

Factors Determining Morbidity in Kerala

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Abstract

The study analyzes the factors that determine morbidity in Kerala. “Morbidity is a state of affair in which an individual is feeling physical, mental or social sufferings”. Loss of life and morbidity are important components of human welfare. Kerala, in its fourth stage of epidemiological transition, gives a clear picture of a state facing the problem of lifestyle related diseases. Kerala attracts the attention of everyone within its co-existence of high level of morbidity with low levels of mortality and high life expectancy. Morbidity pattern of Kerala underwent major changes because of the ageing of population as a result of the declining birth rate and the migration of young adults to the Gulf and other countries. Socio economic factors such as, ageing, literacy, per capita income, health expenditure, Health Care, IMR and population determines morbidity in Kerala.

The hypothesis of this study is: Morbidity is negatively influenced by health expenditure and literacy and Per capita income is negatively related to morbidity. This study is based on secondary data and period covers from 1991 to 2011. The influence of these factors can be analyzed by using tables and multiple regressions. The study found that morbidity and health expenditure are inversely related. The government’s health expenditure which was increasing trend over the study period has augmented health facilities which have an impact on morbidity.

Key words: health, morbidity, ageing, expenditure

Introduction

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Health is an important determinant of wellbeing. It is positively related to labour productivity and economic efficiency. Therefore, maintaining good health is important for an individual or a household at the micro level and for the society at the macro level. Health status in most developing countries is constrained by poor working and living conditions on the one hand and supply and demand factors on the other.

“GOOD HEALTH = f (nutritious food, pollution free environment, drinking water, mental peace, opportunity for work and recreation, genetic endowment, and use of health services)”.¹

The concept of health, disease and treatment are related to the social structure of the community. Our health is affected not by only unbalanced diet but also by disease, which may be water borne, airborne, or food borne. More than how what a person looks like and how intelligent he or she might be, genes are determining factors whether a person is predisposed to certain illness like specific cancer, heart problems, diabetes, obesity sickle cell anemia and Alzheimer’s diseases.

Kerala which has a low income status in the Indian context has achieved tremendous development in the areas of health status of its population when taken into account the life expectancy at birth, mortality, utilization of health and health transition. The progressive socio economic and Educational reform movements that took place in Kerala have substantially contributed to the overall transformation.

What is Morbidity?

Morbidity is an incidence of ill health. “It is a state of affair in which an individual is feeling physical, mental or social sufferings”.

Morbidity can be calculated as²,

¹A Primer of Health Systems Economics- V Raman kutty, Allied publishers 1999

$$\text{Morbidity} = \frac{\text{Number of ailing persons in the state}}{\text{Total number of population in the state}} \times 1000$$

Morbidity measures are of two fundamental types, self-perceived and observed.

Self-perceived morbidity refers to measures that are perceived and reported by an individual, usually in response to inquiries regarding illness. It depends upon an individual's perception of illness.

Observed morbidity, is assessed through an independent observer employing specific methods that can be repeated with some degree of consistency.

Morbidity Profile of India

Loss of life and morbidity are important components of human welfare. Connections between mortality and morbidity are an area of wider discussions in the present Indian context. The current health scenario in India is often described as “Dismal” or “Disturbing”. Even though the life expectancy of Indian has increased in the last few decades, level of morbidity is still in pathetic condition. Socially advanced states like Kerala, Punjab and West Bengal have lower infant mortality and greater life expectancy for its people, but in contrast have high morbidity rate also contrary to that morbidity rate is low in states like Bihar, Madhya Pradesh and Rajasthan. One of major reasons put forwarded the low level achievement in health in India is the systematic lack of investment by the government, which adversely affects the poor. This may be due to the fact that states which are economically and educationally well off early report their ailments, and will be more vulnerable to life style related diseases.

Morbidity Profile of Kerala

² Soumitra Ghosh. P. Arokiasamy, “Morbidity in India: Trends, Patterns and Differentials”, *Journal of Health Studies*, 2009, pp. 136-148.

Kerala has received wide appreciation for her public involvement to encourage human development and welfare. Kerala which is in the fourth stage of the epidemiological transition proves to be the state where lifestyle related diseases are prevalent. Kerala attracts the attention of everyone within its co-existence of high level of morbidity with low levels of mortality and high life expectancy. Among the rural and urban sectors and among all age groups and gender morbidity rates are highest in Kerala. The morbidity pattern in Kerala underwent major changes because of the ageing of population as a result of the declining birth rate and the migration of young adults to the Gulf and other countries. Human Development Report 2005 for Kerala points to the fact that the issue of high morbidity hinders human development and lead to rise in issues regarding “quality and affordability of health care” (CDS, 2006). Table 1 shows that the past studies related to chronic and acute ailments in Kerala.

