	141		-6.3	0.001
3	Infant mortality rate (IMR)		0.803	-0.16±0.02	141	187.9	-8.2	0.001
	Young age dependency ratio			-0.19±0.02	141		-6.9	0.001
	Sex ratio of 65+			0.06±0.02	141		3.2	0.001
4	Infant mortality rate (IMR)		0.821	-0.15±0.02	141	157.7	-7.8	0.001
	Young age dependency ratio			-0.41±0.06	141		-6.2	0.001
	Sex ratio of 65+			0.11±0.02	141		4.8	0.001
	Total dependency ratio			0.27±0.07	141		3.6	0.001
5	Infant mortality rate (IMR)		0.843	-0.13±0.01	141	145.7	-7.3	0.001
	Young age dependency ratio			-1.2±0.21	141		-6.0	0.001
	Sex ratio of 65+			0.11±0.02	141		5.2	0.001
	Total dependency ratio			1.1±0.2	141		5.4	0.001
	Aging Index			-0.17±0.04	141		-4.3	0.001
6	Infant mortality rate (IMR)		0.848	-0.13±0.01	141	125.5	-7.3	0.001
	Young age dependency ratio			-1.2±0.21	141		-6.0	0.001
	Sex ratio of 65+			0.11±0.02	141		5.2	0.001
	Total dependency ratio			1.1±0.20	141		5.4	0.001
	Aging Index			-0.17±0.04	141		-4.3	0.001
	Sex ratio at birth			0.41±0.18	141		2.1	0.031
After removal of above variables								
1	Total fertility rate (TFR)		0.821	-6.1±0.35	142	291.2	-17.0	0.001
2	Total fertility rate (TFR)		0.863	-3.7±0.49	142	204.6	-7.6	0.001
	Gender inequality index			-21.8±3.4	142		-6.2	0.001
3	Total fertility rate (TFR)		0.869	-3.6±0.48	142	143.1	-7.6	0.001
	Gender inequality index			-22.5±3.4	142		-6.5	0.001
	Sex ratio (Total population)			0.06±0.02	142		2.4	0.017
4	Total fertility rate (TFR)		0.875	-3.7±0.47	142	113.0	-7.8	0.001
	Gender inequality index			-27.2±3.8	142		-7.0	0.001
	Sex ratio (Total population)			0.56±0.19	142		2.8	0.005
	Sex ratio 15-64 yrs			-0.35±0.14	142		-2.5	0.013
5				±				

				±				

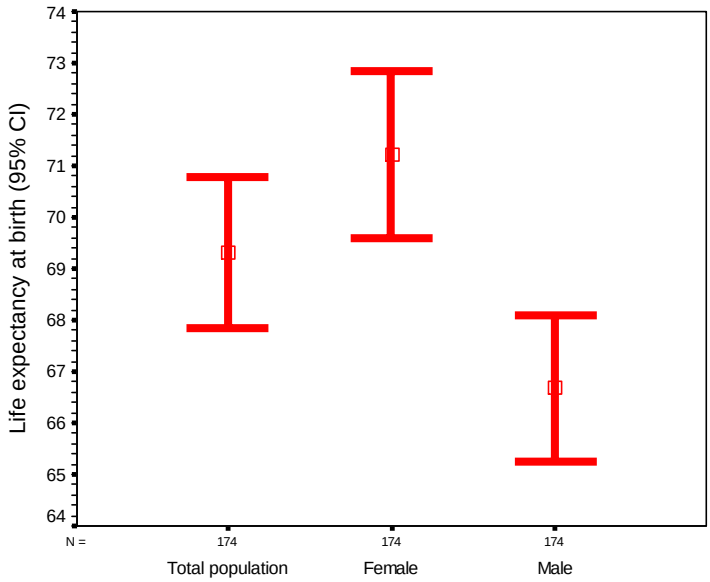

Figure 1: Error bar diagram showing 95th percentile of life expectancy at birth for population of the world. It is apparent that the life expectancy of females are significantly higher than males

