

## Testing the Multi-Dimensional Nature of Mortality Rates in Emerging Economies

Dr. Nagaraju Patha<sup>1</sup>

<sup>1</sup>(Associate Professor, Centre for Economic and Social Studies (CESS), Hyderabad, Telangana, India)  
Corresponding Author: Dr. Nagaraju Patha

---

**ABSTRACT:** With the constant changes in the demographic features in all the major countries the issue of the health outcomes is to be questioned? A long research gap has been arrived in the literature in studying the impact of the various indicators on the mortality rates and other health related outcomes. Hence, I take up the panel of developing countries and testify the impact of the unemployment, sanitary conditions and health expenditure. The study finds a strong relationship among the variables and also draws the policy implications of promoting the health expenditure of the government. The study also highlights the issues of the growing costs of health expenditure. The present study has taken the panel data of India, Afghanistan, Bhutan, Bangladesh, Maldives, Nepal and Srilanka for the time period of 2003 to 2014.

**KEYWORDS** -Mortality rates, Unemployment, Sanitary conditions and Health expenditure.

---

Date of Submission: 26-02-2018

Date of acceptance: 13-03-2018

---

### I. INTRODUCTION

With the drastic changes in the lifestyles of the people in all the economies in the recent past a question arises on the improvement in the quality of life of the people. The drastic changes in the expenditure levels of the people on various aspects can be seen in the recent past. And when compared at a global level in the developed and developing countries a pattern can be observed as the expenditure levels in the developed countries is bit high than the developing or less developed countries and these patterns also disclose the possible doubt that whether development is the root cause of the expenditure of the people on their health and related aspects. It is also seen along with the growth process the even distribution of the income levels that is the inequalities also play an important role in up building the people levels of expenditure in improving the consumption patterns. It is already known that the higher income levels will also have impact on the health related outcomes by inducing the spending pattern of the people. In the context of the developing countries the role of the government will be on prior to tackle these issues as it is difficult for the people to meet the expenses and it's termed out of pocket expenditure where people meet out their expenses on health related problems apart from their budget. The observed mortality rates of the major developing countries also show that they moreover remained same in the recent past as in comparison to the health expenditure of these respective countries these will remind us the impact of the health expenditure which they have spent. The role of the income levels of the people is to be reminded at this stage apart from the income levels the level of employment opportunities the government provide to the people and their education attainment can also be viewed as a major factor in this issue. As we can see the unemployment, income levels, the standard of living and the expenditure on the health issues and final motive mortality rates are mutually interlinked. Hence in analysing the mortality rates one cannot assess it only on the basis of the health expenditure they made. The role of institutional factors and the policy of the government towards the people of the country can also cause an impact on the total mortality rates. Improvised medical facilities and also the major issue of the sanitation problems will also play a role in controlling the mortality rates.

A century back the high prevalence of the mortality rates can be seen in all the countries this can be the reason of the less advancement in the medical facilities and the limited role of the government and also the absence of the awareness of the sanitation facilities to the people. These sanitation facilities which also come under the sustainable development goals of the United Nations framework which are necessary for to achieve the sustainable development for all. The developing and under developed countries mainly the people in the slums and rural parts are turning to be the pray to the evil of the diseases which are caused because of the poor facilities of the sanitation and also the drinking water in mere conditions it is also found that both the sanitation or the drainage pipes and the drinking water facilities pass through the same area leaving the water to be contaminated. It will result in the spreading of the water borne diseases and also making people to be less immune to the diseases such as typhoid, malaria and also cholera will also spread by these factors. When the

people in these areas will increase that is the growth rate in the population increases it will further worsen the situation the urban slums are more prone to this type of problems. Even the urban population grows as the inequality levels have risen up very strongly in all the countries the urban poor are also increasing at the same rate leaving a section of the society backwards.