Table 1: Morbidity rates in Kerala from different studies

Studies	Year	Acute	Chronic
NSS28th	1974	74.21	63.38
KSSP	1987	206.39	138.02
KSSP	1996	121.86	114.60
NSS52nd	1995-96	141.00	65.00
NCAER	1993	130.00	65.00
Paniker	1999	78	58.60
Krishna swami	2000	119	127
Sample Survey	2004	218.34	155.46

Source: P. Krishna swami, Discussion Paper No. 63, CDS.

Statement of the Problem

Kerala has achieved a lot in the health sector which is visible through a positive trend shown by the health indicators. In recent years the problem of morbidity has evolved as a major threat to the health care sector. The 52nd round of NSS (1995-1996) has found that the combined morbidity rate for acute and chronic ailments for Kerala was 118 per 1000 for rural and 88 per 1000 for urban which higher than the national rate of 55 per 1000 for rural and 54 per 1000 for

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Factors Determining Morbidity in Kerala

urban India. Kerala facing many socio economic factors like Poverty, population, aging, literacy and also inadequate nutrition which caused an increase in the morbidity rates. In Kerala, morbidity rate has been increasing over the years especially for non-communicable diseases. The present study concentrates factors determining morbidity pattern of Kerala.

Objectives of the Study

1. To analyze the factors determining the morbidity pattern of Kerala.

Hypotheses of the Study

1. Morbidity is negatively influenced by health expenditure and literacy.
2. Per capita income is negatively related to morbidity.

Methodology

This study is based on secondary data only. The study period covers from 1991 to 2010. The data were collected from various sources like articles, Hand Book of Kerala, Economics and statistics department of Kerala, National Health Intelligence Reports, RBI hand book of statistics, India stat.com and internet sources. For empirical analysis this study used simple statistical tools and simple econometric tools based on the requirements.

The present study used multiple regressions for analyzing the factors determining morbidity pattern of Kerala.

$$Y = \alpha + \beta_1 HE + \beta_2 IMR + \beta_3 L + \beta_4 OLD + \beta_5 P + \beta_6 HF + \varepsilon$$

Where,

Y = Morbidity, HE = Health Expenditure, IMR = Infant Mortality Rate, L = Literacy, OLD = Old Age Dependency Ratio, P = Population, HF = Health Care Facilities

α = intercept term, and $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are the slope of the coefficients.

Scope of the Study

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Factors Determining Morbidity in Kerala

The Kerala model, based on the development experience of the southern Indian state of Kerala, refers to the state's achievement of significant improvements in material conditions of living, reflected in indicators of social development that are comparable to that of many developed countries even though the state's per capita income is low in comparison. Achievements such as low levels of infant mortality and population growth, and high levels of literacy and life expectancy, along with the factors responsible for such achievements have been considered the constituting elements of the Kerala model. Kerala is one of the first Indian states to relax narcotics regulations to permit use of morphine by palliative care providers. Kerala model of Development is followed by many developed countries.

Review of Literature

Krishnasami. P (2004) opined that Kerala holds the highest position in morbidity in comparison with all other Indian states. That is, morbidity rate for acute and chronic ailment for Kerala as 118 per 1000 for rural and 88 per 1000 for urban as against 55 and 54 for all India. The morbidity pattern of Kerala has undergone changes mainly because of the aging of its people as a result of the declining birth rate and migration of young adults to gulf and other countries. The study obtained illness rates which were lower than the Kerala Sasthra Sahithya Parishad (KSSP) Rates of 1996, 48.04% of the diseases came from fever nonspecific diseases. Acute morbidity is lower among males than females under the age group of 15-44.

Suryanarayana M.H. (2008) examined the economic profiles of morbidity by disease in Kerala and all-India. Morbidity rates, in general, are more for the rich than for the poor. There could be factors other than income, which influence the morbidity rates as revealed by horizontal pseudo-Lorenz curves for distribution of reported total morbidity across households. This study found that diabetes mellitus had elasticity greater than one for rural and urban all-India; heart disease and hypertension too have elasticities greater than one only for rural all-India.

Arokiasamy and Somitra (2009) present evidence on levels, differentials and patterns of morbidity prevalence in selected states of India. It examined the existing inequalities in non-fatal

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Nimisha P., M.A., M.Phil., B.Ed.

Factors Determining Morbidity in Kerala

health outcomes between different subsections of Indian population. The study found that gender inequality was observed in morbidity prevalence with females had lower risk of ill health than males.