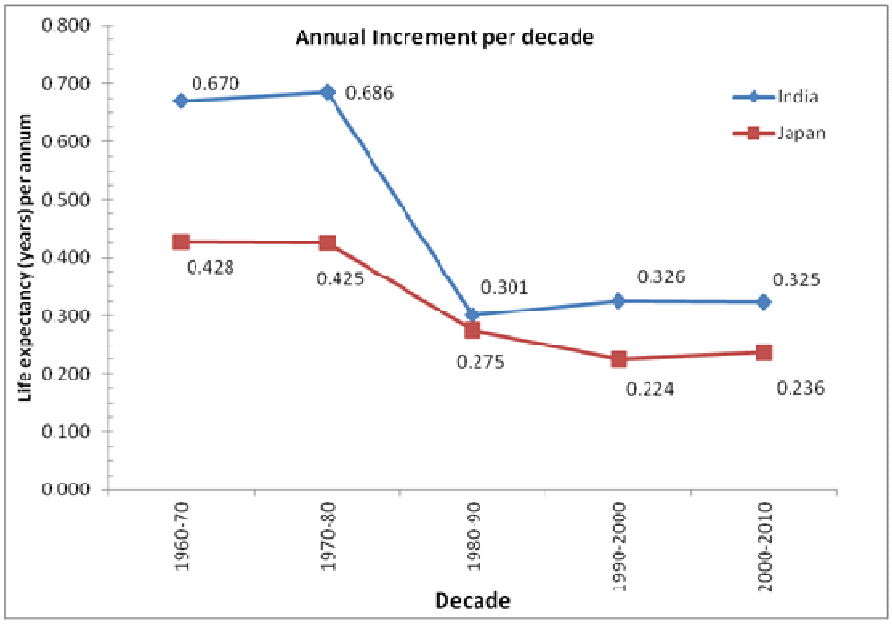

Figure 2: Comparative Annual Increment of life expectancy per decade (1960-2010) in India and Japan

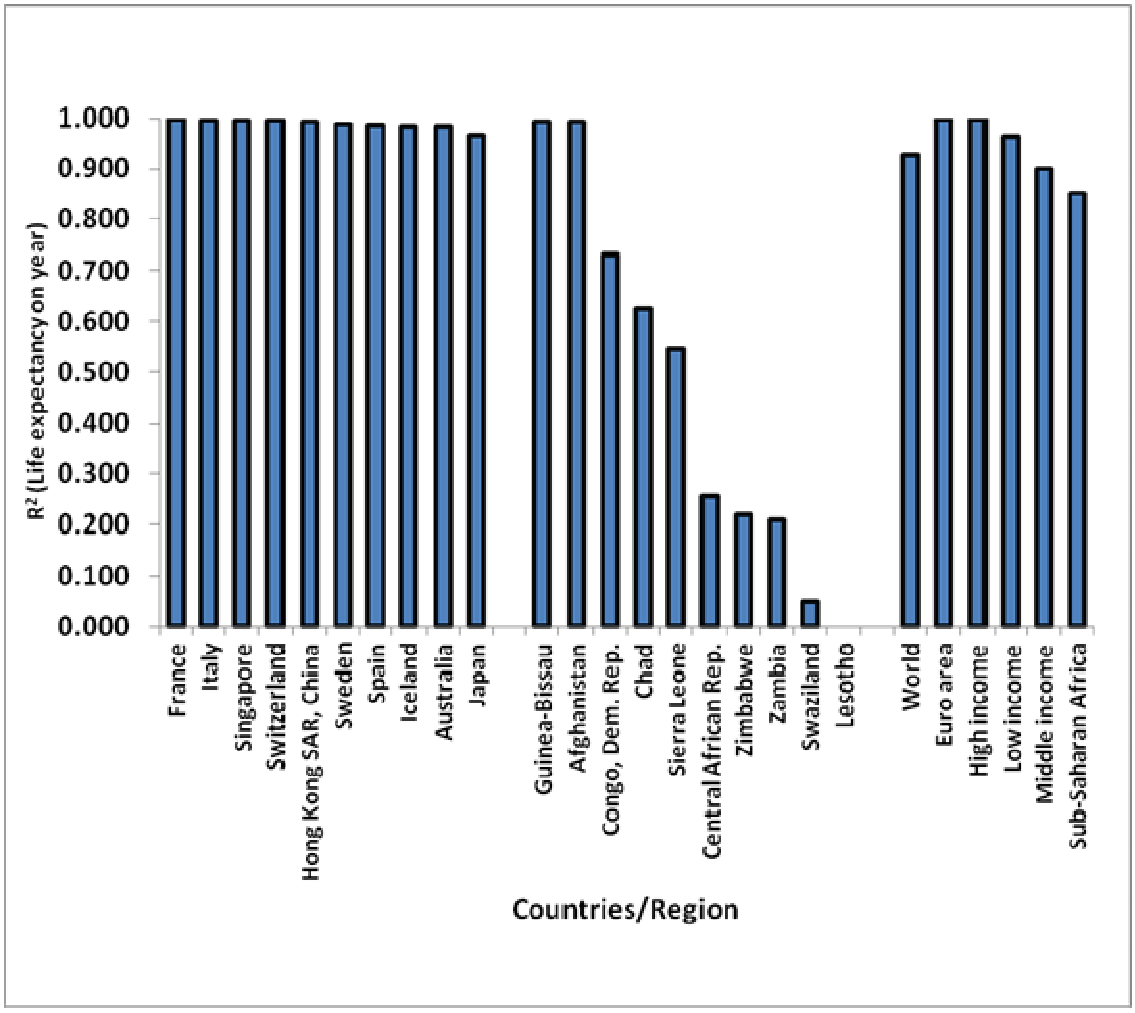

Figure 3: Regression coefficient showing magnitude of increment in life expectancy at birth among top 10 and bottom 10 nations and different regions of the world (R^2 is significant at 1% level for all except Lesotho).