## II. LITERATURE REVIEW

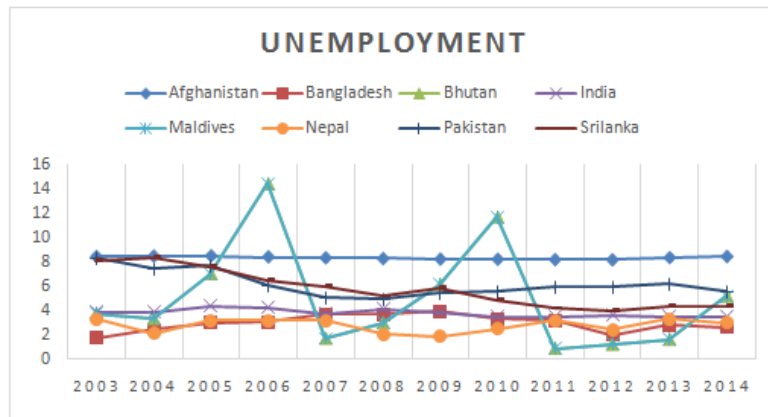
Millions of people do die every year all over the world for lack of drinking water, lack of health facilities, and proper care during illness. The rural area people who are far away from the coverage of the facilities provided by the government in most of the developing countries. In these countries many of the deaths are related to the health and hygiene issues which are not even tackled by the governments in most unreached areas the illnesses were mostly preventable because of the existing conditions. Lack of sanitation is the major problem in many of the countries. Improvised access to the water and also the sanitation facilities can be called as the basic need in the present world hence World Health Organization which also magnifies these problems and helps in controlling the problems of the countries by funding them. Over all nearly 2.6 billion people are not availing this service of proper sanitation and access to drinking water. The decade of water 2005-15. In an effort to bring global attention and resources to the problem, international organizations have created several water and sanitation initiatives. The UN, as part of its Millennium Development Goals (MDGs), has set a target of halving the proportion of people without access to safe drinking water and basic sanitation by 2015. WHO has declared 2005–2015 the decade of water, with the goal of establishing the framework to eventually provide full access to water supply and sanitation for all people? In 2003, WHO also established the Household Water Treatment and Safe Storage Network, a consortium of nearly 100 organizations working throughout developing nations? The aims of the network include fostering collaboration, generating research, and exploring measures to scale up pilot projects. In another major initiative, Water Aid has helped foster citizen-action groups to improve services as part of a global grassroots movement in water and sanitation. In most countries, the proportion of people with access to improved water and sanitation increased from 1990 to 2002. Linking to the overall outcomes of the health expenses to the income levels and the development generally points the positive relations as the income levels increases which also show an increase in the inequality levels. It can be concluded easily that the health care expenditure is the luxury good for the people who are below the poverty line who cannot even meet their expenses. When the government role increases in taking care and who can meet the public health care expenses one such study can be found by Livio Di Matteo and Rosanna Di Matteo (1997) who worked on the Canadian provincial government health expenditures they have the data from the period of 196-1991 using the pooled time series cross section regression analysis and the age group is over 65. The outcome of the research shows that as the governments transfers i.e. expenditure on the public health care increases then the health care expenditure made by the people decreases the health care expenditure is not a luxury good provided that the government financing increases. SeherNurSülkü and Asena Caner (2010) puts out another important outcome in the case of the turkey where the authors examined the data for the period of 1984-2005 by employing the Johansen multivariate cointegration technique and the results which the authors have found is in contrast to the other findings that the income elasticity is almost less than one and also a gradual increase of 10% increase in the gross domestic product in the case of the turkey it will result in the increase of 8.7% in the per capita health expenditure. The authors also claim that the elasticity in the private health expenditure is to be greater than 1 which clearly depicts that the health expenditure is a luxury good and in these two instances and also supported by many others we can highlight the role of the government in increasing the health care expenditures towards the people. In many of the countries such as the United States of America which have spent nearly 21% of its GDP which amounts to \$3.9 trillion in the year 2016 Even though health care may seem to be costly in these countries but when compared to the developing countries like India where the expenditure of the government may be comparatively low as the governments cannot afford the heavy burden and it will unleash the debate between the growth and development. Osler et al (2003) have studied the Danish area by relating the mortality rates and the unemployment rates in the area with a sample of 15980 men and women age range of 20-67 years from the pooled series of Denmark and Copenhagen for the time period of January 1981 to December 1998. The study claims the equal impact on both the men and women as their unemployment increases and their prospects of mortality increases. This clearly explains that the increase in the mortality risk among the individuals if they are unemployed as the income resources will be absent to use for the health reasons hence unemployment can be regarded as the major indicator of increasing the mortality risk. Hewartz and Theilin (2003) who shows that the recent increase in the health expenditure in the western countries and have taken the OECD countries data for the period of 1961-79 and shows that the effects of all the countries are different and the health expenditure is not same in all the countries and they do vary the country specific importance is being shown their study.