Navaneetham, Kabir and Krishna Kumar (2009) examined determinant levels and pattern of morbidity in Kerala. According to them Kerala seems to have entered into the fourth stage of the epidemiological transition and studies have pointed out that life style related diseases are on the rise in Kerala. Therefore age pattern of morbidity seems to have undergone changes in the state. This study found that females were greater risk of morbidity than males.

The studies reviewed, therefore, indicate varied relationship between morbidity, morbidity and health status among people.

Factors Determining Morbidity in Kerala

Features like age, education, income, health care facilities, caste, religion, and socio economic status as well as environmental and community level of the individual and the households regulates the risk of morbidity in Kerala. In addition, low level of income low nutritional status and medical care also can viable to morbidity. There are many factors that determine the incidence of Morbidity in Kerala, such as life expectancy, infant mortality, per capita income, education, ageing, health care infrastructure and health expenditure. The influence of these factors can be analyzed by using following tables and multiple regressions.

Table 2: factors determining morbidity in Kerala

Year	Morbidity³	Literacy*	IMR	Old age*	HE	Health care facilities	Percapit a Income	Life Expectancy
1991	422	89.81	17	8.8	23180.45	976	12855	71.4
1992	450	89.92	17	9.1	23922.9	985	12933	71.8
1993	207	90.03	13	9.6	29845.13	990	13684	73.25
1994	176	90.14	16	9.8	35661.43	1007	14895	71.20

³ Morbidity is taking proxy value of death rate of communicable diseases from 1992 to 2010. It is the sum of eleven communicable diseases in Kerala.

1995	163	90.25	15	10.1	41787.82	1036	16043	71.25
1996	146	90.36	14	10.3	45442.56	1051	16547	71.65
1997	210	90.47	12	10.6	53758.36	1057	17063	72.05
1998	228	90.58	16	10.8	57618.22	1064	17287	72.20
1999	442	90.69	14	11.1	73055.57	1064	18321	72.55
2000	965	90.80	21	10.8	70431.56	1048	19461	73.15
2001	616	90.90	11	10.9	75858.36	1048	19809	73.35
2002	321	91.21	10	11.1	71214.24	1048	20659	73.45
2003	452	91.52	13	11.9	80570.21	1043	21944	73.55
2004	329	91.83	12	11.3	81332.51	1039	23159	73.80
2005	278	92.14	14	11.4	87779.9	1017	25122	73.85
2006	359	92.45	15	11.5	100991.8	1016	27714	73.75
2007	253	92.77	13	11.6	113631.7	1123	30476	73.45
2008	293	93.08	12	11.7	139464.7	1173	33372	73.80
2009	233	93.39	12	11.8	150198.3	1169	35457	73.40
2010	271	93.70	11	11.9	182316.7	1174	37234	73.75

Source: Indiatat.com, Handbook of RBI, Health intelligence report various years, hand book of RBI.

IMR- Infant Mortality, HE- Health Expenditure, *Estimated data from Census 1991, 2001 and 2011.

The table 2 shows the factors determining morbidity in Kerala. Morbidity is depending upon many factors such as old age, health care facilities, and health expenditure of the government, literacy rate, Infant mortality and total population. Using these variables the researcher has used multiple regression for analyzing the variable mostly determine in the morbidity.

Morbidity= f (Health Expenditure, Infant Mortality Rate, Literacy, Old age, Population, Health care facilities)

$$Y = \alpha + \beta_1 HE + \beta_2 IMR + \beta_3 L + \beta_4 OLD + \beta_5 P + \beta_6 HF + \varepsilon \text{ ----- (equation 12)}$$

(t stat) (-2.42) (2.24) (-4.43) (2.23) (2.62) (-1.65)

$$R^2 = 0.74$$

Where,

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Factors Determining Morbidity in Kerala

Y = Morbidity, HE = Health Expenditure, IMR = Infant Mortality Rate, L = Literacy, OLD = old age dependency ratio, P = Population, HF = Health Care Facilities, α = intercept term

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are the slope of the coefficients

The estimated equation is as follows:

$$Y = 48171.28 - 0.015608HE + 28.8687IMR - 618.7306L + 354.5923OLD + 0.0004P - 2.24.81HF + \varepsilon$$

The function fitted is good since the coefficient of determination is high at 0.74. the value of R^2 shows that 74% of variation in morbidity rate is determined by the factors included, namely health expenditure, Infant Mortality Rate, Old age dependency ratio, population, and health care facilities. Further the estimated co-efficient expected signs with high significance.

The co-efficient representing expenditure as expected, is negative and significant. This implies negative relationship between health expenditure and morbidity rate. Higher the health expenditure, lower is infant mortality. This is but natural. Higher health expenditure creates health facilities, which tends to prevent appearance of diseases and helps in curing of the diseases.