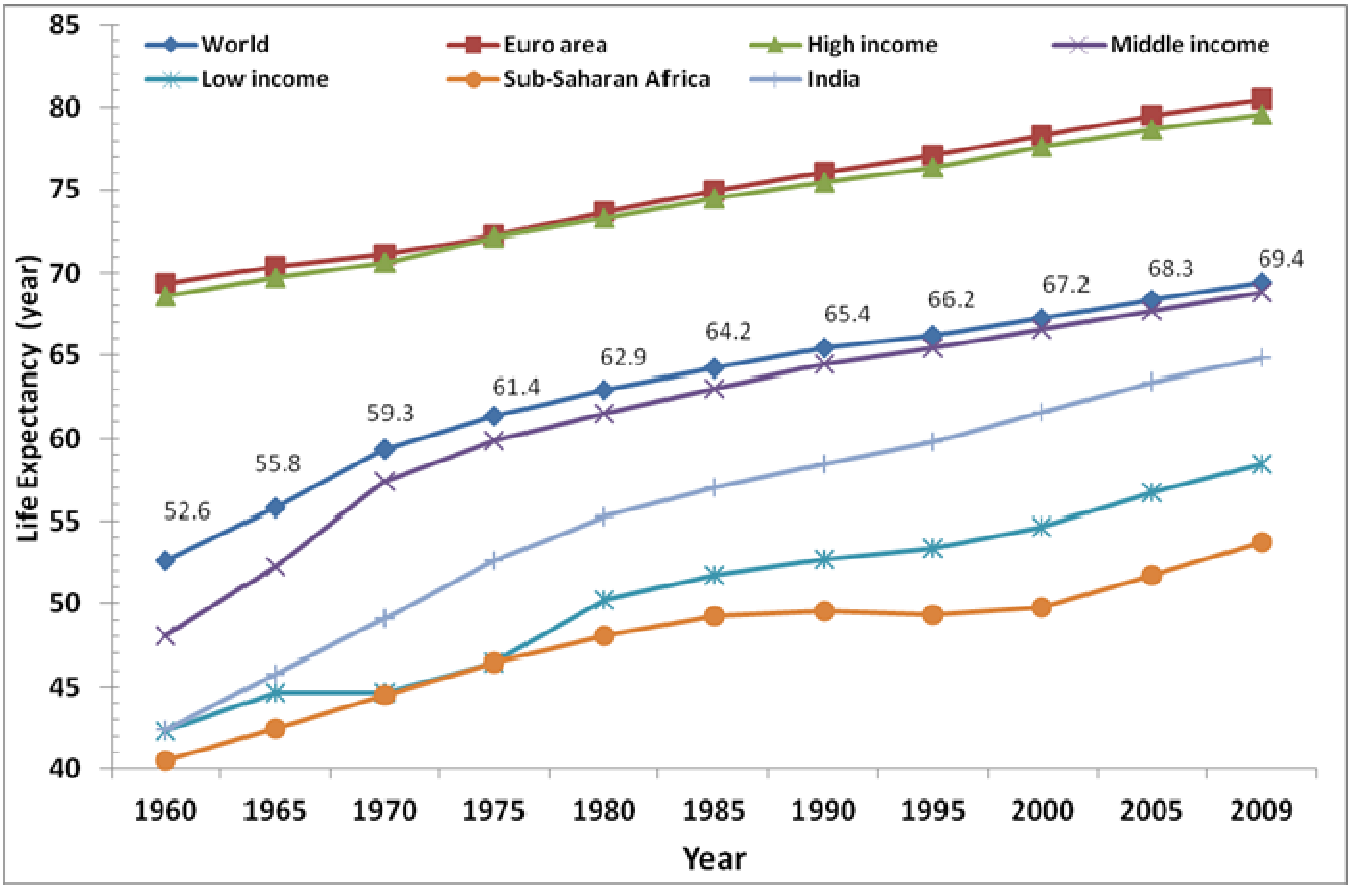

Figure 4: Line graph showing the trend of life expectancy at Birth in the world population and different regions of world including India.