III. DATA AND METHODOLOGY

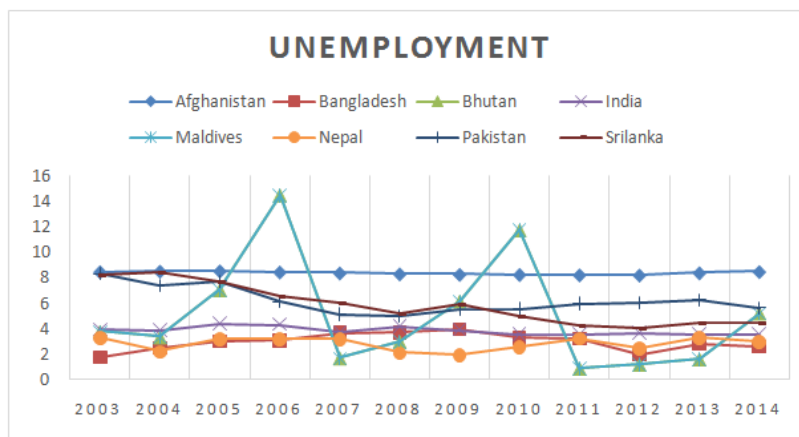
The present study tries to find out the impact of Health expenditure, Improved Sanitation facilities, and Unemployment on the Mortality rates. The present study is focussed on the countries i.e,India, Afghanistan, Bhutan, Bangladesh, Maldives, Nepal and Srilanka a panel data study from the time period of 2003 to 2014 and all the data variables are taken from the world development indicators of the world bank. We employ unit root tests to test the stationarity of the data, Pedroni panel cointegration tests to find the long run relationship and the granger causality to find the direction of causality.

A constant decrease in the mortality rates of all the countries can be seen from the above figure except in the case Maldives where high fluctuations can be viewed from the figure in the 2006 and in 2010 a high increase in the mortality rates can be seen. In the case of Nepal and which has a comparatively lower average fluctuation in the mortality rates. In the case of Afghanistan, the higher rates of mortality rates can be seen in all the periods. Srilanka shows a drastic fall in 2009 in the case of India also a series of increase can be seen from 2004-06 and also from 2007-10. The case of Pakistan which is comparatively higher than India, Bangladesh and Nepal

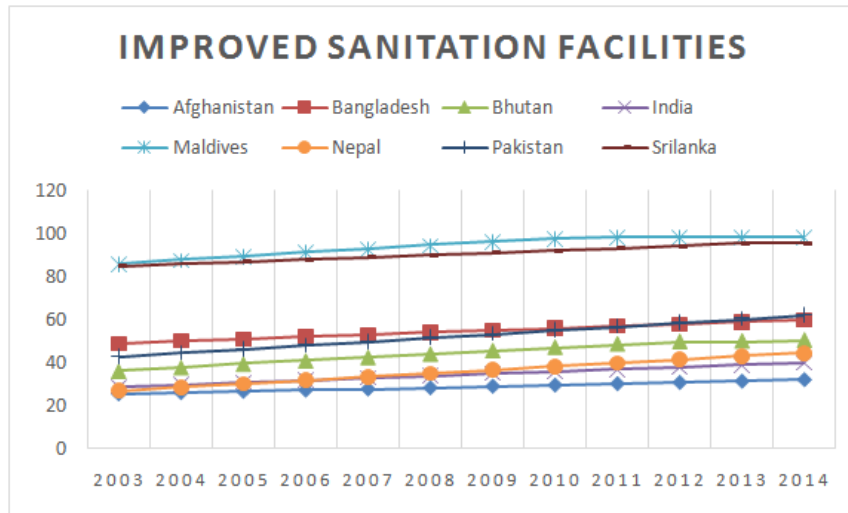
It is generally believed that the health expenditure is positively related to that the growth of the economy. A higher standard of living and development will induce the people to spend and take care of their living and also the expenditure on the health services will increase. A higher consumption pattern also will be seen in the developed countries. In the above figure Srilanka stands above all the countries in the case of health expenditure whereas Bangladesh is lower than all the countries. Bhutan which highly fluctuates is higher than Srilanka from the period of 2006-2011 but later falls down. After Srilanka and Bhutan India occupies the third place. Followed by Afghanistan, Nepal and Pakistan.