The co-efficient representing infant mortality rate is also positive and significant. Higher IMR and morbidity rate possess a two way causation process. Morbidity induces in the pregnant mothers which communicate to children who become casualty in the process. Higher IMR also causes high morbidity. The co-efficient relating to literacy, as expected is negative, which implies higher the literacy lesser is the morbidity rate. Higher literacy creates greater health consciousness about diseases and consequences. Therefore, people avoid practices which contribute to disease.

The co-efficient representing old age is positive which implies that as the person becomes older and older he becomes susceptible to disease and hence high morbidity. The co-efficient of population is also positive which implies higher morbidity rate. Higher population restricts availability of food, sanitation and health facilities, which again lead to more disease or reduction in diseases becomes difficult when the population is more. The co-efficient representing health

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Factors Determining Morbidity in Kerala

facilities is negative therefore lower the mortality rate. Health facilities tends to cure disease of the people and hence the negative relation.

The regression results are shown in the following table.

Dependent Variable: M

Method: Least Squares

Date: 09/28/11 Time: 08:23

Sample (adjusted): 1992 2010

Included observations: 19 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	48171.28	14559.33	3.308620	0.0062
HE	-0.015608	0.006447	-2.421208	0.0322
IMR	28.86874	12.84690	2.247137	0.0442
L	-618.7306	151.8782	-4.073862	0.0015
OLD	354.5923	158.8910	2.231670	0.0455
P	0.000420	0.000160	2.622964	0.0223
HF	-2.248191	1.360254	-1.652772	0.1243
R-squared	0.744159	Mean dependent var	347.5263	
Adjusted R-squared	0.616238	S.D. dependent var	192.5220	
S.E. of regression	119.2646	Akaike info criterion	12.67788	
Sum squared resid	170688.4	Schwarz criterion	13.02583	
Log likelihood	-113.4398	Hannan-Quinn criter.	12.73676	
F-statistic	5.817341	Durbin-Watson stat	1.341523	
Prob(F-statistic)	0.004794			

Other Factors Determining Morbidity

Morbidity is also determined by other factors such as per capita income of the people, life expectancy and health care facilities. When income of the people increases, people have high health status which leads to low morbidity. It shows that every year the income of the people is increasing and morbidity shows decreasing trend. Life expectancy and morbidity are negatively related. That is, when life expectancy of the people increases, then morbidity decreases. In 1991,

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C. Subburaman, Ph.D. (Ed.) *Health and Medical Care Services: Claims on National Resources*

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Factors Determining Morbidity in Kerala

Kerala's life expectancy was 71.7 and it increased to 73.4 in 2010. The health care facilities and morbidity are negatively correlated. When health care facilities are increasing, morbidity will decrease.

The regression results are shown in the following table.

Morbidity= f (Health facilities, Life expectance, per capita Income)

Dependent Variable: M

Method: Least Squares

Date: 10/04/11 Time: 11:44

Sample: 1992 2010

Included observations: 19

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5294.018	7405.467	-0.714880	0.4857
HF	0.493783	1.614416	0.305859	0.7639
LE	73.91979	92.41746	0.799847	0.4363
P	-0.012619	0.020390	-0.618890	0.5453
R-squared	0.042403	Mean dependent var	347.5263	
Adjusted R-squared	-0.149117	S.D. dependent var	192.5220	
S.E. of regression	206.3775	Akaike info criterion	13.68196	
Sum squared resid	638875.2	Schwarz criterion	13.88078	
Log likelihood	-125.9786	Hannan-Quinn criter.	13.71560	
F-statistic	0.221401	Durbin-Watson stat	1.119068	
Prob (F-statistic)	0.880021			

It may be seen from the table that R^2 value and co-efficient values are not significant although per capita income and high life expectancy bear positive relationship with morbidity.

The first hypothesis is that morbidity is negatively influenced by health expenditure and literacy level of the people. The multiple regression results show negative co-efficient for health expenditure and literacy level suggesting the fact that morbidity is negatively related to these factors. Therefore, the second hypothesis is also proved to be correct.

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Factors Determining Morbidity in Kerala

The second hypothesis is that per capita income negatively determines the morbidity is not borne out by the findings of the study. The positive coefficient representing per capita income indicates with higher per capita income the diseases also increase. This may be proved in the case of non-communicable diseases like cancer, heart diseases, blood pressure, diabetics which are in fact described as diseases of affluence.

Conclusion

Kerala is well known for its achievements in the field of social development like education, health, family planning etc. low birth rate, death rate always with higher life expectancy, lowest infant mortality and low levels of disability are the characteristics of Kerala achieve The morbidity trends to decrease because of improvement in prevention and treatment of illness, but trends to increase with increased perception due to better health awareness.

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