In the case of unemployment rates the Maldives too fluctuates highly. Afghanistan has the highest unemployment rate whereas followed by Pakistan, and Srilanka. Bangladesh has comparatively lower unemployment rates than all the countries India comes in the fourth place where as followed by Bangladesh and Nepal.



In the case of sanitation as we have discussed earlier and its importance Maldives ranks above all in providing the sanitation facilities and next followed by Srilanka followed by Bangladesh, Pakistan, Bhutan, Nepal, India and Afghanistan.



In the case of urban population growth which is just viewed as an indicator of economic growth with the background that as the urban population grows it also increases the people covered by the good facilities of medical care, sanitation and also less unemployment. Excluding the case of Maldives fluctuation, the highest urban population by 2014 is in Afghanistan and lastly by India even though Bhutan has higher urban population, it decreases gradually and at the end equalises with Pakistan and Nepal. With this we go for the methodology.

I. UNIT ROOT TEST

Variable	Statistics	At level		At First Difference		Inference
		I	I&T	I	I&T	
LnHealth	IPS	-0.08968	0.35555	-4.03850*	-2.96166*	I (1)
	ADF	8.07954	7.17251	36.6388*	26.7666*	I (1)
LnMortality	IPS	2.02765	-1.14926	-3.82324*	-2.37453**	I (1)
	ADF	3.6165	13.7854	33.0083*	21.8796**	I (1)
LnUnemployment	IPS	1.18866	-0.10048	-6.10438*	-4.99252*	I (1)
	ADF	4.41623	12.1735	51.5698*	39.9833*	I (1)
LnSanitaiton	IPS	4.89907	0.26412	-2.53992**	-2.54699*	I (1)
	ADF	0.97218	8.1283	24.7727**	22.8038**	I (1)

The above employed tests of Im Pesaran and shin and the augmented dickey fuller tests show that the variables reject the null hypothesis of unit root and they are found to be stationary. Where \*, \*\*, \*\*\* refers to 1, 5 and 10% level of confidence interval.

We then proceed to the Pedroni cointegration test. Which is based on the following equation?

The null hypothesis

Alternative hypothesis: common AR coeffs. (within-dimension)					
	Statistic	Prob.	Weighted Statistic	Prob.	
Panel v-Statistic	-3.511973	0.9998	0.012970	0.4948	
Panel rho-Statistic	1.056932	0.8547	1.370141	0.9147	
Panel PP-Statistic	-22.7878	0.0000	-6.305316	0.0000	
Panel ADF-Statistic	-9.955637	0.0000	-2.694816	0.0035	
Alternative hypothesis: individual AR coeffs. (between-dimension)					
	Statistic	Prob.			
Group rho-Statistic	2.726858	0.9968			
Group PP-Statistic	-4.391928	0.0000			
Group ADF-Statistic	-2.456622	0.0070			
Cross section specific results					
Phillips-Peron results (non-parametric)					
Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
Afghanistan	0.229	1.87E-06	1.66E-06	2	11
Bangladesh	0.081	3.87E-06	3.87E-06	0	11
Bhutan	0.024	1.61E-06	1.17E-06	3	11
India	-0.22	5.37E-07	7.24E-07	1	10
Maldives	-0.233	0.000601	0.000405	3	11
Nepal	-0.426	9.96E-06	8.27E-06	2	11
Pakistan	0.017	7.93E-06	8.02E-06	1	11
Sri Lanka	-0.484	0.016638	0.00361	10	11
Augmented Dickey-Fuller results (parametric)					
Cross ID	AR(1)	Variance	Lag	Max lag	Obs
Afghanistan	0.229	1.87E-06	0	1	11
Bangladesh	0.081	3.87E-06	0	1	11
Bhutan	0.024	1.61E-06	0	1	11
India	-0.22	5.37E-07	0	0	10
Maldives	-0.233	0.000601	0	1	11
Nepal	-0.966	7.86E-06	1	1	10
Pakistan	0.017	7.93E-06	0	1	11
Sri Lanka	-0.809	0.005418	1	1	10

The above table shows that the existence of a long run relationship among the selected variables and 6 out of 11 cases the null hypothesis of no cointegration is rejected and hence we strongly claim that mortality is being affected by health expenditure, unemployment, and improved sanitation facilities. With these we proceed to the causality tests in order to find the direction of causality.

## II. GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests			
Sample: 2003 2014			
Lags: 4			
	Obs	F-Statistic	Prob.
LOGHEALTH_EXPENDITURE does not Granger Cause LOGMORTALITY_RATE	64	1.39503	0.248
LOGMORTALITY_RATE does not Granger Cause LOGHEALTH_EXPENDITURE		0.63175	0.642
LOGIMPROVED_SANITATION_FACI does not Granger Cause LOGMORTALITY_RATE	64	0.83677	0.5079
LOGMORTALITY_RATE does not Granger Cause LOGIMPROVED_SANITATION_FACI		1.25741	0.2981
LOGUNEMPLOYMENT does not Granger Cause LOGMORTALITY_RATE	64	1.03957	0.3954
LOGMORTALITY_RATE does not Granger Cause LOGUNEMPLOYMENT		5.18421	0.0013
LOGIMPROVED_SANITATION_FACI does not Granger Cause LOGHEALTH_EXPENDITURE	64	2.70523	0.0395
LOGHEALTH_EXPENDITURE does not Granger Cause LOGIMPROVED_SANITATION_FACI		2.23083	0.0775
LOGUNEMPLOYMENT does not Granger Cause LOGHEALTH_EXPENDITURE	64	0.60200	0.6628
LOGHEALTH_EXPENDITURE does not Granger Cause LOGUNEMPLOYMENT		6.77005	0.0002
UNEMPLOYMENT does not Granger Cause LOGIMPROVED_SANITATION_FACI	64	1.05077	0.3896
LOGIMPROVED_SANITATION_FACI does not Granger Cause LOGUNEMPLOYMENT		11.5773	7.00E-07

From the above table we can see the mortality rate is causing unemployment, and a direction of causality from sanitation to health expenditure, and uni-directional causality from health expenditure to unemployment and also from sanitation to unemployment.

#### **IV. CONCLUSION**

Hence we conclude that mortality is being affected by health expenditure, unemployment, and improved sanitation facilities and hence it is recommended that the importance should be recognized to a greater extent and also the facilities should also be extended to the rural unreached poor and improving the employment conditions to the poor by providing them the employment opportunities by this we step towards achieving an equalitarian society. The rural poor and the urban slums should also be focussed and to be improved to a greater degree of coverage under the schemes.

#### **REFERENCES**

- [1]. Di Matteo, L., & Di Matteo, R. (1998). Evidence on the determinants of Canadian provincial government health expenditures: 1965–1991. *Journal of health economics*, 17(2), 211-228.
- [2]. Sülkü, S. N., & Caner, A. (2011). Health care expenditures and gross domestic product: the Turkish case. *The European Journal of Health Economics*, 12(1), 29-38.
- [3]. Osler, M., Christensen, U., Lund, R., Gamborg, M., Godtfredsen, N., & Prescott, E. (2003). High local unemployment and increased mortality in Danish adults; results from a prospective multilevel study. *Occupational and Environmental Medicine*, 60(11), e16-e16.
- [4]. Herwartz, H., & Theilen, B. (2003). The determinants of health care expenditure: testing pooling restrictions in small samples. *Health Economics*, 12(2), 113-124.

International Journal of Business and Management Invention (IJBMI) is UGC approved  
Journal with Sl. No. 4485, Journal no. 46889.

Dr. Nagaraju Patha. “Testing the Multi-Dimensional Nature of Mortality Rates in Emerging Economies” International Journal of Business and Management Invention (IJBMI) , vol. 07, no. 03, 2018, pp. 45–50.